

Vol 51 No 4 August 1987



chemistry

in new zealand



SEM
TEM
NMR
IR
AA
UV-VIS
FLUORO

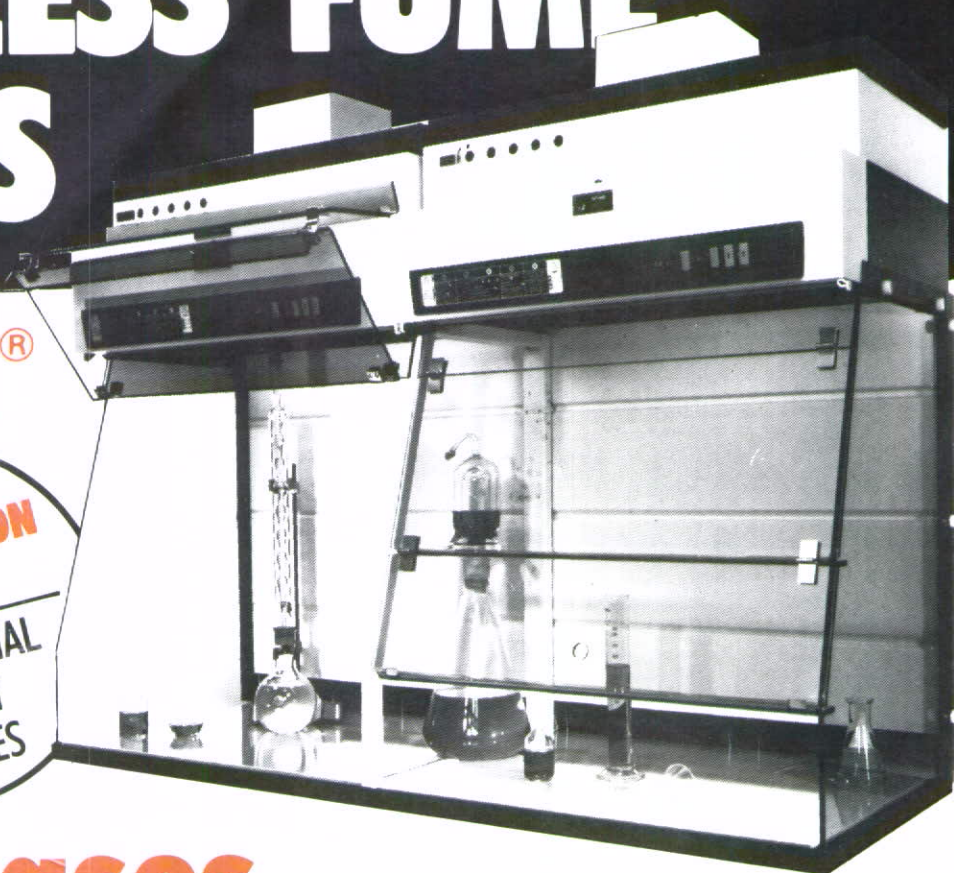
Hitachi Scientific Instruments

ALPHATECH

DUCTLESS FUME HOODS

captair®

**NO
INSTALLATION
COSTS**
OPERATIONAL
WITHIN
MINUTES



Toxic gases eliminated by filtration

The surprising efficiency of this ductless portable fume hood is based on the total filtration of toxic substances which we have mastered for the past 15 years. Besides protecting people and purifying the air, a Captair also improves laboratory activity by very easy utilisation and exceptional mobility. 20,000 Captairs are in service around the world and not only in the most prominent laboratories.

ECONOMICAL

The Captair assembles in just 15 minutes, no ductwork installation or expensive labour required. Saves energy too, recirculates heated/cooled air.

EFFICIENT

The Captair's specially designed filtration system traps toxic fumes and vapours with 99.9% efficiency, protects you from harmful pollutants and odours.



Exclusive distributors for Captair:

Kempthorne Medical Supplies Ltd

AUCKLAND: P.O. Box 1234. Ph. 775-289

WELLINGTON: P.O. Box 16-061. Ph. 850-299

CHRISTCHURCH: P.O. Box 22-286. Ph. 792-050

DUNEDIN: P.O. Box 233. Ph. 771-065



chemistry

in new zealand

Vol 51 No 4 August 1987

Editor: Bruce Graham, c/-
Dept. of Health, 2 Edenvale
Rd, Mt Eden, Auckland.

Branch Editors:

Auckland: Dr Roger Whiting,
Auckland Technical Institute,
Private Bag, Auckland.

Waikato: Dr Max Sutton,
Ruakura Soil and Plant
Research Station, Private
Bag, Hamilton.

Manawatu: Dr Cecil Johnson,
Applied Biochemistry
Division, Private Bag,
Palmerston North.

Wellington: Dr Lawrence
Porter, Chemistry Division,
DSIR, Private Bag, Petone.

Canterbury: Dr Doug Rankin,
Wool Research Organisation,
Private Bag, Christchurch.

Otago: Dr Jim McQuillan,
Chemistry Department,
University of Otago, P.O. Box
56, Dunedin.

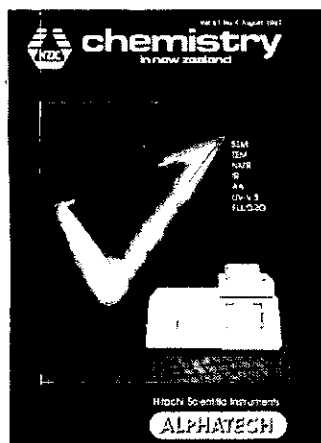
Published on behalf of the
New Zealand Institute of
Chemistry (Inc.), P.O. Box 29-
183, Christchurch. President:
Dr Brian Halton, Hon. Gen.
Secretary Dr John Rogers,
Registrar Denis Hogan.

Included with this issue of
Chemistry in New Zealand is a
special lift-out catalogue and
Directory for the Chemical
Industries Trade Fair being held
in conjunction with the 1987
Annual Conference.

CONTENTS

Editorial: thoughts for future conferences	86
National Chemistry Week: a final note from Terry Hitchings	86
News: a new ICI warehouse, the AAVA prize, and commercial developments at Ruakura	87
Letters to the Editor: Conference costs, and the grades of membership debate	87
Beyond Amsacrine: A New Zealand Contribution to the Development of Better Anti-Cancer Drugs: Bill Denny and the 1986 ICI Prize	89
Controlled Release Technology Symposium: Wolfgang Passl reports on this Australian meeting	94
Chemistry Division Opening/DSIR Open Days: some recent Auckland events	95
OCCA News	95
The New Hewlett Packard 1040M Diode-Array Detection System	98
NZIC AGM: minutes of the 1986 meeting, and the agenda for 1987	100
NZIC Annual Report 1986/87	101
NZIC Financial Report 1986/87	102
NZIC Officers and Membership 1986/87	105
Government Depts and Research Institutes	106
University News	106
People	107
Branch News	107
Book Reviews: including Safety Publications	108
Cover Story	109
Company News	110
Product News	111

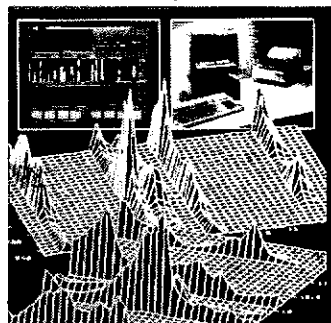
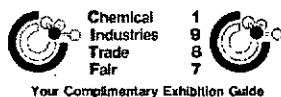
Published by CATHEDRAL PRESS LTD, P.O. Box 9072, Newmarket. Phone 775-533
Advertising Manager Carl Roze. Phone Auckland 547-244.



COVER STORY

Alphatech Systems now offer
the range of equipment from
Hitachi Scientific Instruments
including TEM, SEM, UV-VIS,
IR, AA and Fluorescence Spec-
trophotometers and research
and teaching NMR systems.

See Page 109



Hewlett Packard first introduced
the 1040 Diode Array Detector
in 1982. Now the HP 1040 has
been enhanced by the addition
of a new Workstation (Chem-
Station) and software, and the
ability to interact with the 1046A
programmable fluorescence
detector by way of an HP-IB
digital interface.

See Page 98

SPECIAL NOTICE NZIC MEMBERS

Chemistry in New Zealand is your magazine and needs your support.

If every member gave us 30 minutes of his time once a year we could do much more with your journal
and save you money.

HERE'S HOW.

Talk to your employer. Show him your copy and suggest he use the magazine to advertise — remember *Chemistry in New Zealand* is read by some of the most influential decision makers in our industry not to mention Government Departments, Education and Research organisations.

Advertisements placed by this means will be of direct benefit to NZIC funds.

If you are the Decision Maker in your organisation make the decision to support the NZIC *now* and advertise in *Chemistry in New Zealand.*

**Please contact your
branch secretary
for details.**

For further information please circle no. 29 on reader reply card.

EDITORIAL

To Confer, or not to Confer...

In a Letter to the Editor published elsewhere in this issue Philip Tree expresses his concern at the cost of the Auckland Conference. He is certainly not alone in this regard. The issue becomes of even more concern the further one travels south, and the registration fee has to be added to the already high cost of travel. Whether or not this year's Conference is as successful as previous ones, and whether or not cost has been a significant factor, we will know within the next few weeks. In the meantime it seems appropriate to consider some of the broader issues with regard to this annual event.

Do we need an Annual Conference? Last year a number of very successful meetings were organised by some of our specialist groups. These attracted large numbers of people, members and non-members of the Institute, and by virtue of their specialist nature were probably of considerable value to those attending. Compare this to the usual Conference offerings where, for most of us, the few papers of direct relevance are diluted by others of general interest, and many of no interest at all. Perhaps the time has come for us to follow the Australian example of regular specialist meetings, and a less frequent National Convention?

If we do persist with an Annual Conference, when should it be held? Our tradition of the August university and school vacations is currently proving difficult. There is now only one week common to all the universities, and with the advent of the four-term year the school holidays are in danger of going completely out of synch. Of course most of our members are not involved with either of these institutions, so the question has to be asked whether trying to find that right week matters much at all?

If we don't stick with the university vacations the question of venue then becomes a problem. Generally the university facilities are more suitable and less expensive than any of the commercial ones available. And so we come back to that question of cost again. Just how much are members prepared to pay?

I am sure there are other matters with regard to the Annual Conference that need to be raised. I am also sure there is much that could be said in favour of the event, but I have no intention of sullyng this column with such esoterics.

I would be happy to receive further correspondence on this matter.

Bruce Graham

NATIONAL CHEMISTRY WEEK, 15-21 AUGUST 1987

"Pleasurable and Profitable"

Professor Cadigan's address to ANZAAS in May will be screened by Television New Zealand on Sunday 16 August. Time and channel will be announced shortly. Exciting and dramatic developments in applied chemical research are brilliantly featured in this illustrated address transmitted live by satellite.

Copies of the videotape will shortly reach branches, thanks to the support of BP New Zealand Ltd. These may be used for branch meetings and for screening to wider audiences and loaned to schools.

RACI/NZIC Visiting Speaker

Professor RB Bucat's visit is now organised. His itinerary will allow for the following meetings with branches:
Christchurch: Monday 15 August.
Dunedin: Tuesday 18 August.
Wellington: Wednesday 19 August.
Palmerston North: Thursday 20 August.

Hamilton: Friday 21 August.
Auckland: Sunday 23 August.

Poster, Photographic and Essay Competitions

Winners will be announced during National Chemistry Week by the President, as part of a news release.

Local Initiatives

There has been good support for crystal growing competitions, visits to chemical institutions and local industries, "Chemistry Scholar of the Year" competition, Open Days at some tertiary institutions, public lectures and newspaper supplements.

All members of the Institute are asked to give National Chemistry Week the greatest amount of support by personal involvement. The impact of concerted action will be far more effective than uncoordinated activities at other times of the year.

Terry Hitchings
Vice-President

New Auckland Warehouse for ICI

ICI New Zealand's new storage and distribution complex at Riverview in Mt Wellington was officially opened by Mr Peter Tapsell, Minister of Internal Affairs, on 23 June 1987. Redevelopment of the 1.8 hectare complex began in mid-1986, after the previous warehouse had been destroyed in the December 1984 fire. At a cost of \$2.5 million the new complex has been described as "the most modern chemical storage facility in New Zealand."

Redevelopment of the site has involved construction of a bulk store, office block, covered drum store, container unloading area and chemical storage bunkers. The new 4200 sq. metre bulk store is a third larger than the previous building and incorporates as a design and safety feature, 21.4m single span glue-laminated timber portals that support both the sides and the roof. A feature of the project is the compartmental concept of bunkers for the segregated storage of chemicals. Twenty such bunkers have been constructed. A 100 sq. metre open-sided building has been built for the storage of drums under cover.

Bunding around the site has been designed to contain any spillages or washdown within the complex. In addition containment sumps have been built, and an automatic shutoff of stormwater has been provided to minimise any risk of contaminated stormwater release into the Tamaki estuary.

The two most notable features of the new complex are the chemical storage bunkers and the extensive use of "HAZ-CHEM" labelling throughout the site. Constructed of precast concrete slabs, each bunker has the capacity to hold 192 x 200 litre drums. Each bunker is effectively isolated from its neighbours by the concrete walls, while the rear of each roof includes a pressure releasing section that would automatically rupture in the event of a fire. The rearward sloping floor of each bunker provides self-containment for spillages. The contents of each bunker are identified by means of "HAZ-CHEM" warning signs, which indicate the hazardous nature of the material and the initial action required in the event of an emergency.

Riverview is the second of the company's warehouses to be redeveloped. The Seaview com-

plex in Lower Hutt was officially opened in March 1987, and work is currently under way on a new Christchurch facility.

AAVA Chemistry V Prize

The winner of the prize for the student gaining the highest marks (1986) for Stage V NZCS (Chemistry) is Mrs Cathy Newman, an employee of New Zealand Steel Ltd.

Cathy joined NZ Steel in 1982 as a Lab. assistant in the Environmental Laboratory. She is now an Environmental Analyst in the lab. Her work involves the monitoring of discharges from the mill into the Manukau Harbour, the results of which are sent to the ARA Water Board. Cathy is responsible for the day



results, consultancy and advice.

There is no doubt that Ruakura is well-placed to provide this service. It is the largest agricultural research centre in New Zealand and is centrally located in relation to most of the agricultural chemicals industry. It is also ideally located within the most productive horticultural and agricultural regions in the country. Over 50 consultancy staff offer a wide multidisciplinary base encompassing pastoral and arable agriculture, horticulture and aquatic plant research. Over the last 20 years Ruakura has established a reputation for excellence in pesticides research and is recognised as a unique resource in New Zealand.

The facilities available in the unit are too extensive to detail fully here, but cover broadly the areas of plant protection, animal parasitology, analytical organic chemistry and pesticide application equipment. More specifically the facilities include:

- the full range of analytical organic equipment, including a modern high resolution mass spectrometer which provides unrivalled versatility, sensitivity and specificity for pesticide analysis.

- sophisticated semi-automated soil insect extraction and sampling systems.

- environmental rooms, glass-houses and screenhouses.

- artificial aquatic plant environments.

- full pen housing for sheep, goats and calves, and beef feedlot facilities.

- full parasitology laboratory support services.

- full abattoir slaughter facilities.

- full animal surgical facilities.
- dairy facilities and milk analysis laboratory.

- access to most breeds of sheep, goats and cattle.

Associated facilities include a biometrical analysis unit, extensive library facilities and the full range of other equipment and services available within MAFTech.

Further information is available through the Unit Manager, Dr RP Pottinger, Pesticides Research Unit, Ruakura Research Centre, MAFTech, Private Bag, Hamilton (Ph. 62-839).

LETTERS TO THE EDITOR

Conference Costs



Sir,

I have attended every NZIC Conference for the last five years, and was intending to go to the Auckland Conference this year. I had budgeted for a conference fee of between \$80 and \$100, and, as usual, expected to keep my costs to a minimum by lodging with friends. But, at a time of financial restraint, \$330 (incl. GST) is just too much, and so I, for one, shall not be attending.

How many members, I wonder, find themselves in a similar situation? Personally, I feel the Auckland Committee has gone 'over the top' on this one. Was it necessary to hire the Sheraton? Could more sponsorship have been arranged?

Well, I hope the Conference does not run at a loss as a result, because I shall object most strongly if the rest of us find our subscriptions increased to bail them out!

P.J. Tree
MNZIC

Grades of Membership

Sir,

The 1976 rules are unique. They enable a self-disciplining professional body to set status bench marks for quasi-professionals without weakening the professional structure. In keeping with other professions the pre-requisite for corporate membership remains a university degree or its equivalent.

Unless the AAVA has usurped the function of the universities the NZCS is not equivalent to a degree. Nor should there be a common entry grade. The emphasis received in education is different, the immediate grade goals are different.

If Auckland considers "Technician" pejorative let it offer a better term, but not at the price of destroying the reputation of the Institute's pathway for the professional.

If Auckland considers administration of the grades complex it should re-read the rules — they are simple, clear and unequivocal.

Above all, Auckland should examine its motives; they are far from clear and I suspect they equivocate grievously.

John Pollard
Fellow

to day running of the lab (to Telarc standards), and the monitoring of water samples from the various water treatment plants within the mill. Most of the analyses are done by ICP, AAS, some uv/vis and other general wet chemical methods. She is also involved with the analysing of soil, sediment and marine biota samples and virtually anything that comes to the Environmental Lab. — be it from within the mill or external samples.

Ruakura Pesticides Research Unit Launched

In response to the requirement for commercialisation of their activities MAFTech Ruakura have established a Pesticides Research Unit which was officially launched on 10 June 1987. The Unit has been established to facilitate commercial interaction with the agricultural chemicals industry and other organisations involved in the use of pesticides in New Zealand. The major functions of the Unit will be to act as a contact point with potential clients, co-ordinate pesticides research at Ruakura, and ensure quality standards for contractual research and reporting undertaken by Ruakura staff. Services available through the Unit will include research and development, problem solving, chemical analysis, the analysis of

You can expect
in-depth information from

newScientist

This popular English weekly publication specialises in informed comment and data over a broad range of scientific and general interest subjects.

Coverage of important international topics by well known and respected writers, plus a number of regular features make New Scientist an excellent source of information.



AVAILABLE NOW FROM
SELECTED BOOKSELLERS.

Order your copy now, to avoid disappointment. \$3.25

HAINES 54430

BEYOND AMSACRINE: A NEW ZEALAND CONTRIBUTION TO THE DEVELOPMENT OF BETTER ANTI-CANCER DRUGS

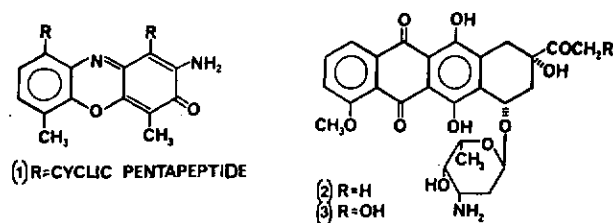
William A. Denny
Cancer Research Laboratory
University of Auckland School of Medicine

Bill Denny is Deputy Director of the Cancer Research Laboratory in Auckland. In 1986 Bill was awarded the ICI Prize for his work in the development of anti-cancer drugs, some of which is described in this paper.

Introduction

The evaluation of chemical compounds for their anti-cancer effects has been one of the more vigorously prosecuted chemical activities: to date nearly 500,000 compounds have been screened in animal tumour models. Unfortunately, it can also be regarded as one of the least-productive chemical endeavours. On average only one compound in every 5000-10,000 of those tested showed verifiable anti-cancer activity in animals, and most human cancer chemotherapy rests on as few as 15 widely-used drugs. The major reason for this low historical productivity is that much of the early work involved the random screening of natural products and chemicals produced for other purposes. While this approach has resulted in useful drugs, it has been largely superseded by more highly-focused, inter-disciplinary drug design programmes.

drug to enter clinical use anywhere. Because of its relatively simple structure it has been widely-employed in biochemical studies to determine the mode of action of intercalating agents, and was the first such compound for which a detailed mode of action has been determined (see later).



The Historical Importance of Amsacrine

The historical development of one broad class of anti-cancer drugs, the DNA-intercalating agents, exemplifies this change in approach. The intercalating agents possess a flat, aromatic portion in the molecule, and can bind tightly but reversibly to cellular DNA by inserting (intercalating) this portion between the base-pairs of the double helix, with resultant distortion of the DNA geometry (Fig. 1).

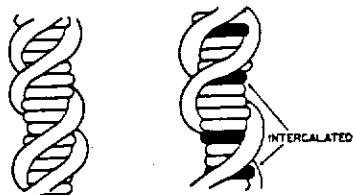
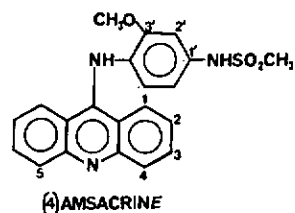
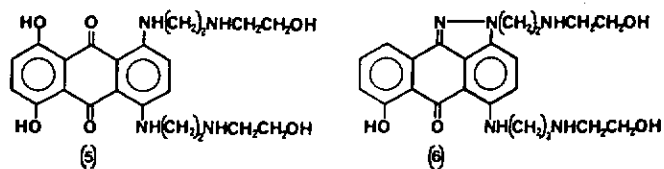
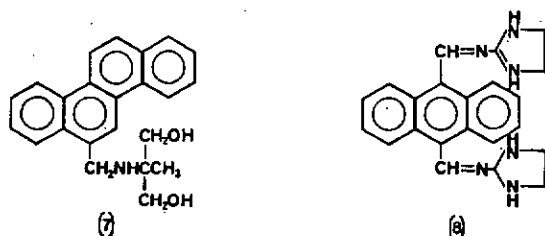


Fig. 1. Schematic representation of a drug (black plate) binding to double-helical DNA by intercalation between the basepairs.

The first examples of this class of drug were the fungal metabolites actinomycin D (1) and daunomycin (2), which were discovered through random screening. They entered clinical practice in 1964 and 1965 respectively, but had limited use. The related anthracycline doxorubicin (Adriamycin) (3) was discovered similarly, and has been in use since 1974. It was the first really broad-spectrum anti-cancer drug, and represented a major advance in cancer chemotherapy.



These 'antitumour antibiotics' are very complex molecules. They show a wide variety of cellular effects apart from their ability to intercalate DNA, and their primary mode of action as anti-cancer drugs has been determined only very recently. In the historical context, the development of amsacrine (4) in the Cancer Research Laboratory in Auckland under the direction of the late Professor Bruce F Cain occupies an important position. Not only was amsacrine the first pharmaceutical of any type developed in New Zealand to be used here clinically, it was also the first synthetic DNA-intercalating anti-cancer



The clinical success of amsacrine has been an important factor in stimulating work on other synthetic DNA-intercalating ligands as anti-cancer drugs, and to date at least a dozen compounds of diverse structure, from drug development laboratories all over the world, are in various stages of clinical evaluation. At the moment, the most well-advanced is mitoxantrone (Novantrone) (5), which is achieving some success in the treatment of breast cancer. Other compounds in the trial include the structurally-related anthrapyrazole (6), the chrysene aminodiol (7) and the anthracene analogue bisantrene (8).

W. GRAYSON & ASSOCIATES LTD

Analysts

Chromatography – GLC, HPLC, etc

Corrosion Consulting

Food & Pharmaceutical Analysis

Forensic Investigation

Gas Analysis

Geochemical Analysis & Assayers

Microbiology

Product Development & Metal Analysis

Plastics, Packaging & Oils

Water, Effluents & Wood Analysis

A TELORC registered laboratory
Telephone

(09) 590-329

Hugo Johnson Drive, Penrose, Auckland, New Zealand.
P.O. Box 12-545, Penrose. FAX NZ (09) 599-044
Also at Invercargill Phone: (021) 82-247

TECHART 969

For ALL YOUR CHROMATOGRAPHY NEEDS



**ALLTECH ASSOCIATES, INC.
APPLIED SCIENCE LABS**

P.O. Box 33-527 Takapuna, Auckland 9, New Zealand
☎ (09) 4443230 • Telex: NZ61111 Alltech • FAX: +64 9 4442399

For further information please circle no. 24 on reader reply card.

For further information please circle no. 23 on reader reply card.

ADVERTISEMENT

IS YOUR FUMECUPBOARD REALLY SAFE?

"The primary reason for using a fumecupboard is to provide safe working conditions for the operator and other laboratory personnel." That quotation comes from the preface to Australian Standard AS2243.8-1986. Published only last year the emphasis is of course on the word "safe", and it raises the question. "What is safe?" or "How safe is safe?"

There are several types of fumecupboard available in New Zealand. In selecting a fumecupboard, the purchaser should have an eye not only to his particular purposes but also to the detailed specifications of the cupboard. The Australian Standard already quoted makes the point that "no one design or material will satisfy the requirements of all users." Careful selection is obviously implied.

Very significantly the Australian Standard goes on to say (para 2.1.5) "The recirculating type of fumecupboard is not recommended for general use as it may not protect the operator when the absorption medium becomes loaded and therefore ineffective." For this basic reason "ductless fumecupboards which recirculate air and do not extract to the outside atmosphere are excluded from the standard," a fact significant in itself.

The commonsense factors are obvious. In the majority of laboratory situations, fumecupboards are used in more than one application. Filters are often very specialised, and a change of job may well mean a change of filter. Failure to change could lead to the interaction of two or more substances, one already in the filter, the others introduced in the new operation . . . and the result could be fire, explosion or the creation of further toxic materials. Even where there is little or no probability of different substances being collected in the same filter, there remains the possibility of the

absorption medium becoming loaded and therefore ineffective . . . and whatever its state, the air within the fumecupboard is recirculated into the laboratory atmosphere.

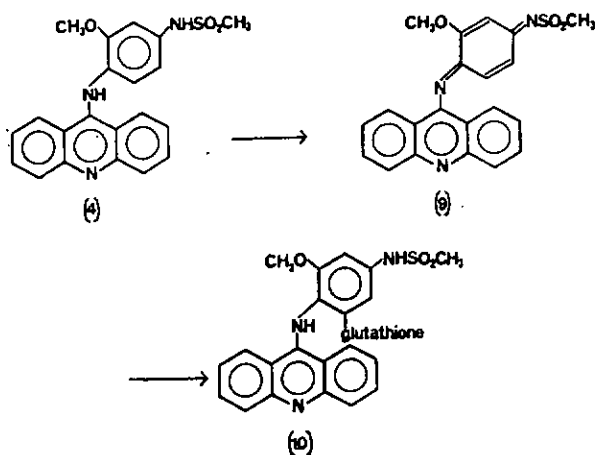
Both the Australian Standard and the British draft standard recognise the potential hazards. The Australian document states that many existing fumecupboards will not comply with Standard requirements. It recommends a high priority for upgrading, and even that "fully ducted fumecupboards which do not comply should be upgraded to the required levels as soon as possible". Thermoplastic Engineering Limited, leaders in the design, manufacture and installation of fumecupboards in New Zealand subscribe to the principles laid down by the Standards Association of Australia. None of their four ranges of fumecupboards, Utility, Safety, Perchloric Safety and Laminair Safety require filters because they are all ducted for fume discharge to the open air. Additionally, there is little danger of two acids or solvents combining within the fumecupboards. There are no filters to change, none to dispose of, (in itself at times a messy and hazardous task) and obviously no filter failure to worry about. Thermoplastic fumecupboards have other advantages, notably a range of standard sizes in each of the four types and a choice of construction materials to meet individual circumstances. They also manufacture special sizes to order.

Full information covering all Thermoplastic fumecupboards, extraction fans, ducting systems and installation is available on request from the Company, Box 25038, Wellington. Telephone (04) 882-092, Telex NZ31255 INTCOM/THERMO and Fax (04) 394-825.

For further information please circle no. 31 on reader reply card.

Mode of Action of Amsacrine (and other DNA-Intercalating Agents)

Compared to compounds such as Adriamycin (3) and mitoxantrone (5), which are reactive species capable of undergoing redox reactions, amsacrine (4) appears relatively inert. However, it also readily undergoes redox reactions, being capable of reversible, two-electron oxidation to the reactive quinonediimine (9). This can be achieved cleanly by cyclic voltammetry, when a redox potential of 280 mV can be measured, chemically by MnO_2 , and by liver microsome preparations. Amsacrine is also readily oxidised by cells in culture, but the quinonediimine is not detected, since it is rapidly converted into further metabolites such as the glutathione conjugate (10) (Scheme 1).



SCHEME 1

These redox properties of amsacrine give it the ability to degrade DNA by a free-radical mechanism, in the presence of copper. Since amsacrine has been shown to break cellular DNA, this redox chemistry was thought to be relevant to its mode of action.

However, recent studies in other laboratories have shown this is not so. The important biological effect of amsacrine is cleavage of DNA, but by an enzyme-mediated process which appears to be common to many DNA-intercalating anti-cancer drugs, but which was first studied with amsacrine (Fig. 2). The enzyme "mammalian DNA topoisomerase II" has the critical function of maintaining the topology of DNA inside the cell. It is able to completely break a strand of DNA and then, while holding the strands 'in register' on the protein framework, pass another DNA strand through the gap and reseal the breaks, resulting in an alteration of the winding level. The intermediate complex is fragile, and if disrupted by other biochemical processes a potentially-lethal DNA break is formed. The enzyme thus regulates the process so that this complex is only present in very small amounts at any one time. The effect of amsacrine is to alter the equilibrium, trapping large amounts of the enzyme in this fragile complex for long periods. The net effect is the production of DNA strand breaks due to unscheduled disruption of the complex, leading to cell death.

Beyond Amsacrine: The Drug Amsalog and other Amsacrine Derivatives

By 1980 amsacrine (4) had proved to be useful in combination with other drugs for the treatment of leukemia, and entered front-line use for the treatment of this disease. However, it showed little activity against the more common solid tumours in humans. Much of the work in the Cancer Research Laboratory from 1980 to 1982 was therefore directed at the development of analogues of amsacrine with a broader spectrum of action. Detailed multi-parameter structure-activity relationships of the large number of existing analogues suggested that the structure of the aniline sidechain was fairly close to optimum, and that more scope was available for modification of the acridine chromophore. This purely analytical approach was backed up by consideration of the

known metabolism of amsacrine to the reactive quinonediimine (9) (see above). We did not know whether (9) was in fact the active form of amsacrine (at that time the action of amsacrine and other DNA-intercalating agents on topoisomerase II was not known), but changes in the aniline ring which prevented this oxidation taking place led to inactive compounds.

We therefore decided to leave this portion of the molecule intact and explore modification of the acridine (the DNA-binding moiety). Changes here are liable to alter a number of molecular properties simultaneously (e.g. overall solubility, the pKa of the acridine nitrogen, the ability of the molecule to bind to DNA and possibly its metabolic stability). In addition, it was not possible to make and evaluate more than a tiny fraction of all the analogues which could be made (there are more than 10^8 disubstituted compounds alone which can be made from only 20 different substituents). The strategy was rather to design for a set of molecular properties which we felt, from experience, generally predisposed to activity. Such molecules would then have the highest possible chance of activity in the appropriate tumour tests, which would be used to maximum purpose. This process might be termed "intelligent screening", where the ultimate selection is still made from the results of screening, but there is "intelligent" rather than "random" input into the screen.

Previous experimental work by ourselves and others with a range of DNA-intercalating ligands had shown that high activity was generally associated with strong binding to DNA, and particularly with the kinetics of binding. Compounds which attached themselves to one particular binding site for a longer time, rather than coming on and off the DNA very quickly, were appreciably more active. In addition to these properties which affected "intrinsic cytotoxicity", great importance was placed on building good distributive properties into the molecule. This is of critical importance for solid tumour activity, where the drug might have to diffuse to remote tumour sites and then penetrate a poorly-vascularised tumour mass. A more weakly-basic compound was therefore

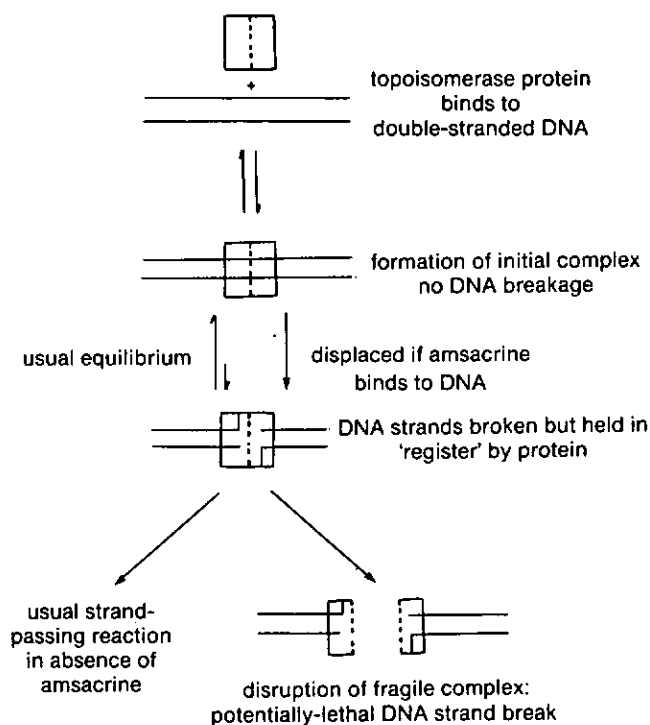
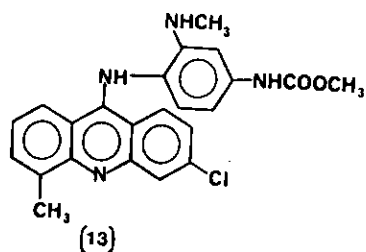
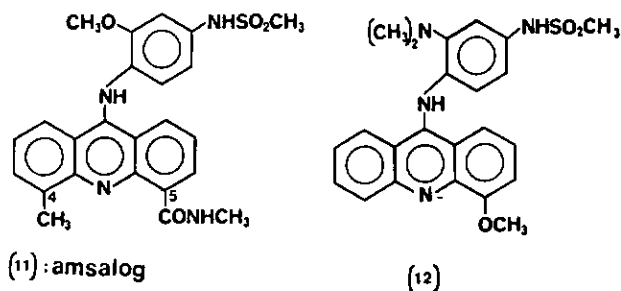


Fig. 2. Enzyme-mediated DNA cleavage by amsacrine (4) and other DNA-intercalated drugs.

sought, which would have a higher proportion of the diffusible neutral form present. Modifications were therefore sought which would increase DNA binding but lower the acridine pKa. Over 100 analogues were made, concentrating on electron-withdrawing, hydrogen bond donor/acceptor type substituents.

These compounds were evaluated against a number of human solid tumour cell lines in culture, and against the standard leukemia and a new solid tumour model (the Lewis lung carcinoma) *in vivo*. About a quarter of the compounds showed solid tumour activity (unlike amsacrine, which is inactive in the Lewis lung model), and in 1982 4-methyl-5-methylcarboxamido-amsacrine or 'amsalog' (11) was selected for preclinical evaluation overseas.



This compound had the desired set of physicochemical properties with respect to amsacrine (Table 1), being more water-soluble with a lower pKa and a stronger DNA binding, and showed greatly superior biological activity (Table II).

Although the bulk of the work on amsalog then shifted to the U.S., we continued to evaluate the most economical preparation for use in large-scale commercial synthesis, where costs are dominated by the price of starting materials and the number of steps in the process. Clinical trials of amsalog began in Ohio and Puerto Rico in late 1985, and in Auckland in early 1986, although it will be another year before any firm idea of the usefulness of the drug can be gained.

Concomitant with the development of amsalog (11), other work with amsacrine derivatives continued. In particular, varying the electronic properties of the 3'-group on the aniline ring showed that electron-donation at this position was desirable, and in fact the 3'-N(Me)₂ group (the most powerful electron-donor known) provided a series of compounds with very high activity against the solid tumour, as exemplified by compound (12) in Table II.

In separate work, cell culture studies showed that alteration of the 1'-substituent of amsacrine (4) to carbamate provided compounds effective against drug-resistant leukemia cell lines. The development of multi-drug resistance (pleiotropic resistance) by tumour cells is a common phenomenon. It is

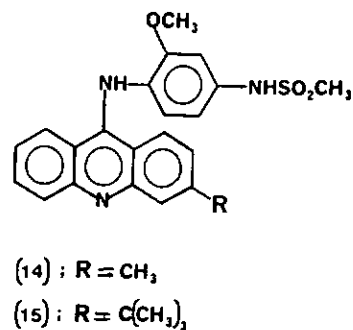
one of the major causes of disease relapse after initial, drug-induced remission, and compounds with activity against such resistant cells would be clinically valuable in second-line therapy. For this reason, development of these compounds was also pursued. Amsacrine (4) is not active *in vivo* against the Adriamycin-resistant leukemia line designated ADR/P388, and amsalog (9) is only moderately active, but carbamate derivatives such as (13) show superior activity while retaining good solid tumour effects (Table II).

It is from compounds such as (12), (13) and their close analogues that a third clinical candidate would be selected, if a decision is ever made to develop another member of this series.

Broad Rules for the Design of DNA-Intercalating Anti-cancer Drugs

The increasing number of DNA-intercalating drugs of diverse structure (e.g. 2-8) prompted us to seek properties and structural features which these compounds had in common, since a broad set of 'rules' for design would be of great help in the process of "intelligent screening" mentioned above.

The most well-defined requirement is that of intercalative binding to DNA. For example, 3-methylamsacrine (14) and 3-*tert*-butylamsacrine (15) bind to DNA in quite different ways. While (14) binds by intercalation as amsacrine itself does, (15) is prevented from doing this by the bulky *tert* butyl group, and binds on the outside of the double helix. Although the compounds have a similar affinity for DNA, (14) is a very effective experimental drug, while (15) is inactive. Thus the mode of binding is more important than the strength of the binding.



This is particularly true if broad-spectrum drugs are sought. Much early work concentrated on the development of more tightly-binding drugs, by using large, positively-charged chromophores, since this property does correlate with potency in leukemia models. However, for drugs to exhibit broad-spectrum activity they need to distribute well in the body to remote tumour sites, and be able to penetrate solid tumour masses. Large aromatic chromophores do not penetrate efficiently due to high levels of binding to proteins (and nucleic acids!), and most of the large, tightly-binding, highly-charged compounds with good anti-leukemic potency are not active against remotely-sited solid tumours.

Table I. Physicochemical Properties of amsacrine (4) and amsalog (11)

	amsacrine	amsalog
water-solubility (mg/mL, 20°C)	0.12	0.72
acridine pKa	8.02	6.99
% ionized at pH 7.2	88	33
association constant for DNA (M ⁻¹)	1.3 x 10 ⁵	20.9 x 10 ⁵
average residence time at DNA site (msec)	5.5	108

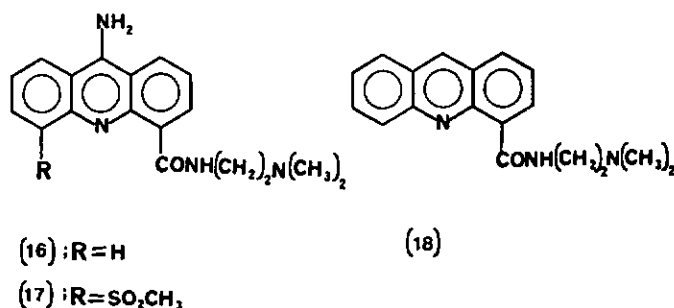
Table II. Experimental *in vivo* anti-cancer activity of amsacrine analogues.

	P388 leukemia	%ILS ^a Lewis lung carcinoma	ADR/P388 leukemia
amsacrine (4)	78 (0)	inactive	inactive
amsalog (11)	200 (3)	168 (3)	50 (0)
3'-dimethylamino derivative (12)	141 (0)	235 (4)	40 (0)
1'-carbamate derivative (13)	173 (0)	143 (4)	79 (0)

^a%ILS: the percentage increase in lifespan of tumour-bearing, treated mice compared to that of tumour-bearing untreated controls (non-cured animals only). Values in parentheses are the number of animals out of a group of six which are long-term survivors (cured).

Illustration of this point can be made from the acridine-4-carboxamide series of compounds under development in the Cancer Research Laboratory. The 9-amino-4-methyl derivative (16), with a chromophore pKa of 8.01, is very cytotoxic (IC₅₀ 0.5 nM, cf 33 nM for amsacrine) and has good anti-leukemic activity, but is inactive against the Lewis lung solid tumour (Table III). If the pKa of the acridine is lowered to 5.15 as in the 5-SO₂Me derivative (17) activity is now seen in the Lewis lung model, and lowering it further to 3.54 by removal of the resonant 9-NH₂ group provides a compound (18) with extraordinary activity (the highest ever seen) against the lung tumour.

A second physicochemical property that correlates well with biological activity is the ability of the compounds to bind at individual DNA sites for periods of 100 msec or more before dissociating. A structural feature that commonly confers this property, and which many of the new DNA-intercalating drugs (e.g. 2-8) possess, is a flexible, positively-charged sidechain, capable of making additional H-bonding contacts with the DNA.



Our work since 1983 on the design of new drugs of this class has therefore been to develop compounds with the following broad features:

— a chromophore as small and as weakly-binding as possible, that will still intercalate DNA.

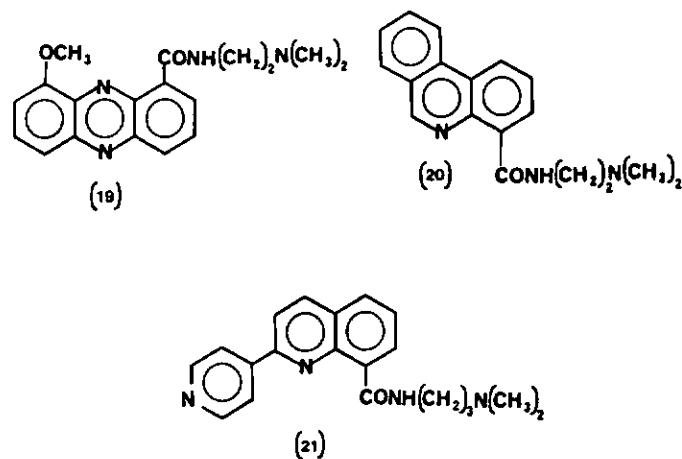
— weakly-basic chromophores that will exist largely as the neutral form for good distribution, but are capable of carrying a cationic charge to assist in DNA binding and cellular uptake.

— a correctly-placed sidechain that will provide slow dissociation from DNA, giving the molecule an average residence time of at least 100 msec.

A considerable number of such compounds have been prepared and evaluated, and three new series of drugs in addition to the acridinecarboxamides (18) have been discovered. These are exemplified by compounds (19-21), whose physicochemical and biological properties are given in Table III. All these series are under development, but particular interest is focused on the pyridoquinoline (21), which has a small, novel chromophore with desirable DNA-binding properties, and shows excellent broad-spectrum anti-cancer activity.

Conclusion

The synthetic DNA-intercalating agents have received more attention over the past five years than any other class of anti-



cancer drug. The cellular target of these compounds has been identified, rules for their design have been elucidated, and at least a dozen compounds of this class are now in clinical trials.

With the successful introduction into clinical use of the first synthetic DNA-intercalating drug amsacrine (4) in 1978, the clinical testing of amsalog (11) in 1985-86, and the development of the four new series of experimental drugs: acridine-4-carboxamides (18), phenazine-1-carboxamides (19), phenanthridine-8-carboxamides (20) and 2-pyridoquinoline-8-carboxamides (21), the Cancer Research Laboratory has made a significant New Zealand contribution to this area of drug development. In addition to the new types of drugs discovered, the laboratory has contributed to new routes for drug synthesis, new methods of measuring drug/DNA interactions, and new types of biological test systems, work which has been reported in more than 120 publications over the last five years.

Selected Bibliography

- B.F. Cain, G.J. Atwell & W.A. Denny. *J. Med. Chem.*, **18**, 1110-1117, (1975).
 W.A. Denny, G.J. Atwell, B.F. Cain, A. Leo, A. Panthanickal & C. Hansch. *J. Med. Chem.*, **25**, 276-316, (1982).
 J. Feigon, W.A. Denny, W. Leupin & D.R. Kearns. *J. Med. Chem.*, **27**, 450-465, (1984).
 B.C. Baguley, W.A. Denny, G.J. Atwell, G.J. Finlay, G.W. Rewcastle, S.J. Twigden & W.R. Wilson. *Cancer Res.*, **44**, 3245, (1984).
 G.J. Atwell, B.C. Baguley, G.J. Finlay, G.W. Rewcastle, & W.A. Denny. *J. Med. Chem.*, **27**, 1769, (1986).
 L.P.G. Wakelin, G.J. Atwell, G.W. Rewcastle & W.A. Denny. *J. Med. Chem.*, **30**, 885, (1987).
 G.W. Rewcastle, W.A. Denny & B.C. Baguley. *J. Med. Chem.*, **30**, 843, (1987).

Table III. Physicochemical and biological properties of representatives of new classes of DNA-intercalating drugs.

compound	chromophore pK _a	% ionized at pH 7.2	IC ₅₀ ^a		% ILS ^b
			L1210 leukemia	P388 leukemia	
16	8.0	87	0.47	107 (0)	inactive
17	5.15	1	2.80	138 (4)	106 (1)
18	3.54	0.02	105	91 (0)	all cures ^c
19	1.0	0	48	106 (0)	128 (4)
20	2.95	0.01	2100	73 (0)	117 (1)
21	2.42	0.01	170	145 (0)	132 (3)

^aIC₅₀: concentration of drug (in nM) to reduce the number of L1210 leukemia cells growing in culture to 50%.

^b see Table I, footnote a.

^c all animals cured, % ILS cannot be computed.

CONTROLLED RELEASE TECHNOLOGY SYMPOSIUM

WJ Passl, DSIR

This symposium, held at the University of Queensland, 1-2 September 1986, was organised by the Polymer Division and the Queensland Branch of the Royal Australian Chemical Institute. About 120 delegates attended, mainly from Australia but also from New Zealand, the United States and France.

An **Introduction** into the concept of controlled release was provided by **Richard Oppenheim**, School of Pharmaceutics, Victorian College of Pharmacy, Parkville. He defined the most common release profiles and release mechanisms and stated as important decisions that have to be made when designing controlled release products: 1. Whether or not any release lag-time or environmental protection is to be built into the product, and 2. when controlled release does occur, whether it must be at the preferred zero order rate or would the cheaper, easier-to-make products with first order or $t^{1/2}$ release profiles suffice?

Jorge Heller, the Director of the Polymer Sciences Department, SRI International, Menlo Park, California, then gave an overview of **Controlled Drug Release from Bioerodible Polymers**. He explained the importance of bioerodible polymers in delivery devices for the controlled systemic administration of therapeutic agents from an implantation site (the expended device does not have to be surgically removed!).

In developing bioerodible drug delivery devices, there are three distinctly different types of device that can be developed. The therapeutic agent may be covalently attached to a bioerodible polymer backbone and released as the labile bond cleaves; the therapeutic agent may be contained in a core that is surrounded by a rate-limiting bioerodible membrane, and the therapeutic agent may be dispersed within a solid matrix to form a bioerodible monolithic device.

"Controlled release of Biologically Active Substances for Improved Crop Production" was discussed by **DR McGuffog**, Development Manager, Incitec Ltd., Morningside. He was the first of the three speakers delegated by Incitec, demonstrating the great interest of this company in controlled release. Incitec are just marketing a new series of products for

the sustained control of soil and foliage pests (SuSCon products). McGuffog stated that fertilisers, crop protection substances and growth regulants were the main groups of chemicals applied to crops for improved production, but that controlled release formulations of these substances still accounted for only a relatively small proportion of usage in broad-area agriculture.

Peter May, Market Development Agronomist, also from Incitec Ltd., described **In Flight Encapsulation of Agricultural Chemicals** as a process of utilising the film-forming characteristics of polymers to produce microcapsules in flight (during spraying), with droplet formation, transport to, and impingement at the target. Encapsulation is used to deliver optimum doses of active ingredient to the target at constant and controlled rates and to extend the residual activity of the active ingredient by reducing degradation losses due to volatilisation, photolysis, oxidation and microbial action.

To round off this part of the programme **MT Cooper**, the third speaker from Incitec Ltd., described **A Standard Technique for Characterising Soil-Applied Controlled-Release Pesticide Formations**, while **KJ Chandler**, Bureau of Sugar Experiment Stations, Gordonvale, North Queensland, also referred to Incitec's SuSCon when discussing **Aspects in the Development of the Field Application of a Controlled Release Insecticide for the Queensland Sugar Industry**.

RH Laby, Animal Production, CSIRO, addressed the topic of **Controlled Release in Animal Health and Production**. He demonstrated the need for implants in the animal body and described the various possibilities to achieve this. He then introduced the general purpose device he has designed, which can be used for the delivery of 50-odd materials, e.g. growth-promoting and fermentation-promoting compounds, trace elements and anthelmintics.

Chemical Changes in Polymers Induced by Radiation Sterilisation were discussed by **Dr DJT Hill**, Department of Chemistry, University of Queensland.

Pharmaceutical preparations which are to be used for topological, parenteral, implant, or ocular treatments require steril-

isation. The traditional methods of sterilisation for pharmaceuticals involve heat treatment or treatment with ethylene oxide gas. For controlled release formulations, the heating process suffers from the possibility of causing undesirable changes in the polymer properties or the nature of the formulation, while ethylene oxide is a suspected carcinogen. For these reasons, the use of high energy radiation for sterilisation, either gamma radiation or electron beams, offers a possible alternative.

In his second paper presented at this symposium, **Professor J Heller** addressed the **Use of Bioerodible Polymers in Self-regulated Drug Delivery Devices**.

These are based on the communication of the drug delivery system with the living organism. Delivery can be regulated through a feedback system based on sensors, pumps, micro-electronics, magnetism, ultrasound, or chemical interactions. One of the most important type of chemical interactions is enzymatically controlled and may be either continual or triggered. The drug is dispersed in a pH-sensitive bioerodible polymer surrounded by a hydrogel containing an enzyme. Once the enzyme reacts with the substrate, the ensuing pH change triggers bioerosion of the drug-containing polymer.

D Oldfield, Materials Research Laboratories, Defence Science and Technology Organisation, Ascot Vale, described the **Long Term Performance of Antifouling Elastomers**. He pointed out the long history of growth prevention of marine organisms on ships and calculated that the use of anti-

foulants may save as much as 15% of the fuel bill in naval vessels. At the Materials Research Laboratories a new concept was investigated, whereby an organotin compound is covalently incorporated into the elastomer network, resulting in excellent fouling protection for extended periods in tropical waters. The release rate is sufficient to maintain a fouling free surface and low enough to ensure long life.

Other speakers and the papers they presented, were as follows:

GA George, Senior Lecturer, Queensland Institute of Technology, spoke about **Controlled Polymer Photodegradation**.

R Vickers, CSIRO Division of Entomology, described the **Characteristics of the Ideal Pheromone Dispenser**.

Professor Joseph R Robinson, School of Pharmacy, University of Wisconsin, presented **Recent Advances in Muco-adhesive Polymers**.

JH Hodgkin, CSIRO Division of Applied Organic Chemistry, dealt with **Controlled Release Technology with Ionic Polymers in Pharmacy and Veterinary Science**.

An overview of **Colloidal Controlled Delivery Systems** was given by **Dr R Oppenheim**, School of Pharmaceutics, Victorian College of Pharmacy, Parkville.

and **Radiation Processing of Bioactive Materials** was dealt with by **JL Garnett**, University of New South Wales.

This report has been considerably abridged from the original material supplied. Anyone interested in obtaining copies of the full report should contact Dr Passl at Chemistry Division, DSIR, Private Bag, Petone.

CONFERENCES

"Fats For The Future II" Auckland, 12-16 February, 1989

An international conference on Oils, Fats and Waxes is being organised by the Oils and Fats Group of the NZ Institute of Chemistry, and sponsored by the Royal Society of New Zealand and the NZIC.

The Programme's major objective is the consideration of the future course of the science and technology of oils and fats and the interplay of marketing trends. Programme features

will include industrial and biochemical applications, commercial aspects of trade, nutritional aspects, analysis of oils and fats, health, milkfat technology and world trade.

For further information please contact Conference Chairman Laurence Eyres, or Secretary Jennifer Gray — 1989 Oils and Fats Conference, c/- Chemistry Department, University of Auckland, Private Bag, Auckland.

CHEMISTRY DIVISION OPENING DSIR OPEN DAYS

A long wait for new premises is over for the Auckland branch of Chemistry Division, DSIR. On 26 June the **Hon. RJ Tizard**, Minister of Science, officially opened the new laboratory building at the DSIR Mt Albert Research Centre. **Dr Peter Nelson** (Government Analyst, Auckland) introduced speakers **Mr John Longworth** (Centre Chairman), **Dr Mike Collins** (DSIR Head Office) and **Dr Gordon Leary** (Director, Chem-

Colin Denmead, who served only a short time before **Tony Keys** (previously Government Analyst, Dunedin) took over the position. Scientists in Chemistry Division branch laboratories at that time were required to be extremely versatile, and Tony Keys brought his wide experience to bear in organisations such as NZIC, ACA and the Consumer Council. **Don Nelson**, who succeeded Keys in 1975, had typically varied duties

include commercial contract research in fertiliser processing.

The new three-floor Mt Albert building is fully air-conditioned and in addition to laboratories, has administrative offices and library (floor 2) and a large forensic garage (floor 1). This garage includes "a hoist, and with adjoining specialised laboratory space provides a facility unrivalled in New Zealand for the forensic examination of vehicles.

In the week following the opening of the Chemistry building, the DSIR campus was open to the general public for the first "Open Days" since 1981. In her speech on 1 July opening the "Open Days", **Helen Clark** (MP for Mt Albert) emphasised the importance the Government places on science and technology, while **Frank Ryan** (Mayor of Mt Albert) emphasised the influence (mostly beneficial) the Research Centre has on the surrounding Mt Albert community.

About 1800 school children were among invited groups who attended on 1-3 July, and 3500 members of the public attended on Saturday, 4 July. Many of the display areas were set up to illustrate how the wide variety of disciplines and skills available at the Centre can be focused on a particular problem (e.g. commercial development of a particular crop). The main display subjects were DSIR's activities in the Pacific, library information services, instrumentation (electron microscopes and the sophisticated new mass spectrometer), pasture (pests, disease control and weed control), crops (vegetables, berryfruit, grapes, apples, summerfruit, citrus, kiwifruit and new fruit crops), sensory

evaluation, fruit processing, fish technology, forensic science, food analysis and applied chemistry.

While Chemistry Division has only recently arrived at the Centre, chemistry and biochemistry are of course fundamental to much of the work undertaken by the other major DSIR Divisions at Mt Albert (Horticulture and Processing, Entomology, and Plant Diseases). The chemists visiting the Open Days were therefore able to view and discuss work on insect pheromones, genetic engineering, chemical changes in fruits during processing, and fish fatty acid composition, to name some examples. The Chemistry Division displays featuring illicit drugs, poisonous plants, drugs in sports, designer drugs and a dissection of the potential evidence from a staged "hit and run" accident were particularly popular.

It is hoped that those who visited the "Open Days" left with an enhanced image of the worth of chemistry.



Mr Tizard cutting the metal chain, and using the comparison microscope to examine tool marks left on the chain fragments cutters

istry Division). Mr Tizard then spoke on the history of the Auckland laboratory and on the Government provisions for science in the recently released Budget. After unveiling a commemorative plaque, Mr Tizard was conducted towards the forensic section of the laboratory, where his way was barred by a metal chain. He removed the chain with the help of bolt cutters and was shown how the cut chain fragments could be conclusively associated with the particular bolt cutters used.

The Auckland laboratory was established in High Street in 1924 to meet a local need for analytical services in surveillance of food and water quality. The first Government analyst, **Ken Griffin**, featured in newspaper photographs transporting samples on his bicycle to the laboratory, and also gained publicity for his wide involvement in local scientific work, from forensic cases to Manukau Harbour pollution studies. By 1941, the staff had grown to 10, and the laboratory was relocated to Broadcasting House, Durham Street. Ken Griffin completed his service after 34 years as Government Analyst in 1958. His replacement was

in his earlier years in Chemistry Division, but developed enthusiasm for forensic work to the extent of taking his family to California in the 1960's at his own expense so he could study and become the first New Zealand holder of the Berkeley D.Crim. degree.

The next Government Analyst, **Mike Kingsford**, was a very talented individual with a background in food, water and pharmaceuticals but held the post only from 1982 until his early death from illness in 1983, when **Peter Nelson**, a drugs and toxicology specialist, succeeded him.

Peter Nelson now has charge of 42 staff, of whom about two-thirds are involved in forensic work (physical evidence including explosives and firearms, forensic biology, illicit drugs and toxicology). The other major activity of the laboratory is food analysis, which is primarily for the Health Department. The obligations for DSIR to become involved in revenue-earning activities are reflected in the laboratory's preparations for duties as the official drug analysts for the 1990 Commonwealth Games, and the extension of staff expertise to



Some young visitors examining a vehicle paint flake at the "hit and run" exhibit

OCCA News — Wellington Section

Mr Harry Stone, Forensic Toxicologist with the DSIR, was the guest speaker at the May meeting, and gave an interesting address about the Toxic Substances Board. He spoke specifically about iso-cyanates, paint solvents, cadmium pigments, and 2,4,5-T. He then spoke of the toxicity of tobacco, and the problems encountered with vested interests in getting any controls imposed on the use of tobacco. Many questions were raised with often lively discussion from the audience. It was a very informative and interesting talk.

Mr Mike Lennane, National Sales Manager, (Industrial Coatings) for BJN Holdings NZ Ltd, gave an in-depth and sometimes hilarious discourse on a salesman's point of view in selling industrial coatings to the NZ industry.

Mike has been involved in the industrial market for over 30 years, and was able to outline the progress that has been made in the automotive, car coating and furniture industries.

As well as the various paint systems that have been developed, Mike was able to give us an insight into the evolution of paint application equipment in this country.

Ready, s

TRAACS 800 CONTIN Takes the fingers and thumb

Until now, sample analysis has always meant a large element of operator involvement. Sample preparation, visual checks, starting and stopping tests. At best this is time-consuming, at worst — tedious and clumsy.

UNTIL TRAACS 800 FROM TECHNICON

Using continuous-flow chemistry, TRAACS 800 is the simplest, easiest, fastest and most economical autoanalyser ever made available. It is also the most technologically advanced and the most compact in size.

Naturally, the TRAACS 800 still involves some operator input, but once you have prepared your samples and keyed in the test requirements, no further operator involvement is necessary —

TRAACS 800 does the rest. Analysis, checking, sequencing and result printouts.

UNIQUE FEATURES

TRAACS 800 offers laboratories more unique features than any comparable system.

- *Random access sampling and automatic resampling of off-scale results*
- *Both UV and visible detectors*
- *Automatic base and gain*
- *Self-aligning flow cells and filters*
- *Programmable auto-diluter*
- *Reagent sequencing*

TRAACS 800 allows you to run a far greater number of samples simultaneously than ever before. Using 4 channels, it can run up to 480 tests per hour. Or, TRAACS 800 can handle much smaller test runs with identical ease.

Set, flow.

CONTINUOUS FLOW SYSTEM. Takes you out of laboratory analysis.

ERRORS ELIMINATED AUTOMATICALLY

Operating with up to four chemistries per sample and offering an extremely wide method range, TRAACS 800 is entirely controlled by computer. Any errors in analysis are detected instantly and flagged.

So, because it uses only small quantities of reagent, and eliminates much of the time-consuming work currently being carried out by an operator, TRAACS 800 is cheaper to run than conventional autoanalysers.

And because it takes out so much of the manual labour of analysis, the tedious fingers-and-thumbs aspect of lab work will be gone forever.

TRAACS 800™
AN INNOVATION OTHERS CAN ONLY FOLLOW



TECHNICON™
Forty great years – and still ahead of the rest.

TECHNICON EQUIPMENT PTY. LTD. PO BOX 9717, WELLINGTON. TELEPHONE (04) 852 552

THE NEW HEWLETT PACKARD 1040M DIODE-ARRAY DETECTION SYSTEM

Designed for the acquisition and fast, interactive evaluation of chromatographic and spectral data, the new HP 1040M is the ideal problem solving tool for laboratories involved in research, method development and quality control applications. The detector is compatible with any make of HPLC and can be moved easily from one instrument to another.

To provide continuous spectral acquisition without stop-flow, HP first introduced diode-array technology into HPLC detection in 1982. Sensitivity optimisation and the ability to carry out purity and identity checks for each peak were among the major advantages offered. Now, all the advantages of the most advanced UV/Vis HPLC detection technique have been fully utilised and improved to produce the HP 1040M diode-array detection system. An HP 9000 Series

moved along the wavelength axis, the chromatogram is displayed at different wavelengths in the bottom window of the screen. For each peak, the wavelength that offers the best sensitivity and selectivity is identified quickly.

As the vertical cursor moves across a peak along the time axis, the compound's spectrum is displayed in the top window on the screen. If the spectra from different parts of the peak are different the peak is impure.

In DATA EDITOR, there are several automatic routines that help confirm peak purity and identity (Figure 1). Spectra acquired during a peak's elution are normalised and overlaid automatically by pressing the PEAK PURITY key. At the same time, an overlay of the peak at different wavelengths is displayed on the same screen: any shift in retention time due to a peak of impurity is clearly

factor is displayed on the screen. The names and match factors of the other possibilities are tabulated in order of match factor. The spectra can be overlaid with the unknown peak and the individual peaks annotated.

For each peak the report includes information on retention time, peak purity and identity match factor and the name of the best match from the library, the impure peaks are flagged with an asterisk.

The library search can be made with original spectra as well as after mathematical manipulations such as derivation, smoothing and background subtraction. Existing libraries can be edited and extended and new ones created.

For automated routine analysis, the library search program can be customised with MACRO programs.

Once the user has defined the optimum wavelength and bandwidth for each compound, the chromatograms are quantitated simultaneously using versatile integration software. Timed events such as area reject, threshold value and baseline allocation are defined interactively on a graphics display. To re-integrate without reinjecting, the user simply modifies the set-points on the display.

The integrator reports HEIGHT%, AREA%, NORM%, ESTD and ISTD. Other features, which help improve quantitation include multiple internal standards, peak area

allows all fluorescence detector parameters including excitation and emission wavelength selection, PMT gain, lamp frequency, response time and time programming to be set up on the ChemStation monitor. Practically any number of analysis methods can be stored on the hard disk. In a sequence, the same or different samples can be run under different conditions.

During a run, the chromatogram can be monitored on a screen and the raw data are stored. After the run, the raw data are available for all the HP ChemStation evaluation routines, e.g.:

- * overlay of signals from different runs.
- * normalisation and overlay of excitation and emission scans.
- * optimisation of wavelengths.
- * annotation of chromatograms and scans.
- * integration of peaks.
- * calibration with a standard.
- * statistical evaluation of data.

All the above evaluation procedures can be automated and customised. In addition, programs are available for calculating and plotting statistical data for a series of runs.

If the fluorescence detector is used in a series with an HP 1040M diode-array detector system, both data acquisition and raw data are stored in common files, so that instrument control and data evaluation can take place simultaneously (Figure 2).

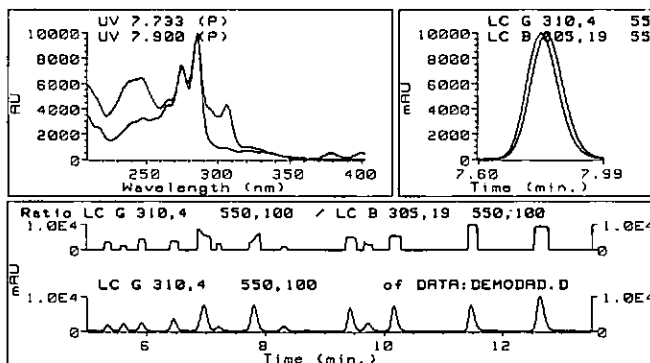


Figure 1.

300 16/32 bit computer provides all the facilities needed for data acquisition, comparison of data, integration and report generation. And the fast-interactive graphics make the system so easy to use.

During an analysis signals and spectra over a wavelength range of 190 to 600nm are stored on a Winchester disc drive, then after the run, the software provides the user with access to a 3-dimensional matrix of analytical information, absorbance over the full wavelength range and elution period. You choose the optimum wavelength to quantify each of the peaks.

By pressing the COLOUR VIEW key, all spectra are converted into a map of iso-absorbance data (see front cover of catalogue). The user gets a thorough overview of the sample by moving a horizontal or vertical cursor through the map.

As the horizontal cursor is

visible.

Not only can impure fused peaks be identified as such, but by using the optional QUICKRES software, these co-eluting peak sets can also be mathematically resolved into their components. Utilising state-of-the-art chemometrics techniques QUICKRES flags impure peaks, resolves these peaks into the underlying components and allows absolute identification and quantitation of each compound, without any prior knowledge of spectra, peak shape or retention index.

Peak identity can also be confirmed using the built-in UV/VIS SPECTRAL LIBRARIES. The software allows you to select a peak within a chromatogram and then specify a retention-time "window" and a library file. The program then instigates a search of the library for the ten best matches with the unknown peak. The first match is overlaid with the spectrum of the unknown peak and the match

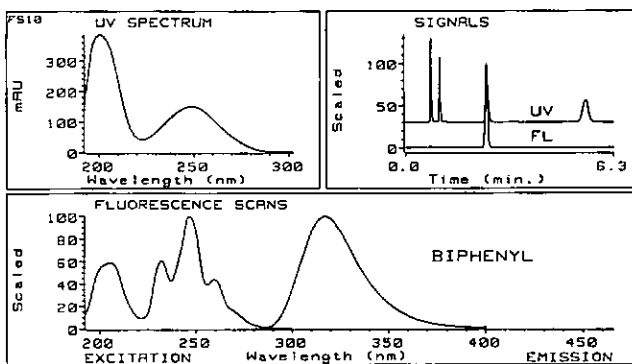


Figure 2.

ratios and multi-level calibration. Results can be printed in a variety of formats and you choose from a selection of HP printer/plotters.

Another exciting new capability is the HP-IB interface between the ChemStation and the HP 1046A programmable fluorescence detector. This

For further information or a demonstration of the HP 1040M/1046A contact your nearest Northrop Office i.e. Peter Hermans at Auckland, Ph: 545-065, Wayne Sprosen at Wellington Ph: 856-658.

For further information please circle no. 20 on reader reply card.



Special Gases

TRADITIONAL SUPPLIERS OF:
HIGH TECHNOLOGY PRODUCTS INCLUDING
GASES EQUIPMENT

Calibration Standards
Zero Grade
Instrument Grade
Certified Grade
Ultra High Purity
Research Purity
Liquid Helium
Mixed Gases

Matheson Regulators
Flowmeters
Leak Detection
Flash Back Arrestors
Control Valves
Mass Flow Controllers
Mixing Systems
Purification Filters

COMPLETE ANALYTICAL SERVICES
INCLUDING SAMPLE TESTING

AUCKLAND: PH 598-166 MR SKINNER
WELLINGTON: PH 684-249 SPECIAL GASES
CHRISTCHURCH PH 487-199 MR CARTER

Minutes of the Annual General Meeting of Members of the New Zealand Institute of Chemistry held at the University of Otago, Archway Lecture Theatre No. 1, at 5.00 pm on Tuesday 26 August 1986.

1. The President, Professor GB Petersen, welcomed the 46 members present and called for apologies.

2. APOLOGIES received from Professor AD Campbell, Dr J Cutfield, Professor RD Laverty, Professor KM MacKay and Mr KE Seal were accepted by the meeting.

3. MINUTES: On the motion of the President/General Secretary the minutes of the 1985 Annual General Meeting as distributed were taken as read and confirmed.

4. MATTERS ARISING: There was no business arising from the 1985 meeting to report.

5. ANNUAL REPORT: Professor Petersen/Dr Rogers moved the adoption of the Annual Report as published in the August 1986 issue of *Chemistry in New Zealand*. In speaking to the Report the President noted:

a. The establishment of a development fund to provide for paid secretarial service.

b. The need for recruitment. Professor Petersen described the recruitment package including the June issue of *Chemistry in New Zealand* which Council had made available to branches for this purpose. In reporting that Council had asked for the preparation of new publicity publications, modelled on those of RACI and other Societies, the President said it was to the advantage of branches as well as to the NZIC in the long run to recruit student members as well as qualified chemists. Professor Petersen reminded the meeting of the concession for post-graduate students to continue to pay the student rate, currently \$10.00 plus GST. Applications for this must be made through branch committees. It is available to those

receiving less than \$10,000 p.a. There was no comment on the Report by the meeting and the motion was carried.

6. FINANCE: After moving the adoption of the 1985/86 Statement of Income and Expenditure and the 1985/86 Balance Sheet (Registrar/President) as published in the August 1986 issue of *Chemistry in New Zealand* Mr Hogan outlined the sources of the surplus resulting from the year's operations. The meeting received the Statement and Balance Sheet and adopted the motion.

7. ELECTION OF OFFICERS: Professor Petersen reported that Council had elected the following to take office from 1st September 1986:

President: Dr B Halton
1st Vice President: Mr TR Hitchings
2nd Vice President: Dr DR Llewellyn
Dr J Rogers was elected as Honorary General Secretary.

8. AWARDS AND PRIZES: The President drew members' attention to the award of the OBE to Professor HN Parton (a former President of NZIC) and of the election of Professor Charmian O'Connor as a FRSNZ.

Professor Petersen announced that Honorary Fellowship had been conferred on: IRC McDonald, Dr J Rogers, Dr HP Rothbaum and AH Wooff. He reported that Prizes were awarded as follows:

Easterfield Award: Dr PJ Steel, Department of Chemistry, University of Canterbury.

ICI Prize: Dr WA Denny, Cancer Research Laboratory, University of Auckland.

Shell Prize: ND Blazey, NZ Pharmaceuticals Ltd, Palmerston North.

1987 NZIC-RACI Visiting Speak-

er Award: Dr RB Bucat, University of Western Australia.

Chemical Education Award: AG Groves, Ellesmere College, Leeston.

Chemical Essay Prize: B Whittington, University of Canterbury.

Student Paper Prize: AM Manning, University of Otago.

9. GENERAL BUSINESS: The President noted that Council had allocated \$20,000 of NZIC funds as the nucleus for a NZIC Chemical Education Trust, the deed for which a legal firm was to be commissioned to prepare. Other indications of Council's concern for chemical education and the "Image of Chemistry" were its decisions to arrange a National Chemistry Week in 1987 and to seek Associate Membership of the New Zealand Chemical Industry Council.

For 1987's National Chemistry Week Mr Hitchings would co-ordinate programmes arranged by the branches as a pilot for future years. A budget of \$2000 had been allocated for this.

Dr D Newstead, Chairman of the Manawatu Branch, said that the Manawatu Branch now supported the proposal by the Auckland Branch that the non-corporate grades of membership — Technician, Graduate and Associate — be combined into one called Associate.

Professor Petersen in commenting on Dr Newstead's statement said that Council had decided to ask the Auckland Branch to send to branches new evidence supporting its initiative for this proposed change to the grades of non-corporate membership.

The President emphasised the initiative for this change came from the Auckland Branch, not from Council. If the proposal was adopted there would be

two non-corporate grades of membership — Student and Associate — and two corporate ones as at present — Member and Fellow.

Professor Petersen asked that members of branches be consulted on this important issue and that discussion not be confined to branch committees.

Mr G Husheer expressed concern about proposals for changes to the Laboratory Technology course for NZCS. He referred particularly to glass blowing, which he noted as an example of the laboratory skills not commonly found in graduates.

Dr Halton expressed the appreciation of Council and members of the Institute to the retiring President for his leadership. In his address to branches during the year Professor Petersen had communicated his enthusiasm for research in biochemistry. His Presidential Address to the Conference earlier in the day had brilliantly expressed his concerns for the effects of changes in Government policy on the careers of chemists and the future of science in New Zealand.

In replying, Professor Petersen said he had enjoyed his year as President and in handing over this responsibility offered his good wishes to Brian Halton, his successor. He noted that in accord with Council policy to adopt a higher public profile for the Institute, a press release was being made about the awards announced at the meeting.

Before concluding the meeting the President presented Dr J Rogers, Honorary General Secretary, with the certificate for Honorary Fellowship after outlining his career and service to the Institute. The meeting closed at 5.30 pm.

NOTICES

1987 NZIC Annual General Meeting

The Annual General Meeting of the New Zealand Institute of Chemistry will be held at 5.00 p.m. on Tuesday 25 August 1987 following the Easterfield, 3.30 p.m., and Presidential addresses, at the University of Auckland, Library Building, B15.

Agenda

1. Welcome by the President, Dr B Halton.
2. Apologies.

3. Minutes of 1986 AGM to be confirmed.

4. Matters Arising.

- (i) Chemical Education Trust.
- (ii) National Chemistry Week.
- (iii) Associate Membership NZIC.

(iv) "The Image of Chemistry" — NZIC's public profile.

5. Annual Report. See August issue of "Chemistry in New Zealand."

6. Finance — 1986/87 Statement of Income and Expenditure.

— 1986/87 Balance Sheet. See August Journal.

7. Election of Officers: President, First Vice-President, Second Vice-President, General Secretary.

8. Prizes: ICI, Shell, Chemical Education, Chemical Essay, NZIC/RACI Visiting Speaker.

9. Non-corporate grades of membership.

10. General Business.

J Rogers
General Secretary

Chemical Education Trust

The Chemical Education Trust is now established and receiving contributions for its Fund. All corporate members of the Institute should by now have received a letter from the President inviting them to contribute to this worthy cause.

Donations to the Trust are tax deductible. Annual donations, once-only contributions, and contributions by way of legacies or covenants are all welcome.

NZIC ANNUAL REPORT 1986-87

On behalf of the Council I have pleasure in presenting the Annual Report for the 56th year of operation of the New Zealand Institute of Chemistry.

The past year has seen the Institute continue its positive programme of developments to allow it to respond effectively to events and to meet the needs of its members in our changing society.

Three former Presidents, Alan Mackney (Chairman), Geoff Malcolm and George Petersen have agreed to serve as the first trustees to administer the Trust Deed of a Chemical Education Trust Fund. This Fund was established by Council in August, with an allocation of \$20,000 from our reserves, to promote the study and teaching of chemistry in secondary schools. Following submission of the Trust Deed to the Inland Revenue Department, tax exemption for contributions to the Fund by individuals/companies was approved. With a target of \$100,000 the fund was launched and letters seeking contributions have been dispatched to the widest possible range of N.Z. industry and its support services. Corporate members will have received a similar invitation and we earnestly seek your financial support if we have not yet received it. In 1987-88 the trustees are expected to invite nominations of projects for support from branches. The Manawatu Branch has established a similar fund to support chemistry teaching in the secondary schools of its region.

In February Council authorised John Rogers to seek approval for the printing of new publicity brochures for corporate, non-corporate and student members from designs produced and used by RACI. We thank the staff of the RACI for generously making these available to us for modification for our needs and for assisting in the production. The new pamphlets will be available for the 1987-88 recruitment campaign. Despite such efforts and a major recruitment programme in the branches in June last year the Institute is not attracting the graduates it ought. While it may be argued that NZCS holders are unattracted to our non-corporate structure, the proportion of university chemistry and biochemistry graduates that join our ranks is inadequate for the well-being of the Institute. Indeed the membership statistics included in this report are cause for continuing concern as the overall increase in membership fell to

19 — half the average of the last 30 years. However, in the Auckland Branch, membership increased by 44 (over 10%); the number of Student members almost trebled and those of its Graduate members almost doubled. This demonstrates that opportunities do exist for recruiting young chemists. Membership of the Canterbury and Manawatu branches also increased, whereas that of Wellington, Waikato, Otago and overseas declined.

At its August meeting, Council agreed to support work of the General Secretary and Auckland Branch in assembling a Chemists' Support Package designed to meet the needs of members made redundant as well as of those seeking their first job or changing their employers. Branch newsletters afford useful opportunities for employers to advertise vacancies, including part-time and temporary positions.

The work of the Institute continues to be performed by a largely voluntary group at both the national and the local level. Nonetheless, there is a greater expectation of "performance" by Council and the branch committees; indeed the nature of New Zealand society today demands it. In order to provide for a higher profile and greater efficiency the duties of the Council officers were reviewed last August and a division of responsibilities agreed upon. I am particularly grateful to the Vice-Presidents for accepting a higher profile (and workload) than had become traditional. The demands made upon the General Secretary have also grown and Council is currently assessing the impact of this with a view to providing an honorarium by analogy with that made available to the Registrar. The co-ordination of the responsibilities of the General Secretary, the Administrative Secretary and the Registrar is also under investigation. There can be no doubt that the time for a fully paid professional secretariat is not too far into the future and Council has been exploring these matters in general terms so that there is a smooth transition to a permanent office with full-time staff in about five years' time. It was specifically with this in mind that a development fund was established last year with \$30,000 from reserves and by placing a \$5.00 levy on all but student member subscriptions; Council increased this latter figure to \$6.00 for the 1987-88 financial year.

Awards, Prizes and Honours:

We have pleasure in recording the awards made by the Institute, and the honours bestowed by external organisations upon our members. Thus Institute prizes were awarded as follows:

Easterfield Award: Dr PJ Steel, University of Canterbury.

ICI Prize: Dr WA Denny, Cancer Research Laboratory, Medical School, University of Auckland. Shell Prize for Industrial Chemistry: Mr ND Blazey, NZ Pharmaceuticals Ltd., Palmerston North.

With the approval of the sponsor, this Prize was renamed "The Shell Prize for Industrial and Applied Chemistry". Shell New Zealand Holding Company Ltd is thanked for raising the value of this prize to \$500.00 plus a certificate commemorating the achievement.

NZIC/RACI Visiting Speaker Award: Dr RB Bucat, Chemistry Department, University of Western Australia.

AC Kennett Memorial Award (jointly with the Australasian Corrosion Association): Mr DW Postins, Air New Zealand, Auckland.

Chemical Education Award: Mr AG Groves, Ellesmere College, Leeston. This was the inaugural award.

Chemical Essay Prize: Mr B Whittington, University of Canterbury.

Student Paper Prize: Mr AM Manning, University of Otago.

Chemistry V AAVA Prize: Mrs C Newman, New Zealand Steel, Glenbrook.

Honorary Fellowship of the Institute was conferred upon Professor RM Barrer, Drs J Rogers and HP Rothbaum, Messrs IRC McDonald, KE Seal and AH Wooff.

We have pleasure in acknowledging the award of an O.B.E. to Professor HN Parton, the Hector Medal of the Royal Society to Dr AJ Ellis and Royal Society Prince and Princess of Wales awards to Drs RJ Weston and H Young. Professor CJ O'Connor was elected to Fellowship of the Royal Society in 1986 and Drs EN Baker and WT Robinson likewise in 1987. Mr N Lodge was awarded one of the inaugural Science and Technology awards by the Minister of Science and Technology.

The President was accorded Honorary Fellowship status for his term of office by the RACI and CIC. Dr TH Spurling, President RACI, was elected Honorary FNZIC.

Conferences The Inorganic

and Organometallic and X-ray Crystallography specialist groups held a very successful two day meeting at Massey University in May 1986. Over 40 of the 90 participants were MSc and PhD research students. A principal speaker was Professor W Cullen from the University of British Columbia, with sponsorship from our Overseas Visitors' Fund.

With the New Zealand Biochemical Society the Institute sponsored an IUB symposium on "Genetic Manipulation: Its Application and Potential" 19-22 August at Hanmer Springs, preceding our joint Annual Conference in Dunedin. Our President, Professor George Petersen, was chairman of the organising committee. Over 175 delegates (many of them graduate students) attended. Twenty-two papers were given by overseas invited speakers. This international meeting provided an opportunity for New Zealand molecular biologists to meet and hear some of the world leaders in the field.

The Institute is grateful to Professor Arthur Campbell (Chairman), Dr John Cutfield (Secretary) and the Committee for organising the joint conferences with the NZ Biochemical Society and the Australian and New Zealand Society for Mass Spectrometry at Otago University, August 24-29. The linking of the meetings under the general umbrella of instrumental methods proved to be very popular with some 310 registrants. A significant number of eminent plenary lecturers were attracted from overseas and these included Professors MM Bursey (North Carolina), CT Caskey (Houston), B Freiser (Purdue), A Kuskis (Toronto), JA McCloskey (Utah), H Schwartz (Berlin), Drs M Brown (ANU), G Gray (Varian Associates, Palo Alto), G Wider (Brucker — Australia), G Winter (Cambridge), PE Wright (Scripps Clinic, California), and Mr R Self (Norwich). Those who attended were accorded typical southern hospitality, a first rate scientific programme, and a week filled with highlights. A conference surplus of about \$3000 was returned.

During an international symposium on the production of fuels and chemicals from natural gas (hosted by the University of Auckland, 27-29 April), Professor RM Barrer, FRS, was presented with the Honorary Fellowship of NZIC. A graduate of Canterbury College, he received a standing ovation for his address to the three day

Cont. on next page

INCOME AND EXPENDITURE FOR YEAR ENDED 30TH APRIL 1987

1985/6		1986/87		1985/6		1986/7
\$		\$		\$		\$
	EXPENDITURE				INCOME	
	ADMINISTRATIVE AND			67,829	Subscriptions	76,363
	SUNDRY EXPENSES				Interest Received:	
1,000	Accountancy/Audit Fee	1,825		2,249	— Bank of New Zealand	3,165
	Branch Expense Grants			1,771	— BNZ Finance Ltd	
9,793	— Re Capitation Fees	9,615		5,476	— Equiticorp	
3,000	— Re Student Travel	3,000		540	— Fletcher Challenge Ltd	
800	Computing, Address Labels etc	3,006		31	— Local Body Stock	31
—	Conference Registrations			150	— Royal Society of New Zealand	189
	— Council Donations	641		642	— UDC Group Holdings	264
3,000	Prince & Princess of Wales			—	— AGC (NZ) Ltd.	1,370
	Science Awards Scheme	3,000		10,859		5,019
	Chem 13 Exam Expenses	120		50	Donations Received	
8,818	Honoraria & Allowances	9,552			Conference Surplus	
—	ANZAAS Conference Contribution	987		4,785	— Canterbury	
2,417	Overseas Visitors Expenses	1,773			— Dunedin	2,553
6,073	Printing, Stationery, Stamps	10,547			— Genetic Manipulation	546
900	Prizes	550			Sale Ties and Scarves — Net Surplus	137
	Subscriptions					
653	— Royal Society of N.Z.	631			Excess of Expenditure Over	
140	— S.A.N.Z.	160			Income for Year	4,838
50	— I.P.E.N.Z.	50				
—	— F.A.C.S.	614		<u>\$83,523</u>		<u>\$89,456</u>
60	— N.Z Futures Trust	60				
5,407	Travelling Expenses	10,170				
491	Depreciation	491				
42,602		56,792				
	PUBLICATIONS					
19,580	Journal — Publisher	22,110				
1,900	— Editor	2,000				
1,030	Chem NZ	1,161				
382	List of Members					
3,380	Sundry Publications	1,510				
26,272		26,781				
1,413	Less: Publication Sales	2,027				
24,859		24,754				
67,461	TOTAL EXPENSES:	81,456				
—	Proposed Transfer to Development					
	Fund (\$5/Member)	7,910				
16,062	EXCESS OF INCOME OVER					
	EXPENDITURE FOR YEAR					
\$83,523		\$89,456				

NEW ZEALAND INSTITUTE OF CHEMISTRY (INC) NOTES TO FINANCIAL STATEMENTS

CONTINGENT LIABILITY:

Prior to Balance Date the Institute, as Settlor, entered into a commitment to pay by way of gift, \$20,000 of the Institute's Funds, to the Trustees of a Trust being formed for educational charitable purposes: in chemistry in particular.

STATEMENT OF ACCOUNTING POLICIES:

General Accounting Policies

The measurement base adopted is that of historical cost. Reliance is placed on the fact that the entity is a going concern.

Accrual accounting is used to match expenses and revenue.

Particular Accounting Policies

The Financial Statements have been prepared on a GST exclusive basis.

Subscriptions in Arrears and Sundry Debtors are stated at expected realisable value.

Depreciation has been charged using the straight-line method based on an estimated 5 year economic life of the assets concerned.

Investments are stated at cost or, where applicable, with the addition of interest compounded to date.

These accounts must be read subject to the attached notes.

lobby Members of Parliament in their regions, with regard to the Beattie Report, and to offer assistance to them for a better understanding of the scientific issues. Similar action was initiated to assist media reporters and in this context it is gratifying to record a marked decrease in the errors which hitherto marred many press reports. Despite these efforts the image of chemistry remains at a low level due in the main to the environmental and health hazards that are perceived to emanate from the chemicals industry. Accordingly we support the efforts of the New Zealand Chemical Industry Council (NZCIC) to safeguard chemical workers, the public and the environment. Council sought and was pleased to accept Associate Membership of NZCIC. The Institute and NZCIC have

in common the concerns of safety and health (including storage and transport), environmental protection and public relations.

Our Hazardous Chemicals Committee has made submissions to the Department of Labour on the "Assessment and Control of Major Accident Hazards in Industry". Moreover, this committee and the Environmental Committee are assisting the Ministry for the Environment to produce a management strategy for hazardous substances. Institute members are encouraged to assist NZCIC by joining its local Hazardous Substances Technical Liaison Committees which exist nationwide.

National Chemistry Week. Council has established National Chemistry Week as part of its

programme to raise NZIC's public profile. We thank Vice-President Terry Hitchings and his helpers in Christchurch and branches, for their co-operation in preparing our inaugural National Chemistry Week, 15-22 August 1987. Aimed primarily at the school pupil in 1987, the outcome of poster, photographic, essay and analytical competitions will be displayed during the Auckland Conference. The 1987 NZIC/RACI Visiting Speaker, Dr Bob Bucat, will address branch meetings during this week.

International Chemistry: The involvement of NZIC in the international chemical community has continued at a consistent level. The IUPAC Affiliate Member scheme has continued. Professor Arthur Campbell, a member of the IUPAC Bureau,

will represent NZIC at a meeting of world chemical society presidents in New Orleans in August immediately after an IUPAC Bureau meeting. A further International Chemical Congress of Pacific Basin Societies is to be held in Hawaii in 1989. Council accepted an invitation to be an official participating organisation (as it was for the 1984 meeting) and is to be represented in the planning for this Congress by Brian Halton.

Chemical sciences were well represented at the 1987 ANZAAS meeting in Palmerston North, thanks to the efforts of Professor GN Malcolm and his colleagues at Massey University. NZIC was pleased to be associated with the arrangements which enabled Dr Mary Good (President, American Chemical

Cont. on next page

Society) to be a keynote speaker and to have its own President chair the satellite-linked lecture by Professor John Cadogan (Research Director, British Petroleum).

Application of Council's 'Overseas Visitor Fund' has enabled sponsored lecture tours to take place by Professors MI Bruce (University of Adelaide), June 1987, W Cullen (University of British Columbia), May 1986, W Jennings (University of California), February 1987, A Kuksis (University of Toronto), September 1986, HA McCloskey (University of Utah), September 1986, and J Ruzicka (University of Denmark), March 1987.

Professor Barry Welch, Department of Chemical and Materials Engineering, University of Auckland, addressed 12 RACI branches and also delivered seven seminars to university chemistry departments and industry groups in three visits to Australia (July, August, November, 1986) as NZIC/RACI Visiting Speaker. His research specialty — aluminium smelting — was his principal topic. Dr Bob Bucat, Department of Physical and Inorganic Chemistry, University of Western Australia, was elected as the 1987 NZIC/RACI Visiting Speaker. He

will talk about his work as the Australian Academy of Science supervising editor for the Academy's school chemistry project during his visit in August.

The joint conference with RACI to mark the Australian Bicentenary which was scheduled to take place in Hobart in January next has now been cancelled. We thank those members who had accepted responsibility as session convenors.

The fraternal greetings of this Institute were dispatched to the Association Quimica Argentina on May 27 to mark the 75th anniversary of the founding of that society.

Publications. Our flagship publication, *Chemistry in New Zealand*, has continued to mature under the enthusiastic editorship of Dr Bruce Graham, supported by the Editorial Committee. The assistance and co-operation of our publisher, Allan Breckell, has enabled high standards of publication to be maintained. Increased advertising has allowed the cost of the Journal to be held in 1987. The assistance of members is sought in obtaining additional advertising revenue so that our major cost can be reduced.

Council expresses its appreciation to Dr Andrew Brodie and his editorial group who produced another four issues of *Chem NZ*. The editorship passes to Dr Gary Burns at Victoria University in 1988.

Finance. The balance sheet shows an excess of expenditure over income of \$4,838. This loss is occasioned by a considerable growth in subscriptions in arrears and by the crediting of the Equiticorp investment interest to the Development Fund. The \$5 per member (except Students) contribution to the Development Fund voted by the Council could not be made as there were insufficient funds. The sum of \$7,910 shows as a contingent liability to the fund. There is a commitment to contribute \$20,000 to the Chemical Education Trust which is now formally registered as a Trust. This is able to be met in part by the AGC investment but an additional transfer is necessary this financial year to meet the full commitment. These two commitments will put great pressure on this year's income and expenditure and Council will need to look carefully at future subscription rates and other sources of income.

Overall the financial situation of the Institute is strong but virtually all reserves are now committed to either the Development Fund or the Chemical Education Trust. It would be of the greatest possible assistance if members could pay their subscriptions early in the financial year and particularly if those in arrears could clear their accounts. Only in this way will Council be able to give members an improved service and to plan for a stronger Institute in the future.

(DJH)

Acknowledgements. Much work for the Institute is performed largely by a number of unsung members. To those who have participated and assisted with our various programmes during the year I offer my sincere thanks. Without such help the aims and objectives of the Institute could not be fulfilled. Please consider the up-coming branch elections and decide in which way you can best promote our Institute and our profession.

Brian Halton
President

30 June 1987

Duran laboratory glassware has got a lot of bottle

It's a fact. DURAN® laboratory glassware has got a lot of bottle. Or should it be bottles? Either way it's true.

Let's take bottles first. Schott was the first laboratory glassware manufacturer to introduce borosilicate glass bottles with ISO screw caps. And as yet no other manufacturer has come up with a range of bottles that beats Schott's quality.

No other laboratory bottles are made to such a consistently high quality. Wall thickness and external dimensions are what they claim to be. There aren't many manufacturers that can say that.

But then, only Schott can claim to be Europe's leading manufacturer of special glass.

So, next time you're in the market for laboratory glassware — whether it's bottles, beakers or whatever — ask Lab Supply Pierce for DURAN.

DURAN is a registered trademark of SCHOTT GLASWERKE, Mainz



Lab Supply Pierce (NZ) Limited

* 165 Sunnybrae Road, Glenfield, P.O. Box 32-234, Birkenhead, Auckland 10, New Zealand. Tel: 444-7314, 419-2551 Telex: NZ21424

* 32 Sheffield Crescent, P.O. Box 20035, Christchurch, New Zealand. Tel: 587-410, Telex NZ4774



NZIC OFFICERS AND MEMBERSHIP 1986/87

NZIC Elected Officers

President: Dr B Halton; 1st Vice-President: TR Hitchings; 2nd Vice-President: Dr DR Llewellyn; Hon. General Secretary: Dr J Rogers.

Branch Delegates to Council

Auckland — Dr SJ de Mora; Waikato — Prof. KM Mackay; Manawatu — Dr KR Whittle; Wellington — P.G. Best; Canterbury — Dr MHG Munro; Otago — Dr RAJ Smith.

Officers Appointed by Council

Registrar: DJ Hogan (31/12/87); Admin. Secty: Mrs NE Wignall (31/12/87); Journal Editor: Dr BWL Graham; Hon. Librarian: Dr EW Ainscough; Archives Officer: Dr RFC Claridge (31/12/87).

Obituary

We record with regret the deaths of the following members: SG Brooker Hon. Fellow (Auckland), Sir MM Burns Hon. Fellow (Canterbury), SR Gay Hon. Fellow (Canterbury); AG Hale (Wellington), RJ Lancaster (Waikato), Mrs EM Thomson (Otago), D Whillans (Auckland).

Membership

During the year the following changes in membership have taken place. Hon. Fellows (new) 1, (elected) 4; Fellows (new) 1, (elected from M.) 13; Members (new) 17, (elected from G.) 20, (elected from A.) 2; Associate (new) 4; Technician (new) 1; Graduates (new) 53, (elected from St.) 5; Students (new) 46; Deaths 11; Resignations 39; struck off 54. Nett gain 19.

COUNCIL COMMITTEES

Standing

President Dr B Halton, Delegate from President's branch (PG Best), General Secretary (Dr J Rogers), Registrar (ex-officio).

Finance and Honours

President, 1st Vice-President (TR Hitchings), 2nd Vice-President (Dr DR Llewellyn), General Secretary, Registrar.

Membership

RH Hopgood (31/12/87), Dr GJ Wright (31/12/88), Dr RJ Furkert (31/12/89).

Publications

Dr JR Cretney, Dr HKJ Powell.

Editorial

Editor (Dr BW Graham), Dr AC Herd, Dr WA Denny, Dr JH Garside, Dr PE Nelson, Dr R Whiting, CLH Stonyer, DM Fenton.

Public Affairs and Science Policy

Dr DE Wright, AA Turner (31/12/87), The President (ex-officio).

Chemical Education

GW Valpy (Convenor), PG Best (Council Rep.), W Freitag, Dr WR Sharman, Dr WC Tennant.

Chemical Syllabus

MM Cosgrove (convenor), Dr MA Carr, PJ Tree, Dr CE Devine, Miss V Kirkwood.

Environmental

Prof. R Laverty (Convenor), Dr PW Larking, Dr GF Laws, Dr RAJ Smith (Council Rep), Prof. AD Campbell, Dr KA Hunter, Dr WA Temple, (corres. Ms) Auckland — Dr SJ de Mora.

Hazardous Chemicals

Dr WA Temple (Convenor), Prof. AD Campbell, Prof. GB Petersen, A/Prof MR Grimmett, AN Scrymgeour. (corres. Ms) Auckland — RH Hopgood, DJ Ogilvie; Waikato — Dr WP Judd; Manawatu — Dr GA Lane, Dr DF Newstead; Wellington — AA Turner, Dr GP Irwin; Canterbury — Dr NJ Peet, Dr ETJ Bathurst.

Representatives to Other Bodies

AAVA W Freitag (31/3/88), deputy, NR Edmonds (31/3/88). SANZ Dr HJ Percival (31/3/88).

UNESCO N.Z. Committee Dr GR Burns.

FACS Working Groups Chemical Education — GW Valpy; Instrumentation — JG Clarke; Chemistry and the Environment — Prof. R Laverty; Chemistry and Industry — GM Ryburn; Professional Affairs — Dr J Rogers.

MEMBERSHIP STATISTICS: APRIL 30 1987

BRANCH	HON.F	FELLOW	MEMBER	ASSOC.	GRAD.	TECH.	STUDENT	TOTAL
Auckland	10	76	255	31	49	10	35	466
Waikato	5	22	92	5	24	1	3	152
Manawatu	0	31	98	9	7	2	7	154
Wellington	7	71	222	4	26	0	9	339
Canterbury	7	68	112	5	24	1	10	227
Otago	1	49	54	3	13	2	1	123
Overseas	4	28	138	2	13	1	1	187
TOTAL:	34	345	971	59	156	17	66	1648

Branch Membership:

April 30	1984	1985	1986	1987
Auckland	404	406	424	466
Waikato	138	148	164	152
Manawatu	143	148	151	154
Wellington	338	344	349	339
Canterbury	215	214	215	227
Otago	128	133	131	123
Overseas	195	195	195	187
Total:	1561	1588	1629	1648

Specialist Groups:

Group	Secretary	NZIC	Non-NZIC	TOTAL
Analytical	DJ Hogan	52	2	54
Chemical Education	DT Howarth	174	354	528
Chromatography	Dr PG Robinson	114	166	280
Electrochemistry	Dr RJ McQuillan	31	27	58
Fats and Oils	Dr SF Hobbs	28	15	43
Geochemistry	Dr BW Robinson			
Inorg. & Organometallic	Dr GA Bowmaker	76	26	102
Organic Chemistry	Dr PJ Steel	83	4	87
Polymer Chemistry	RJ Norris	49	28	77
Thermodynamics	Dr GR Hedwig	16	3	19
X-Ray Crystallography	Dr GJ Gainsford	22	3	25

GOVT DEPTS AND RESEARCH INSTITUTES

DSIR, Divn. of Horticulture & Processing

Dr Harry Young is one of the recipients in the eighth series of awards announced recently by the Royal Society of New Zealand under its Prince and Princess of Wales Science Awards Scheme. Following the commissioning of a new mass spectrometer with fast atom bombardment capability, Harry plans to travel to London to gain first-hand experience both on the operational aspects and interpretation of results. After a training course provided by the manufacturer he will undertake specialised training with a leading researcher in the application of FAB to complex oligosaccharide problems.

Wool Research Organisation of New Zealand (Inc.)

Dr Peter Ingham, of the Textile Chemistry Group at WRONZ, is currently at the International Wool Secretariat Development Centre, Ilkley, England, studying aspects of the mothproofing industry as it applies to wool. He will be heading research projects in this area on his return to WRONZ.

Wheat Research Institute

Mr Tom Mitchell retired from the Wheat Research Institute on 10 June 1987. Tom worked at

the Institute for 31 years, the last five as the Director. Dr Bill Swallow is now the Acting Director.

DSIR Chemistry Divn, Gracefield

David Bibby, together with Russell Howe (University of Auckland), Clarence D Chang and Serge Yurchak (both of Mobil R & D) co-convoked an international meeting entitled 'Methane Conversion Symposium'. It ran from 27 April to 1 May — three days at Auckland and one day at Synfuels, New Plymouth. The symposium attracted 140 participants — including 100 from overseas. The Transactions will be published by Elsevier.

The Forensic Section is hosting a co-operative student — Greg Appleyard — from the University of Waterloo, Ontario. His time at Gracefield contributes to his BSc Honours course.

Lionel Sharman, Peta Stringer and Stuart Dickson attended the 11th meeting of the International Association of Forensic Scientists in Vancouver on 2-7 August. Yeap Foo left for one year's study leave at Corvallis at the end of July to work on research into useful products from waste materials from the forestry industries.

COMMERCIALISATION AT FOREST RESEARCH INSTITUTE

Since the April 1st shake-up (no, not another earthquake) at Rotorua caused by the simple minds of the revolutionary cadres in Wellington, there has been a major re-alignment of staff and responsibilities at FRI. A loss of over 60 staff (early retirements, redeployment etc) which debilitated certain sections has left the chemistry interests relatively unscathed. Graham Will and Nigel Cummins have retired; John Ralph (and wife Sally) has left to take up a scientific position at the University of California, Berkeley. Access to seven supercon NMR instruments for research purposes played a large part in his decision. Roger Meder (ex-Otago University) has joined FRI to assist with the NMR facility. The FTIR-GC system delivered last year is now fully operational and under the benign control of Bernard Dawson.

Due to the cost recovery restrictions imposed by the Government, these equipment and staff acquisitions are likely to be the last substantial ones for the foreseeable future. All current recruitment is related to revenue earning potential; equipment

budget is drastically reduced (it's an overhead!); objectives are becoming short-term and supported by contract staff. Most budget control has been delegated to research field leader level with the added onus of recovering a pre-set level of costs. This has led to the formation of co-operative group support units to provide routine analyses and consultancy and a much greater interaction with a range of industrial clients. That's where the money is! It has also stimulated international interaction as it is obvious, even within the short time these objectives have been in force, that it will be impossible to realise the income levels set by Government from national sources alone.

These requirements have come as a shock to some who are still failing to adapt to the new levels of management and operational skills required. However, overall the stimulation of more responsibility, identifiable objectives and more tangible (to Treasury) rewards will result in a more dynamic and effective research facility. If we survive the first three years!

UNIVERSITY NEWS

Victoria

Recent visitors to the Department have included Professor M Bruce University of Adelaide (NZIC sponsored visitor) who gave a seminar on Adventures with Acetylene; Professor Gordon H Whitham, Oxford University, who described approaches to the Stereospecific Synthesis of Tetrasubstituted Olefines, and Dr Malcolm Carr, Waikato, who spoke about Teaching and Learning about Energy: Some Problems.

Dr Simon Buckland has recently left the Department to take up a position at Chemistry Division, DSIR. Before he left he gave a seminar on his research in the Department.

Dr S.I. Smedley recently attended the 171st meeting of the Electrochemical Society in Philadelphia. Janet Burns has just left to attend and present papers at two conferences — the first an IUPAC Conference on Chemical Education in Sophia, Bulgaria, and the second on Girls in Science and Technology at Ann Arbor, Michigan.

China Visit — Dr Jim Johnston
Dr JH Johnston and Dr JDH

Collen of the Research School of Earth Sciences have just returned from a 3½ week visit to the People's Republic of China, where they were invited to give a series of lectures on petroleum exploration geochemistry and geology at the Lanzhou Institute of Geology, Lanzhou, Gansu Province. They also had research discussions with the staff and research students of the Institute and set up collaborative research programmes between the Institute and Victoria University of Wellington.

The Lanzhou Institute of Geology has some 200 staff and offers MSc and PhD programmes. It is very well equipped with a wide range of modern analytical instruments.

Following this, Dr Johnston and Dr Collen spent a week visiting the Yumen oil fields in the Gobi Desert, working with the scientific staff associated with the Yumen oil exploration programme and carrying out field work in the Gobi Desert.

Overall they were very impressed by the positive attitude towards and the encouragement for science in China, and also the high quality of the

graduate students coming out of the Universities and Research Institutes.

Canterbury

The Department is to host two visiting Erskine Fellows in the June-August period — Professor John Well, University of Saskatchewan, and Professor Martin Tobe, University College, London. Mr Bruce Clark, who recently completed his MSc, has been appointed to the technical staff with responsibility for the MS80 and MS902 mass spectrometers.

Otago

There have been several recent visitors to the Chemistry Department. Professor Michael Bruce of the University of Adelaide spoke on "Adventures with Acetylenes" on 17 June. Professor John Well of the University of Saskatchewan on 24 June gave a seminar on "The Trapped Hydrogen Atom", and Professor Martin Tobe of University College, London, spoke on 29 June on "Dimethyl sulphoxide: An anomalous rea-

gent in square planar substitution".

Dr Joe McKee from the Department of Chemistry and Biochemistry, Massey University, has taken up a UGC Postdoctoral Fellowship in the Chemistry Department to work with Associate Professor Don Brasch and the seaweed research group. Dr Simon Mitchell has completed a year of postdoctoral research with Professor Brian Robinson's group and has returned to the United Kingdom to a position in ceramics research.

In May, Dr Joan Parnell of the Human Nutrition Department was invited to speak at the 21st Annual Conference on Trace Substances in Environmental Health in St Louis, Missouri, USA; her topic was "The Effect on New Zealand Adults of Consuming Large Amounts of Cadmium in Oysters". Both Dr Parnell and Professor Marion Robinson subsequently attended the 6th Conference on Trace Element Metabolism in Man and Animals at Monterey, California, USA; to present their research on iron and zinc, and selenium, respectively.

PEOPLE

Dr Richard Garland has been appointed general manager of the Linton-based firm of New Zealand Pharmaceuticals Limited. He takes over on June 15 from Richard Barnes, who has left to become executive general manager for Steel and Tube in Wellington.



Dr Garland spent four years in research and development for Tasman Vaccines Laboratories before joining the pharmaceuticals company in 1976.

He had been involved in the company's technical operations and commercial activities before his appointment.

In 1978 Dr Garland was the first recipient of the Institute's Industrial Chemistry Prize, which at the time was sponsored by ICI-Tasman Vaccine Ltd.

Dr Tony Morcom has recently joined the staff of New Zealand Steel Limited at Glenbrook. Tony was a Technologist with UEB for a number of years but was made redundant in April as the result of company restructuring. He held a temporary position with the Department of Health, NECAL, prior to his new appointment.

Joan Mattingly is attending the 13th Congress of the International Federation of Clinical Chemistry at the Hague, 28 June-3 July, then visiting laboratories in the UK.

We note with regret the recent death of **Mrs Eileen Thomson MNZIC**, of Palmerston in Otago. Mrs Thomson graduated BA and BSc from Victoria, taught for a while in various secondary schools in the North Island, and then went to Otago as one of the early students of home science. Here she carried out research into seaweeds, and also met and married Mr TA Thomson BSc, and assisted in his studies in microchemistry.

Mrs Thomson devoted her married life to home and family, but remained a member of the Institute since first joining in 1939. She is survived by her husband who is a Fellow of the Institute.

BRANCH NEWS

Wellington

The 1987 Mellor Lecture was given by **Dr Graeme Gainsford** on the development of X-ray crystallography to its current form. The lecture was held in the Royal Society rooms on 1 July.

The Wellington Branch held a most successful combined meeting with the NZ Pharmaceutical Society in the new DSIR Gracefield campus conference centre on 9 June. The meeting was addressed by **Dr Jim Fraser** of the Health Department on food additives.

Canterbury

On 4 May **Dr Dennis Dutton** of the N.Z. Sceptics Society talked informally to a meeting of the Canterbury Branch. He briefly discussed the aims of this society, which is affiliated to the American Committee for Scientific Investigation of Claims of the Paranormal, and some of the cases the group had recently been involved with in New Zealand. The meeting was followed by a lively discussion of the role of such societies and the responsibility of scientists for informing the public on

scientific matters and exposing the flaws of pseudo-science.

Drs Murray Munro and **John Blunt**, of the Chemistry Department, University of Canterbury, presented a seminar entitled 'Anti-viral and Anti-tumour Compounds — Are New Zealand Invertebrates a Source?' to the June branch meeting. Murray Munro introduced the talk by backgrounding the approach that their multi-disciplinary group has taken to identifying and screening various invertebrates for types of biological activity and dealt with some of the problems associated with such work. John Blunt briefly outlined some of the classes of compounds of interest that have been isolated to date from their studies and illustrated his talk with some elegant examples of structure determinations using ^{13}C and ^1H NMR (the latter particularly using the nuclear overhauser effect).

Otago

On 11 June, **Professor Robin Ferrier** of Victoria University of Wellington gave the R.E. Corbett Lecture to the Branch on "Novel Approaches to Modern Medicinals".

The Art of Scientific Writing

From Student Reports to Professional Publications in Chemistry and Related Fields

by **H. F. Ebel, C. Bliefert and W. E. Russey**

1987. XIX, 492 pages with 27 figures and 16 tables.

Hardcover: DM 98.00/A\$ 80.40.

ISBN 3-527-26469-8.

Softcover: DM 48.00/A\$ 39.40.

ISBN 3-527-26677-1

Three scientists from both sides of the Atlantic have collaborated to make this book possible. The fruits of their experiences as authors, teachers, and publishing editors are here distilled for the benefit of others seeking to learn about scientific writing and publishing.

Marvels of the Molecule

by **L. Salem**

1987. 104 pages. Softcover. DM 45.00/A\$ 36.90.

ISBN 3-527-26530-9

An internationally known chemist takes the reader on a tour of the fantastic and incredible world of the molecule. Written in everyday language and beautifully illustrated throughout, the book describes the concepts that govern the structure, motions, and transformations of molecules, the basic building blocks of all matter and life.

Scientists in Conference

The Congress Organizer's Handbook
The Congress Participant's Companion

by **V. Neuhoff**

1987. Approximately 230 pages. Hardcover.

Approximately DM 60.00/A\$ 50.00.

ISBN 3-527-26579-1

This book is written for scientists faced with the challenge of organizing a congress, meeting or symposium. It considers in chronological order all items involved, ranging from the selection of place and date to social program, bookkeeping and final financial settlement.

Australian dollar prices are estimates. The actual price will be calculated on the basis of the exchange rate at the time of billing.

For further information please contact:

D. A. Book (Aust.) Pty. Ltd.

P.O. Box 163, 11-13 Station Street

Mitcham, Vic. 3132

Telephone (03) 8734411



For further information please circle no. 22 on reader reply card.

BOOK REVIEWS

PROBLEMS IN FLUID FLOW

D.J. Brasch and D. Whyman.
Edward Arnold, London, £13.75.

Most fluid mechanics texts have a bias towards civil or mechanical engineering with no material on particle-fluid mechanics, for example. Chemical engineering authors like Denn, de Nevers, and Nedderman and Kay do better in this regard, as do the authors of the more significant unit operations texts. But no matter how good the text, the student often finds difficulty in applying theory to actual problems.

Students should be able to understand worked examples before tackling fresh problems, but few texts include more than a sprinkling of problem solutions (Nedderman and Kay have none). The various problems manuals available in fluid mechanics (e.g. Douglas; Giles; Francis and Minton) suffer from the bias referred to above. Coulson and Richardson (Chemical Engineering, Volumes 4 and 5) deal well with fluid flow, but only as a part of a full unit operations course.

Don Brasch and Derek Whyman have identified a gap in the literature and filled it admirably. Wisely, their text includes no theory; detailed references point the reader towards readily available background reading, if this is needed.

Over 50 examples (supported by almost as many student exercises with answers) illustrate technical problems encountered in the pipe-flow of Newtonian liquids, gases and gas-liquid mixtures, flow mea-

surement, pumping of liquids, and open-channel flow. The solutions are clearly laid out and easy to follow. S.I. units are used throughout. I have a minor quibble. The authors use the Stanton-Pannell friction factor as do Coulson and Richardson, but most chemical and mechanical engineering texts prefer the Fanning or D'Arcy friction factor f , which is a particular form of the drag coefficient C_D used in Chapter 9.

An equally important section of the book deals with problems in packed bed flow, including applications to industrial filtration systems, and with particle-fluid interactions in such operations as sedimentation and classification, fluidisation, and pneumatic conveying.

Several of the topics not dealt with (e.g. applications of the momentum equation, the behaviour of multiple-pipe systems) are handled in books like Giles or Francis. If there is a topic I would like to have seen included, possibly at the expense of some of the open-channel material, it would be non-Newtonian pipe flow. Non-Newtonian materials are of considerable importance in the dairy, pulp and paper, and food industries and engineers used only to Newtonian fluids encounter pitfalls in trying to apply standard design procedures to non-Newtonian flow.

The authors suggest that their book has been written primarily for chemical and mineral engineers, but it deserves a wider audience. Mechanical and civil engineers, and industrial chemists, will find much

that is helpful and informative. It will be of value to the practitioner as well as the student. The authors are to be congratulated.

A.M. Kennedy
Dept. of Chemical
and Process Engineering
University of Canterbury

GUIDE TO SAFE PRACTICES IN CHEMICAL LABORATORIES

Royal Society of Chemistry,
London, 1986, 44 pp, £10.00.

General guidance on which specific procedures can be based is the broad objective of this Guide which updates the Royal Institute of Chemistry's 1976 publication "Code of Practice for Chemical Laboratories". The Guide recognises that laboratory design, equipment and procedures are subject to change, particularly in response to legislative developments and has attempted to anticipate such changes. Although aimed primarily at those who manage or work in chemical laboratories, principles in the Guide will also be of interest to those working with toxic, radioactive, or biological hazards.

Four subdivisions are made and discussed separately. They are "Organisation for Safety", "Hazards", "Design" and "Operation." There is also a comprehensive section of "Legislation and Bibliography" with legislation dealing specifically with chemical laboratories and a bibliography organised by each of the subdivisions. Cross references throughout the Guide link the sections together efficiently.

Every aspect of safety is covered by the Guide, from safety policy through to specific details in areas of safety usually taken for granted (such as refrigerator design, for example). The Guide can be applied to chemical laboratories in New Zealand as it stands but to obtain full value, it will be necessary to be familiar with the relevant UK legislation and publications listed in the bibliography. While some of the books are readily available standard safety texts, a large proportion are published by HMSO or other U.K. bodies. Obtaining these could prove to be a daunting task for anyone wishing to utilise the Guide to its fullest. Comparing the UK requirements to New Zealand's legislation and various codes of practice could prove a worthwhile activity.

The £10.00 cost is, however, out of all proportion to the size of the Guide and will probably limit its influence in New Zealand's chemical laboratories.

E.T.J. Bathurst
DSIR Chemistry Division
Christchurch

The Registrar will place an order with RSC for copies of this publication, at approximately \$30.00 per copy, within one month of the appearance of this review. Members wishing to avail themselves of this offer should write immediately to the Registrar, P.O. Box 29-183, Christchurch. The exact cost will be advised when the order is placed.

SAFETY PUBLICATIONS



The Management of Hazardous Substance Incidents

This publication contains the presentations from a seminar organised by the Department of Health and the Otago University National Toxicology Group, and held in Dunedin 24-28 November 1986. Key personnel from organisations including Health, Labour,

Fire Service, Police, Transport, Environment, Trade Unions and the Chemical Industry Council were invited to attend to discuss the responses expected from various agencies during a hazardous substance incident, and any deficiencies and means of improvement. The scope of the seminar subsequently extended to encompass a wide range of matters revolving around the central theme of "safety with hazardous substances."

The papers presented are grouped under a number of headings: Organisation and Regulatory Responsibility, Industry Viewpoints, Advice Services, Incident Control, and Discussion Papers. At the conclusion of the seminar the participants put forward some 16 recommendations which they felt were important in improving the current situation, and these are also included.

As a compilation of current "official" attitudes towards hazardous substance incident management, and as a pointer to future directions, this publication is essential reading for those with responsibilities in this area. Copies are available at a cost of \$20 each from the NZ National Poisons Centre, Medical School, University of Otago, P.O. Box 913, Dunedin.

The Shell Guide to Safe Handling and Use of Petroleum Products

This is the second edition of this booklet, which is one of the series initiated by Shell a few years ago. Written in a clear, concise style, and sprinkled with a few amusing illustrations, the basic aim of the booklet appears to be to provide ready information to those who need it most — the users of petroleum products,

either at home or on the factory floor.

The first half of the booklet provides general advice on the risks associated with petroleum products — namely fire and health hazards — and gives general advice on precautions against these. The second half describes each product in turn, and discusses the health hazards, handling precautions and emergency treatments related to it. The products covered are lubricants, diesel oil, bitumens, fuel oil, kerosines, LPG, motor spirit and aviation fuels.

This booklet would certainly be of use in informing people of the safe use and appropriate precautions for petroleum products — be they those sold by Shell or any other of the oil companies. Copies of the booklet are available from Shell Oil branches throughout the country.

HITACHI SCIENTIFIC INSTRUMENTS

Alphatech Systems now offer in New Zealand the range of equipment manufactured by Hitachi Scientific Instruments. This range includes transmission and scanning electron microscopes, research and teaching NMR systems, infrared spectrophotometers, UV/Vis spectrophotometers, fluorescence spectrophotometers and atomic absorption spectrophotometers.

Electron Microscopes

Hitachi scanning electron microscopes (SEM) have successfully pursued the ultimate objective of improving resolution while simultaneously achieving economy and ease of operation. Field emission electron source technology is now available in many models of the Hitachi SEM range, a technology which allows exceptional performance, particularly at low voltages with uncoated samples. The model S-900 achieves a resolution of 0.8 nanometers with magnification to 800,000x using this technology. At the other end of the scale, Hitachi model S510 with conventional tungsten electron source provides the ultimate ease of operation for student or industrial use with minimal operator training.

Similarly, Hitachi transmission electron microscopes (TEM) having achieved a resurgence in popularity worldwide in recent times, are now available again in New Zealand with one of the popular H-7000 models to be installed in August/September. Again, the emphasis is on superb quality of image with ease of use in a competitive instrument.

Spectrophotometers

Hitachi provide a complete range of microprocessor-based spectrophotometers for industrial, research and teaching laboratories. A feature on all but the most basic instruments is the inclusion of a CRT screen, printer and keyboard as standard items. The inbuilt pre-programmed software allows you to carry out a wide range of spectral manipulation functions that often require an add-on PC and extra software. With their significant advances over standard systems, they cost no more than less sophisticated instruments.

They also incorporate Hitachi's unique mechanically ruled Stigmatic Concave Grating which cuts down light scatter due to the line shape. This gives

extremely low stray light and highly accurate wavelength resolution, not possible with the normal type of grating.

UV/Vis Spectrophotometers

Hitachi UV/Vis spectrophotometers incorporate their mechanically ruled grating to give the highest degree of accuracy of the measured wavelength plus very low stray light necessary for precision spectrophotometry.

The low cost models U1000 and U1100 utilise their ratio beam system to give long term stability to the instrument's performance. They also automatically adjust the source light intensity to ensure maximum energy is available for all sample types. The 0.05% stray light is equal to the more sophisticated instruments of other manufacturers.

The newly introduced U2000 is in a class of its own with a scan speed of 2400 nm/min, spectral storage facilities and extended spectra computation facilities normally found on the top range instruments.

For a totally self-sufficient instrument, Hitachi's U3200 with a double monochromator, low stray light band pass settable to 0.1 nm stands alone. Its functions are controlled by an onboard computer that is fully programmable by the operator using both the inbuilt keystroke commands and basic programming language. It is possible to program the instruments to automatically carry out your own unique analyses and report on them without tying up your lab P.C. The soft keys operating from screen instruction make this unit the most user friendly instrument available.

If near IR is important then the U3400 based on the U3200 should be considered. Both these research grade instruments exceed the Australian NBSL requirements.

Infrared Spectrophotometers

The separate addition of a computer to carry out data manipulation and to store spectra is no longer required with the use of a Hitachi 270-30 or 270-50 infrared spectrophotometry system. With their floppy disk drive, CRT screen, keyboard and printer make these instruments totally self sufficient. The on-board software includes inter-spectra data calculations, spectral expansion, ABS/%T conversion, as well as baseline corrections, auto cali-

bration and a full range of user settable measurement parameters. As a workhorse for industrial applications, their specifications are well within the stringent requirements demanded by the NBSL and British Pharmacopeia standards. There are also a wide variety of accessories available to ensure its complete versatility.

For those who require only a basic unit the 260-10 is available, and if necessary may be connected to your lab computer via an RS232C as required. This instrument can also meet the stringent requirements of the NBSL standards.

Fluorescence Spectrophotometers

The major models of the Hitachi range of fluorescence spectrophotometers are the fully programmable F4000 and its sister F3000. As well as a full keyboard, the operating functions are carried out using the CRT and its eight soft keys. The CRT screen, printer and keyboard are standard. The F4000 includes a twin floppy disc drive. The units incorporate Hitachi's mechanically ruled grating to give greatest measured wavelength accuracy. The pre-scan function, automatic peak pick and automatic adjustment of the vertical scale on the CRT and plotter are possible. The F3000 can be upgraded to F4000 by the simple addition of a twin floppy disc drive.

Also available is the Model 850 with a resolution of less than 0.15 nm, and utilising a double monochromator ensuring highly accurate readings over the full wavelength range of 200-900 nm.

HPLC users with a need for fluorescence detection of their separations have a range of models especially developed by Hitachi. The F1000 is the largest selling HPLC fluorescence detector in Australasia. Combining its mechanically ruled stigmatic concave grating with a 150W xenon lamp, low bandpass and partially masked cell, give the F1000 the sensitivity to accurately measure 0.2 pg of quinine sulphate. Its versatility is also greatly enhanced by a selectable range of cell volumes, 2-40 ul extended emission wavelength range and position of the flow cell at the front of the instrument.

Atomic Absorption Spectrophotometers

Hitachi have been world leaders for many years in the

field of Atomic Absorption Spectrophotometry through their introduction of polarised zeeman effect flame and graphite furnace systems, Z6000, Z7000 and Z8000. Polarised zeeman effect allows the accurate measurement of low ppm and ppb levels of metals without the wide errors inherent in standard AA systems. They can also offer a flame and furnace system with the burners in tandem, removing the tedium of constantly changing these heads, and still incorporate their polarised zeeman system. A first for Hitachi is the introduction of the first and only instrument that is truly capable of simultaneously measuring four elements and a total of eight elements from eight lamps simultaneously lit can be automatically measured, in two groups of four. If the sample is too concentrated or requires matrixing this is automatically carried out by the inbuilt diluter. The Z9000 is now available as a graphite system with the flame system being released in November.

All Hitachi atomic absorption spectrophotometers include a data processing module as an integrated part of the standard unit so there are no hidden costs over the basic unit.

NMR spectrometers

Both basic units for research/teaching functions to fully automated top grade research FT-NMR instruments are available from Hitachi.

The R-24B is a low priced 60 MHz NMR capable of performing a wide variety of analyses, and does not require any particular operator skill to use. Double and triple resonance accessories may be added to further increase its versatility.

The model R600 is a high resolution fourier transform NMR that operates at 60 MHz for proton observation. Using this model it is possible to obtain routine spectra on quantities less than 500 micrograms at low cost.

The Hitachi R-90 FT-NMR is a fully automated instrument incorporating the latest computer technology. It is also capable of measuring ^1H and ^{13}C nuclei, incorporates substantial autocontrol and processing software and is the ideal instrument for work requiring critical analysis.

For further information please circle no. 1 on reader reply card.



ANALYTICAL CHEMIST

MIRINZ is centralising its services for the analysis of meat, meat industry byproducts, potable water, and other materials. This analytical service is primarily to support the Institute's R&D programme but is also to provide a service to meat companies and other commercial organisations.

We seek a person to supervise an analytical laboratory and to help develop analytical techniques which best meet clients' needs. The appointee must be familiar with modern analytical techniques such as HPLC, GLC, amino-acid analysis and atomic absorption. The minimum qualification is a good science degree, preferably at Ph.D. level with at least 5 years experience in analytical chemistry. The ability to maintain good working relationships in a service environment is important.

This position offers the opportunity to develop a recognised centre of excellence for analytical work at the centralised R&D Institute for New Zealand's meat export industry.

Applications close on 28 August 1987.

Requests for further information or applications should be addressed to:

Dr A.K. Fleming, Head, Process Technology Division
MEAT INDUSTRY RESEARCH INSTITUTE OF NEW ZEALAND (INC)
P.O. Box 617, Hamilton.



- Cost Effective Recruitment
- No Deadline too great
- International Search Service at no extra cost
- Special Projects Undertaken
- Fast and Reliable
- Replacement Period Guarantee

When only the best will do PHONE 600-172

BANNISTER INTERNATIONAL RECRUITMENT

Unit 4, Kensington Mall, 718 Dominion Road, Auckland 4, New Zealand.
PO Box 10046, Balmoral, Auckland, New Zealand.

For further information please circle no. 27 on reader reply card.
110/Chemistry in New Zealand/August 1987

COMPANY NEWS

Advanced Analytical Ltd.

Advanced Analytical Ltd (a wholly owned subsidiary of Advanced Electronics Limited) is a new name under which we will sell our range of analytical instruments. Advanced Analytical specialises in the fields of **atomic spectroscopy** including AAS, ICP, ICP-MS and GD-MS, **chromatography**, GC and HPLC including selective detectors, **FT-IR spectrometers**, and **mass spectrometers** including magnetic sector and quadrupole GC-MS, gas isotope ratio, thermal isotope ratio and specialised gas analysis systems.

We are New Zealand representatives for GBC Scientific Equipment Pty Ltd., Mattson Instruments Inc., Labtam Pty Ltd., Photron Pty Ltd., Tracor Instruments Inc., and the VG Instruments Group.

Advanced Analytical Ltd., P.O. Box 36-280, Northcote, Auckland 9. Ph: 419-1448, FAX: 418-0022, Telex 60048.

For further information please circle no. 7 on reader reply card.

Transfer of Technicon Industrial Systems to Bran + Leubbe Pty

On 27th February 1987 the International Industrial Systems Division of Technicon Equipment Pty was purchased by Bran + Leubbe Pty, a West German subsidiary of Alfa Laval A.B. (Sweden). The transaction was effective in New Zealand from 1st July 1987.

Industrial personnel have transferred from Technicon to

Bran + Leubbe, but for a period of several months will continue to work closely with Technicon to ensure that all services are fully maintained while the new organisation is established. A sales and service base is to be developed in Wellington.

The new company acquires from Technicon all of the industrial products including Infra-lyzer, AutoAnalyzer and TRAACS 800. In addition the on-line process analyzer manufactured by Bran + Leubbe and a range of new x-ray fluorescence analyzers, the ExAAct, will also be handled.

* **InfraAlyzer:** Near infrared reflectance spectroscopy for rapid analysis of major constituents in the food and chemical industries. Development in the areas of automation (on-line process control) and remote programming through a unique "Infranet" system.

* **AutoAnalyzer:** Continuous flow analysis is the technique of choice in water, soil and plant analysis. Now upgraded with computer control and greater throughput.

* **TRAACS 800:** New generation AutoAnalyzer with fully integrated computer control, data handling and random access sampling.

* **Bran + Leubbe Monitor:** On-line wet chemical analysis for process control.

* **ExAAct:** Applied x-ray fluorescence for fast accurate elemental analysis.

For further information please circle no. 8 on reader reply card.

EMPLOYMENT

In response to the number of their clients interested in bringing in skilled personnel from overseas, Bannister International is introducing a potentially exciting and original package. Their first inclination is to encourage potential employers to seek their advice before contemplating any costly activity incurred in the search for such elusive candidates. Bannister International Recruitment have succeeded in placing skilled personnel and therefore suggest that the local market should first be thoroughly exhausted. However, should it prove necessary to broaden the search, they are introducing an economical option which enables the employer either to retain their services to act solely on their behalf overseas or have the employer personally interview the candidates outside New Zealand with the international support services of their recruitment consultancy.

They believe that should the employer be seeking more than just one or two employees this package could well be of interest to them. Priced around \$6,000 NZ, included will be the return airfare, comfortable accommodation, central office space for interviewing purposes and the cost of a limited and effective advertising campaign. Also included in the price will be the services of one of their Recruitment Consultants, familiar with international recruitment, who will assist the client from placing the initial advertisement, through to finalising the job offer. Therefore the employer will have access to the Recruitment Consultant both in New Zealand and overseas. This package, which is tax exempt, could provide a golden opportunity to also gain information on overseas activities.

For further information please circle no. 9 on reader reply card.

PRODUCT NEWS

Tecator Homogenizer for Rapid Sample Preparation of High Moisture, High Fat and Fibrous Samples.

The 1094 Homogeniser from Tecator is designed for macerating and homogenizing a variety of high-moisture, high-fat and/or fibrous samples. Application examples include: size reduction of forage, dry food and chemical products; homogenisation of meat, fish, fruit, vegetables and prepared foods (e.g. pizza, meat pies and frozen meals) and chemical and pharmaceutical formulations.



The 1094 Homogenizer allows frozen food samples to be homogenized in less than one minute, providing more accurate analyses of unstable constituents such as vitamins. From 0.2 to 2 kilograms of sample material can be homogenized in one batch.

Homogenization is accomplished through the high speed (3,000 rpm) combined with a powerful cutting action (1,000 watts). Angled knife blades produce a vertical flow within the batch and facilitate rapid and thorough homogenization.

The 1094 Homogenizer comes with two different rotors equipped with adjustable smooth and scalloped blades for different samples and workloads.

For further information please circle no. 12 on reader reply card.

Major Advance in Fume Cabinet Design

A generally-held belief is that if hazardous laboratory work is carried out in a fume cabinet it must be safe. However, tests performed by the engineers at MAF Wallaceville Animal Research Centre showed that many existing models of fume cabinet are deficient in design and do not meet even basic safety requirements.

The staff at Wallaceville began a plan of research to gather fume cabinet design and technical information from all over the world. As a result the engineers discarded all conventional constructions, designing a totally new fume cabinet from basic safety principles. The Wallaceville cabinets are the

first to meet testable standards, in particular those laid down in BSI DD80 (1982) and AS 2243.8 (1986).

It is a basic feature of this fume cabinet design that when connected to a fan of suitable specification, complete scavenging of the cabinet is effected, and the air velocity at the face, measured at any position, is not less than 0.5 m/sec.

There are a number of unique features about the Wallaceville designed cabinet

- * The front face of the cabinet slopes back so that the operator's head need not be inside the cabinet.

- * A horizontal sliding sash of laminated glass functions as a full face and body shield and permits uninterrupted airflow into the cabinet. The sash can be easily removed to allow construction of large apparatus.

- * Laminar airflow from front to rear across the work area.

- * Continual visual measurement of airflow.

- * The work surface in the cabinet is #316 stainless steel, shaped to contain chemical spillage.

- * Steel framing with baked epoxy coating.

- * #316 stainless steel framing available for perchloric.

The Wallaceville designed fume cabinet is now manufactured under exclusive licence by Chemical Plant Ltd.

An essential requirement in the ability of this cabinet design to meet the defined standards is the use of a suitable radial-bladed centrifugal fan with a minimum extraction rate of 29m³/min. The FumeFlow range of belt-driven pvc Centrifugal fans is also manufactured by Chemical Plant Ltd. Features include:

- * No metal exposed to fumes.

- * Positive mechanical shaft steel.

- * Baked epoxy-coated steel stand.

- * Belt drive allows versatile duty.

These products will be displayed at the forthcoming Conference Trade Fair, CITF '87, by the sole distributor Insapipe Industries Ltd.

For further information please circle no. 13 on reader reply card.

Microwave Acid Digestion Bomb

The Parr Instrument Company is pleased to introduce an entirely new, microwave acid digestion bomb, as an important addition to its growing list of special pressure vessels for analytical sample preparation.

Using a new, high strength, microwave-transparent material to enclose a chemically inert, teflon sample cup, the new Parr

4781 microwave digestion bomb provides a pressure vessel which can be placed directly in a microwave oven for specific, high speed, microwave heating.

The Parr Instrument Company is represented in New Zealand by John Morris Scientific Ltd.

For further information please circle no. 10 on reader reply card.

Hand-held Thermometer with Alarm

Kempthorne Medical Supplies Ltd announce the availability of a new electronic thermometer, which comes with the following features:

- * Robust plastic case with pocket clip or desktop stand.

- * Stainless steel spiked probe with one metre of cable.

- * Dual range: -40/+50°C (switchable to -40/140°F).

- * Accuracy +/-1°C (+2°F).

- * Sliding cover reveals setting controls.

- * High and low alarm points can be selected which (when exceeded) activate an audible warning alarm.

- * Battery and full instructions included.

For further information please circle no. 11 on reader reply card.

Laboratory Automation

The SIC model CC-12 integrator provides a unique starting point for complete automation of the chromatography laboratory. Equipped with all of the features now considered as standard in a modern system, the basic integrator unit can be expanded with a memory drive, and dual floppy-disk drive for chromatogram and methods storage. The integrator can communicate with an

Vacuum Course October 1987, Auckland University

Air Driven Pumps (NZ) Limited are holding a course in basic vacuum technology, in conjunction with the Footscray Institute of Technology, Melbourne, and the American Vacuum Society. The course is appropriate for persons of varied experience and interest, working in the areas of design, operation and maintenance, that involves the use of vacuum equipment.

Topics Covered:

- vacuum concepts and theory.

- pumps, rotary, liquid ring, etc.

- pressure measurement.

- materials, design, leak detection.

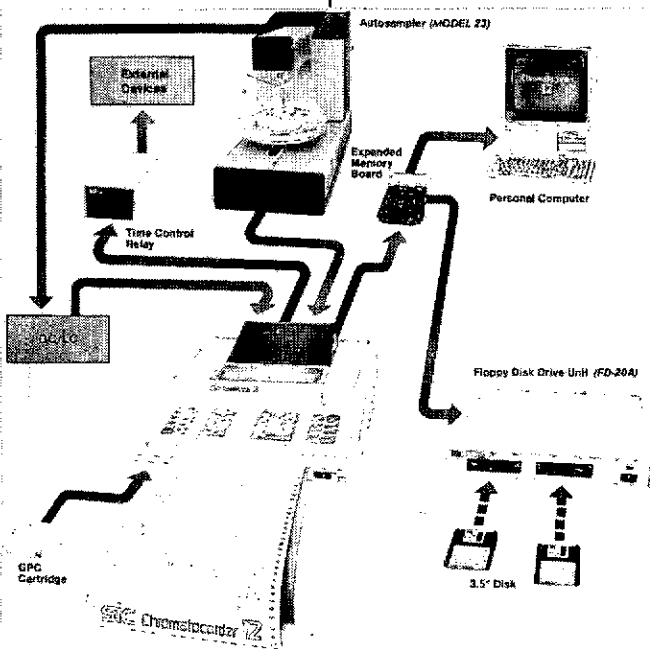
A full set of course notes will be provided and equipment demonstrations will be included.

For further details please contact Air Driven Pumps NZ Ltd., P.O. Box 598, Manurewa, Ph. 278-4121. or:

For further information please circle no. 14 on reader reply card.

external computer via the expanded memory board for full transfer of data and methods in either direction. Control of the new SIC Model 23 HPLC auto-sampler is direct, and control of other HPLC autosamplers and devices is possible with a time control relay.

The SIC systems are available through Sci-med (NZ) Ltd. For further information please circle no. 15 on reader reply card.



PRODUCT NEWS

Fully Automatic Determination of Melting Point

The new FP62 melting point instrument from Mettler determines melting points automatically. The point is detected by an optical system, so ensuring completely impartial and highly reproducible results. The user obtains corrected, i.e. true,



temperatures (thermodynamic determination) which are shown clearly and unmistakably on an easily viewed LCD display. Heating rates can be selected between 0.1 and 10°C/min. in steps of 0.1°C and the temperature range extends from room temperature to 300°C.

The results can be logged in two ways. With a Mettler GA44 printer connected to the FP62 the user receives a detailed printout of the results. By connecting a normally available (Epson-compatible) printer-plotter it is possible to record the melting curve.

For users in research and quality assurance the FP62 represents a means of reliably determining melting points, its efficiency as a working tool being enhanced by the fact that it is in constant readiness.

Mettler are represented in New Zealand by Watson Victor Ltd.

For further information please circle no. 3 on reader reply card.

Chromatography Supplies from Sci-Med

Sci-Med (NZ) Ltd are proud to announce to the New Zealand chromatographer, a new era in supply and service.

Robert Lyon, Sci-Med's Auckland Sales Manager, says "our aim is to provide an ex-stock facility to satisfy the day to day needs of chromatographers working in the research or quality control fields. To accomplish this we are building extensive stocks in GC and HPLC columns, GC septa, GC and HPLC fittings, microlitre syringes and sample preparation/purification systems in our Auckland warehouse. Customers can place their orders by

contacting their nearest Customer Services branch who will relay the order by computer to Auckland for immediate processing. In this way we can offer the quickest, most efficient delivery.

"In the coming months the scope of the stock held will be expanded to cover a broad spectrum of consumables used in instrumental analysis. Our range for example, will include consumables used in electrophoresis, UV/VIS, AA and I.R. spectrophotometry and general instrumental techniques."

For further information please circle 4 on reader reply card.

Conductivity Measurements from Deionized Water to Brine with only one Probe

This improved version of HI 8033 has all the benefits of its predecessor such as manual temperature compensation with B of 2%, and a K% potentiometer to adjust the response with a standard solution, as well as having the additional features of an extended conductivity range of up to 200,000 uS and a membrane keyboard.

The enlarged conductivity range permits testing of seawater and brine, thus making the instrument ideal for laboratory and research purposes. A display symbol indicates whether measurements taken are microsiemens (uS) or millisiemens (mS).

For further information please circle no. 5 on reader reply card.

A New Era in Mass Spectrometry

If 1986 was the year of the high-field nmr in New Zealand, then 1987 must surely be the year of the high resolution mass spectrometer. With the arrival of a VG 70-250 instrument at DSIR, Mt Albert, and orders placed for similar instruments elsewhere, the country looks set to enter a new era in high quality applications of this powerful technique.

The new instruments offer a number of advantages compared to earlier models, and also the "bench-top" systems currently in vogue. With facilities such as fast atom-bombardment for sample ionisation the scope for investigations of "large" molecules is extended enormously. The resolving power of up to 1 in 10,000 provides for greatly extended capabilities in sample identification. And of course, the modern data systems bring their own additional benefits, such as increased flexibility and power in instrument operation,

and reduced data processing times.

One of the significant areas of potential application for the new systems is in environmental monitoring. In combination with a capillary gas chromatograph the high resolution mass spectrometer provides a sensitive and specific detector for the analysis of many pollutants. In such analyses, both high specificity and low detection limits are a prime requirement, which can best be met by the use of high resolution selected ion recording (HRSIR). Essentially, in this technique, the mass spectrometer monitors, under data system control, a number of mass windows accurately centred on masses which are characteristic of the compounds it is required to detect. The profile of each compound as it elutes from the GC is recorded by monitoring each mass, usually about once every half second. By this means, at a resolving power of 10,000, many pollutants, e.g. polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) can be analyzed down to detection levels well below 1 pg.

To ensure the unambiguous detection of a particular pollutant, in addition to utilising GC resolution and retention time, it

is usual to monitor at least two ions (often chlorine containing ones which differ by two daltons by virtue of the two chlorine isotopes) from each compound. The measured ratio of the intensity of the two ions should lie within specified limits calculated from the known isotopic abundances of the composite elements.

In addition, by operating the mass spectrometer at high (10,000) resolution, a further degree of specificity is obtained by precluding potential interferences from compounds which are close in mass. One major potential source of interference in the analysis of PCDDs and PCDFs is the polychlorinated biphenyls (PCBs). Because of their ubiquitous occurrence and close proximity in mass and GC retention time these can easily mask the response from some of the PCDDs and PCDFs, when operating at low resolution.

Full details of this analysis are contained in a VG Analytical application note available from Advanced Instruments (formerly Advanced Electronics).

For further information please circle no. 2 on reader reply card.

UNIVERSITY OF OTAGO RESEARCH TECHNICIAN HYPERTENSION RESEARCH

Applications are invited for the above post within the Hypertension Unit at the Wellcome Research Institute, Dunedin, to study cellular calcium channels in animal models of hypertension. The applicant should be a graduate in the chemical, biochemical or physical sciences; knowledge of biomedical research techniques is desirable but not essential. The post is funded by the New Zealand Medical Research Council and is of two years' duration.

For further information contact Dr A. Millar, Pharmacology Department, University of Otago Medical School (740-062 ext. 852 or 624).

Written applications quoting reference number N87/184 and giving full particulars of age, qualifications and experience and the names of two referees, should be addressed to the undersigned, P.O. Box 56, Dunedin, as soon as possible.



HPLC-SYSTEM 400

the comprehensive answer to your HPLC needs
FOODSTUFFS • PHARMACOLOGY • BIOTECHNOLOGY • MEDICINE



Tailor-made system configurations to suit specific individual needs and methods are one of the most important features of the SYSTEM 400 HPLC line. Addition of new components is possible at any time thanks to the inherent flexibility of the system.

With the single addition of one or two modules an isocratic system may be converted to either, a high pressure or low pressure ternary gradient system. The SYSTEM 400 can adapt to suit your changing needs.

For further information please contact:

Kontron Instruments
A Roche Company
Innovative Technology
Realistic Prices



Roche Products (NZ) Ltd
P.O. Box 12-492
Penrose, Auckland
Ph. 640-029

Schleicher & Schuell

S & S MEMBRANE FILTERS AND FILTER HOLDERS



Behring Diagnostics Section.
Hoechst New Zealand Limited
C.P.O. Box 67
Auckland
Phone 578-068. Telex 2338