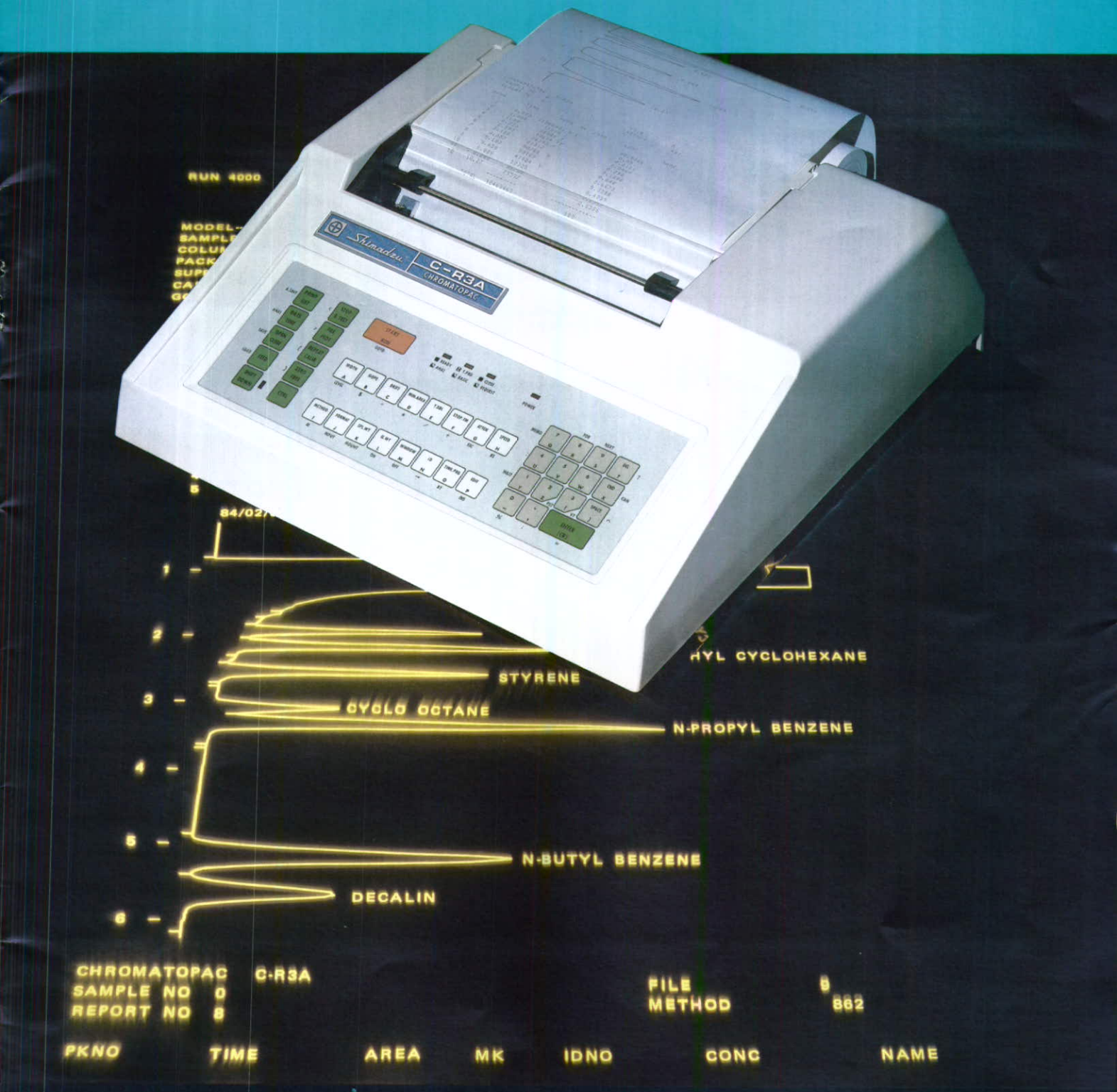
August 1984 Volume 48 No. 5

Chemistry in new zealand



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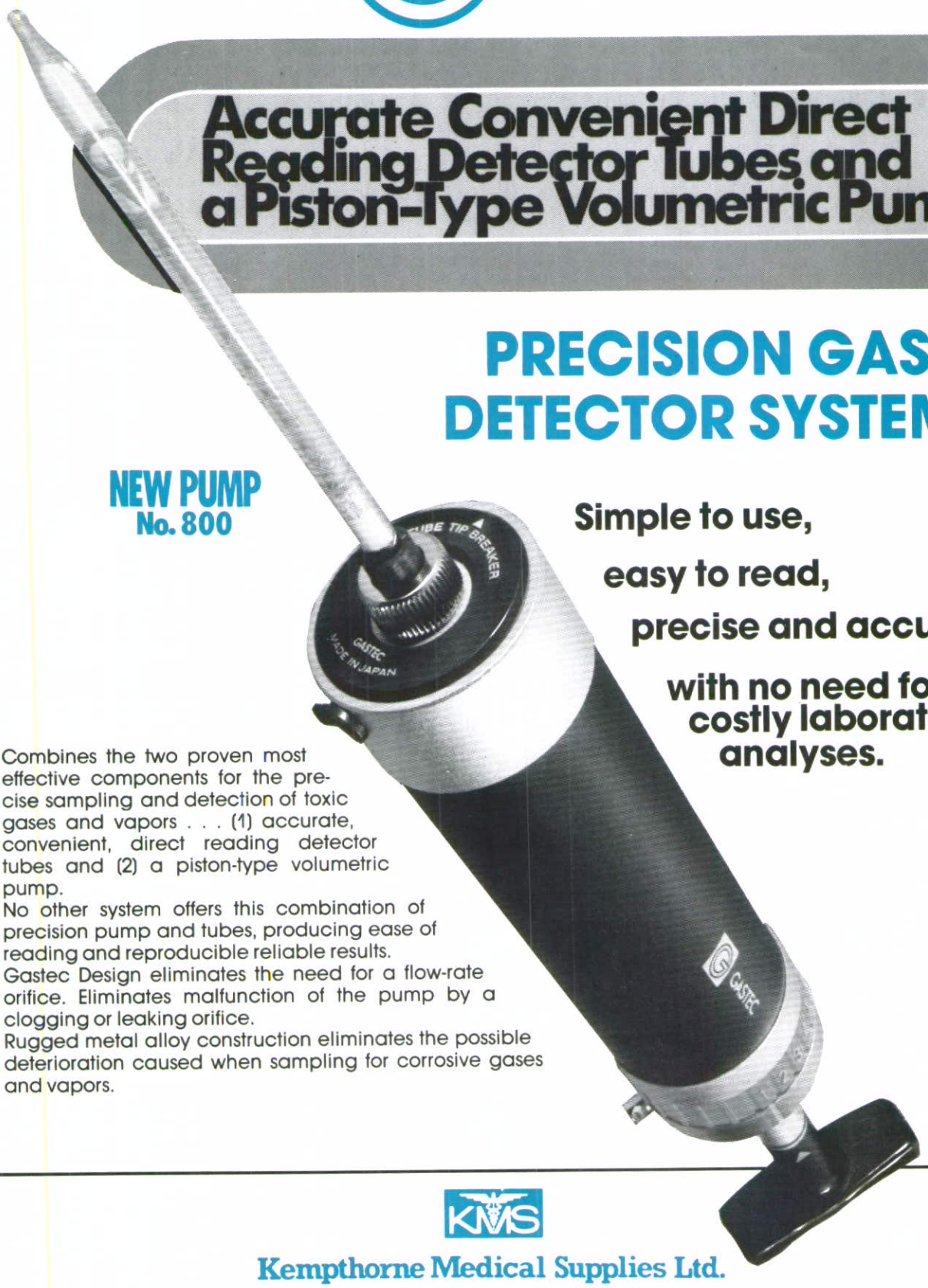

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COVER STORY

SHIMADZU CHROMATOGRAPHY DATA PROCESSOR CHROMATOPAC C-R3A

COVER: Shimadzu's new computing integrator/data processor for chromatography, the model C-R3A, features large capacity chromatogram memory. The stored chromatograms may be very simply recalled and replotted and may be reprocessed any number of times using different parameters.

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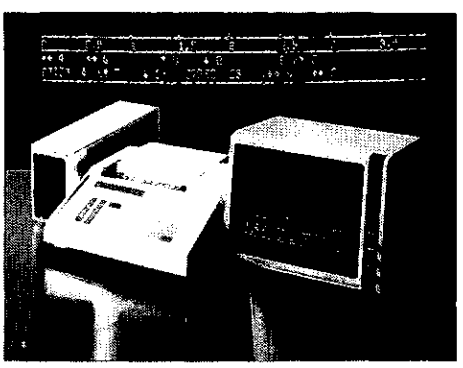

Incorporation of an optional floppy disk drive affords permanent memory and fast data recall. In addition, it allows a vast chromatogram storage capability, and the possibilities for chromatogram libraries and archiving.

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SOLE NEW ZEALAND AGENTS FOR THE CHROMATOPAC C-R3A ARE: SCI-MED (NZ) LTD.

For further information circle 2 on Reader Reply Card

Chemistry in new zealand

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GUEST EDITORIAL

INCENTIVES FOR INDUSTRIAL INNOVATION

The Science and Technology Plan is Government's response to the new wave of enthusiasm for science and the economic and social benefits that can flow from it. If the plan is fully supported we may expect, in particular, scientific programmes with commerical potential to be encouraged and an increase in funds for research and development. If this happens will the scientific community rise to the challenge and ensure that New Zealand reaps the rewards?

Most scientists, perhaps after a little thought, would affirm that science has always more than paid its way in New Zealand. There is little doubt that our environmental and social policies and our agricultural, horticultural and forestry industries have benefitted substantially from the understanding and enterprise of New Zealand scientists. What is now looked for is an increased effort to successfully develop and market the products of research in areas like manufacturing. Because only a minority of scientists work for industry, much of the additional effort will need to come from the Government and University sectors of the scientific community, in partnership with industry.

University and Government research falls into three broad, overlapping categories: the fundamental work that is essential to underpin all of the other programmes, the short-term developmental work that will be applied immediately, and, in between, longer term work, usually relating to New Zealand resources, that can potentially be exploited to benefit the nation. It is this intermediate category of work that we have to encourage if there are to be very substantial benefits flowing from science through to the marketplace. The question is, are enough of our better scientists motivated to help? For to be successful we need talented, dedicated people who are personally enthusiastic about the application of their science.

In a large Government organisation like Chemistry Division, DSIR, most scientists are motivated to excellence in their work because they are conscious of its value to others; either to society in general (e.g. by controlling pollution, solving crime, or assisting industry) or to the international scientific community. In both cases it is their **reputation** — locally or internationally — that is most important to them; a reputation that is largely achieved through an opportunity to talk about or publish their work.

Financial reward for excellence must not be overlooked as an incentive but it is often most important in the form of funds to support such things as research programmes or travel to overseas conferences rather than in salary increases. Salary increases, unless they are very substantial, are largely negated by the high level of income tax and the cash in hand may be less significant to the recipient than the corresponding change in grading or title. Industry, of course, gets around this problem by providing expense accounts and company cars in lieu of pay rises.

So how do we motivate top Government and University scientists to work on projects they may never publish or even talk about to their friends?

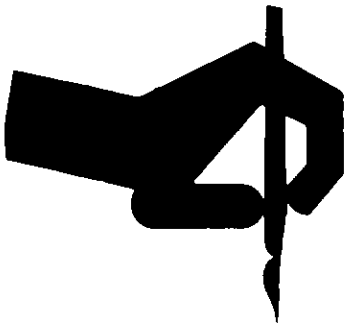
The prime need is to particularly encourage those unusual scientists who feel responsible for the practicalities of their science, and not make them feel at a disadvantage in comparison with their more academic colleagues. Government (through the new Science and Technology Council or DSIR) should declare that it will actively support new industrial ideas, especially with the provision of facilities and any necessary travel. If projects reach the pilot-plant stage, the scientists who are seconded to industry should expect to receive the same additional benefits as private sector scientists. Innovative industrial projects should be enthusiastically assisted up to such time as they are successfully implemented or it can be clearly shown they have no realistic chance of succeeding.

In those cases where the scientists' endeavours are adopted by industry, and they succeed in creating financial benefits for others, there is no reason why the scientist should not have some share in the profits (e.g. royalties). This is already possible for scientists in many of the overseas countries whose economic successes we wish to emulate.

The Institute should also do more to give recognition to chemists working on industrial innovation. True, the Shell Industrial Chemistry Prize (formally the ICI-Tasman Vaccine Prize) is awarded annually; however we could well add another industrial prize for the under 35's and we could also suggest that the Royal Society should recognise industrial success as a qualification for the award of an FRSNZ.

We should proclaim our equal interest in both basic and practical knowledge; it now is our industrial innovators who need extra applause and real rewards.

Gordon Leary,
Chairman, 1984 NZIC Conference Committee, Wellington.



LETTERS TO THE EDITOR

Sir,
re: "The Gizmo".

I wonder how many members of the Institute of Chemistry have actually handled a Gizmo, have set the slide to their own particular weight and liquor intake and have read the figures which the device gives. I would expect that very few indeed have actually done so. If they had they would be as distressed as I am with the widespread distribution that it has been given, and the information on it which is patently incorrect.

In the article by Professor Batt (Chemistry in N.Z., April 1984) it mentions that 45,000 Gizmos were printed and distributed free of charge. This is not correct. As I understand it the number prepared and distributed was 450,000 so that potentially this reached a large proportion of the households in New Zealand. It is thus a serious issue, as, if the device is misleading, as I believe it is, it could potentially do very much damage.

Consider one or two examples: assume
sex of drinker: male
weight of drinker: 80kg (equals 12½ stone)
number of drinks, with meal: 10
equivalent volume, beer: 2000 ml
wine: 750ml equals 1 bottle
spirits: 180ml just on ¼ bottle (0.24)
indicated blood alcohol
reading after 30 minutes: 65mg

The inference is that a normal male could drink any one of the above amounts of liquor, or presumably any combination that equalled 10 "standard drinks" and yet be safely within the legal limit of 80 mg/100 ml of blood. There is also the inference that a person having drunk these volumes of liquor can drive perfectly legally.

There are many other examples which can be taken, and I would suggest that members of the Institute who are interested should acquire a Gizmo and apply their own particular circumstances to it. They will quickly realise that excessive amounts of liquor are indicated by the Gizmo.

Professor Batt can produce any arithmetic he likes about the volumes of water in the body, and carry out these calculations, but in a real life situation it is clearly very different. To drink a whole bottle of wine or a quarter of a bottle of spirits in one sitting at a meal, and then to drive would be the height of folly. It is even worse when one realises that these figures do not take into account the age of the person and yet it is well known that young people are more adversely affected by liquor than are older people who have perhaps learned how to tolerate liquor.

Also, since this device became widely distributed throughout the country we have all seen a very rapid increase in the rate of deaths on the road. The road toll is now at an all time high, and there can be no doubt that liquor contributes to a proportion of this.

Professor Batt on television also recommended that people take quantities of liquor which would be the mark of the alcoholic or the insipient alcoholic. I heard him say that 6 standard drinks in an evening would be quite a normal amount of alcohol. On a regular basis, this is excessive drinking by anybody's standards.

It would be bad enough if Professor Batt were a private citizen in his own right, but he also happens to be President of this Institute. I am deeply concerned that someone in this position should be promoting the excessive use of alcohol particularly amongst drivers of motor vehicles.

T. J. Sprott

PROFESSOR BATT REPLIES:

Commenting on the points raised by your correspondent, Dr. Sprott, concerning the so-called Gizmo, presents some difficulty with his mixture of questions on facts and his liberal use of personal opinion. Perhaps it would be best to start with his queries on facts. Firstly, Dr. Sprott claims that the information given in the calculator relating alcohol intake to blood alcohol levels is "patently incorrect". If he has scientific evidence to support this contention, can we see it? Science advances by sound experimental evidence, proper interpretations and by constructive debate. Our work and results have been published in international scientific journals of repute, passed the rigorous attention of referees and are accepted by people who have the basic physiological knowledge to understand the

(Continued on Page 105)

CONFERENCE SPEAKERS

Professor Sir George Porter FRS

Fullerian Professor and Director of the Royal Institution, London, Professor Porter was awarded the Nobel Prize for Chemistry in 1967 for his research on fast photochemical processes and pioneering the technique known as flash photolysis which is used for studying these processes. He has been awarded numerous other medals and prizes including the Faraday medal in 1980. Sir George was knighted in 1972.

Sir George's group at the Davy-Faraday Laboratory have been major contributors to our present knowledge of the rapid photochemical processes associated with photosynthesis. With his experience in this field, a good part of the work of the Davy-Daraday Laboratory is now devoted to trying to mimic photosynthesis as a means of storing solar energy.
energy.

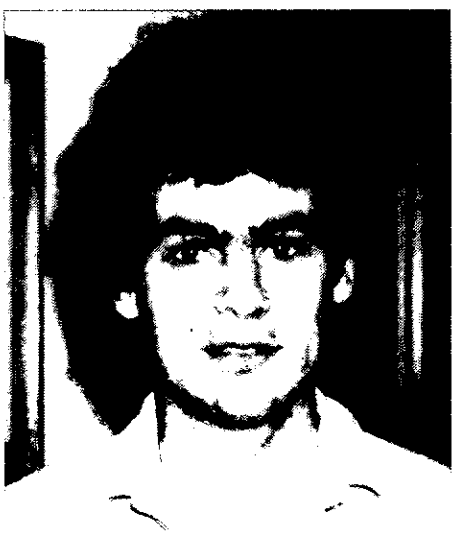
Sir George is equally well known for his work in popularising and explaining science to the lay community through television and his lectures to school children. In this role, he carries on a tradition of excellence in the art of lecturing which has been a feature of the Royal Institution since the days of Humphrey Davy and Michael Faraday. Much thought and preparation go into Professor Porter's lectures to school children: the results are captivating.

Dr J.M. Guss

Department of Inorganic Chemistry, University of Sydney, Australia.

Dr Mitchell Guss was educated in Australia and held post-doctoral positions with Professor Sir Ronald Mason and Proffessor Struther Arnott before taking up his position with Professor Freeman's group at Sydney University. He is currently an editor of the Journal of Molecular Graphics, and Chairman of the X-ray diffraction committee of the Australian Crystallographic Society.

His current research interests include the structures of the 'blue' copper proteins plastocyanin and the basic blue protein from cucumbers, the methodology and effectiveness of protein crystal structure refinement and the uses of computer graphics in the presentation and analysis of protein crystal structures. Research on the various plastocyanins at Sydney has lead to a considerable international reputation for both Professor Freeman and Dr Guss at the Sydney laboratory.



Dr R.B. Saint

The Walter and Eliza Hall Institute of Medical Research, Royal Melbourne Hospital, Australia.

Dr Robert Saint was born in Whyalla, South Australia and gained his degree at the University of Adelaide. He has held several Fellowships and studied at the Standford University School of Medicine from 1979-82 prior to taking up his position in the Laboratory of Molecular Parasitology at the above Institute. His research work has dealt with the structural sequencing and synthesis of a variety of biological macro molecules. Currently, he is a member of a team working with considerable Australian Government assistance, pioneering research and development in malaria vaccine production.

Dr J.H. Johnston

Chemistry Department, Victoria University of Wellington.

Dr Jim Johnston was born in Stratford, Taranaki and gained his degrees in Chemistry at Victoria University of Wellington. His PhD research was carried out under the supervision of Professor J.F. Duncan. He is currently a Senior Lecturer at Victoria, enjoys leading a viable geochemical research group and has a main interest in using Mossbauer spectroscopy and X-ray diffraction methods to study a variety of geochemical systems.

Dr Johnston is the NZ representative on the International Commission for the Applications of the Mossbauer Effect and has attended a number of International Conferences. He is active in promoting geochemistry in NZ and was president of the NZ Geochemical Group 1981-83. His outside interests include keeping pace with his children's activities, recreational private flying and he is a member of the Rotary Club of Karori.

Prof. David L. Trimm

School of Chemical Engineering and Industrial Chemistry, University of New South Wales

Prof David Trimm graduated PhD from the University of Exeter in 1961. He joined the Department of Chemical Engineering and Technology of Imperial College as the BEIT Scientific Research Fellow and spent a further 12 years there lecturing in catalysis. In catalysis. In 1976 he was appointed Professor of Petrochemistry at the University of Trondheim. He took up his present position as Professor and Head of the School of Chemical Engineering and Industrial Chemistry, University of New South Wales in 1979.

His research interests lie in the field of catalysis with an emphasis on the applications of catalysts to applied problems such as synthetic fuel production, coal conversion as well as catalyst and reactor design. He has also served as an industrial consultant for a number of industrial firms.

He has published a wide range of papers in the catalytic field, is the author of "Design of Industrial Catalysts" and an Editor of the journal "Applied Catalysis".

Professor D.M. Doddrell

School of Science, Griffith University, Queensland.

Professor David Doddrell was born in Brisbane, Australia and gained his BSc and PhD at the Universities of Queensland and Indiana (USA) respectively. He has since been awarded the DSc at Griffith University and been made a Fellow of the RACI. He holds a personal chair at Griffith University and directs the Brisbane NMR Centre.

Professor Doddrell is no stranger to New Zealand, speaking here at the 1976 IUPAC meeting in Dunedin. His NMR reputation is recognised in numerous publications, a Rennie Medal, several patents and a consultancy with the German firm BRUKER. Apart from the research applications of NMR, his research also covers the medical applications of NMR imaging and Topical NMR.

Dr R.W. Henley

Richard W. Henley received a BSc. in Geology in 1968 from the University of London and a PhD. in geochemistry from the University of Manchester in 1971 following experimental studies of gold transport in hydrothermal solutions and the genesis of some Precambrian gold deposits. Dr Henley was Lecturer in Economic Geology at the University of Otago, New Zealand from 1971 to 1975 and at Memorial University, Newfoundland until 1977. Research interests have focussed on the mode of origin of a number of different types of ore deposit including post-metamorphic gold tungsten veins, porphyry copper, massive sulphide and placer gold deposits. He is currently Head of the Geothermal Chemistry Section of DSIR at Wairakei, Chairman of the International Rock-Water Interaction Group's

Interest Group on Active Geothermal Systems, and a visiting lecturer at the Auckland Geothermal Institute. His present research includes a number of isotope and chemical studies relating to the exploration and development of geothermal systems and geothermal implications for the origin of ore deposits. Dr Henley has recently returned from study leave at U.S. Geological Survey at Reston, Virginia.

NZIC ANNUAL GENERAL MEETING

The Annual General Meeting of the New Zealand Institute of Chemistry will be held at 7.00 p.m. on Tuesday 21st August in the Maclaurin No. 3 Lecture Theatre at the Victoria University of Wellington.

Agenda

1. Welcome by the President, Professor R.D. Batt.
2. Apologies
3. Minutes of 1983 AGM to be confirmed.
4. Matters arising
5. Annual Report: see this issue
6. Finance — 1983/84 Statement of Income and Expenditure, — 1983/84 Balance Sheet: see this issue.
7. Election of officers: President, First Vice-President, Second Vice-President, General Secretary.
8. Awards and Prizes: Easterfield Award, ICI Prize, Shell Industrial Chemistry Prize, Essay Prize.
9. General Business

5th July 1984.

NZIC ANNUAL CONFERENCE

Changes to the Programme OUTLINE published in the June Issue (as at 3 July 1984)

Monday 20th Biochemical sessions will begin with the Pharmacia Award Lecture at 4.00 p.m. There will be an Organic specialist session starting at 4.00 p.m.

Tuesday 21st Only POSTERS will run from 10.00 a.m.-12.30 p.m. The Joint Biochemical Symposium on Peptide Hormones with the NZACB will be held in the **afternoon** at the latter's conference site (transport will be provided). Inorganic, Electrochemistry, Mass Spectrometry and x-ray specialist groups will run in the afternoon, along with the Ion Chromatography/HPLC Applications workshop. (7 instruments). The NZIC AGM begins at 7.00 p.m.

Wednesday 22nd Chromatography Specialist Group will run oral sessions from 10.00 a.m. until lunch. There will be **no** Biochemical sessions in the afternoon.

Thursday 23rd Organic, Analytical and Geochemistry specialist sessions will be run either after morning tea or after lunch.

The Quality Assurance meeting will highlight Drs I. Danis, and R. Richards, two TELARC/NATA assessors and will run from 2 to 5.00 p.m.

The Biochemical Society A.G.M. will be held at 4.00 p.m., with oral presentations preceding it.

There is **no** formal end of meeting.

Friday 24th Biochemistry presentations will run through the morning. The Catalysis & Energy workshop (zeolites) will run until afternoon tea.

GENERAL NEWS

SCIENCE AND TECHNOLOGY COUNCIL RECOMMENDED

Government should set up a Science and Technology Council to advise it more effectively on all aspects of science and technology in New Zealand, recommends a review team headed by the Chairman of the State Services Commission, Dr M. C. Probine.

The Council would provide a strategic overview of science and technology to be reviewed annually, and critically assess public research and development in terms of national needs, says the team's report.

It would replace the Government's present source of advice on science and technology policy, the National Research Advisory Council.

The Council would be mainly advisory, but it would work closely with organisations whose role it is to allocate funds to research bodies.

The review team was established earlier this year by the Minister of Science and Technology, Dr Shearer, to examine the methods by which science and technology policy is developed for Government-funded research, and how it is co-ordinated and monitored.

Earlier this month, Dr Shearer referred to the possible replacement of the NRAC with an organisation "better attuned to the rapid technological advances of the 1980s."

He spoke of an independent Science and Technology Council which would integrate science and technology more effectively into Government's economic policy and planning.

Dr Shearer described the formation of such a Council as the third step of a five-step strategy designed to boost the contribution of science and technology to New Zealand's economic growth.

The first two steps were a review of science and technology in New Zealand completed last year by the NRAC, and a national Science and Technology Plan launched on May 7 this year by the Prime Minister, Sir Robert Muldoon.

ARTHUR C. KENNET AWARD: The closing date for applications for this award has been set back to 31 August 1984. Further details were published in the June 1984 issue.

1984 THRESHOLD LIMIT VALUES PUBLISHED

The 1984 TLV booklet is now available from the Department of Health. Based on the list adopted by the meeting of the American Conference of Government Industrial Hygienists (ACGIH) in 1983 the booklet also lists alterations made on the advice of the Occupational Health Advisory Committee for this country. These include standards for asbestos, coal dust, non-fibrous talc dust and mica dust, ethylene glycol di-nitrate, nitrogylcerin, HDI and TDI, and ethylene oxide. Guidelines for noise exposure are also listed. Revised standards for crystalline silica, lead, and man-made mineral fibre (including fibreglass) are currently under consideration, and comments are invited by the Department. Copies of the booklet may be obtained from District Offices of the Department, or by writing to: Department of Health, P.O. Box 5013, Wellington.

OBITUARIES

S. H. Wilson

Dr Stuart H. Wilson, a long-time resident of York Bay, Eastbourne, who died on 23rd May at the age of 87, had an outstanding career in chemical sciences in New Zealand. Although he officially retired from the Department of Scientific and Industrial Research in 1964 he continued to do research and publish his work for a further two decades. He was one of the pioneers of geothermal power development and a prolific author of papers on a wide range of topics in chemistry and earth sciences. He was a founder of the NZ Geochemical Group in 1963, serving as the Society's secretary and Editor for over ten years.

Born in Dunedin in 1897, he graduated BSc from the University of Otago, in 1920 and later completed a MSc degree at Manchester. Following post-graduate work at Breslau and Danzig (now Gdansk), he joined the Dominion Laboratory (now Chemistry Division, DSIR) in 1925 as its first specialist physical chemist. In 1936 he installed in Dominion Laboratory the first emission spectrograph in the southern hemisphere, and throughout the 1930's and 1940's he continued analytical chemistry research in this field, applying the method to soils, minerals and plant element deficiencies.

In 1936 he began a career interest, spanning over 40 years, in geothermal chemistry. His first work was on the Ketatahi hot springs and fumeroles, and on White Island where he discovered for the first time polythionic acids in hot spring waters.

With government interest in geothermal development beginning in the late 1940's he built up a team of geochemists to survey thermal resources and interpret the chemical results in terms of field temperatures and pressures. With his meticulous analytical chemistry background he instilled in his assistants, of which I was one, the need for accuracy, a good sense of field improvisation, and a flexible outlook in interpreting results. Many of his methods of sample collection and analysis are still used by geothermal chemists around the world.

Before retirement in 1964 he worked at the Institute of Nuclear Sciences for 5 years. Here he specialised in the application of sulphur isotopes to understanding geothermal and volcanological processes, publishing many papers in this area.

His wide ranging work was recognised by the University of Manchester awarding him a DSc degree in 1977.

Stuart Wilson was a person of considerable vigour, wide reading, and great versatility. He had many innovative ideas, expressed them in a robust way, and wrote them into a vast collection of papers, only some of which are represented in his considerable publication list. He had a strong influence on the first generation of NZ geochemists, many of whom would not have undertaken particular successful projects without his enthusiasm and insistence. His considerable work in retirement for the NZ Geochemical Group enabled it to grow into a viable scientific society of distinct character. As a Society it must be unique in having only one rule: "That there be no rules".

Dr Wilson is survived by his wife and two daughters. His passing marks the end of an era in New Zealand physical chemistry and geo-chemistry.

A. J. Ellis

D. J. Spedding

David John Spedding was educated at Stratford District High School and Victoria University of Wellington, where he studied Chemistry and Biochemistry. He studied for MSc and PhD degrees under the direction of Professor A.T. Wilson who introduced him to isotopic techniques in studies of the environment and of living cells.

His first paper, published with Professor Wilson, was entitled "Studies of the early reactions in the germination of *Sinapis alba* seeds.".

After a period on the teaching staff in the Department of Soil Science at Massey University, he joined the staff of the Chemistry Department at Auckland University in 1966. His teaching work was centred principally around the work of the Urey Radiochemistry Laboratory to the development of which he made outstanding contributions. In recent years he lectured also in first year courses and introduced the study of Environmental Chemistry as a second year paper (later moved to the third year).

He was a popular and most successful supervisor of research students during his 18 years on the staff of the Chemistry Department and gathered around himself a most enthusiastic group of research workers.

Much of his work was concerned with the chemistry of sulphur and its compounds in nature and their interactions with living systems. Four areas into which his work on sulphur compounds penetrated were —

Environmental chemistry
Chemistry of Corrosion
Sulphur gases in wine
Biochemical reactions between sulphur gases and living cells.

At the time of his death in June he had eight research workers in his group, and their work included the following:

Sulphur-35 studies on the uptake of sulphur compounds by silverbeet chloroplasts — a continuation of work begun while on leave in Germany in the early seventies.

Sulphur-35 studies on the uptake of sulphur compounds and their metabolism in wine yeasts

Studies on sulphur gases in the head space of bottled wines

Air/sea exchange of condensate which might be spilled from the Maui A platform

Air/sea exchange of 2,4-D pesticide

Collaboration with the current SEAREX (sea-air exchange) programme in determining the concentration of sulphur-containing compounds in the atmosphere.

Studies of effects of sulphur dioxide on *Pinus radiata* (in conjunction with NZ Forest Products Ltd)

Studies of internal corrosion of the Maui condensate pipeline (in conjunction with Shell BP Todd).

Work recently completed includes:

Tracing plumes of gas from geothermal wells by following sulphur compunds

Studies of mechanism of rusting using tritium tracer techniques .

Development of a novel method of detecting fingerprints on cloth using sulphur-35 SO_2.

In addition to many scientific papers describing the above work Dr Spedding published a book, "Air Pollution" in the Oxford Chemistry Series.

His tireless energy found leisure-time outlet in refereeing rugby football. He died suddenly on Sunday 17 June while refereeing a match at Victoria Park.

John was an outstanding scientist, a popular supervisor and a highly regarded colleague. His ceaseless encouragement to all of his students and his excellent capacity for keeping himself completely up to date with each and every topic in which he was involved, together with his extremely amiable attitude to staff and students alike, made him a personality in the department who will be sorely missed. He is survived by his wife Pat and two children.

A.L. Odell, B.E. Struszczak

CORRECTION:

In the paper by L. Eyres and D. Fenton published in the June issue two errors evaded the vigilant eye of the proof readers in the rush to meet publishing deadlines. These were as follows:

1. Paragraph 4 — the last sentence should read: There are 2 series derived from linolenic acid and *a*-linoleic acid.
2. Table 2 — the top series of headings (safflower, sunflower, etc) should not have been included in this table.

6401.72

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OCCUPATIONAL HEALTH IN NEW ZEALAND

LEGISLATION INFORMATION AND TRAINING

Ian B. Campbell
and
Douglas M. Hay
Massey University

Douglas M. Hay, Senior Lecturer in Safety and Occupational Health at Massey University, holds a B.Sc. (Chemistry); B.E. (Chemical Engineering); M.Sc. (Industrial Safety) (Imperial College, University of London); DIC. The latter two were awarded with distinction. His industrial experience was with Reidrubber, Auckland; DSIR — Pottery and Ceramics Research Association as a research engineer; Tasman Vaccine Laboratories as a plant chemical engineer and the Central Institute of Technology as Tutor.

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INTRODUCTION

In most countries, recognition of the importance of the health problems that arise in industry has been a very slow process. In N.Z., however, we seem to lag even further behind in our acknowledgement of such, and in our development of strategies to improve the position. Many countries with whom we have the closest relations, have recently moved to stress the health aspects of the workplace with the passing of comprehensive occupational health and safety legislation, such as the UK Health and Safety at Work etc. Act 1974. Here, contrary to this trend, we have further entrenched the piecemeal status quo with the passing in 1981 of the Factories and Commercial Premises Act and in 1982 the Quarries and Tunnels Act. It is therefore appropriate to ask why is it that in New Zealand occupational health does not get the amount of attention that it should receive, and why is there not a greater general awareness of the nature and extent of the problem?

We feel that part of the reason for this lack of interest and action lies in the poor quality of available statistical data relating to occupational disease. Such information is reported annually by the Department of Health[1] but ultimately, however, such information depends on: (a) the necessary reports being made to the Department and, (b) that those who are expected to report are in possession of all the facts. The whole problem is compounded by the impact of factors such as lifestyle on the work environment, and the difficulty of attributing a single cause to a particular effect. (see Pearce et al[2]) A 1981 ILO Convention[3] requires the establishment of procedures for the notification by employers (and others) of occupational accidents and diseases. This has not yet been ratified by New Zealand. We suggest that to do so would begin to improve significantly the available information.

THE INCIDENCE OF WORK-RELATED ILLNESSES

In this lack of data New Zealand is by no means unique for elsewhere health aspects still tend to play a minor role as compared with safety. The reason for this is not difficult to discover; in short, the true extent of the problem is unknown. For example, in the United States, deaths annually, from occupational illnesses have been estimated from as low as 1,000 to as high as 100,000. From Canada Ison[4] suggests that the actual incidence of disablement from occupational disease could be several times that indicated by the statistics of compensation claims. He attributes this, at least in part, to the lack of training in occupational medicine of many medical practitioners.

The final report of a United States Interagency Task Force on Workplace Safety and Health[5] states:

> *There is an increasing concern over the health effects of workplace exposure to toxic substances. Most attention has been focused on job-related cancers and DHEW (Department of Health, Education and Welfare) has recently stated that:*
> ★ *Traditional estimates attributing only one to five percent of total U.S. cancers to occupational factors have not been scientifically documented,*
> ★ *Past exposure to asbestos is expected to result in over two million premature cancer deaths in the next three decades — roughly 17 percent of the total cancer incidence expected during that period; and*
> ★ *At least eight other substances may contribute to cancer comparable to that due to asbestos.*
> *Beyond these controversial and gloomy estimates it is generally conceded that the nature and extent of U.S. occupational disease is largely unknown. The oftenquoted DHEW past estimate of 390,000 new cases of work-related disease and 100,000 deaths per year is felt by others to be very approximate. However, no better*

estimates are now available, partly because most occupational disease is not diagnosed or recorded. More research is needed to identify the effects of harmful substances or combinations of substances whose interactions are suspected or unknown.

Clearly the import of these statements also applies to New Zealand even if the incidence and type of such problems may differ. Whilst to some the failure to diagnose a condition as occupationally related, may result in one less claimant being entitled to Accident Compensation, there is much more to it than that. So long as the link between the work and the illness remains unrecognised, then the chance to institute preventive measures will be lost.

It should perhaps be emphasised that conditions in the workplace may also have implications for the community at large. The possibility of environmental contamination is often present. In addition stress arising out of the work environment may cause quite serious health problems, affecting not only the worker but the family as well. There are also other potential problems which relate not only to work but to its lack. Thus it is now appreciated that it is not only the physical, chemical and biological aspects of the workplace with which we are concerned, but the psycho-social as well.

IDENTIFYING THE PROBLEM

From these points it is clear that progress towards healthier and safer workplaces will only be accelerated when there is a better appreciation of the totality of the problem by all involved. At the same time the medical profession, more particularly general practitioners should be encouraged to consider the work history of their patients when examining a present condition. Increasingly it has become recognised that many health problems will only be identified by the application of epidemiological principles and methods. However for that to be successful, occupational illness must first be recognised, and then the need for the recording of sound basic data has also to be realised.

The right of individuals to know just what hazards they may be exposed to and what bearing that may have on their health, is a lively issue in many countries. Such may extend well beyond that concerning the hazardous substances and processes; covering for example, details about the worker's individual exposure, or even suspected possible exposure, medical records and other relevant information. In some cases such a right may well be protected by legislation but even that will depend on the effectiveness of the legislation, apart from the fact that records may be quite inadequate or even non-existent. The fact that a substantial number of work related illnesses do not manifest themselves clinically until many years after the exposure presents a considerable problem in itself. Unless medical practitioners are more aware of the possible connection of many conditions with work exposure, it is unlikely that they will ask the right questions thus diminishing the chances of collecting the necessary vital data. The notion of body counts to establish a nexus may be abhorrent to many but in some cases it remains the only avenue open.

The possibility of a link between many illnesses and conditions in the workplace has never been studied and a lot more research is called for. There are some substances suspected of causing cancer but adequate research has yet to be undertaken for most of these as well as for disorders arising from stress at work. It has been suggested that in the past the difficulty in establishing a case for Workers' Compensation has had some effect on the general attitude, indeed indifference, but overseas the tide is rapidly turning and in many countries is now in full flood.

At the moment a relatively few cases of occupational illness have been compensated by the Accident Compensation Corporation and the majority, if not all, of these would be for acute exposure. One of the main problems confronting a potential claimant is lack of medical evidence to support the claim. Very few, if any, companies would have a complete exposure history of their employees. We believe that some attempt should be made to assess the hazards of the work environment.

WHAT NEEDS TO BE DONE

In the workplace there is a need for a great deal more knowledge of the hazards that are daily being faced or are likely to be faced if the correct precautions are not observed. In the larger industrial nations of the northern hemisphere such has aroused not only a lot of interest but also positive action especially on the part of organised labour. The right of the workforce to be informed of the hazards to which they are exposed has been exhaustively pursued. The monitoring of the work environment is often the first essential but in New Zealand we have a serious lack of personnel, trained even in the elementary principles of the task. Another feature of some countries is the amount of training that has been given to the workforce in the form of trade union education, so much so that in both Britain and in Ontario, Canada, for example, it has been stated that workers are becoming better informed on health and safety matters than their supervisors and middle management. Here in New Zealand, the Federation of Labour is well aware of the need to carry out extensive education among the membership of the unions and already a pilot project is in progress. Only lack of finance has prevented earlier action but even that, the Federation has been endeavouring to raise for some years. The Engineers' Union has taken the initiative and recently appointed a health and safety officer. The role of this officer is to conduct and arrange seminars throughout the country to educate workers in the hazards of the workplace. It is hoped that this initiative by the Union will carry over into management and that they will adopt a similar education programme.

It is a relatively easy task to monitor and control the physical hazards to safety in the workplace. However, it is much more difficult to control the hazards to health. This can only be successfully achieved if regular monitoring of both the individual and the workplace is carried out. The industrial sector is easier to monitor than the research sector in that exposure to pollutants in the industrial sector is repetitive whereas pollutants are varied in the research environment. What becomes important in research laboratories is the target organs the chemicals attack, thus a knowledge of this is necessary if protection is to be effective.

THE EXAMPLE OF VINYL CHLORIDE MONOMER

Take for example, vinyl chloride monomer, the time frame before it was recognised as a carcinogen was:

1933 Acute effects identified — narcotic effects noticed. (People became drowsy) ▼

Medical research into use as an anaesthetic agent. This was discontinued when it was found to disturb the heart rhythm. ▼

1962 Limit for air contamination (based on narcotic effects) set at 500 ppm.

1971 Research shows vinyl chloride affects: liver, bones, kidneys, TLV* set at 200 ppm. ▼

1974 B.F. Goodrich announces THREE of its workers have died of liver cancer (angiosarcoma). ▼

1975 (Feb) Health and Safety Executive reduces TLV to 25 ppm. ▼

1975 (Oct) TLV reduced to 10 ppm. ▼

1978 TLV reduced to 5 ppm.

*Threshold Limit Value (TLV) — refers to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect.

This illustrates the problems associated with the setting of hygiene limits, on the one hand the acute exposure is well documented and on the other the effects of chronic exposure are not noticed until years later.

SURVEYS AND AUDITS

The concept of 'safe exposure levels' should be understood by scientists. They are not fine dividing lines between 'safe' and 'dangerous'; they are only a guide and represent the best knowledge, as determined by the scientific

community, at the time they were set. Techniques are now available by which regular monitoring of the workplace can be carried out in a scientific way. The Accident Compensation Corp. is at present beginning to promote an international safety rating and audit programme developed by the International Loss Control Institute of Atlanta, Georgia. This comprises a systematic appraisal of the workplace and the determination of a rating by a points system for individual undertakings. In its entirety it covers the whole spectrum of industrial activity from the role of management to hygiene standards for employees. Other techniques which have been used for some time are the checklist and the health survey. A typical laboratory checklist covers: fire protection; working environment; personal protective equipment; electrical hazards; flammable liquids and materials; compressed and liquified gases; toxic, carcinogenic and hazardous chemicals; radiation; microbiological hazards and storage facilities.

The health survey provides a means by which employees can be alerted to possible adverse effects to their health. If a company is large enough this can be carried out by the occupational health nurse employed by the firm or with smaller companies, use can be made of the Health Department or consultants brought in to conduct these surveys. A recent study carried out by the Department of Health on problems associated with the use of plain paper photocopiers[6], made use of such a survey in evaluating health problems experienced by operators. The health survey is industry specific and time must be spent in formulating a questionnaire which reflects the possible hazards associated with that industry. Once developed, however, a survey provides a valuable tool with which employees may be alerted to health changes brought about by the environment.

CONCLUSION

The major task which faces us in New Zealand is to raise the level of awareness of occupational health problems and an approach such as outlined above should be of considerable assistance. In this we have much in common with many other countries, even if they may be a little ahead of us. In Britain, for example, in 1982 the Employment Committee of the House of Commons heard submissions on health and safety problems in industry in recognition of the 10th anniversary of the tabling of the now famous Robens Report. In the Committee's Report[7] the following appears:

> *Within the United Kingdom the Health and Safety Commission draw a distinction between their work in the two fields of accidents and occupational disease. Although accidents are coming under control, the problems of occupational diseases are much more difficult to deal with. They consider that this should be a priority in the health and safety field, and they see a need for more professional people such as toxicologists and epidemiologists. Not enough appears to be known about the hazards of occupational diseases however, and the Committee consider that more research and publicity is necessary, so that the Commission's efforts in this field should be directed to the best advantage.*

This comment, we suggest, is even more relevant to New Zealand. Inevitably the question will arise as to what is the cost of such measures and though that amount would be difficult to quantify, it may well be that the cost of inactivity is much higher even in material terms to say nothing of human values. The challenge remains with us.

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THE DETERMINATION OF HEAVY METALS IN SEAWATER — THE MATRIX PROBLEM

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Toni Mitchell completed her B.Sc. with first class honours at Deakin University in 1983 and is presently pursuing post-graduate studies at the University of New South Wales under the supervision of Dr. Jarda Matousek.

INTRODUCTION

The determination of heavy metals at the trace level is often complicated by matrix effects. At the ultra-trace level, say below 100 parts ber billion (ppb), additional complications may arise — changes in the nature of the sample during storage, contamination of the sample, reduction of the analytical blank. These can be overcome by correct choice of container, container cleaning, sample pre-treatment, working in controlled atmosphere laboratories (clean laboratories), use of ultrapure chemicals, and good housekeeping.

Approaches to the problem of matrix interferences have been (i) to prepare blanks and standards with the same matrix composition as the sample, (ii) to quantify using the method of standard additions, (iii) to add matrix modifiers, (iv) to separate the analyte from the sample matrix, (v) select an analytical method where the nature of the matrix ceases to be a problem.

Separation of the analyte from the matrix would appear to be the logical answer — no matrix, no matrix interferences. But this approach loses its attractiveness if the separation procedure is time consuming and/or increases the risk of contamination or loss of analyte.

INSTRUMENTAL METHODS

Atomic absorption spectroscopy, employing electrothermal atomisation (ETAAS), is the instrumental method most commonly used to determine ultratrace levels of heavy metals in liquid samples. For seawater samples the matrix imposes significant problems for ETAAS and stripping voltammetric techniques are being increasingly embraced. In anodic stripping voltammetry (ASV) the dissolved salts function as a supporting electrolyte, and preconcentration into a hanging drop or thin film mercury electrode occurs in the analysis cell without introduced chemicals, hence the risk of contamination is reduced. The preconcentration (deposition) step makes ASV one of the very few analytical techniques with the inherent sensitivity for the direct determination of heavy metals in unpolluted natural waters.

The ASV technique has the following drawbacks; (i) lack of general applicability, (ii) the time taken to complete a quantitative determination — 5 to 20 minutes deoxygenation, 3 - 30 minutes deposition, 2 - 10 minutes stripping, plus additional cycles for replications[4], standard additions, etc., (iii) interferences by organic species[1], (iv) different responses to different forms of metal.

TABLE 1

Concentration of Metals in Seawater (ppb, $\mu g/l$)

	Open Ocean Water[1]	Sydney Harbour[2]	Port Phillip Bay[3]
Cu	0.120	1.61	0.62
Cd	0.015	0.08	0.07
Pb	0.014	0.90	0.59
Zn	0.010	7.24	1.78

The use of ETAAS for metals in seawater has usually been preceded by solvent extraction or ion exchange to achieve concentration and separation from the matrix.

TABLE 2

Element	ETAAS Sensitivity[5] (1% absorbance)	Weight of Analyte in 10 Microlitre Sample: Open Ocean Water	Port Phillip Bay
Cu	4.0×10^{-12}g	1.20×10^{-11}g	6.2×10^{-12}g
Cd	0.2	0.15	0.7
Pb	4.0	0.14	5.9
Zn	0.3	0.10	17.8

It is apparent from Table 2 that preconcentration of the analyte is necessary for the analysis of unpolluted ocean water by ETAAS, but the method has the inherent sensitivity for the direct analysis of waters receiving anthropogenic input of heavy metals, even if the pollution levels are only slight. In reference to Table 2 it should be noted that detection limits are below sensitivity levels and that, for modern large graphite furnace elements, injection volumes up to at least 40 μl can be employed. Therefore it would seem that the almost universal use of a separation procedure prior to ETAAS analysis of seawater is to overcome matrix problems with the concentration enhancement a useful bonus. But both ion exchange and solvent extraction procedures are time consuming and become tedious when large numbers of samples are to be processed.

A typical ion exchange procedure for seawater using Chelex 100 resin[6] would take about two hours. The solvent

extraction of mixed pyrrolidinedithiocarbamates and diethyldithiocarbamates into Freon TF[7], with back extraction in nitric acid, can take, at the metal concentrations concerned, up to twelve hours to process 10 samples[8]. Separation procedures increase the risk of contamination and loss of analyte, and also increase the degree of difficulty in automating a particular determination.

FACTORS OPERATING AGAINST DIRECT ETAAS ANALYSIS

There have been a few attempts to analyse seawater directly by ETAAS. Sturgeon[9] noted that, in contrast to the large effort devoted to separation and preconcentration schemes, few researchers have undertaken a systematic assessment of the feasibility of directly analysing seawater for trace metals by graphite furnace atomic absorption spectroscopy. Direct analysis is highly desirable because it reduces the time taken to get an answer, minimises sample handling, and elimination of pretreatment minimises the contamination risk. But, because of the severity of matrix interference effects, direct ETAAS analysis is not the method of choice for the routine determination of metals in seawater.

Matrix interferences have been, and continue to be, the most serious practical drawback to the analytical application of thermally pulsed graphite furnace AAS[10]. When a sample of seawater is atomised in an electrically heated furnace element a large non-atomic absorption signal is obtained at many wavelengths due mainly to molecular absorption by molecules of NaCl, $CaCl_2$, Na_2SO_4, and scattering by condensation particles[11, 12].

Figure 1 shows the background absorption curve for a very dilute solution of sodium chloride. At this salt concentration direct analysis of cadmium, lead and zinc can be performed without straining the background correction facility of modern instruments. However, at the seawater level of dissolved salts, total attenuation of the deuterium arc output and hollow cathode beam is the usual result.

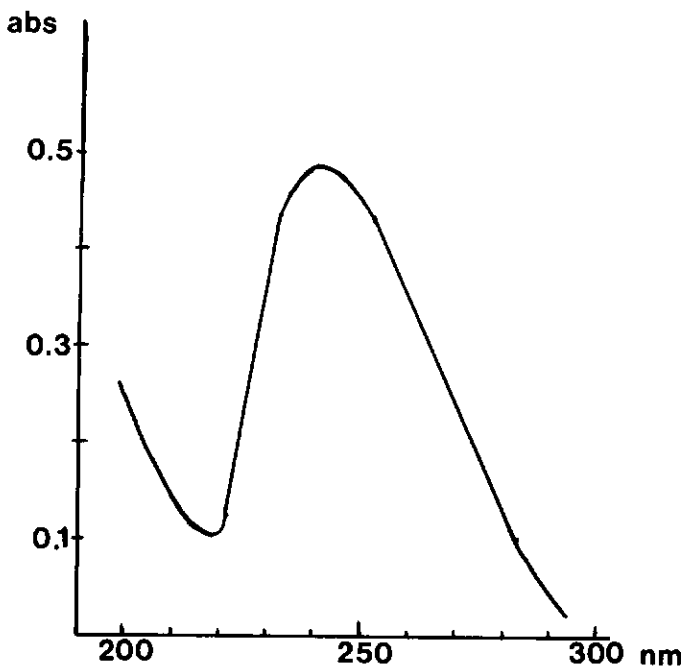

Figure 1
Absorption curve for a 0.01 per cent w/v solution of sodium chloride obtained using an IL951 atomic absorption spectrophotometer with CTF655 atomiser. Ash maximum 400 °C, atomise 1200 °C.

When the interior wall of the furnace element reaches a temperature at which the metal of interest vaporises, the metal permeates into the gas phase. This temperature, and the rate at which the metal leaves the wall of the furnace, will vary with the composition of the matrix. But numerous other factors will influence the atom population within the furnace including, the nature of the graphite surface (pyrolytic, non-pyrolytic, age), furnace geometry, mode of heating (pulsed or constant), ashing temperature and duration of the ashing cycle, rate of heating to the atomisation temperature, temperature distribution along the length of the furnace, gas flow rates, oxidation or pyrolysis during ashing. It is little wonder then that ETAAS is infamous for numerous and complex interferences.

Many metals, in the presence of certain matrix constituents are vaporised slowly, starting at remarkably low temperatures (below their boiling points). This limits the temperature to which the sample can be subjected to during the ash cycle. Figure 2 shows that at a low constant ash temperature of 200 °C, the maximum atomic population of cadmium, from nitrate, is obtained at about 900 °C. If the atomisation temperature is held constant at 1000 °C and the ash temperature varied, losses of cadmium are apparent once the temperature exceeds about 250 °C.

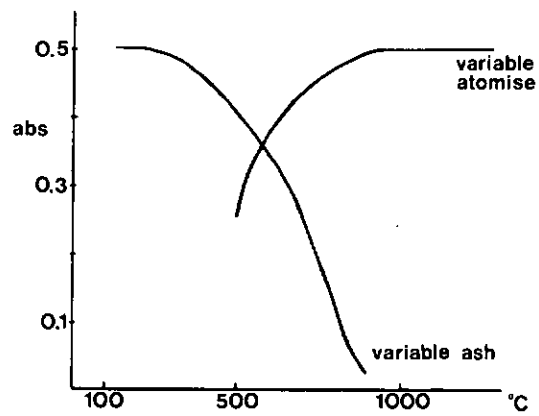

Figure 2
Absorption profiles for cadmium in nitric acid medium (2μg/l, in 0.2 M HNO_3).

For the same cadmium concentration, 2μ g/l, in two percent v/v hydrochloric acid solution the absorption v temperature profile is similar, but decrease of atomic population with increasing ashing temperature does not become apparent until approximately 360 °C. Figure 3 shows that, for 0.01 M phosphoric acid medium, loss of cadmium was not recorded until ashing was conducted above 500 °C.

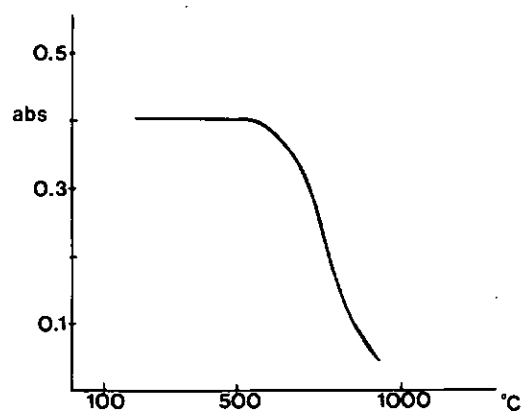

Figure 3
Absorption profile for cadmium as a function of ashing temperature.

TABLE 3

Forms of Metals in Seawater[1]

Copper	Cadmium		Lead		Zinc	
Up to 50% of total copper may be associated with organic matter. Predominant inorganic forms — $Cu(OH)_2$ 40% $CuCO_3$	$CdCl^+$	92%	$PbCO_3$	83%	Zn^{2+}	27%
	$CdCl_2$		$PbCl_2$	11%	$ZnCl_n$	47%
					$ZnCO_3$	17%

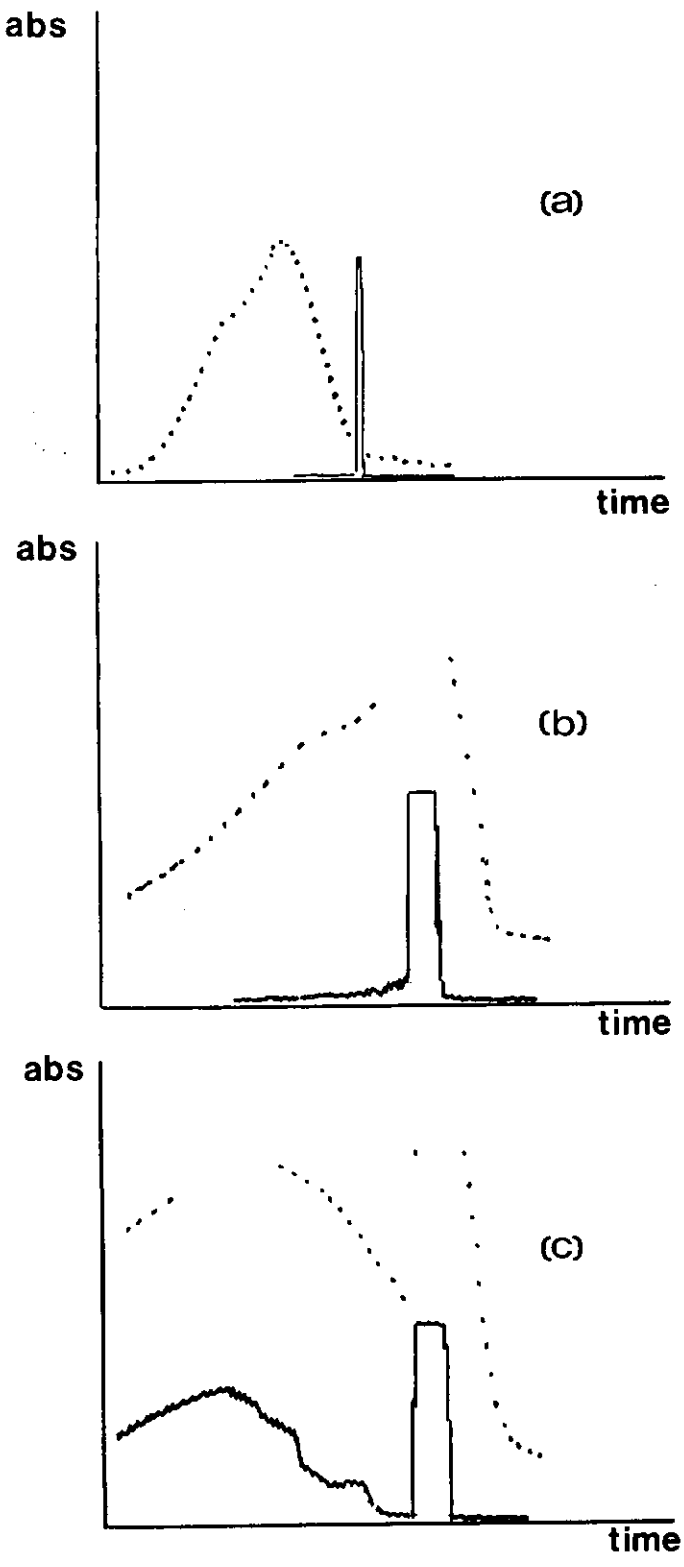

Figure 4
Absorption and background (dotted) curves for Nickel in 1, 2, and 3 percent sodium chloride solutions ((a) to (c) respectively).

Data in Table 3, based on computer modelling programmes, indicates that the volatilisation of metals from seawater is much more complex than volatilisation from a 'simple' chloride matrix, but on the score of interference the large amount of chloride present will be dominant. The atomisation temperature of lead in a sodium chloride matrix is lowered so that the appearance of the lead absorbance peak approximately coincides with the release of sodium chloride molecules from the furnace wall i.e. from about 1050°C. Reduction of the analyte signal due to loss of analyte prior to reaching the atomisation temperature is the most serious chemical interference effect. Cadmium, lead, and zinc chlorides volatilise below the temperature required to remove the bulk of the seawater matrix, and they diffuse out of the furnace element. Vapour phase dissociation equilibria are affected by components of the matrix volatilised into the volume of the furnace at the same time as the analyte molecular species.

APPROACHES TO DIRECT DETERMINATION

(A) Selective volatilisation — This depends on the volatilities of the analyte species and concomitant species being different. A number of workers [9, 13, 14] have reported attempts to determine hewavy metals in complex matrices, and have concluded that the application of selective volatilisation to inorganic matrices would be limited to cases where the differences in volatilities between matrix and analyte were quite large, e.g. in the April 1984 issue of Chemistry in New Zealand, Murnane described the analysis of calcium and iron in brine. This determination worked because the atomisation temperatures were separated from the temperature of vaporisation of the sodium chloride by some 1000°C.

For the environmentally important heavy metals Cd, Cu, Ni, Pb, and Zn the atomisation temperatures commonly employed range from a minimum of 1000°C for zinc up to about 1950°C for nickel. Thus nickel is the only prospect for direct determination based on controlled volatilisation. Figure 4 (a) to (c) illustrates the determination of 5μg/l Ni in 1, 2, and 3% sodium chloride with an atomisation temperature of 1900°C and maximum ash temperature of 1200°C (higher ashing temperatures resulted in premature loss of Ni). It is obvious that the selective volatilisation approach for Ni becomes complicated above salt concentrations of one per cent. Sodium chloride, boiling point 1413°C, is not dissipated before the nickel atomisation temperature of 1710°C is reached.

(B) Matrix modification — If the volatilities of the interferent and the analyte are similar then some form of chemical treatment is essential. Matrix modifiers either change the nature of the matrix to alter the conditions which prevail during atomisation, or they stabilise the analyte. First suggested by Ediger[15] in 1974 it has become the most popular approach. Varian[16] in 1975 advised that sodium chloride interference in the determination of cadmium in seawater was eliminated by addition of ammonium nitrate (about 8 g per 100 ml seawater). The molecular band absorption of calcium and sodium halides is reduced by removal of chloride as the extremely volatile ammonium chloride. the method has proved less than satisfactory because large additions of NH_4NO_3 are necessary to completely remove the halides. Our experience is that amounts in excess of 5 g per 100 ml of seawater result in losses due to covolatilisation and unacceptable dilution of the analyte. Unless the seawater matrix is completely removed to avoid vapour phase

interaction then it is immaterial whether the analyte is ultimately analysed from the oxide or the chloride.

Selective volatilisation and matrix modification have not, on their own, enabled direct ETAAS analysis of the environmentally interesting heavy metals in seawater. However we believe that, with the new generation of graphite furnaces which allow much greater flexibility of temperature control and conditions applying within the furnace element during ashing, a combination of matrix modification and improved temperature programming could prove effective. Currently both inorganic and organic compounds are being investigated as matrix modifiers for high salt samples.

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SYMPOSIUM — HEALTH HAZARDS OF CHEMICALS IN THE WORKPLACE

A symposium was held by the Auckland branch of the Institute at the Vacation Hotel, Auckland, on 19 June.

Sixty-nine participants, coming from Whangarei to Bluff, and representing 42 areas of the chemical industry — heavy and light manufacturing, bulk chemical suppliers, consultants, academia, government and monitoring organisations — reflected the genuine concern felt within the industry about the presence of potential hazards, and the likely effects of these hazards on the workforce exposed to them.

The high quality and practical nature of the papers presented assured animated discussion and an attentive audience throughout the day.

The opening address by Dr Keir Howard (Wellington Clinical School of Medicine) on "Concepts of hazard and risk — The model of asbestos", set the tone for the day with the definition of, and illustration of, these concepts. He pointed out that the interpretation of hazard and risk by the general public is poorly understood. He expressed the concern, felt also I am sure by many of us, of the danger of these misconceptions and misunderstandings of the relationship between hazard and risk affecting the industrial innovator — quote "The great danger of these misconceptions etc, . . . to emotional pressure groups".

He was followed by Dr Keith Bedford (Chemistry Division, DSIR) with a comprehensive but succinct outline of the classification of toxic substances by their physical, chemical and physiological effects on the human body. He presented practical illustrations of the effects encountered using some of the hazardous substances found in industry.

The morning tea break was followed by Dr Bruce Graham (Health Department, Auckland) illustrating methods of monitoring the workplace for the potential hazards present. The pros and cons of active and passive sampling systems as well as total environment or personal sampling systems were discussed.

Dr Robert Winchester (Health Department, Auckland) then explained the operations and history of the Occupational Health Units. A comprehensive bibliography of the studies carried out by the units since their establishment illustrated dramatically the diverse nature of the problems encountered in industry.

Mel Tyson (National Health Institute, Wellington) was suffering from a biological affliction in the throat, so his paper, "Biological monitoring in the workplace" was ably read by Brian Cavit (Health Department, Auckland). He outlined the types of biological monitoring available to assess the levels of heavy metal, organic solvent and insecticide/pesticide exposure within the workforce by analysis of body tissue and/or fluids.

The excellent lunch enjoyed by all, provided the risk of a somnolent afternoon session. However, the quality of the morning session was maintained with the speakers from specific industries, who illustrated areas of hazardous activities within their own industry, how these activities were monitored, and what steps are taken to reduce the risk of exposure.

Dr Ian Johnson of NZ Steel Ltd presented a comprehensive account of the effects of the various dusts and fumes encountered in the steel-making industry and how these are monitored.

Mr Bill Harland, NZ Farmers Fertilizer Co, followed with an explanation of the problems encountered with materials handling within the fertilizer industry, with emphasis upon reduction of fluoride emissions, the handling of sulphur, and the production of sulphuric acid. He explained the simple classification system employed to guide the workforce as to the correct protective equipment and procedures to employ when handling chemicals.

Joe Bognar, NZ Forest Products, described the obviously mammoth task of coping with the very wide nature of the chemicals involved within the forestry sector, particularly with the production of pulp and finished products.

Mike Farrier, NZ Aluminium Smelters Ltd, illustrated the variety of potential hazards within the aluminium smelting industry and how in several areas, NZ Aluminium have successfully engineered out the risk of hazardous exposure to toxic materials. In some aspects they have provided world first methods of dealing with such hazards.

The final industry paper was presented by Ken Mills, Dulux NZ Ltd, who illustrated the systems involved in identifying hazardous materials and the general principles of hazard control with particular reference to the nature of the materials encountered within the paint industry.

The afternoon tea break was followed by trade representatives John Wikaira of NZ Safety Ltd and Elizabeth Davies of 3M (NZ) Ltd, giving an excellent overview of the products and systems available to monitor and reduce the risk of exposure to the many hazardous materials surrounding us all in our working environment.

The day ended with a social hour, giving the opportunity to chat, discuss and view the trade displays.

I understand that the function was a financial success thanks, in part, to the sponsorship provided by 3M (NZ) Ltd, and NZ Safety. The profits will be used to support future Branch activities of this nature.

Thanks to the Auckland Branch Committee, and to Bruce Graham in particular, for a well organised, well run and practical symposium.

Dennis Karl

(Dennis Karl is General Manager, S & G Consultants, Auckland)

NZIC ANNUAL REPORT 1983-1984

On behalf of the Council we have pleasure in presenting the Annual Report for 1983-1984.

Amongst initiatives taken during the year was Council's adoption of a new logo for use on NZIC scarves, stationery and ties.

Others were grants totalling $3000 for Branches to sponsor student members to the NZIC and other approved conferences, a $2000 donation to the Prince and Princess of Wales Award scheme organised by the Royal Society of New Zealand and a $1000 contribution to the capital of the Arthur C. Kennett Memorial Award co-sponsored with the Australasian Corrosion Association. These funds promote the science and practice of chemistry and the usefulness and efficiency of persons engaged therein — one of the objects of NZIC as stated in our rules.

Council is concerned that less than 20 per cent of those completing NZCS and B.Sc. qualifications in chemistry each year apply for membership of NZIC. Proposals designed to increase membership of the Institute are under consideration.

NZIC contacts with chemical societies overseas were strengthened through visits here by the Presidents of the ACS in June and of the RACI in August. NZIC's President took part in the planning meeting in Tokyo for PAC Chem 84 and the General Secretary paid courtesy calls on the Executive Secretary of the Royal Society of Chemistry in London and on officers of the Federation of Asian Chemical Societies (FACS) in Bangkok, Kuala Lumpur, Singapore and Australia.

Prizes: Institute Prizes were awarded as follows:

ICI Prize: Dr E. N. Baker, Department of Chemistry, Biochemistry and Biophysics, Massey University.

Shell Industrial Chemistry Prize: P. D. Rawdon, BP Chemicals Ltd, Wellington.

Chemical Essay Prize: no entries.

Student Paper Prize: B. R. Dent, Victoria University of Wellington.

Chemistry V AAVA Prize: M. E. Bowden, Chemistry Division, DSIR, Petone.

Conferences: The Institute thanks Dr P. Holland (Chairman), Dr C. Devine (Secretary) and the Committee for arranging a most enjoyable and successful Conference at the University of Waikato in Hamilton 23-26 August. The New Zealand Society of Soil Science and the NZ Committee for Water Pollution Research and Control joined with the NZIC and NZ Biochemical Society on this occasion. There was an attendance of over 170 NZIC members in the total of 300. A profit of more than $2000 resulted.

In addition to a wide range of plenary addresses, symposia, specialist sessions and a comprehensive trade display, a feature of the meeting was the attendance of Dr D. E. Weiss, President of the Royal Australian Chemical Institute. As the inaugural NZIC-RACI Visiting Speaker he gave one of the plenary addresses on "Processing with Magnetic Particles", describing his work with CSIRO on water treatment.

Prior to the Annual General Meeting Dr R. H. Newman of Chemistry Division, DSIR, spoke on "Down to Earth Applications of Nuclear Magnetic Resonance" after receiving the Easterfield Medal from the President, Dr Wright.

At the AGM three resolutions were passed on the subject of advertising of butter by the Dairy Board. Action was taken by Council officers prior to and after this meeting. The advertisements which were considered unsatisfactory are no longer used on radio or television.

Commenting on Public Issues: At the Council meeting last August it was decided to incorporate the Public Affairs Committee into a new Public Affairs and Science Policy Committee. Shortly afterwards, the issue was raised of whether the Institute should make a statement on nuclear disarmament and all Branches were asked to seek the views of Institute members on this question. A summary of what happened subsequently was published in the April, 1984 issue of "Chemistry in New Zealand". The outcome — Council decided not to make a statement. This decision was made because the members of the Institute were clearly divided on the issue.

But the question which now arises is: What is the point of having a Public Affairs Committee? Perhaps the Institute should discuss the possibility of allowing the President to make public statements on the advice of the Public Affairs and Science Policy Committee with the constraint that the President should be convinced that an opinion expressed would be likely to be a majority opinion of Institute members. It is quite clear that unanimous opinions of Institute members would be rare although on the "butter advertising" issue there was no querying of the actions taken by the Council.

Now, what do we think of the "Science Plan"? The best procedure might be to delegate to the Council or a Council subcommittee the responsibility for making whatever statement or recommendation it thinks appropriate on behalf of the whole Institute.

Guidelines for NZIC Committees: In August Dr Wright and Dr Percival tabled a report setting out guidelines for NZIC committees. Council has agreed that each committee should have clearly defined objectives and should include a council member. Rotation of committees round the Branches is to continue, the convenors being identified by Council, Convenors liaise with their Branch committee to nominate members, ideally from one Branch, including a member of Council. Corresponding members can be co-opted from other Branches. Each committee is required to prepare a report for the August meeting of Council, which will review the relevance and value of the work done. Council may disestablish existing or establish new committees.

The Energy and Chemical Materials Resources Committee and the Archives Committee were disestablished. The latter was replaced by appointing Dr R. F. C. Claridge as Archives Officer. The Standing, Honours, Membership, Publications, Environment, Hazardous Chemicals and Chemical Syllabus Committees continue and their members are listed in this report.

The Public Affairs Committee was incorporated into a new Science Policy and Public Affairs Committee with Professor Batt as Chairman for 1983/84. Thereafter the chair will move between the Wellington and Manawatu Branches at three year intervals. An Editorial Committee for "Chemistry in New Zealand" was established in November.

Membership: In August Professor R. E. Corbett, Mr W. E. Russell and Dr S. H. Wilson were elected Honorary Fellows. The Registrar, Mr D. J. Hogan, was elected to Honorary Fellowship in February in appreciation of the completion of twenty five years of service on 30th April 1984.

The President of the Royal Australian Chemical Institute, Mr J. R. Warby, was elected an Honorary Fellow during his term of office and our President, Professor R. D. Batt, has been similarly honoured by the RACI. John Warby is Manager — Quality Assurance Laboratories of Wellcome Australia Ltd. He was New South Wales Branch President 1979-82.

Dr R. B. Miller was awarded an OBE in the Queen's New Year Honours.

Membership has risen by 34. Although this is almost three times last year's increase of 12, Council is concerned that only a small proportion of the young chemists completing NZCS and B.Sc. qualifications in chemistry apply for membership of NZIC (see membership tables in this report).

A new procedure for applications for membership was introduced. It is to be reviewed by Council in August 1984.

Proposals for simplification of the non-corporate categories of membership of NZIC and for clarification of the progression from non-corporate to corporate membership are under consideration by Branches and Council. The aim is to maintain professional standards and to recognise developments in tertiary training in chemistry and in the needs of young chemists — particularly the growing number employed by small companies. The introduction of a company membership is being investigated, drawing on the experience and practice of sister institutes in Australia and USA.

Council has welcomed a proposal for the formation of an Oils and Fats Specialist Group from Dr Laurence Eyres, Chairman of an interim committee and agreed to make available to it the usual facilities. The list of Specialist Groups included in this report was revised.

International Chemistry. PAC CHEM 84: As President, Dr D. E. Wright attended a meeting in Tokyo 16-18 May of the Program Planning Committee of PAC CHEM 84 — the International Chemical Congress of Pacific Basin Societies to be held in Honolulu 16-21 December 1984. This Congress is sponsored by the ACS, the Chemical Institute of Canada and the Chemical Society of Japan. Air NZ has advertised a package tour for this Congress in "Chemistry in New Zealand". Mr A. W. Mackney will lead the NZIC delegation.

Overseas Visitors' Fund: In June Professor Fred Basolo, Morrison Professor of Chemistry at North Western University, Illinois, spoke to most Branches. His visit was the second by a President of the American Chemical Society.

At the Annual Conference in Hamilton, Professor Robin Clark, a graduate of the University of Canterbury, who is now Professor of Chemistry at University College, London, delivered the RSC Tilden lecture. Another plenary speaker was Professor P. J. Fensham of Monash University, Melbourne, the RSC Nyholm Memorial Lecturer in Chemical Education. Professor K. L. Rinehart, University of Illinois, Professor H. A. McKenzie, Australian National University, Dr C. C. A. Culvenor, CSIRO Division of Animal Health and Dr F. B. Whitfield, CSIRO Division of Food Research, were other overseas speakers at this meeting.

In September Dr A. C. Moffat, a forensic scientist from the UK Home Office, Central Research Establishment, visited four Bran-

THE NEW ZEALAND INSTITUTE OF CHEMISTRY (INC.)
BALANCE SHEET AS AT 30TH APRIL 1984

1983 $			
	CURRENT ASSETS:		
5,437	Bank of New Zealand	9,287.38	
406	Prepaid Travel Account	394.78	
4,045	Subscriptions in Arrears	2,969.70	
3,446	Prepayments: re Future Conferences, etc.	1,300.00	
716	Sundry Debtors	174.00	
1,048	Stock of Publications on Hand	—	
15,098			14,125.86
	INVESTMENTS:		
2,000	BNZ Term Deposits: Various Terms	—	
3,000	Fletcher Challenge Ltd 18%, 30.4.86	3,000.00	
500	Lyttleton Harbour Board Stock — 6.25%, 1.7.98.	500.00	
3,572	Marac Holdings Ltd —16.75%, 18.5.84	3,603.60	
15,148	Marac Holdings Ltd — 11.0%, 4.11.84	17,000.50	
1,000	Nth Canty. Hosp. Bd Stock — 5.25%, 1.11.84	1,000.00	
1,000	Royal Society of N.Z. — 15%, 30.11.85	1,000.00	
3,058	U.D.C. Group Holdings Ltd — 17%, 19.5.84	3,057.50	
29,278			29,161.60
	FIXED ASSETS: At Cost		
	Office Equipment	1,530.41	
	Less:		
	Accumulated Depreciation	880.41	
		650.00	
	Films	822.08	
	Less:		
	Accumulated Depreciation	444.08	
		378.00	
	Presidential Chain	266.60	
1,196			1,294.60
$45,572			$44,582.06

1983 $			
	CURRENT LIABILITIES:		
3,935	Sundry Creditors	3,642.50	
388	Subscriptions in Advance	561.70	
2,660	Symposium Regs in Advance	—	
6,983			4,204.20
	SPECIAL ACCOUNT:		
567	Easterfield		566.86
	ACCUMULATED FUNDS:		
	Balance, 1.5.83	38,021.51	
	Add: Excess of Income over Expenditure for Year	1,789.49	
38,022	Balance, 30.4.84		39,811.00
$45,572			$44,582.06

AUDITOR'S REPORT:
We have audited the financial statements of the New Zealand Institute of Chemistry (Inc.) in accordance with accepted auditing standards, and have carried out such procedures as we considered necessary. In our opinion, the financial statements give a true and fair view of the financial position of the Institute as at 30th April, 1984.

SHANAHAN, WINDER, TOMLIN & CO.
Chartered Accountants

Christchurch, 20th June, 1984.

These accounts must be read subject to the attached notes.

(Annual Report Continued)

ches and spoke about analytical toxicology after attending the 7th Australian Analytical Chemistry Symposium. Dr P. L. Cropp, Chemistry Division, DSIR, arranged his programme. Mr L. Bretherick, formerly Research Project leader with UK's BP Research Centre, addressed all Branches during March on chemical hazards. Dr W. Temple, National Poisons Hazardous Chemicals Information Centre, Otago University Medical School, arranged this visit, which was sponsored in part by the Accident Compensation Commission.

Dr Peter Sykes, Fellow of Christ's College, Cambridge, came from Melbourne 4-23 April and spoke on organic chemistry to members throughout the country at Branch meetings and seminars in University departments. Dr Brian Halton, Victoria University of Wellington, arranged the itinerary. The Royal Society of Chemistry assisted in sponsoring this excellent speaker. Through the resuscitated Corday-Morgan Fund the RSC assists members of any established Chemical Society/Institute in the Commonwealth to visit chemical establishments in another Commonwealth country. A second and related scheme applies to members of the RSC only. Application forms are available from Branch secretaries. Closing dates are 1st April and 1st October.

The guidelines for sponsors of overseas visitors brought to New Zealand to speak to Branches are now understood and appear to be working well. Council resolved not to transfer the Fund to the Branches after consideration of the alternatives.

NZIC-RACI Visiting Speaker Award: Dr D. E. Weiss, OBE, President of the Royal Australian Chemical Institute, in addition to delivering a keynote address at the Annual Conference in August spoke to the Auckland, Otago and Canterbury Branches as the inaugural speaker in the NZIC-RACI Visiting Speaker Award. Dr Weiss, who is Director of the Planning and Evaluation Unit responsible for strategic planning procedures in CSIRO also addressed an invited audience in Wellington on "Planning and Evaluation in Science" at the NRAC Conference Room. His emphasis on accountability and comments on the need for research to be seen as being used locally and to have sound economic overtones were accepted as helpful and timely by NRAC and his widely representative audience from Government Departments and business, in relation to the National Science and Technology Plan.

Professor R. D. Batt was selected by the RACI from the nominations put forward by Council for the 1984 NZIC-RACI Visiting Speaker Award and will spend about three weeks in Australia in July.

Federation of Asian Chemical Societies: Although NZIC members have yet to take part in any meetings arranged by the Federation of Asian Chemical Societies, contacts with the Thailand, Malaysian and Singapore members of this Federation were made by the General Secretary through a series of courtesy calls made in Bangkok, Kuala Lumpur and Singapore in April. Members of NZIC who are travelling through Asia are invited by the Chemical Societies there to consider stopping over to talk with and to meet colleagues there. Funds are available to pay the local costs of such visits. Branch secretaries have copies of the FACS Newsletter which lists contact points of the Federation's member societies.

Finance: The Balance Sheet shows an excess of income over expenditure of $1790. Ex-

THE NEW ZEALAND INSTITUTE OF CHEMISTRY (INC.) INCOME & EXPENDITURE ACCOUNT FOR YEAR ENDED 30TH APRIL 1984

1983 $			
	EXPENDITURE:		
	ADMINISTRATIVE & SUNDRY EXPENSES		
975	Audit Fee	980.00	
	Branch Expense Grants		
7,191	— Re Capitation Fees	9,180.00	
	— Re Student Travel	3,000.00	
714	Computing, Address Labels, etc	445.91	
—	Donation — Prince & Princess of Wales Science Awards Scheme	2,000.00	
—	— A.C. Kennett — Memorial Fund	1,000.00	
7,685	Honoraria and Allowances	7,685.50	
2,323	Overseas Visitors' Expenses	1,938.46	
7,874	Printing, Stationery, Postages, Tolls, etc.	6,069.86	
150	Prizes	100.00	
724	Promotions — Chemex Display	—	
49	Specialist Group Expenses	33.96	
	Subscriptions		
383	— Royal Society of N.Z.	345.50	
125	— S.A.N.Z.	125.00	
50	— N.Z.C.W.P.R.	50.00	
455	— F.A.C.S. (2 years)	—	
50	— N.Z. Futures Trust	50.00	
6,740	Travelling Expenses	6,732.52	
321	Depreciation	331.00	
35,809			40,067.71
	PUBLICATIONS:		
	Journal — Publisher	16,122.67	
	— Editor	1,200.00	
	Chem., N.Z.	322.25	
	Sundry Publications	1,710.99	
	Stock of 'Chemistry in a Young Country'	1,048.00	
23,538		20,403.91	
	Less:		
	Publication Sales 1,776.56		
	Sales 'Chemistry in a Young Country' 176.40		
3,942		1,952.96	
19,596			18,450.95
55,405	**TOTAL EXPENSES**		58,518.66
2,236	**EXCESS OF INCOME OVER EXPENDITURE FOR YEAR**		1,789.49
$57,641			$60,308.15

1983 $			
	INCOME:		
49,433	Subscriptions		52,575.63
	Interest		
	— Bank of New Zealand	460.98	
	— Fletcher Challenge Ltd	540.00	
	— Local Body Stock	83.76	
	— Marac Holdings Ltd	2,352.23	
	— Royal Society of N.Z.	141.58	
	— U.D.C. Group Holdings Ltd	519.76	
3,816			4,098.31
	Conference Surplus		
2,338	— Otago (additional)	54.69	
	— Waikato	2,412.45	
	— Adhesives Symposium	1,167.07	
			3,634.21
2,054	Overseas Visitors Account Transferred		
$57,641			$60,308.15

These accounts must be read subject to the attached notes.

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

STATEMENT OF ACCOUNTING POLICIES:

1. **General Accounting Policies**
   (a) The measurement base adopted is that of historical cost. Reliance is placed on the fact that the Institute is a going concern.
   (b) Accrual Accounting is used to match expenses and revenues.

2. **Particular Accounting Policies**
   (a) Subscriptions in Arrears and Sundry Debtors are stated at expected realisable value.
   (b) Depreciation has been charged using the straight-line method based on the estimated 5 year economic life of the assets concerned.
   (c) Investments are stated at cost or, where applicable, with the addition of interest compounded to date.

3. **Change in Accounting Policy**
   Subscriptions in Arrears accrued are in respect of those still outstanding for the immediately preceding year. Past practice has been to accrue all subscriptions due, unpaid. The effect of this change is to exclude $2,133 subscriptions owing for more than one year from the financial statements.

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penses were less than budget forecasts in most items and income was increased by the unbudgeted Conference surplus. These factors turned a predicted loss into the modest excess.

The February decision by Council to hold subs for 1984/85 coupled with significantly increased Journal costs and a general rise in costs following the end of the freeze means that a deficit is probable for the current year. A sub increase for 1985/86 should be considered.

The Institute is however in a strong financial position. The trend to more international involvement by the Institute continues and finance must be provided for this desirable development.

In August Council approved four guidelines governing the underwriting of chemical seminars and conferences. These were published in the October issue of "Chemistry in New Zealand".

Publications: Dr Herd, Editor, and the new publisher, Cathedral Press (Pacific) Ltd, have continued to improve "Chemistry in New Zealand". The President, on behalf of the Council, has expressed to Tony Herd the gratitude and thanks of members for his outstanding service since 1982 in making our Journal interesting, informative and a credit to the Institute. Although no longer Editor, Tony will continue to work with the publisher and Editor in producing the magazine.

Dr B. W. L. Graham was appointed Editor from the June 1984 issue of "Chemistry in New Zealand". Bruce has been Auckland Branch Correspondent and has the best wishes of Council in undertaking the important responsibility of maintaining contact between our members through our Journal. This is the major item of our expenditure.

Dr Andrew Brodie and his editorial team in Palmerston North have produced three issues of Chem NZ during the period under review.

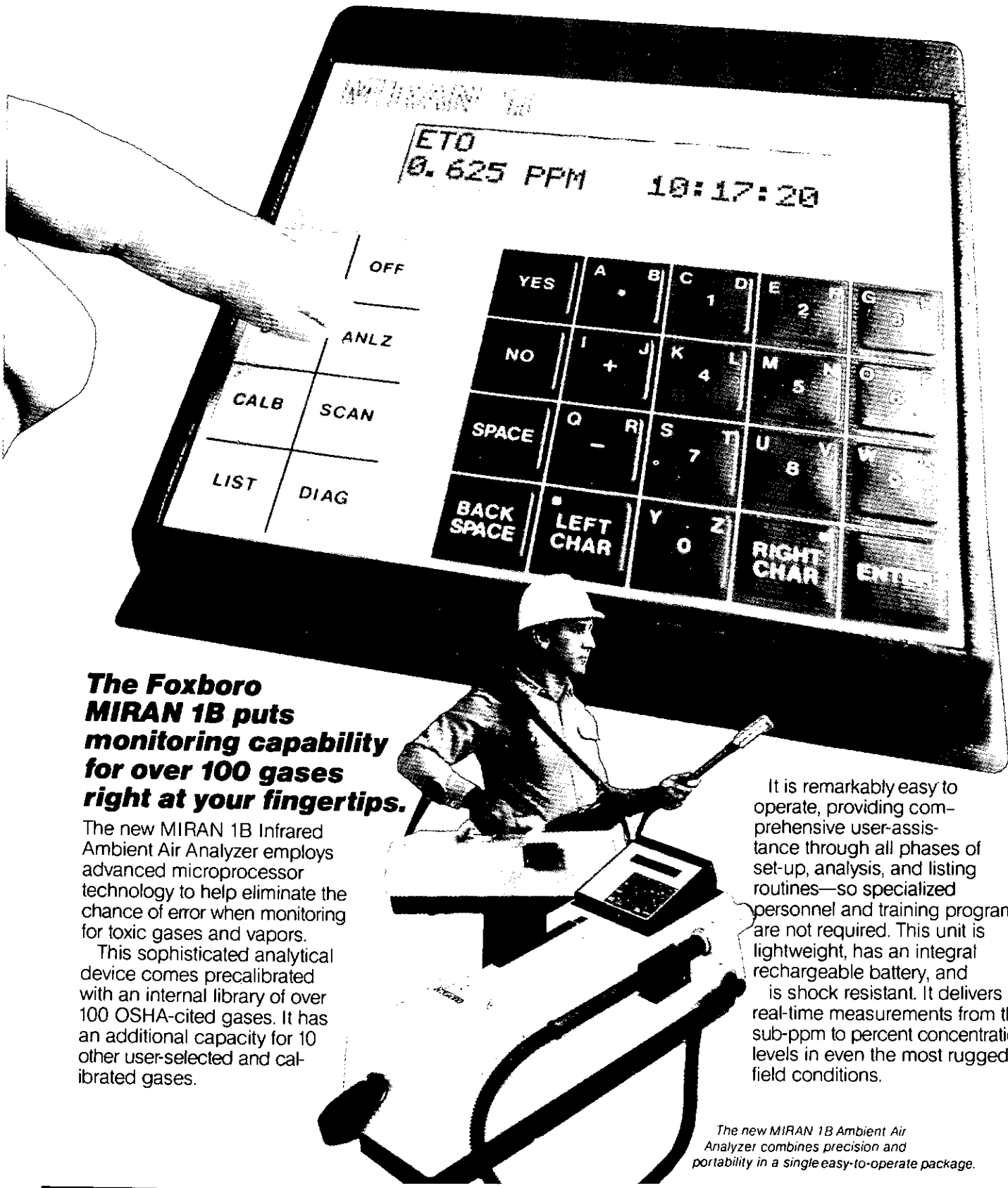
NZIC Logo: Following the adoption of a combination of designs submitted by Anita Vink and Glenn Jameson of an Auckland Technical Institute Graphic Design class orders have been placed for ties and scarves carrying the design which are expected to be available to members about August 1984.

The design, a hexagon within which a flask containing the letters NZIC, represents man and the tools he uses to study and explore nature. Horizontal lines through the hexagon converging towards the top represent growth linking man and nature. The design is in use on Institute stationery.

Thanks: Finally to all members who have assisted in so many ways to fulfil the objects of the Institute we offer sincere thanks. A report such as this conveys only part of the work of creative planning, problem solving and formal administration undertaken by them on behalf of the Institute. Much of the work is done voluntarily. Those who quite properly receive salaries or honoraria have accepted financial restraint as required by legislation without any dimunition in dedicated service.

R. D. Batt, President
J. Rogers, General Secretary.

Ambient air analysis made simple– with the MIRAN 1B ANALYZER



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The new MIRAN 1B Infrared Ambient Air Analyzer employs advanced microprocessor technology to help eliminate the chance of error when monitoring for toxic gases and vapors.

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NZIC OFFICERS AND MEMBERSHIP 1983/84

In April 1984 the number of members in the Institute's various grades was as follows:

Branch	Honorary Fellow	Fellow	Member	Associate	Graduate Member	Technician	Student Member	Totals
Auckland	9	60	263	31	26	11	4	404
Waikato	3	18	89	9	7	1	11	138
Manawatu	0	29	98	7	6	1	2	143
Wellington	7	69	233	3	22	4	0	338
Canterbury	6	70	93	4	28	1	13	215
Otago	1	37	77	1	7	1	4	128
Overseas	4	27	149	1	13	1	0	195
	30	310	1002	56	109	20	34	1561

Specialist Groups:

Group	Secretary	NZIC	Non-NZIC	Total
Analytical	D J Hogan	48	1	49
Chemical Education	D T Howarth	155	318	473
Chromatography	Dr P G Robinson	106	105	211
Electrochemistry	Dr A J Easteal	38	27	65
Geochemistry	Dr K L Brown	38	98	136
Organic Chemistry	Dr P J Steel	85	5	90
Polymer Chemistry	R J Norris	51	17	68
Thermodynamics	Dr G R Hedwig	20	3	23
X-Ray Crystallography	Dr G J Gainsford	23	2	25
Industrial		18		
Inorganic	Prof K M Mackay	61	21	82
Fats & Oils	Dr L Eyres	member list not submitted.		

Branch Membership:

	June 1981	April 30 1982	April 30 1983	April 30 1984
Auckland:	382	397	401	404
Waikato:	116	123	122	138
Manawatu:	141	148	138	143
Wellington:	319	334	345	338
Canterbury:	180	201	199	215
Otago:	115	119	131	128
Overseas:	187	193	191	195
	1440	1515	1527	1561

Elected Officers: President: Prof. R. D. Batt. 1st Vice-President: Mr A. W. Mackney. 2nd Vice-President: Prof. G. B. Petersen. General Secretary: Dr J. Rogers.

Branch Delegates to Council: Auckland: Dr W. A. Denny, Waikato: Dr R. M. Daniel. Manawatu: Dr E. N. Baker. Wellington: Dr H. J. Percival. Canterbury: Dr J. R. Cretney. Otago: Dr J. M. McKenzie.

Officers Appointed by Council: Registrar: Mr D. J. Hogan (31/12/84). Administrative Secretary: Mrs N. E. Wignall (31/12/84). Journal Editor: Dr A. C. Herd (to 30.4.84). Dr B. W. L. Graham (from 1.5.84). Librarian: Dr L. Eyres (31/12/84). Archives Officer: Dr R. F. C. Claridge (31/12/84).

Committees Appointed by Council: Standing: President, Dr E. N. Baker. General Secretary: Registrar (exofficio). Honours: President, Vice Presidents, General Secretary. Membership: Dr A. F. Wilson (31/12/84). Dr H. K. J. Powell (31/12/85). Dr J. H. Garside (31/12/86). Publications: Dr J. R. Cretney, Dr H. K. J. Powell. Editorial: Editor, Mr N. G. Thom, Dr W. A. Denny, Dr J. H. Garside, Dr P. E. Nelson, Mr S. G. Brooker, Mr C. L. H. Stonyer, Miss D. M. Fenton. Science Policy and Public Affairs: Prof. R. D. Batt (31/12/84). Dr D. M. Bibby, Dr S. I. Smedley, Mr G. R. G. Wright. Chemical Syllabus: Mr J. B. Butchers, Dr H. J. Percival, Mr W. Freitag. Environment: Prof. R. Laverty, Dr P. W. Larking, Dr G. F. Laws, Dr W. A. Temple, Prof. A. D. Campbell, Dr J. McKenzie. Hazardous Chemicals: Dr W. A. Temple. Prof. A. D. Campbell, Assoc. Prof M. R. Grimmett, Mr A. M. Scrymgeour, Prof. G. B. Petersen.

Representatives to other Bodies: AAVA: Mr W. Freitag (31/3/86). Deputy, Mr N. R. Edmonds (31/3/86). SANZ: Mr J. G. Fletcher (31/3/85), Dr H. J. Percival (31/3/86). RSNZ: Member Bodies Councillor, Prof. R. D. Batt. Member Bodies Management Committee: Dr H. J. Percival. Prof. R. D. Batt.

Obituary: We record with regret the deaths of the following members: Dr H R Whitehead (Manawatu), J E Brundell, A C Kennett, Dr M Kingsford (Auckland), W. L. Escher (Wgtn), Dr A. Metcalfe, W S Wick (Canty). Dr E Gregory (Otago), J N Breen (Waikato).

Membership: During the year the following changes in membership have taken place:

Honorary Fellows elected	3
New Fellow	1
Members elected to Fellowship	7
Member re-instated	1
New Members	15
Graduate Members elected to Membership	18
New Associate Members	3
New Graduate Members	35
Student Members elected to Graduate Members	2
New Technician Members	4
Student Member elected to Technician Member	1
New Student Members	13
Deaths	8
Resignations	11
Struck Off	19

BRANCH NEWS

AUCKLAND

Mr Raymond Hopgood represented the Institute at the Hazardous Activities Forum organised by the ARA. The Forum attracted 153 representatives of groups as varied as Greenpeace, Friends of the Earth, industry, central and local government, with the exception of the oil companies. He has tabled a report for submission to our Hazardous Chemicals Committee who will issue a full statement in due course. Our thanks go to Ray for his efforts in representing the Institute in this area.

The Auckland Branch has started operating a chemical exchange through the monthly newsletter. The purpose being to help laboratories with chemicals surplus to requirements to dispose of them to laboratories which can use them. The first batch of chemicals offered did not make it to the newsletter but got snaffled up by the Committee. This month's newsletter has 35 chemicals offered, and the service promises to be well patronised.

The Auckland Branch this year contributed money for chemistry prizes to the University of Auckland and Auckland Technical Institute.

The University chemistry prize was for the best undergraduate student in chemistry and was awarded to **Mr Leslie Young**. Leslie is at present studying for a Masters degree and working under **Dr Martin Banwell** on the synthesis of trimethoxy aryltropones.

On completing his Masters he plans to study for a Ph.D. and then move into industry.

The Auckland Technical Institute prize was for the best NZCS student in chemistry and was awarded to **Mr Mike Alston**. Mike works as a chemist at Hayes Metal Refining analysing alloys for quality assurance and producing laboratory batches of specialised alloys.

WAIKATO

Dr Peter Sykes, Fellow of Christ's College, Cambridge, talked about "Pathways through the organic jungle" at the April branch meeting. His lecture drew attention to the main areas from which the basic information about organic reaction pathways actually comes, including the structure of products kinetic measurements, kinetic isotope effects, isotope labelling, detection of intermediates and trapping. Having obtained this basic information, Dr Sykes showed how it can be fitted together in a plausible fashion to form that orderly succession of molecular events we call a reaction pathway.

Dr Colin Jones from the Department of Biochemistry, University of Leicester spoke about "Bacterial energy conservation" at the May branch meeting. He is a leading worker in this field and the author of several books and reviews. His current interests include thermophiles and methanol oxidising bacteria. Although respiration is remarkably similar in all higher organisms, bacteria exhibit a diversity of systems. They are able, for example, to respire in the absence of oxygen. As well as being of intrinsic interest, the study of bacterial energetics is of considerable significance in biotechnology, where growth yields and efficiencies have a large influence on the economics of many processes.

Professor Dick Batt gave his Presidential Address on "alcohol and politics" at the June branch meeting. He presented a lot of fascinating statistical information, dating back well over one hundred years, which indicates that alcohol abuse is a social problem, rather than a medical problem. Professor Batt gave an account of the changing levels of alcohol consumption in New Zealand and the ineffectiveness of legislation to offset the effects of alcohol misuse in the community.

WELLINGTON

The May meeting was the NZIC Presidential Address delivered by Professor R.D. Batt, head of the Department of Chemistry, Biochemistry and Biophysics at Massey University. He described how protein research in his department developed from an 'over the tea-table' discussion to full commercial projects which return royalties to the University. The necessity for a team approach was emphasised. Research into protein separation techniques, purification and crystallization were needed before the more academic work of crystal structure determination and amino acid sequencing could be undertaken.

Some of the difficulties in ensuring promotion for research workers whose work resulted only in one or two publications over a seven or eight year period were discussed together with problems associated in working with processes where publications could not be made until after patents and accessing had been negotiated. The Departments of Chemistry, Biochemistry and Biophysics under Professor Batt have been particularly successful in obtaining overseas licences for several of its processes for protein separation and commercialises its ideas through the Development Finance Corporation.

The June Branch meeting saw a disappointingly small group of members visit

BRANCH NEWS

the newly installed Tandem Van de Graaf accelerator at INS. This equipment is probably the single most expensive research instrument installed in New Zealand. The accelerator will reach a maximum of 6 million volts, and is used to measure very low concentrations of cosmogenic radio nuclides e.g. 14C, 10Be and 36Cl.

CANTERBURY

The June meeting of the Canterbury Branch was a joint meeting with the Association of Clinical Biochemists (Canterbury Branch) held at the Christchurch Clinical School. Appropriately, the speaker was Professor R.D. (Dick) Batt currently President of both NZIC and the New Zealand Biochemical Society. In his address "Alcohol Metabolism in Humans" he traversed the history of alcohol consumption in New Zealand since the 1850's and commented on how the change to our drinking laws has led to a previously absent link between public consumption of alcohol and entertainment. He then reviewed recent research carried out on rates of alcohol metabolism and the factors which affect metabolism and elaborated on his public comments that there was some evidence that moderate consumption might have some beneficial effects.

At this well attended meeting, the President took the opportunity to confer Honorary Fellowship of the Institute on NZIC Registrar Denis Hogan — a recognition of the outstanding contribution Denis has made to affairs of the Institute in his 25 years as Registrar. Honorary Fellowship is usually conferred only on retirement of a prominent member of the Institute and is the highest honour the Institute can confer. In his vote of thanks at the end of the meeting, ex-President John Pollard commended Council on this unprecedented step, suggesting that the Registrar duly record an appropriate entry in the Precedents Book.

Also in June Dr Peter Harland and Dr Chris Easton (University of Canterbury) travelled to the West Coast to give "Chemistry in Action" lectures to senior secondary school pupils, In Greymouth, 60 students from Greymouth, Hokitika, and John Paul High Schools attended; in Westport a similar number from Westport, Reefton and Karamea High Schools came. The main theme of each lecture was "Energy and Chemistry" (complete with lively demonstrations) but the opportunity was also taken to talk to the students about career openings in chemistry.

OTAGO

The May meeting of the Branch took place in early June when the Branch's Annual Dinner was held in the Staff Common Room of the Medical School. Prof. Margaret Loutit from the University's Department of Microbiology spoke to the gathering as a representative of the Otago Development Council. Her talk was concerned primarily with ways in which University expertise is being marshalled to help the business community, and in return, with ways in which the University can generate income from these activities. Mrs Glenda Billcliff was primarily responsible for the excellent catering. Her car burst into flames on the way to the meeting, but great presence of mind saved the quiche.

On the schools scene, John Billcliffe (OBHS) reports that Science Teachers from the Otago-Southland region met in April with Dr Malcolm Carr to discuss proposals for the 7th form chemistry prescription. Dr Carr is the Subject Convener in Chemistry for the Universities Entrance Board.

EIGHTH AUSTRALIAN SYMPOSIUM ON ANALYTICAL CHEMISTRY

The Eighth Australian Symposium on Analytical Chemistry will be held at the Southern Cross Hotel, Melbourne, from 15-19 April 1985. The theme of the conference will be 'Choosing the Right Method — the practical chemist's dilemma'. This theme will strike a chord with all practical chemists who well know the difficulties these days in selecting, from an array of potential methods, the one that is best for their particular situation.

Plenary speakers include Professor Larry Sternson, USA (Pharmaceuticals); Dr Olle Lindsjo, Finland (Mining and Metallurgy); and Prof. John Riley, UK (Environment). There will also be a plenary speaker on Ecotoxicology/ Occupational Health.

Specialist speakers will present review papers on a number of topics including the following: Analytical NMR; Atomic Spectroscopy; Chromatography; Electrochemistry; Energy dispersive XRF; Laboratory Management Systems and Molecular Spectroscopy.

Requests for the Registration Circular, which will be available in August 1984, should be sent to 8AC, ACTS, GPO Box 1929, Canberra, ACT, 2601, Australia.

GOV'T RESEARCH LABS

CHEMISTRY DIVISION WELLINGTON

The Director of Chemistry Division, Dr G.J. LEARY recently spent a week at the beginning of July attending the Gordon Research Conference in New Hampshire. This meeting examined the utilisation of renewable resources.

Dr W. GIGGENBACH has been visiting Mexico and Costa Rica to visit Geothermal research centres.

Dr K. MORGAN has joined the Spectroscopy Section to work on NMR studies. Dr Morgan completed his PhD at Victoria University of Wellington and visited Canada for Post Doctoral studies before joining Chemistry Division.

Mr J.T. HUGHES has retired from Chemistry Division, where he was a principal analyst in the Food Section.

Dr B. WEISBERG has resigned from Chemistry Division. Dr Weisberg was formally head of the Geochemistry Section.

Dr D. HANNAH recently visited Australia to attend the Food Analysts Meeting in Adelaide.

Dr I. MILLER has recently visited Britain and the USA to visit organisations involved in the plastics industry.

INS WELLINGTON

"Dr D.C. Lowe and Mr W.J. Judd visited the radioisotope accelerator facility at the Physics Department of the University of Arizona, Tuscon, for two weeks. At the facility they made tests on samples which will later be used in oceanographic and atmospheric projects in the vicinity of New Zealand. These will include carbon-14 measurements aimed at establishing the ventilation rate of the deep ocean, as well as the increase in concentration of some atmospheric trace gases.

Dr Bill Burnett of Florida State University has spent three months at INS and the Oceanographic Institute, DSIR. He was interested in dating ocean floor phosphate nodules and pellets. Working with Mr W.J. McCabe and his group, Dr Burnett applied the uranium series dating methods developed at INS.

SOIL BUREAU

Dr Benny Theng will be attending the Second Conference of the International Humic Substances Society in Birmingham, England on 23-28 July. He is giving a paper on the interactions of humic substances with clays and minerals which will form a chapter in a reference book on the structures, properties and interactions of humic substances being produced by the Society. Dr Theng will also visit the Department of Physical Chemistry at Cambridge University and a Spanish clay company. The latter visit will involve discussions on clay-organic complexing in relation to the manufacture of slow-release drugs.

WALLACEVILLE ANIMAL RESEARCH CENTRE, MAF

John Liddle has left the Trace Element Biochemistry Section at the Wallaceville Animal Research Centre to take up the position of Chemist/Laboratory Manager at Analytical Services, Cambridge.

At Wallaceville he was engaged in research on factors that affect the availability of mineral elements to animals.

BUILDING RESEARCH ASSOCIATION OF NEW ZEALAND

Dr John Duncan visited Building Research Establishment Metals Section and corrosion workers in London, Manchester and Nottingham en route to the International Congress on Metallic Corrosion in Toronto in June, where he represented New Zealand at the International Corrosion Council meeting and presented a paper on chloride in New Zealand atmosphere as a corrosion stimulant.

Dr Rob Whitney will be attending the Third International Conference on the Durability of Building Materials and Components in Helsinki in August. Four papers from BRANZ scientists have been accepted for Conference. Dr Whitney will also be visiting research organisations in Canada, Finland, Sweden, Denmark and England. He will be discussing research planning and contract research.

MT ALBERT RESEARCH CENTRE

Mark Gallop, of Chemistry Division has been awarded an 1851 Exhibition Scholarship. He will take up the award to complete a PhD at Kings College, Cambridge.

Dr Haruyasu Shiota, a flavour chemist from Shiono Koryo Kaisha Ltd, Osaka, Japan was a visitor at MARC from July 2 to July 20. During his visit Dr Shiota worked with Harry Young on aspects of kiwifruit aroma analysis.

RUAKURA AGRICULTURAL RESEARCH CENTRE

Brenda Crane visited the Zonta Dairy Village in Thailand in late March. It is situated about 160km south of Bangkok and was initiated five years ago by the Zonta Club of Bangkok I, as a project aimed at bringing poor people from the slums of Bangkok, training them in dairying and settling them with a house, some land and four to eight cows per family. Milk is collected co-operatively and taken to the Rural Development Centre in Chomburg, where it is pasteurised and packed in sachets for sale in Bangkok. Miss Crane took with her equipment donated by the Zonta Club of Hamilton, Waikato, and set up a phosphatase test to check pasteurisation efficiency.

Dr John Watkinson visited Beijing in the Peoples Republic of China at the end of May and presented two papers at the Third International Symposium on Selenium in Biology and Medicine. He also visited the Institute of Animal Science (Chinese Academy of Agricultural Sciences) and gave a talk at the Research Department of Chemical Geography in the Institute of Geography (Chinese Academy of Sciences). In addition, Dr Watkinson gave an address at the Environmental Protection Agency in Hong Kong.

Dr Bill Saunders travelled to Calgary in Canada at the beginning of June in order to present a paper at the Sulphur-84 Conference, which was attended by about 500 people from 27 countries.

Dr Bert Quin has been appointed to the position of Chief Scientist in a reorganisation of the Ruakura Soil and Plant Research Station. He expects to transfer from the MAF Head Office in Wellington to Ruakura in mid July.

FOREST RESEARCH INSTITUTE

FRI has had a series of recent migrations of staff:

Dr K.L. Mackie has gone away for the rest of this year on a David Henry Scholarship to Ottawa to work with Forintek Canada Corp on the use of steam explosion techniques for wood pre-treatment prior to enzymic hydrolysis.

Dr I. Suckling has returned from completing his Ph.D at the University of British Columbia with Dr E. Piers on the synthesis of stemodin (a diterpene). He is now working on the mechanisms of wood degradation during pulping.

Dr P. McFarlane will be joining FRI to replace Dr I. Callendar to continue the research on anaerobic digestion of wood wastes.

Dr T.J. Fullerton has left for a brief visit to North America and to participate at the Gordon Conference at Brewster, New Hampshire. He will present aspects of his work on lignin/carbohydrate interactions during pulping.

Approval has been given and an order placed for the purchase of a Bruker AC200 MHz superconducting FT NMR to replace the vintage T60 still operating. This will be operated and controlled by Dr J. Ralph, himself a recent arrival from doing a PhD at the University of Wisconsin at Madison.

CHEMISTRY DIVISION, CHRISTCHURCH

Dr John Love is heading to Australia to attend the State Government Food Analysts meeting in Adelaide in early August. While in Australia he plans to visit several AGAL laboratories and State Government Analysts laboratories in Tasmania, Victoria, South Australia and New South Wales. He will also be visiting the Armed Forces Food Science Establishment in Scotsdale and the CSIRO Food Research Laboratory in Sydney.

WHEAT RESEARCH INSTITUTE

Mr Peter Cressey is at present on six months exchange at CSIRO's Wheat Research Unit in Sydney — the sequel to a similar visit made to Wheat Research Institute by Dr Bill Campbell from CSIRO last year.

INDUSTRIAL NEWS

Recent movements within the cosmetics industry: **Bill Wong** has joined Middows Taylor (Revlon). He was well known at NZ Cosmetic Laboratories, but did not come from there direct, having had a short period of employment in a different industry.

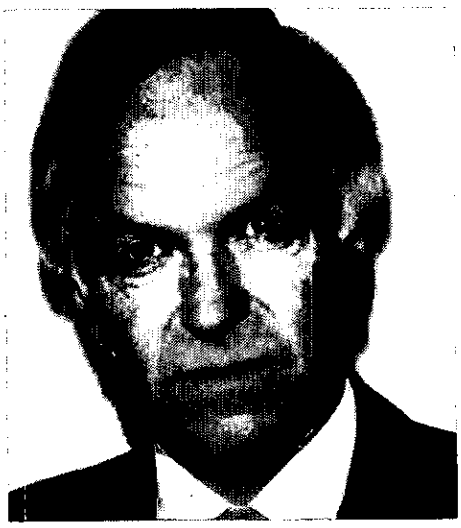
Phillip Ellis, formerly at Middows Taylor, is now Technical Manager (Manufacturing) at Marigny NZ Ltd, makers of the L'Oreal and Lancome brands of cosmetics.

Rob Shaw has recently joined Spectrum Laboratories; and **Margaret Pearce** has been appointed Quality Control Manager in that company. Spectrum laboratories is an associate company of Douglas Pharmaceuticals Ltd. The functions of Spectrum will be as follows: manufacturing of semi-synthetic penicillins, packing of these penicillins and other Douglas pharmaceutical products ready for sale and possibly manufacture of small pharmaceutical specialties.

UNIVERSITIES AND TECHNICAL INSTITUTES

AUCKLAND

Professor Dave Hall, head of the chemistry department has been appointed chairman of the University Grants Committee, as from December 1984. A member of the committee since 1983, he succeeds Dr Alan Johns, a former director-general of the Ministry of Agriculture and Fisheries and a council member of Massey University.



Professor Hall

ATI

Mr Milton Gibson of Auckland Technical Institute starts six weeks of industrial refresher leave on 9 July. He will be looking at new instrumental techniques in organic analysis and will spend some time at DSIR followed by visits to numerous industrial laboratories including the newly opened Dairy Product Graders Laboratory, Wellcome N.Z. Ltd and UEB Industries.

CANCER RESEARCH

Dr Bill Denny has spent three weeks at the Cancer Institute in Melbourne at their invitation where, in co-operation with **Dr Larry Wakelin,** he has been looking at the interaction of antitumour drugs with DNA. This is part of a continuing programme of co-operation between the two groups. On this visit Bill was using techniques developed by the Melbourne group to investigate the action of drugs developed by his group in Auckland. The results generally confirm the theory that slow interaction with DNA is important for antitumour activity.

WAIKATO

We congratulate Philip Watkinson, a graduate member, on the award of his D. Phil. degree. He will spend the rest of this year on a post-doctoral fellowship in this department.

Dr Malcolm Carr has returned from study leave. During May and June he visited all the University centres to talk to university staff and local chemistry teachers about revision of the 7th Form Chemistry prescription (in his capacity as Subject Convenor).

From the Thermophile Research Group — Dr Hugh Morgan has departed on sabbatical leave to the US for 12 months; and Dr Roy Daniel has spent 4 weeks overseas visiting, amongst other places, Iceland. It is anticipated that the Thermophile Research Project laboratory will be ready for occupation on schedule in late August.

Dr Peter Molan returns from his sabbatical leave in early July. He has been working at Newstead Artificial Breeding Centre on the characterisation of anti-bacterial peptides in bovine seminal plasma.

CANTERBURY

Professor Joel Tellinghuisen has returned to the USA after a 6 month visit.

Dr J.P. Matousek is currently (June/July) in the Department as a Visiting Lecturer. He is from the Department of Analytical Chemistry, University of New South Wales and, while here, will be lecturing on atomic absorption and atomic emission spectroscopy.

Dr D.P. Kelly from the Department of Organic Chemistry, University of Melbourne, is expected as a Visiting Lecturer in July/August and will lecture on carbocations and free radicals.

Professor Miles Kennedy, Department of Chemical and Process Engineering, has been on study leave since June. He will be overseas for 12 months spending most of his leave at the University of Exeter.

OTAGO

PROFESSOR Dick Laverty, Head of the Pharmacology Department, is currently away on a term's leave of absence. He is spending most of his leave at Stanford University in the USA, but will return via England where he will attend the 9th International Congress of Pharmacology in London in August. Assoc. Prof. Gary Blackman is Acting Head of the Department in Prof. Laverty's absence. Prof. Blackman has been appointed recently to a 3-year term on the Medical Research Council's Standing Committee on Therapeutic Trials.

Prof. Marion Robinson, from the Nutrition Department, returned recently from Beijing, China, where she attended the 3rd International Symposium in Biology and Medicine. She presented an invited paper there, co-authored by Ms Christine Thompson, entitled, "Selenium status of the food supply and residents of New Zealand".

From the Pharmacy Department, Dennis H. Robinson (Lecturer) was in Australia in May where he visited Schools of Pharmacy in Brisbane, Sydney, Melbourne, Adelaide and Hobart in order to become familiar with Pharmacy courses offered there.

In the Department of Biochemistry, Dr Tony Reeve recently received publicity locally for his work on the genetic origins of Wilm's tumour, a cancer of the kidney in children. Dr Reeve's paper in Nature was mentioned in the New York Times. It was from there that word travelled via an Auckland reporter to be published in the Otago Daily Times. Prof. Robert Bell, a lipid biochemist, visited the Department recently as a William Evans Fellow from Duke University in North Carolina. In a lecture series, Prof Bell reported a major breakthrough in his work which has shown that diacylglycerol functions as a bioregulator linked to cell growth and differentiation. Dr Murray Grigor has now returned from a specialist symposium on lactation at the Australian Biochemical Meeting in Sydney. Dr Grigor spoke there on Comparative Aspects of Milk Lipid Synthesis. Also attending was Arie Geursin who reported on Protein Synthesis in Isolated Mammary Acini from Lactating Rats.

Visitors to the Chemistry Department have included Dr Malcolm Gerloch from Cambridge University in England. He gave talks entitled "Empirical Success in the Angular Overlap Model", and "The Source of Ligand-field Potential". Prof. Joel Tellinghuisen from Vanderbilt University in Tennessee visited in early June. He lectured on the Franck-Condon Principle. Prof. F. Ann Walker from San Francisco State University visited Prof. D.A. Buckingham's Group while returning from leave in Queensland, and talked to the Departmernt about Surprises in the Ligation Reactions of Fe(III) Porphyrins. Sickness prevented her husband, Prof. Fred R. Jensen from the University of California, Berkeley, from visiting with her. Then Dr Gordon J. Leary, Director of Chemistry Division, D.S.I.R., made a flying visit in mid June to talk to the Department on Chemistry in the D.S.I.R.

From the Chemistry Department, Prof. D.A. Buckingham will leave on 29th June for a lecture tour which will take him to Japan, Switzerland, England and the USA. The primary purpose of this tour will be to deliver the plenary lecture at a conference on Separation Methods in Inorganic Chemistry at the University of Neuchatel in Switzerland. The lecture is to honour Prof. Michael Lederer, founder and editor of the Journal of Chromatography, on the occasion of his 60th birthday.

Mrs Mary E. Trounson is finishing a Ph.D. with Assoc. Prof. B.H. Robinson, and will take up a post at the W.R.O.N.Z. in Christchurch in July.

Prof. Arthur D. Campbell, Mellor Professor and Chairman of the Department of Chemistry, has offered prizes to the value of $200 for winners of a chemical essay competition for 6th and 7th form pupils of secondary schools in Otago and Southland. Essays are to be concerned with chemical aspects of New Zealand chemical industry. The topic for 1984 is to be "The Aluminium Industry".

Dr Derek Whyman and Assoc. Prof. Donald J. Brasch have recently signed an agreement with Edward Arnold (Publishers) Ltd. of London to produce a book. At present, it is intended to entitle the book "Fluid Flow: Problems for Chemical Engineers and Mineral Technologists".

INDUSTRIAL NEWS

Jim Robb reports that business for Fur Dressers and Dyers (N.Z.) Ltd has become brisk recently with the indirect exporting of its dressed and dyed oppossum skins. The New Zealand product is now in great demand because skills and experience available locally are now recognised as superior by world standards. Also, Bill Thompson, Chemist with soap manufacturers, McLeod Bros. Ltd of Dunedin, reports that following the arrival of new manager Mr Kevin Montgomery, the Company is finding new outlets for its products in New Zealand and Australia, with a consequence that production has been increased dramatically in recent months. Mr Montgomery has come to McLeod Bros from General Foods Ltd in Auckland with marketing and accounting experience.

Somebody just stamped on your new safety cabinet.

If you've chosen an Email Airpure safety cabinet, it will arrive with some very important stamps on it.

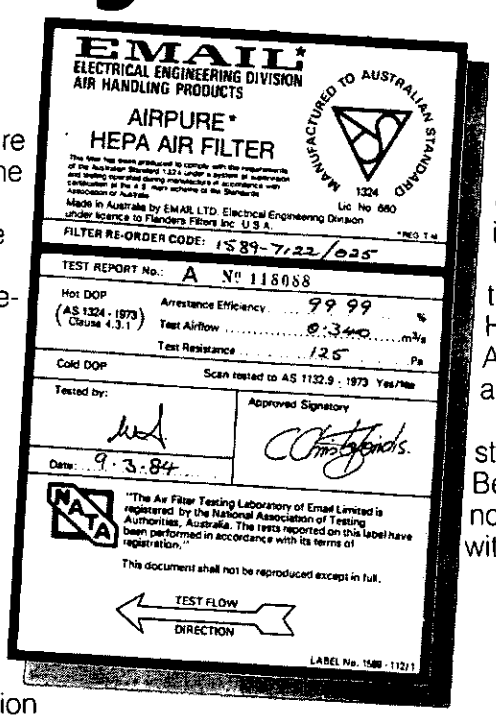
The stamps are your assurance that the heart of the cabinet, its HEPA air filters, are each exhaustively tested and certified to conform with clause 4.3.1 of the Australian Standard AS1324. This Standard has been formulated to ensure that human life is not placed at risk during the manipulation of dangerous substances.

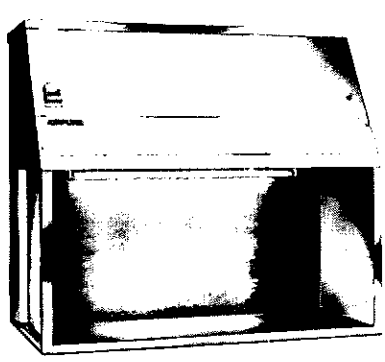
Listed on the stamps will be the results of individual testing carried out on each filter in Email's NATA-registered laboratory, and yet another stamp – the AS Mark of the Standards Association of Australia.

The AS Mark certifies strict conformity with the relevant Australian Standards and is your further assurance of the quality and safety inherent in those vital filters.

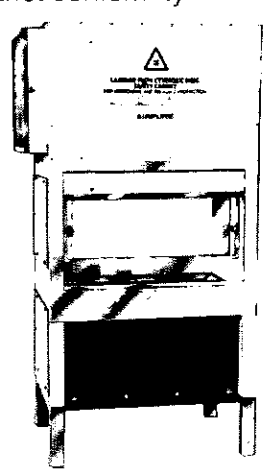
As a final endorsement, the cabinets housing the HEPA filters conform with the Australian Standard applicable to their particular type.

Why all the fuss about standards and stamps? Because Email believes that nobody should take chances with their health or life.

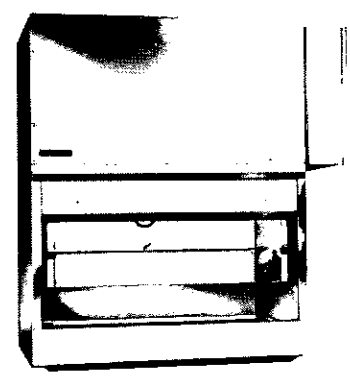




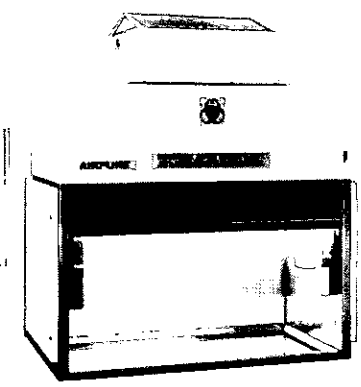
Laminar flow



Cytotoxic



Class II biological



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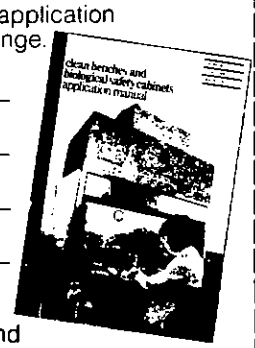

EM578

CLEAN BENCHES CUT RISKS FOR LABORATORY STAFF

It is freely recognised that exposure to aerosols that are a by-product of such operations as blending, homogenising and sonicating is a major cause of laboratory infections. From a safety viewpoint, it's those particles or droplets that range in size from 0.5 to 5.0 micrometres that present the greatest hazard because they are respirable and can be retained in the lungs.

Particles larger than 5.0 micrometres soon settle out of space due to their weight, and those smaller than 0.5 micrometres tend to be breathed out again rather than retained in the human lung.

Good technique by properly trained staff is one way to reduce the aerosol problem. However, this can be minimised further by the employment of containment devices such as clean benches and biological safety cabinets.

A variety of these devices are produced in this country, but one organisation that leads the field is an Australian company — Email Limited.

According to John Nella, manager of the company's Air Handling Products department, the decision to commence the development and manufacture of clean benches in early 1981 was very much a logical extension of Email's existing product range.

"For over 10 years Email was the only manufacturer of HEPA (high efficiency particulate air) filters which form the heart of any filtration system for critical applications, such as hospital operating theatres, clean rooms and, of course, biological safety cabinets and clean benches.

The company's range of Airpure primary containment devices covers four major types:

- laminar flow cabinets
- biological safety cabinets — Class I
- biological safety cabinets — Class II
- laminar flow cytotoxic drug safety cabinets

Laminar flow cabinets use unidirectional air flow to provide a clean area within which a product can be handled or manipulated.

They can be supplied with either horizontal or vertical airflow, and are designed as modular work stations for use where product manufacture, handling or packaging requires an environment free of airborne contaminants.

Email's Airpure laminar flow cabinets are manufactured to conform with the performance requirements laid down in AS1386. Class I series biological safety cabinets are designed specifically to provide protection for the operator.

Air is drawn through the work opening to provide a barrier which prevents the escape of harmful aerosols generated within the work zone, and the contaminated air is exhausted through a HEPA filter.

The units are used extensively where hazardous biological agents are manipulated, such as routine T.B. screening or morbid anatomy, but don't require sterility or asceptic conditions.

Class II biological safety cabinets are designed as modular work stations for use in laboratory applications which require personnel and production protection.

Laminar airflow provides a biologically clean work area and an effective air barrier across the work access opening, thereby reducing the risk to personnel from airborne contaminants generated in the work zone.

Conforming with the stringent standards set down in AS2252 Part 2, the Airpure Class II cabinets are used in such areas as tissue culture, haematology, pathology, bacteriology, genetic engineering as well as in recombinant DNA laboratories.

Cytotoxic drug safety cabinets are used in pharmacy applications which involve the preparation, manipulation or dispensing of cytotoxic drugs. Many of these are known to be mutagens, and are also suspected of being carcinogens and teratogens.

A barrier created by laminary airflow not only protects the product, but also maximises the containment of aerosols generated within the work zone. Contaminants are then trapped by a separate HEPA filter located immediately below the work zone. This filter effectively removes the risk of contamination of the cabinet and its fans.

Recirculated air passes back through the laminar flow filter or is exhausted, while an activated charcoal filter removes gaseous contaminants.

Additionally, all positive pressure plenums and filter seals are surrounded by negative pressure zones, thus reducing the likelihood of contaminated air escaping from the cabinet.

Following a recent conference in the United States, Trevor Menzies, marketing manager for Ultra Violet Supplies, believes that Email's Airpure cytotoxic drug safety cabinet leads the world in terms of design.

Trevor Menzies attended a biological safety conference in Houston, Texas, to present a paper on Australian contaminent systems for cytotoxic drugs on behalf of UVS, who distribute the Airpure range in Victoria and Tasmania.

He reported that users in the US still rely on Class II cabinets which present the hazard of toxic drug exposure to both the user and the people who have to service them.

It also became clear that Australia leads the world in the formulation of standards for the operation and maintenance of all classes of biological safety cabinets and clean benches.

Email's Air Handling Products department has produced literature on each of the safety cabinet types as well as an application manual. The manual, which can be obtained free of charge, is believed to be a world-first in terms of its scope and attention to detail.

It not only considers the range of cabinets and benches available and their respective applications as detailed in local Standards, but also discusses their limitations, maintenance and location requirements.

A section is also included on testing of the HEPA filters which are so critical to the success of any containment device.

It highlights some new research currently underway at Email's Regents Park laboratory which places a question mark against the traditionally accepted relationship between the HOT DOP and the less-demanding sodium flame test methods.

At the end of the manual the company has provided a guide which allows the end-user to objectively evaluate clean bench suppliers, as well as an easy-to-use check-list on cabinet types.

LETTERS TO THE EDITOR

(Continued from Page 82)

factors affecting alcohol intake and distribution through the body tissues. If the calculator errs, it is in being conservative — intentionally — in giving the amounts of alcohol required to give a blood alcohol level of 80 mg/100 ml blood. As my article emphasised it takes a lot of alcohol to reach the legal limit. In introducing this particular law, the legislators attempted to quantify the old law of "drunk in charge of a motor vehicle". There is no doubt that the amounts consumed by a person to reach the legal limit are intoxicating amounts and a person at 80 mg/100 ml blood is drunk.

The second point of fact refers to the number of Gizmo's printed. There was a typographical error in the article as it appeared. There were, in fact, 450,000 calculators printed and distributed free through licensed outlets.

The inferences taken by Dr. Sprott in his third paragraph are correct. The quantities given in the calculator indicating that a person would be under the legal limit mean, as he said, that a person "can drive perfectly legally" — but if the person has an accident, even at levels well below the legal limit, the insurance policy on the motor-vehicle can be invalidated and there can be other consequences in other sections of the law.

The main part of my article was concerned with what Dr. Sprott refers to as "arithmetic" and he makes the remarkable statement that "Professor Batt can produce any arithmetic he likes about the volumes of water in the body, and carry out these calculations, but in a real life situation it is clearly very different". Is this really saying that nothing will convince Dr. Sprott of the true situation? Is he claiming that living systems — the biochemistry and physiology of a living organism — cannot be described in terms of chemistry and physics? Have we in our midst a modern day vitalist?

The problem which Dr. Sprott has in thinking about alcohol intakes and the law is that he is tilting at the wrong windmill. The blood alcohol level of 80 mg/100 ml of blood is far too high. It should be reduced, especially for young inexperienced drivers who will almost certainly be inexperienced in the use of alcohol. No politician is going to be persuaded that the law needs changing if the misconception is promoted that a very small amount will take a person over the present legal limit. My position on these questions is this: the calculator provides information to help individuals relate their drinking to their legal responsibilities under the present drinking/driving law. The calculator may help our legislators appreciate that the figure of 80 mg/100 ml blood represents the intake of a very large amount of alcohol and people are not just impaired at this level, they are drunk in charge of a motor vehicle. If legislators think that "old hands" can drink and drive quite safely, they might at least be persuaded that the young need some consideration and an urgent case can certainly be made to drop the legal limit to 50, at least for the young.

Finally, I think Dr. Sprott could accept that I did not write my article as "President of this Institute" and I have never nor would I ever promote "the excessive use of alcohol particularly amongst drivers of motor vehicles".

R. D. Batt
Professor of Biochemistry
Director, MRC Alcohol Research Project

DANGEROUS GOODS LABELS — WHY?

The principle problem with trade names is that they are "catchy", "trendy" or at best phonetically similar to the chemical name.

Unfortunately a lot of chemicals used in New Zealand are imported with foreign language labelling.

The use of universally recognised symbols and colours carries a message a thousand times faster than a page of words. The handling procedures for each classification of 'dangerous label' are well known and secondary reactions can thus be avoided.

It is important to consider three points when selecting a suitable label material.

1) The maximum life required.
2) What is it being applied to? e.g. 209 1 drum.
3) What conditions would it be subjected to?

The common stock line label is usually a paper product which can be applied cheaply and easily to the outside of a wrapped article for transport purposes. Although lasting for many years in protected (ins'de) environments, paper labels will quickly deteriorate if placed outside (3-4 months).

For longer term exterior use there are many plastic pressure sensitive materials which will provide the necessary performance. These labels must also be resistant to the chemicals contained there — in e.g. acid; peroxide etc.

The invariably poor (adhesion-wise) substrate found on 209 1 drums and particularly the new plastic versions, demands high expectations of the plastic adhesive. A range of adhesives have been developed which will adhere to paint, galvanised iron and plastic in their various shapes and conditions.

From this large multiplicity of possible combinations, a label system can be destined to meet every possible requirement.

Labels are required to carry a message and more importantly with dangerous chemicals a **life long** message. The responsibility for adequate identification belongs to the importer, manufacturer, distributor, freighter and user to insist upon total identification of the product and its dangers. Your diligence is required to prevent the situation that might have occurred at the beginning of this article.

Paul G. Farr
Development Manager
QUIK STIK INTERNATIONAL

PRODUCT NEWS

3M SAFETY PRODUCTS

3M organic vapour monitors are passive collector systems based on a layer of charcoal sorbent. The light weight units clip directly to workers' clothing. After a known period of up to eight hours the units are removed and the adsorbed gases determined by gas chromatography. They are recommended for sampling over 135 compounds and 3M provide an analysis service. For further information, circle on the reader reply card. 3M also manufacture a range of respirators for fumes, dusts, mists and vapours. For further information, circle **38** on the reader reply card.

DIRECT-READING DIFFUSION TUBES

The atmosphere of work areas is now often monitored according to the detector tube method which has become internationally accepted by now. A distinction is made between short-term and long-term detector tubes.

Short-term detector tubes can be used to determine the momentary concentration of the contaminant to be measured. If the measuring periods are relatively long, statements as to the median value and the scatter range of the contaminant concentration are possible by a statistically selected sequence of individual measurements.

Long-term detector tubes can be used to measure the average concentration of the respective contaminant over an extended period of time (up to 8 hours). Although the long-term measuring system may also be used for personal air-monitoring (to this end, the person concerned carries the pump and the appropriate long-term detector tube on his body), it is mainly used for stationary measurements in work areas. The measurement results obtained in this manner do not readily permit conclusions as to the actual exposure of the personnel, since workers may be active at different locations within the plant during any one shift. Thus there has long been a demand for a small, low-cost, direct-indication measuring instrument which would provide a reliable measurement of the exposure of specific persons over a relatively long measuring period.

The direct-reading diffusion detector tubes for the gases ammonia, hydrogen chloride (hydrochloric acid) and hydrogen sulphide have been developed on the basis of the proven ORSA 5 diffusion collector. The diffusion detector tubes together with the matching tube holder can be attached securely to the clothing of the respective person. A pump is not required for the measurement by means of the diffusion detector tubes.

Drager has developed direct reading long term detector tubes in which the contaminant molecules are carried into the detector tube due to diffusion processes in gases. In the tube, the air contaminant to be measured reacts with the chemicals of the carrier material. The result is a colour change in the indicating layer. When the sampling time is taken into account, the length of the colour zone is a measure of the average concentration of the contaminant measured.

The evaluation of numerous measurements has also shown that the product of the contaminant concentration c and the measuring duration t is constant within wide limits. For instance, 50 mL/m³ (ppm) NH_3 yield the same indication, for a measuring duration of two hours, as 20 mL/m³ (ppm) NH_3 over a period of five hours.

The new diffusion tubes are an important addition to the existing Drager line of detector tubes. The system presented in this article permits even comprehensive measuring programmes to be carried out at reasonable cost because there are no additional investments (e.g., for air moving equipment).

For instance, the individual exposure of workers working at various locations in the plant can be determined at the same time (in parallel). Since intermediate values can be read out at any time during the measurement, concentration profiles (e.g., at one-hour intervals) can be established without difficulty

(Continued on Page 109)

Portable Gas Detection Methods

A.C. Herd — Auckland Technical Institute

Prompted by the recent Auckland Branch Symposium — Health Hazards of Chemicals in the Workplace, this short article looks at some of the methods used for gas detection and measurement. Spectroscopic, chromatographic, thermochemical, electrochemical and even ordinary chemical methods have been made compact enough to function as portable gas detectors and monitors.

GAS DETECTOR TUBES

These involve no complex instrumentation but rely on the formation of a coloured reaction product as a known volume of contaminated air (or process gas) is sucked through a calibrated reaction tube. The chemical packing in the tube may react with the analyte gas directly, or the gas may first pass through a pre-layer to remove interfering substances or to convert the gas to a more reactive product. For example trichlorethylene is determined by first passing it through a chromate oxidation packing, then determining the liberated chlorine in an o-tolidine indicating layer.

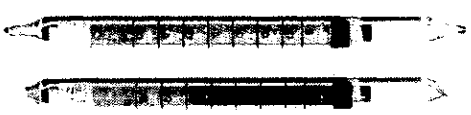

Figure 1. Detector tubes, unused (top) and showing 50ppm ammonia.

The major brands of detector tubes on the New Zealand market are Drager, marketed by New Zealand Safety Ltd, Gastec, marketed by Kempthorne Medical Supplies and Kitigawa, marketed by Protector Safety. The Drager range covers about 200 different tubes for a wide range of gases from acetaldehyde to vinyl chloride. Often these tubes come in different scales, eg there are six different carbon dioxide tubes covering from 0.01 - 0.3% v/v to 5 - 60% v/v concentrations. For spot readings, a hand held bellows pump drawing 100cm^3 is used (Fig. 2) but other systems are available.

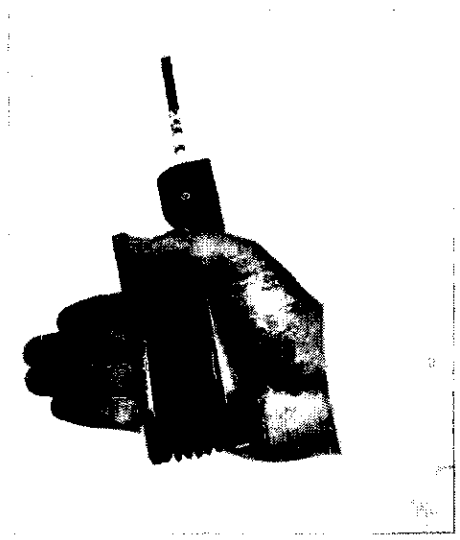

Figure 2. Bellows type pump with tube inserted.

For example a small peristaltic pump will pull the required volume of gas through a tube over a long period (up to eight hours) for TLV type determinations.

The Gastec system employs similar detector tubes, covering over 100 gases, the main difference being the pump which is a piston type calibrated at 50 and 100ml. Kitigawa also offer a piston-type pump and detector tubes for more than 130 gases.

GAS CHROMATOGRAPHY

Alltech Associates are agents for the Photovac 10A10 portable gas chromatograph which is specifically designed for occupational health and environmental protection measurements. (Fig. 3)

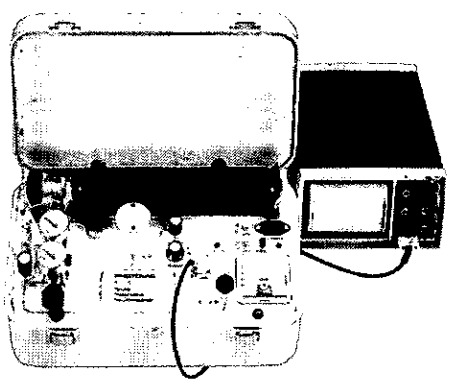

Figure 3. The Photovac 10A10.

This battery powered glc has teflon columns and uses compressed air as carrier gas. Sensitive enough to detect a range of gases at the ppb level, the detector system is a photoionisation detector. An electrodeless discharge tube produces high energy ultraviolet light which will ionise molecules with ionisation energies less than about 12eV. Applications include hydrocarbons and aromatics, chlorinated hydrocarbons, sulphur compounds, nitrogen compounds, alcohols, aldehydes, ketones, esters, and inorganic gases. The photoionisation system is also incorporated in an analyser for measuring total ionisables in air for leak detection, spill location etc.

Foxboro, whose agents in New Zealand are W. Arthur Fisher Ltd, manufacture a range of portable Century organic vapour analysers

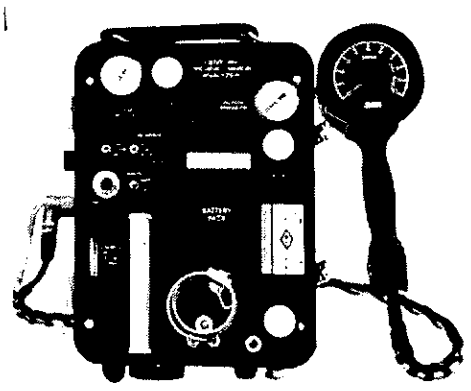

Figure 4. One of the Century organic vapour analysers.

most of which have gas chromatographic capability. Hydrogen is used as the carrier gas which is burnt in an FID detector. To provide temperature control, particularly outdoors, the column is enclosed in a container which can be loaded with temperature control slugs of ice/water or eutectic salt mixtures.

For long term measurements, gaseous pollutants can be collected by pumping through a collector tube then thermally desorbing the pollutants and analysing either in the Century vapour analyser or in a laboratory gas chromatograph (Fig. 5).

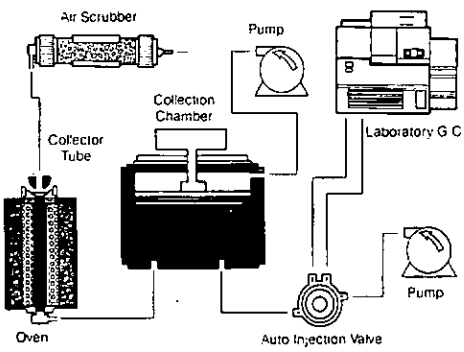

Figure 5. The Century programmed thermal desorption system.

Foxboro manufacture a programmed thermal desorber for this purpose, which allows controlled desorption from re-useable collector tubes and allows replicate injections into a gas chromatograph.

INFRARED SPECTROSCOPY

W. Arthur Fisher also market Foxboro's Miran range of portable infra-red ambient air analysers. A pump draws air into a variable path length cell, (up to 20m depending on the number of times the light passes through the gas) and absorbance can be read either at a single wavelength for a specific compound or, in the more sophisticated models, scanned over 2.5 to 14.5 μm. (Fig. 6). Minimum

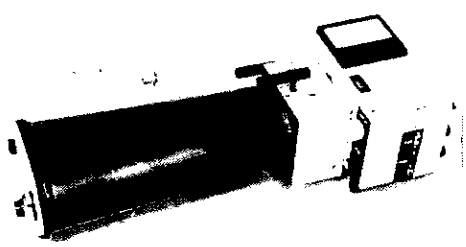

Figure 6. The Miran-1A variable wavelength infrared air analyser.

detectable concentrations for most gases (inorganics such as CO and NO as well as organics) are quoted at less than 1 ppm.

THERMOCHEMICAL AND ELECTROCHEMICAL DETECTORS

Drager produces two CO monitors that operate on quite different principles. The CO Meter AK2 draws in air from a diaphragm pump, raises its temperature to 100°C then passes it over an oxidation catalyst. A

thermoelectric device measures any temperature increase resulting from the exothermic oxidation of carbon monoxide to carbon dioxide.

The Comowarn is a portable CO monitor and alarm system which operates electrochemically.

The air sample is delivered to the electrochemical sensor by a pump, which is protected against fouling by a dust filter. An active carbon prefilter removes interfering gases such as H_2S, SO_2, nitrous fumes, etc.

The heart of the Comowarn is an electrochemical sensor, which contains a working electrode (anode), a counter electrode (cathode) and a reference electrode in an acid electrolyte. (Fig. 7). A

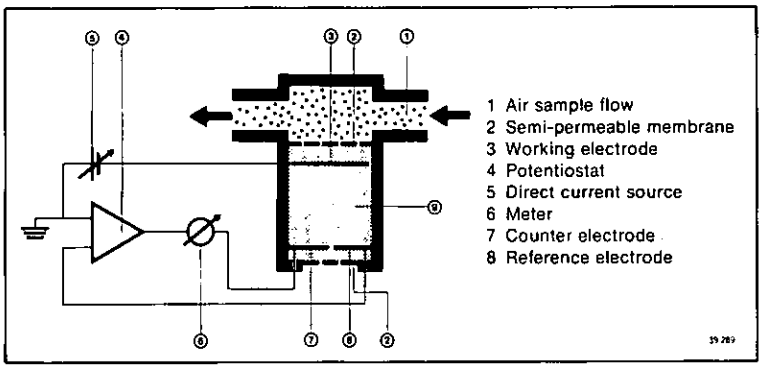

Figure 7. The Comowarn electrochemical CO detector system.

potentiostat ensures that a constant voltage prevails between the working electrode and the reference electrode. The voltage is selected such that any CO present in the air sample is oxidised at the anode in accordance with the equation

$CO + H_2O \blacktriangleright CO_2 + 2H^+ + 2e^-$,

whereby a current proportional to the CO concentration flows through the sensor.

At the same time, atmospheric oxygen is reduced at the cathode according to the equation

$\frac{1}{2} O_2 + 2H^+ + 2e^- \blacktriangleright H_2O$,

so that the water consumed in the anode reaction is regenerated in the cathode reaction.

The current is converted to a signal which is amplified and indicated on a meter in ppm CO.

Kitigawa manufacture a portable combustible gas indicator.

The air sample is sucked in by a squeeze bulb aspirator and

passed over a filament which is part of a Wheatstone bridge circuit. Heat liberated by catalytic combustion unbalances the bridge and is read on a scale calibrated for a particular gas eg methane 0-5%, acetylene 0-2.5%.

An electrochemical portable oxygen meter from Kitigawa (Model OMA-3A) is recommended for checking atmospheres in tunnels, tanks, shafts etc. The oxygen in the air permeates through an FEP film into a cell consisting of a platinum cathode and a lead anode in an electrolyte. A potential is supplied by three dry cell batteries and the following reactions occur:

$O_2 + 2H_2O + 4e \blacktriangleright 4OH^-$

$4OH^- + 2Pb \blacktriangleright 2Pb(OH)_2 + 4e$

The current produced is a function of oxygen concentration.

FURTHER INFORMATION

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Kitigawa oxygen meter	28

For further information on any of the above products, fill out the reader reply card and circle the appropriate numbers.

PRODUCT NEWS

(Continued from Page 106)

over the period of a shift. In addition to the average concentration of contaminant, potential danger sources can thus be detected in space and in time.

For further information circle **39** on the reader reply card.

POLYMER 85

POLYMER 85 will be the first international scientific conference on polymers to be held in Australia. All indications are that there will be a record attendance and number of presentations for a polymer meeting in Australia.

POLYMER 85 is sponsored by the International Union of Pure and Applied Chemistry and the Australian Academy of Science. It will be held in Melbourne at the Chisholm Institute of Technology on 11-14 February 1985. The organizers, the Polymer Division of the Royal Australian Chemical Institute report a large number of enquiries from around Australia and all over the world.

The topic for POLYMER 85 will be the Characterization and Analysis of Polymers. This subject will be examined in depth with particular emphasis on industrial polymers, the latest developments in instrumentation (such as FTIR and NMR) and polymers in new technologies such as liquid crystals and advanced composites.

Each day of POLYMER 85 will concentrate on a specific aspect of polymer characterization and analysis. On Monday 11th — Instrumental Methods, Tuesday — Analysis of Industrial Polymers, Wednesday — Characterization in Polymer Material Science, and Thursday — New Polymer Technologies and Education. The program includes 14 invited review lectures, a series of surveys of key areas, research papers, posters, social activities and an extensive book and instrument exhibition.

As part of the International Symposium of the Characterization and Analysis of Polymer

PRODUCT NEWS

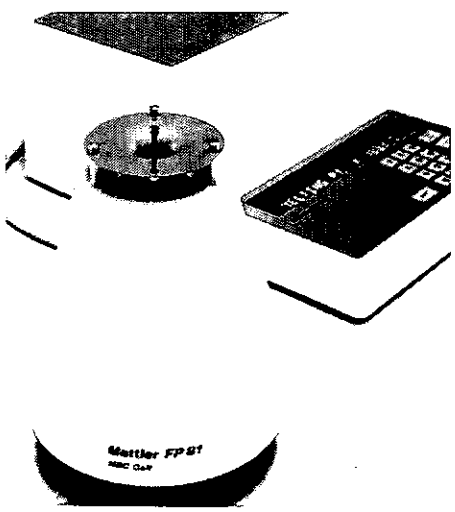
— POLYMER 85 — to be held in Melbourne on 11-14 February 1985, there will be a workshop on **Nuclear Magnetic Resonance and Polymers.** This workshop will be held at Normanby House Clayton on the day before POLYMER 85 starts, Sunday 10th February 1985.

The NMR technique has advanced rapidly in recent years, and now much more information can be obtained about polymers. Solid samples can now be examined directly with magic angle spinning methods, and a range of nuclei including protons, carbon-13, silicon-32 and fluorine-19 can now be studied. This enables polymer scientists to gain new insights into their materials.

An international team of experts on NMR of polymers will present the workshop which will start from basic principles and proceed to the latest developments. The speakers include Professor H. James Harwood (Institute of Polymer Science, University of Akron, USA), Dr James C. Randall (Head of Polymer Characterization, Phillips Petroleum Co., USA) and Professor Jack Koenig (Dept. of Macromolecular Science, Case Western Reserve University, USA).

Further information and registration brochures can be obtained from POLYMER 85, by circling **29** on the reader reply card.

THERMAL DATA WITH PUSH-BUTTON EASE



The New Mettler FP800 Thermosystem is a technologically advanced, yet cost-efficient, approach to thermal analysis. The system consists of a central control unit and five different measuring cells. At the touch of a button, the system supplies all the data relevant to thermal analysis: melting, boiling and clouding temperatures, as well as dropping and softening points. The system also lets you determine the heat of transformation and investigate samples under thermal microscopy conditions.

Because of their modular design, the measuring cells of the Mettler FP800 offer several system-design options. The user does not have to buy all modules at once. In fact, you can put together a thermal analysis system exactly as your needs dictate. Peripheral instruments such as a printer, recorder and a computer can all be connected, since the necessary data interfaces are built into the control unit as standard equipment.

The following 5 measuring cells can be connected to the FP80 central processor:

FP81 — determination of melting point/range, cloud point and boiling point.

FP82/84 — thermal microscopy investigations.

FP83 — determination of dropping and softening point.

FP85 — determination of thermal effects (DSC).

N.Z. agents Watson Victor Ltd. For further information, circle **30** on the reader reply card.

ATOMIC ABSORPTION

The Shimadzu AA670 atomic absorption spectrophotometer designed to provide total automation in AA, now complements the range of atomic absorption spectrophotometers available from SCI-MED (NZ) LTD. This range includes both single and double beam as well as dual channel instruments.

The AA670 is comprised of three units, the spectrophotometer, the graphic printer/plotter and control unit and the automatic gas control unit.

The powerful microprocessor in the AA670 provides a "cook-book" of optimum sets of operational parameters for 61 elements. Operational parameters for up to 10 specific analyses including the concentration of the standard sample can be stored in file. This enables the AA670 to be set up automatically by a single entry via the keyboard. The 8 lamp turret makes this an ideal instrument for laboratories performing large numbers of multi-element analyses.

All the data, such as operational parameters, working curves and processed data are automatically printed out. This feature eliminates the cumbersome job of making working curves and tabulating operational parameters.

The automatic determination of the working curve can be determined with up to 6 points, abnormal values can be excluded to ensure high reliability.

The AA670 can automatically delete any abnormal values in repeated analysis and calculate and print out the average, coefficient of variation of normal values.

The automatic gas control system provides complete safety coupled with ease of operation. The AA670 provides these features and many more.

For further information please contact SCI-MED (NZ) LTD or circle **31** on the reader reply card.

NEW ORGANISATION FOR GENZYME/KOCH LIGHT

Genzyme/Koch Light have announced that Genzyme Biochemicals and Koch Light Fine Chemicals, have formed a new organisation to serve the chemical and scientific products trade.

Mr Ralph Gibbs has been appointed as manager, Asia and Pacific region and Labsupply Pierce (NZ) Limited have been appointed their New Zealand agents.

The new company has announced a new range of specialty immunological research products including human lymphokines notably the first and only commercially available source of intelleukin 1.

For further information, circle **32** on the reader reply card.

PERSONAL COMPUTERS IN THE WORKPLACE FREE APPLICATIONS DATA

Laboratory

1. Chromatography	5. XRD
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10. Interfacing to ORION 701A pH Meter
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PRODUCT NEWS

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4. Level Indicator
5. Radiation density gauge
6. Magnetic flowmeter
7. Image analysis

Physiology
1. Stimulus — response — reinforcement
2. Dose response
3. Motion analysis

For further information contact — John O'Neill, Alphatech Systems or circle **33** on the reader reply card.

NEW GENERATION OF NEWPORT ANALYSERS ANNOUNCED

Oxford Analytical Instruments have announced NEWPORT 4000, a new generation of the Newport NMR analyser. The Newport analyser is the industry standard method for quality control analysis of hydrogen in aviation fuel (ASTM D3701-81, IP338-78 standard methods), fat in foodstuffs and oil in seeds..

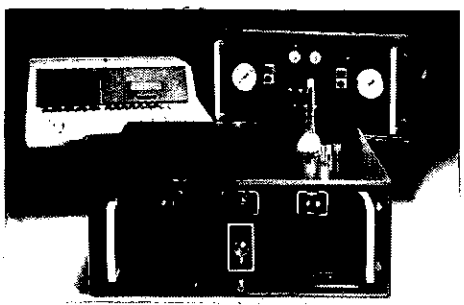
NEWPORT 4000 makes quality control analysis quicker, easier and cheaper than before, adding microprocessor control with customised software, a range of interfaces and built-in paper printer to the existing reliability and acceptability of Newport analysers.

NEWPORT 4000 interfaces direct to an electronic balance to measure sample weight. The equipment contains its own data processing and either prints out results using its own built-in printer or passes results to a laboratory computer. The NEWPORT 4000 control system automatically locks onto the resonance from the sample for rapid results, and also checks its own performance with comprehensive diagnostic routines.

Samples ranging in size from 2ml to 150ml can be measured in the same instrument using interchangeable sample assemblies. For more unusual applications, NEWPORT 4000 automatically optimises all measurement conditions to give the highest accuracy possible.

For further information on NEWPORT 4000 please contact Advanced Electronics Limited or circle **34** on the reader reply card.

RADIOACTIVITY DETECTION SYSTEMS FOR HPLC
PRECISION SPLITTER MIXER
PRECISION RADIOACTIVITY MONITOR



Alphatech Systems Ltd have been appointed agents for Reeve Analytical. Reeve Analytical's Precision Radioactivity Monitor has been specifically designed for the measurement of beta-emitters (^{14}C, ^{3}H, ^{35}S, ^{32}P) under HPLC conditions.

Features include a unique microprocessor-controlled signal averaging algorithm to enhance signal-to-noise ratio, a coincidence resolution time of 10 nano seconds which ensures high flow — fluorescence immunity, and novel heterogenous and homogenous flow cells for analytical/preparative applications. These are easily refurbished and the flow path minimises peak broadening while maximising counting efficiency.

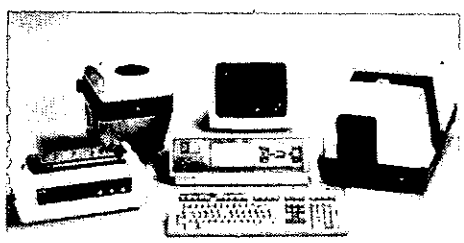
The IEEE-488 interface port permits computer access to the full 1 in 4×10^6 dynamic range of the instrument. A versatile HP-85 based data system can be used for data acquisition, real time display, storage and peak integration. Software up-dates include total systems control (ternary pumping, dual detectors, fraction collectors, auto stop/start) via add-onn interfaces. Disk drive and printer plotters are optional extras.

The Company's post-column reaction system, the Precision Splitter Mixer provides a highly sophisticated easy to use accessory for homogenous detection. The pumps are self-priming, pressure-limiting and pulse free ensuring precise addition of viscous scintillant cocktails to the column effluent and accurate stream-splitting to other detectors/fraction collectors.

Reeve Analytical is rapidly gaining a high reputation in the field of HPLC instrument design, manufacture and application. They can offer expert technical advice, support, immediate on-site servicing and 12 month guarantees on all instruments.

For further information, circle **35** on the reader reply card.

LABSCAN II



In the June issue of Chemistry in New Zealand (p.73) the picture of the LabScan II was accidentally displaced from the text, our apologies to Advanced Electronics Ltd and to Sci Med and we hope it did not cause too much confusion amongst our readers.

The LabScan II spectrocolorimeter, introduced by HunterLab, allows combining either the 0°/45° or sphere optical sensor with a DEC Rainbow personal computer. Software features permit users to define and retain formats for the CRT display and the external printer via the standard RS232 communications port. Simultaneous display and plotting of colorimetric data in any two illuminants gives simple and direct indication of metamerism. Other features include smooth spectral curve plotting, calculation of averages and standard deviations, unlimited data storage and keyboard entry of spectral or colorimetric data.

Availability of a UV enhanced source lamp that closely matches a true D_{65} illuminant down to 300nm permits measurement of fluorescent-whitened materials. The availability of color formulation and color matching software allows the creation of a desired color, while optimizing variables such as pigment type, amount used, level of metamerism and cost of materials and permits correcting and existing batch of color to meet requirements.

Local agents Advanced Electronics Ltd, for further information circle **36** on the reader reply card.

WHAT HAPPENS WHEN SOMEONE SPILLS A HAZARDOUS CHEMICAL?

Chemical Laboratories often lack a "standard" procedure for controlling hazardous chemical spills. If such a spill occurs, the individual responsible must decide quickly what cleanup procedure should be attempted. Because of the need for fast action, the unavailability of necessary materials and the non-familiarity with proper procedures, involved personnel may resort to "home remedies" for spill treatment. The method chosen may be ineffective and could actually increase the hazard. The Laboratory Spill Control Center solves these problems by providing a convenient, technically sound product for the control of common hazardous chemical spills.

Included in the Laboratory Spill Control Center are separate kits for the neutralization and cleanup of spills of concentrated acids, caustics, flammable solvents, mercury, cyanides and hydrofluoric acid.

ACCIDENT:

Laboratory spills of hazardous chemicals are unavoidable. When spills occur they must be cleaned up rapidly! Even spills of seemingly harmless chemicals represent an unsafe condition that should not be ignored.

ACTION:

The Spill Control Center, when placed in each laboratory, enables lab personnel to quickly eliminate spills of hazardous chemicals in a technically correct manner.

Each Kit is clearly labelled as to the type of spill that it controls. A spill kit contains all of the essential components to neutralize, cleanup and safely dispose of a specific type of hazardous chemical spill. A detailed set of directions can be found in each kit, and in the manual that is included with each center.

TREATMENT:

Commonly used spill treatment techniques may not be effective. Why take a chance? The Laboratory Spill Control Center provides the user with proprietary chemicals that have been test proven to be effective in treating hazardous spills. With the Center, spills are properly treated by simply opening one or more designated packages of neutralizing agents and pouring directly onto the spill.

CLEANUP:

A spill, once treated, should be cleaned up rapidly and completely. Each Kit includes all of the materials needed for an efficient cleanup of the neutralized spill.

DISPOSAL:

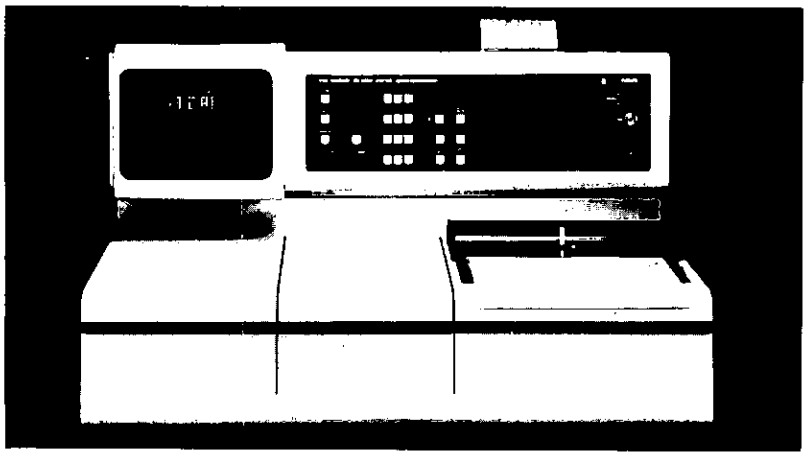
Included in each kit are leak-proof disposal bags with ties and labels for collection of the neutralized spill. The entire spill can be easily disposed in accordance with local environmental regulations.

Further information on the J. T. Baker Laboratory Spill Control Centre is available from Kempthorne Medical Supplies Ltd or by circling **37** on the reader reply card.

PHILIPS ANALYTICAL INSTRUMENTATION

Who, what and where for the world's widest analytical choice.

★ New developments in these techniques due to be announced during 1983



GAS CHROMATOGRAPHY

★ General purpose, dedicated and custom-built systems and accessories

LIQUID CHROMATOGRAPHY

★ Choice of systems and accessories, plus custom-building service

ELECTROCHEMISTRY

★ Everything for pH, conductivity and ion selective measurement

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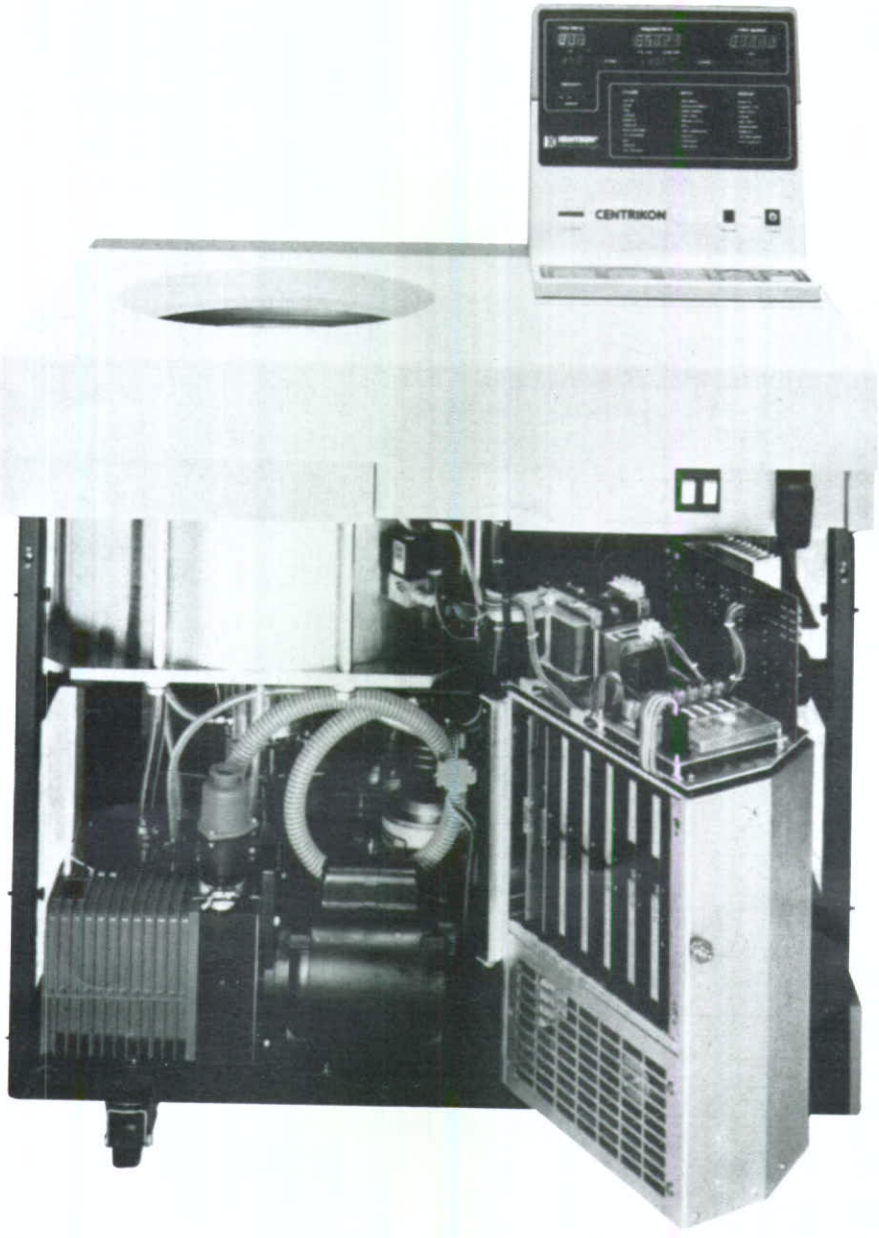

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