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Chemistry in new zealand

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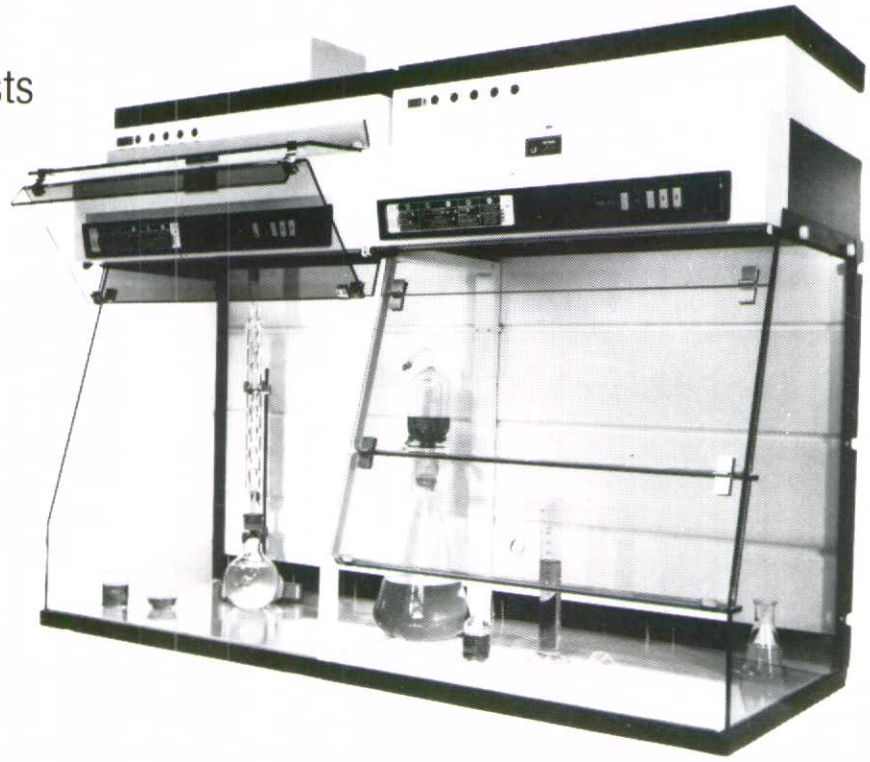

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Chemistry in new zealand

CONTENTS

EDITORIAL

As from the June issue of this year, Dr Bruce Graham will be editor of Chemistry in New Zealand (see page 32 of this issue).

Rather than write yet another farewell editorial the retiring editor offers the following statement from Council for your consideration. Although the particular issue is nuclear disarmament, the arguments for and against the NZIC's involvement can be applied to almost any area of public affairs.

The Council is usually between two stools, either accused of doing nothing or criticised for making statements that do not have the unanimous support of the membership. It could, however, be argued that every recent NZIC President has enjoyed unanimous support, in allowing them to be elected unopposed via a gentleman's agreement, are we not giving them a mandate to speak on our behalf?

Tony Herd

NUCLEAR DISARMAMENT

AN ISSUE FOR THE INSTITUTE?

Jim Sprott's speech at the Conference Dinner last August was memorable in many ways. Fluent, well-balanced, unlaboured, polished — all synonyms to the adjective, elegance, in Roget's Thesaurus. But despite all this — and the wit — there was some who would balk at another of the "elegance" synonyms to describe the speech — felicitous. The problem arose from the second part of the speech in which Jim Sprott became serious and supported nuclear weapons with the protection provided by America's nuclear arms.

Subsequently, as "The Sceptical Chemist" in the Institute Journal issue of October, 1983, Brian Davis of the University of Auckland Chemistry Department, wrote about the speech and, by inference, thought that the Institute should be urging the New Zealand Government to call for an agreement to halt "the testing, production and deployment of nuclear weapons". There was a note of reproval that the Institute had been prepared to make a public statement on butter advertising but had not spoken out on nuclear disarmament.

To check whether members thought it was appropriate for the Institute to comment on nuclear diarmament, Branch Secretaries were asked to ascertain whether there would be support for a statement along the following lines:

"The President on behalf of the New Zealand Institute of Chemistry (Inc.) advises the New Zealand Government that its members consider there is a need for urgency in obtaining international agreements to halt the production of nuclear weapons and urges the Government to promote moves toward total nuclear disarmament".

At the February meeting of the Council, information from members and Branches was available and the question of making a statement was discussed. It was clear that there were many differing opinions on the issue. There seemed to be a large number of Institute members who were "in favour" or "strongly in favour" of making the state ment as it had been drafted. This summary of the situation from one Branch probably covers the attitudes of most Institute members:

"Opinions ranged from those who felt that the NZIC has no business making such statements, which they saw as vague, unoriginal and outside its competence, to those who felt it was worthwhile for the NZIC to 'stand up and be counted'. Overall, a few disapprove strongly, the majority approve or mildly approve, and a very few were strongly in favour".

An interesting range of individual opinions was obtained from Otago Branch members:

"delighted at any involvement of NZIC in public affairs"
"the statement is moderate and therefore more likely to be heeded"
"innocuous — could be much more strongly worded to emphasise the urgency and concern felt by members of the Institute" '
"I will be interested to know what the President takes to be a 'measure of consensus' "
"It is important for professional scientific groups to comment publicly on national and international scientific matters"
"It is most unlikely that the membership of the Institute could ever have a single view point on such a contentious issue. The President could not, therefore, make a statement which could truly represent the views of the members"
"The Institute should not be seen to be making stands on issues on which its members can profess no expertise".

At the Council meeting it was decided not to make the statement. However, the Council decided it should support and commend Mr. Bryce Harland, the NZ Permanent Representative to the United Nations for his call to the General Assembly for

"a treaty to achieve the prohibition of all nuclear test explosions by all states for all time". Referring to the nuclear arms race he was reported to have said that

"the concern felt by New Zealanders at these developments is, we know, shared by people all round the world".

From all of this, it is clear that the President and the Council could not speak for all of the members on an issue like nuclear disarmament. For members who wish to make strong statements on nuclear questions, a solution is that adopted by Brian Davis — join the Scientists Against Nuclear Arms Group. It is probably not surprising that the Institute could be unanimous over the fuss about butter advertising (the AGM at Waikato was definite about it) and yet far from single-minded over the massive world problems which came with the nuclear age.

NZIC/NZBS JOINT CONFERENCE 1984 SCIENTIFIC PROGRAMME OUTLINE

The programme published in the February issue of the Journal has been slightly modified, with the movement of the Quality Assurance Symposium to Thursday afternoon and a planned Catalysis and Energy WORKSHOP on the Friday to follow the Catalysis and Energy symposium and papers on Wednesday morning. The following outline indicates the plenary lecture timetable as at the time of writing.

Monday, August 20 Topic area: Spectroscopy, with emphasis on the Solid State.

Speakers *Dr D M Doddrell* (Griffith University Queensland): the latest developments in nuclear magnetic resonance spectroscopy.

Dr J Johnston (Victoria University, NZ): Applications of Mossbauer spectroscopy.

Tuesday, August 21 Topic area: Biochemical Research and Development.

Speaker: *Dr R Saint* (Walter & Eliza Hall Institute of Medical Research, Victoria): research and development in vaccine production.

The remainder of the morning session will (possibly) be a joint Biochemistry/Clinical biochemical symposium and a conference POSTER session (see below).

After a proposed Trade-sponsored lunch, there will be a *practical* WORKSHOP session on HPLC and/or ion chromatography, meeting of Specialist groups, and further biochemical papers (or POSTERS).

On Tuesday evening following the NZIC annual general meeting, *Sir George Porter* will present an address to NZIC/NZBS and SCICON delegates.

Wednesday, August 22 Topic area: Catalysis and Energy.

Speakers: *Sir George Porter* (Nobel Prize Winner, Great Britain): topic not decided but related to photochemical energy conversion.

Prof D L Trimm (University of New South Wales, NSW): an overview of catalysis in various energy applications.

The afternoon session is set aside for visits (jointly with the SCICON registrants) to local chemical institutions and industry; at present Chemistry Division, DSIR is the only confirmed trip.

Thursday, August 23 Topic Area: Physical and Geochemistry or Electrochemistry.

Speakers: *Dr M Guss* (University of Sydney, NSW): Applying computer graphics to complex (X-ray) structural models, with reference to Plastocyanin.

(SCICON): *M Wellington, J Shallcrass:* A joint education symposium held in the adjacent von Zedlitz building run by the SCICON conference.

The Thursday afternoon session will include a Quality Assurance symposium, with probably an Australian speaker, organized by *Dr J Garside* (Telarc).

Although the conference ends on the Thursday, up to two specialist meetings are planned for Friday: the forensic group on the topic "Certainty and Probability in Forensic Science" (organizer *Dr P L Cropp,* Chemistry Division, DSIR) and a proposed Catalysis and Energy Workshop (organizer, *Dr D M Bibby,* Chemistry Division, DSIR).

CONTRIBUTIONS (POSTERS)

Delegates are invited to present papers or, by preference, POSTERS on any aspect of chemistry. The committee is hoping to avoid the clashes that occur with large numbers of specialist papers by using POSTER sessions, a practice widely used overseas. To encourage this, there will be at least one conference prize for the best POSTER presentation. By appropriate scheduling all participants will be able to view and discuss the presentations.

Details and suggestions for papers and POSTER preparations will be given in the registration circular, which will appear in the June issue of the Journal.

CALL FOR ABSTRACTS

Abstracts will be published with the Programme in the Conference Booklet and may be photographically reproduced in a similar way to the 1983 Conference (details not confirmed). This will probably mean a space limit of 180 mm high by 150 mm wide on A4 paper. The abstracts DEADLINE will be JUNE 26 (START THINKING NOW!) and the address for abstracts will be

Dr Graeme Gainsford,
1984 Conference Secretary
C/- Chemistry Division
DSIR
Private Bag
PETONE

STUDENT PAPER COMPETITION

The usual student paper competition will be held. It is hoped to sponsor the student entrants by paying their travel costs.

All other activities normally associated with the annual conference will be supported: a TRADE DISPLAY, adjacent to tea/coffee stations; FIELD TRIPS as outlined above and TRAVEL concessions (EPIC air fares are probably better).

ACCOMMODATION

The SCICON conference has booked most of the University accommodation but the following will be available:

Weir House Full board $28.00 approx (Victoria) Room only $18.00 approx
Railton Hotel Bed and Breakfast $17.00 approx (Cuba Street, Wellington)

An appropriate bus service will be provided for the delegates at the Railton Hotel.

REGISTRATION

The final circular containing the full conference details and registration form will be enclosed in the June issue of the Journal with the above deadline of 26 June.

Any queries about the conference should be addressed to:

Dr G J Gainsford
Chemistry Division
DSIR
Private Bag
Petone
Phone Wellington 666-919 ext 682

PEOPLE

EX NZIC PRESIDENT HEADS CONSUMERS' INSTITUTE LABORATORY

John Pollard has been appointed Head of the Consumers' Institute Laboratory.

In December last he retired from Pavroc Holdings, bringing to an end a thirty four year involvement with Christchurch industry.

Educated at Canterbury College, he began his career as a chemical engineer with the Dominion Laboratory's Chemical Engineering Section then moved back to Christchurch. He was briefly with N.Z. Plywoods, nearly a decade with the Christchurch Gas Company and almost a quarter of a century with British Pavements, latterly (as Pavroc Holdings) part of the Fulton Hogan Group.

A former Canterbury Branch Chairman, John served on the Membership Committee for ten years and was President in 1975.

He is currently a member of the Telarc Council, a member of the Faculty of Engineering, University of Canterbury and Chairman of the I.P.E.N.Z. Education Committee.

DSIR TECHNICIAN WINS AWARDS

Mark Bowden of Chemistry Division DSIR has won two awards from the New Zealand Institute of Chemistry.

Mark Bowden receiving his NZIC awards from Wellington Branch Chairman Dr N.B. Milestone.

Mark completed NZCS in Chemistry at the Central Institute of Technology in 1983 and was awarded the Wellington Branch NZIC Prize for the student with the highest marks in Chemistry V at C.I.T. It has recently been announced that Mark was judged the top student in stage V chemistry for NZCS, from all the Technical Institutes throughout New Zealand and has also been awarded the New Zealand Institute of Chemistry Prize.

Mark is employed in the Physical Chemistry Section at Chemistry Division where he operates the X-ray diffraction apparatus and is also involved in research into Solid State Chemistry.

LETTERS TO THE EDITOR

Dear Sir,

The remarks of The Sceptical Chemist in the December 1983 issue of Chemistry in New Zealand reflect the situation in the Meat Processing Industry.

Two (at least) major companies — former leaders in meat processing technology — reduced and recently eliminated their Research and Development Departments. Also the Meat Research (M.I.R.I.N.Z.) Conference has been cut from yearly to two yearly. This has been the traditional forum for liaison between workers at "grass root" and research level but fewer Company delegates are attending. With "Export of Innovation" or what could be called "Think Clever", along with "Think Big" being proposed as cures for economic ills, who is to take up the financial tab? — Government Departments, Producer Boards, Research Institutes? or perhaps small businesses or knowledgeable entrepreneurs! All are subject to restriction in budgets and "high risk" capital.

Perhaps the Taxpayer cannot afford to pay — perhaps they cannot afford not to.

Quo Vadis
Stan White

Dear Sir,

In justifying his support for our continuing reliance on nuclear armaments (Letter to the Editor, February issue), T.J. Sprott is being very pessimistic about human nature. However, whether or not we can afford to become pacifists and lay down all our arms is hardly the most pressing issue. Instead, we must ask whether the existence of nuclear weapons and their increase in numbers, far from increasing our security, actually imperils us and adds to our insecurity. If Dr. Sprott thinks otherwise, his pessimism about human nature is being well matched by a considerable optimism about technology.

Clearly Dr. Sprott belives that nuclear deterrence is necessary to preserve our freedom. If immediate unilateral disarmament by the West were the only other option, he could well be right. Such a complete unilateral abrogation of nuclear arms is unrealistic. However, our present situation has gone beyond deterrence — "only" a few hundred nuclear weapons would be necessary for that. Instead with the 50,000 nuclear weapons now in the world, we are all threatened by their presence. It is the possibility of accidents and failures in surveillance and launching systems as well as the likelihood of acquisition of nuclear arms by irresponsible despots and terrorists that puts us all at risk. False alarms have already happened — and there is no shortage of despots and terrorist groups.

We probably do have to be prepared to defend ourselves against our enemies. We may even have to trust nuclear deterrence — at least for a while. But we cannot tolerate a continuing escalation of the arms race — it is far too dangerous, even given the maintenance of a balance between reasonable governments in the Super Powers. Therefore we must make a start towards nuclear disarmament — on both (and all) sides.

Finally, Dr. Sprott appears to display a nice sense of humour. He hopes that we can eventually turn our nuclear bombs into nuclear power stations. Three Mile Island, Windscale and plenty of other near accidents that have been kept hidden from the public (see, for example, Walter Patterson's book, "Nuclear Power"), hardly give us any confidence in the safety of nuclear power and the associated processing of nuclear fuels. Neither have we yet solved the problem of radioactive waste disposal. On second thoughts, perhaps Dr. Sprott does not display his sense of humour. Instead, he confirms an unjustifiable faith in the "technological fix". You would have to believe in the infallibility of technology to maintain, against the evidence, that nuclear power was safe, let alone to contend that the arms race deserves our support.

Yours sincerely,
G.J. Churchman

Correspondence on this subject is now closed. ED.

Dear Sir,

What is happening in our laboratories? Are even our oldest, humblest and most trusted friends not immune from the fads of present day fashion?

I write these pained words after reading, in a student's thesis draft, the following:— "Adherent cells were removed by vigorously pipetting with a pasteur pipette, followed by scraping with a rubber policeperson."

Yours faithfully,
B.H. Howard,
Lincoln College

NEW EDITOR

BRUCE GRAHAM

Starting with the June 1984 issue, Dr Bruce Graham will be the editor of Chemistry in New Zealand. Bruce has been Auckland Branch Editor for the past two years and is not unaware of the challenges facing him. Graduating MSc from Auckland and PhD from Waikato, Bruce went to Chemistry Division in Wellington after a year's post-doctoral work in England. Since 1977 he has been the chemist with the Health Department's Environmental Laboratory in Auckland. His current interests include various aspects of air pollution and work in the fields of industrial hygiene and chemical hazards in general.

Keen and with fresh ideas, Bruce will have a marked impact on the Journal and deserves the support of all the members.

"THE GIZMO"

A CALCULATOR RELATING ALCOHOL INTAKE TO BLOOD ALCOHOL LEVELS

R.D. Batt — Massey University

PROF. R. D. BATT

Professor R.D. Batt is President of the NZIC and Chairman of the NZ Biochemical Society. At Massey University he is the Professor of Biochemistry and heads the Department of Chemistry, Biochemistry and Biophysics. His work on alcohol metabolism dates back about 10 years and he is, at present, Director of the MRC Alcohol Research Programme. A particular interest has been the relationship between alcohol intake and blood alcohol levels. The Research Group has carried out many studies on human volunteers under different situations to define factors which influence this relationship.

The Oxford English Dictionary describes a gizmo as "a gadget, gimmick, thingumajig" a word of "origin unknown" but ascribed to "US slang". The word took on a special association late last year when Bruno Lawrence appeared in a TV advertisement and had this to say.
"I've had a bit of bother in my time drinking. In fact I've been convicted for it. But with the breath testing and all I decided to use my noodle and find out my limit. So I picked up this little gizmo here at the pub. You just spot your weight, push the doo-dacky and bingo you're in the pink or green or red. I know it sounds crazy but it works. Get one and stay within your limit".

The New Zealand Liquor Industry Council had 45,000 gizmos printed and distributed free of charge through licensed outlets in what may well be an unprecedented move by the industry to help inform the drinking population on the relationship between drinking habits and legal responsibilities under the drinking-driving law. Not unexpectedly questions were raised about the accuracy of the calculator. Tests were carried out and reported through newspapers and on TV showing that, if anything, the quantities on the calculator were conservative. To many people it seemed to come as a surprise that an individual has to consume a large amount of alcohol to reach the drinking-driving limit of 80mg/100ml blood. On reflection, however, it should not surprise since the drinking-driving offence was originally referred to as drunk in charge of a motor vehicle and only in recent years has it become, more euphemistically, driving under the influence of alcohol. The intention of the law is clear. It is to prevent intoxicated people from driving. The legal level is consequently set at a point where a person would be intoxicated. The quantities which need to be consumed to reach the legal limit are therefore intoxicating quantities.

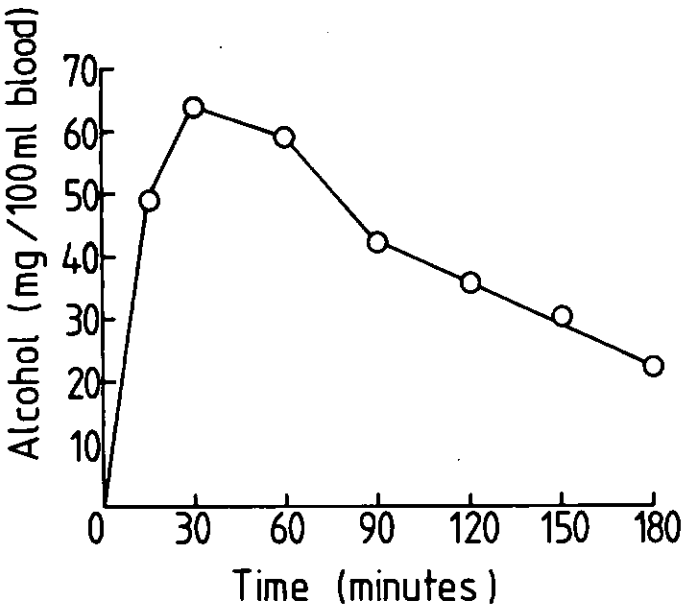
To explain what is involved in checking the validity of the calculator figures some basic facts and simple calculations are needed.

Alcohol absorbed into the body through the gut is rapidly distributed through the total water compartments in the body. This mixing of alcohol through the body water is greatly facilitated by the efficient transport and mixing provided by the circulating blood. There are no barriers to this distribution — and for a pregnant mother it even goes right through the body water of the foetus. In an average man (weight 70kg), approximately 60% of his body is water i.e. 42 litres or 9¼ gallons. In an average woman (weight 55kg), approximately 50% of her body is water i.e. 27.5 litres or 6 gallons. When a man or woman consumes alcohol it will be diluted in the body by these quantities of water. Alcohol is hydrophilic — and accordingly it does not distribute significantly into the water repelling compartments, the fats and other similar solids. One other basic piece of information is required to estimate a maximum alcohol level in the blood from a drink and that is the proportion of blood which is water — about 80%.

If an average man consumes one standard drink of alcohol (e.g. 200ml beer or 1 single nip of spirits) he will have taken into his body about 6 grams of alcohol. This will be diluted by 42 litres of water giving a concentration of 14mg alcohol/100ml of body water. For blood, which is only 80% water, each 100ml will contain 14 x 0.8 i.e. about 11mg alcohol/100ml blood. That is the maximum blood alcohol level which 1 standard drink could give in an average man. To reach this maximum, the alcohol from the drink would have to be instantaneously distributed through the total body water and none would have been broken down by the liver and none retained in the stomach. In fact, a standard drink is unlikely to give an equivalent blood alcohol level of 11mg/100ml blood but may give a value approaching this under some circumstances. If we accept 10mg/100ml

blood as the figure equivalent to 1 standard drink it is clear that it will take 8 standard drinks to give a blood alcohol level approaching 80/100ml blood.

Returning to the average woman with a total body weight volume of 27.5 litres. If she drinks one standard drink the 6 grams of alcohol is diluted in her body water giving a diluted concentration of 22mg alcohol/100mg of



body water. In her blood the maximum level would be 0.8 times this figure i.e. 17mg/100ml blood. Allowing for some metabolism while equilibration is occurring, a maximum figure of 15mg/100ml blood would be reasonable. For a standard woman, 5 standard drinks would need to be consumed — and very rapidly — to give a blood alcohol level approaching 80mg/100ml.

If an average man was drinking with an average woman, the man could drink almost twice as much as the woman to reach the same blood alcohol level.

These calculations have been based on instantaneous distribution of alcohol through the total body water but this is clearly a theoretical assumption. In fact, a number of factors influence the distribution of alcohol through the body, including the speed with which the alcohol goes through the stomach to the small intestine where the main uptake into the body occurs. The time course for the speed of mixing through the body water is seen in the graph. A man was given 5 single nips of vodka to drink rapidly during the first 15 minutes. The graph shows the rise in the blood alcohol level up to a maximum of just over 60, this maximum being reached in about 45 minutes after drinking commenced. The level then decreases as time goes on, due mainly to the removal of the alcohol from the blood by the liver oxidising it. The rate at which the liver removes the alcohol is approximately 6 grams/hour i.e. 1 standard drink per hour. Accordingly, an average man might consume up to 8 standard drinks and no more than 1 extra each subsequent hour — and still be under the legal limit. An average woman could drink 5 standard drinks and no more than 1 extra each subsequent 2 hours — and still be under the legal limit.

For both the man and the woman, food consumed with the drinks will delay the movement of alcohol through the stomach to the small intestine and so delay the rise in the blood alcohol level as seen in the graph.

The calculator makes allowances for (a) the different quantities of body water in men and women, (b) the different sizes of men and women away from average sizes and (c) the effects of food on alcohol uptake by the body.

The calculator was designed to give drinkers a better understanding of where they stand in relation to the drinking-driving law. In using it, it should be remembered that 80mg/100ml blood represents intoxication with marked impairment of skills — and not just driving skills.

CHEMISTRY IN 19TH CENTURY NEW ZEALAND

Joan T. Radford
Department of History and Philosophy of Science
The University of Melbourne

This is the first part of a paper originally presented at the History of Science in New Zealand Conference at the Alexander Turnbull Library, Wellington 12-14 February 1983. The original title was "Towards a History of Chemistry in New Zealand". Further parts will appear in later issues of Chemistry in New Zealand.

Joan Radford was born in Australia and graduated with honours in chemistry from the University of Melbourne. Her chemical career started as an analyst with a firm of Public Analysts in Melbourne where she was involved mainly with metallurgical analyses. She later became Spectroscopist and Officer-in-Charge of the physical laboratory of an arc-welding firm and then Scientific Officer at the Ministry of Supply in London, engaged in emission spectroscopy and i.r. studies. Returning to Australia Joan Radford engaged in spectroscopic research on the mottling of wheat at the University in Brisbane. In 1954 she joined the Chemistry Department at the University of Melbourne retiring as a Senior Lecturer in 1980. She is currently an Honorary Associate in the Department of History and Philosophy of Science at Melbourne where she is following her research interests in the learning process in chemistry and the history of chemistry in Australasia.

Introduction

My interest in N.Z. chemistry developed as a result of my work on History of Australian Chemistry, during which it was apparent that there was considerable interchange of letters and personnel between the Australian Colonies and N.Z. from the earliest days of settlement in the latter colony. When I visited N.Z. in 1977, to extend this work, I found some publications which had already begun to reveal the origins and progress of certain disciplines and industries involving Chemistry. The recent publication (1981) by N.Z. Institute of Chemistry on "Chemistry in a Young Country" has revealed a much greater interest in the subject than I was able to discover in 1977. However, there are some areas and aspects which were not covered in this recent work, so I venture to present my own brief account of 19th Century Chemistry, extracted in the main from the resources I quote throughout the paper.

Although the Chemistry I report here was centred mainly on Dunedin, Christchurch and Auckland, much of the research was made using the records of the Dominion Laboratory, housed at the Wellington Museum, the Royal Society of N.Z.'s resource material in Wellington and the collections of the Turnbull Library and the National Archives at Wellington. In retrospect I realize that my relatively longer period of residence at Wellington caused me to neglect obtaining more data on the 19th Century educational resources of Wellington, and on its industries generally.

Despite this, I have found that the work falls into three major categories — Government, Academic and Commercial or Industrial Chemistry; with the inevitable connection and overlap between the categories.

PART I
Government:

I propose to start at once with some of the difficulties associated with research into History of Science in N.Z.

The first is the obstacle facing any historian of science, presented with the opinion of so many New Zealanders that "Chemistry was the handmaiden of Geology". There is a certain sense in this, but let me stress the following. For the development of the sciences of Chemistry and Physics a man-made laboratory with man-made equipment and chemicals is essential, whereas for Geology and Biology which predominate in early N.Z. science, the initial work was that of collecting facts, for which the *land itself* is the laboratory. When one follows the growth of Chemistry in N.Z. one sees that it *was* initially required as the analytical component of mineralogy and the analytical factor in deciding the use and suitability of N.Z. flora in medical and industrial supply.

It is only when the size of a community warrants the outlay on building, stocking and manning laboratories that any progress in Chemistry and Physics can be possible. For Chemistry, this occurred in N.Z. in 1865, when the Provincial Governments agreed that their individual Geological Surveys[1] (commenced, for Otago, in 1861-2, under the Directorship of Dr. James Hector) be amalgamated and transferred to Central Government control, housed at the Dominion Laboratory of Wellington, as

part of the Museum, still under Hector's control, and charged with the duties of analysing geological and natural resources, Public Health requirements and industrial requirements as they arose.[2] The original Otago survey had not only opened the door to effective mapping for future settlement but also to the possibilities of mining and mineralogical industries in the land. For Hector was not only a trained geologist, but was also qualified in medicine, which had enabled him to practice some analytical work of his own in Britain.[3] This gave him the ability to both direct and assess the work of the chemists employed as analysts to the Survey. He chose, first, C.S. Wood, who started work with him in Otago, but was soon "banished" by ill health to the cold, damp colony in Melbourne,[4] where, however he had access to more medical advice than in Dunedin. Wood maintained a correspondence with Hector, accepting a position with the Victorian Geological Survey,[5] keeping Hector informed upon local Melbourne topics, and giving advice and help on analyses and techniques to be followed by William Skey who had been promoted to fill his position. With Wood's death in 1864, Hector's local Australian source of information was replaced by correspondence with the surveyors themselves, and with various mineralogists, including Professor Liversidge of Sydney. After his appointment as Director of the overall Dominion Geological Survey and of the Central Government's Colonial Laboratory at Wellington, with Skey as his chemist, Hector made several visits to Australia in person.

No complete biography of Skey has been written, and no attempt yet to assess the quality of his work in comparison with contemporaries. He contributed widely to *The Transaction of the New Zealand Institute,* to *Chemical News* in Britain and to the *N.Z. Mining Record.* Certain attempts he made to publish in the specialised, quality journals in Great Britain were of limited success.[6] The records of the Dominion Laboratory show that Skey was less than happy with the attitude and co-operation of the academic scientists of N.Z.[7] It is very likely that Skey was not an easy character to get on with — understandably when you see the amount of work he did and the relatively low remuneration and consideration he received. He was extremely hard working — over 12,000 analyses are listed to his credit in the records of the laboratory, and the annual reports to Parliament.[8] It was work he did, on the whole, single-handed (the assistance he was given didn't please or help him much[9]), and, as well, he tried to design and adapt apparatus to the facilities available, tested other scientific equipment sent for comment by members of the public, kept track of availibility of chemical supplies from Australia, and kept abreast of current British chemical literature. When, in 1956, Professor Briggs of Auckland undertook a short history of N.Z. Chemistry to deliver as an address to the Auckland Institute[11], he was unable to comment in depth upon Skey's life and work, because the Dominion Laboratory Officer who had undertaken to prepare a paper on Skey[12] had not completed the work, although he had collected the data towards such an article. This is a loss to the N.Z. history of Chemistry, but it may still be possible to find the data among that officer's papers.

Professors Bickerton in Christchurch and Black in Dunedin were also appointed as Provincial Government Analysts, in some cases[13] submitting independent analyses to supplement those made by Skey, e.g. mineral springs, gold bearing ores and specimens. In Auckland, the private analyst, Pond, was the appointed Colonial Analyst[14] there, involved as were both Bickerton and Black in analyses which tested conformity with Government standards of health and safety — food adulteration, etc. I could find little work which involved Customs control, although in one case Skey was involved in testing for poison in sugar — an arsenic-bearing-chemical had leaked into sugar batches, during transport from Australia.[15] Although Skey occasionally attended to give evidence at High Court cases, it was the academic analysts, Black and Bickerton, who were called upon when legal cases involving poisoning required chemical evidence.[16] May I here digress and express my surprise that there were so few cases of poisoning, either deliberate or accidental, reported from the country, considering the easy availability of arsenic and strychnine poisons in the land — arsenic in leather dressings[17] and strychnine in vermin baits.[18]

When, from 1874, the Central Government, in its endeavour to encourage more local industry, offered cash bonuses[19] to any person achieving success in manufacture, etc. (the success was specified), the work of the Colonial Analysts increased. Building material analyses increased, as did fertilizer analyses, and numerous previously uncalled-for analyses. Throughout it all, Skey worked long hours, in appalling conditions[20], without direct personal responsibility — under orders from either Hector, or in his absence, his deputy. It would not be surprising that Skey resented the publicity, prestige, freedom and salaries given the University staff. He had helped Hector in the analysis, judging, arranging and display of the 1865 Exhibition[21], and had advised on later ones in Australia, but not much credit was given him in his lifetime. He was spending a lot of time and effort trying to solve the chemical problem of the intransigence of Au (gold) to dissolution in acids (see later). But his work was not appreciated, and after his death in 1900 at the age of 65,[22] his position in the laboratories was taken by the person whose work on the chemistry of gold had rivalled Skey's and gained its protagonist a reputation as the leading chemist in N.Z. at the turn of the century.[23]

PART I

Footnotes

Note: R.D.L. means Records of the Dominion Laboratory (formerly the Colonial Laboratory) housed at the Wellington Museum.

1 Chemistry Division of DSIR. Information Series No. 46 "One Hundred Years of Chemical Research", pp. 7 and 8.

2 R. Burnett, "The Life and Works of Sir James Hector", M.A. thesis, Christchurch, 1936.

3 James Hector's Chemical Notebook of 1852 — in the library of the Wellington Museum. Includes a section on Analyses for Guano.

4 Wood to Hector: Sept. 8th and Oct. 13th, 1862; R.D.L. Laboratory Box 'General' 1850-1864.

5 Wood to Hector: Sept. 11th, 1862 and Jan. 26th, 1863; R.D.L. Lab. Box General 1850-1864.
Bulletin of Geological Survey of Victoria No. 23. "Bibliographical Sketches", p. 46. Obituary Charles Sturveyant Wood F.G.S.

6 Balfour to Hector: 17th July, 1866: A Chemical Committee of the Royal Society, Edinburgh, had examined Mr. Skey's paper and reported it not suitable for Transactions, but if altered could go into Proceedings. R.D.L. Lab. Box General 1865-1866.

7. Skey to Hector, 1887 but not otherwise dated "relating to Au in alkaline liquids". "Professor Black says gold can be acted on by air — but doesn't say how . . . hasn't the manliness to state who found it so. As he is the first text-book man to give this truth, he should in a footnote, state where he got his facts. Now it goes to the world as **his** discovery. But I've always found that those who cannot find will take. I have a large account to square off with these professors". R.D.L. Lab. Box 1887.
Hector to Editor of 'Nature' — 9th Feb. 1887: "Regarding a Nickel Alloy claimed in Nature as discovered by Ulrich I point out that it was described by W. Skey on 28-9-1885 in a paper to the N.Z. Institute".
Ulrich to Hector 20-2-1891 and 20-4-1981: Apologies on the error. He acknowledges AWARUITE as first discovered and analysed by Skey. R.D.L. Lab. Box 1891.

8 (i) Annual Reports of Colonial Laboratory to Government in Appendices to Journal of the N.Z. House of Representatives. These appear in the original in the R.D.L. and are summarized and extracted in a manuscript by (ii) R.K. Dell, "The First Hundred Years of the Dominion Museum" also in the R.D.L.

9 March 1872, a note says that a "Mr. Spencer wants his son to become an unpaid assistant to Skey". R.D.L. Outward letters p. 379.
Skey to Hector: June 1888: wishes to retire — he's tired, his salary is too low and he's worried by a noisy assistant. R.D.L. Letter Book.

10 Microphone testing — Skey to Hector 4-9-1878 and 24-9-1878
Electroscope testing — Skey to Hector 6-4-1884
Speech Recorder — Skey to Hector 23-7-1881.
R.D.L. Lab. Boxes of appropriate years.

11 L.H. Briggs: "Looking Back on N.Z. Chemistry" a lecture to Auckland Institute and Museum, July 28th, 1952, and J.K. Dixon "Chemistry in New Zealand" — Chem. Dept. Records, University of Auckland.

12 R.L. Andrew to Briggs: 9-7-1952 — Chem. Dept. Records, University of Auckland.

13 Reports on Mineral Waters of N.Z. by Bickerton, Black and Skey. R.D.L. Box 1879.
Also in the archival records of both University of Otago, Chemistry, and of University of Canterbury at Christchurch.

14 J. Pond signed reports in 1888 as "Colonial Analyst" — see "New Zealand Farmer, Bee and Poultry Journal" of 1888.

15 Jan. 15th, 1879: Report of Carbolic Sheep Dip, leaked onto Sugar — with analytic method given. R.D.L. Box 1870.

16 (a) Judge to Hector: 6th April, 1865: On Jarvey Trial. R.D.L. Box 1865-66.
(b) Capt. Jarvey Trial, before his Hon. Justice Chapman, Dunedin 1865. Strychnine poisoning was involved, and scientific evidence was given by Australian, Dr. Macadam. Report in National Archives, Wellington, 221/1.
(c) The Hall Case, 1886; heard before Mr. Justice Johnston: Professor Black of Otago gave scientific evidence — poisoning was by (antimony), administered in Tartar Emetic. Report in University of Otago Archives, Hocken Library, Dunedin.

17 (i) Home-Made Sheep Dip Formula: see "N.Z. Farmer Bee and Poultry Journal" 1889, p. 515.
(ii) Brett's Colonial Guide, Auckland 1882 reports the value of arsenious-acid and strychnine in preserving hides on the farm.
(iii) Cyanic acid was readily available in gold mining areas.

18 (i) Skey's method of testing for strychnine in organic matter. 14th Annual Lab. Report (1878-9) — Lab. Copy in R.D.L.
(ii) Report to Stock Department 3-7-1893 upon strychnine's efficiency as an animal poison because it is not destroyed by burning. R.D.L. Letter Book 1891-96.

19 Government Grants to Industry — from 1874 onwards.
Pottery: Bonus of £300 for the first £2000 worth of pottery for household purposes. N.Z. House of Reps. Appendix 1874, I-1 p.2.
Sugar: Offer of £1000 for first 125 tons of sugar manufactured in N.Z. from beet or crops. Report to N.Z. Institute, Sept. 1881 by J.A. Pond.
Chem. Industry: In 1881 Kempthorne Prosser Drug Co. gained Government bonus for preparation of the first 150 tons of sulphuric acid.
General help: 17-1-1890. Report to Parliament on the general help given to production of sodium acetate, sulphuric acid, paper and other indigenous industries. R.D.L. Outward Letter Book 1886-1891.

20 As 8 (ii). The commencing salary was only £300 p.a. and the salary for his successor commenced at £400 p.a.

21 Report on Mineral Exhibits of the New Zealand Exhibition 1865. See also J.R. McInnon, "The First New Zealand Exhibition" thesis 1923, and, R.W. Anderson, "The First New Zealand Exhibition at Dunedin in 1865 . . ." History thesis, 19 . (was undated, JTR).

22 See Obituary to W.M. Skey. Transaction of N.Z. Institute No. 34, 1903, pp. 554-556. Skey died in 1900 at age 65. Also, N.Z. Mines Record Oct. 16th, 1901, p. 129.

23 His successor was J.S. McLaurin then an officer in the Mines Department, and Skey's Chemical opponent on theories of gold dissolution.

1984
CHEMISTRY & INDUSTRY YEARBOOK
CORRECTION

In the April-May 1984 issue of *Chemistry & Industry and Laboratory Management* on p 7 we published an Addenda to the 1984 Chemistry & Industry Yearbook which included a statement that ***Labsupply Pierce NZ Limited*** has ceased to exist. That statement was incorrect and Labsupply Pierce NZ Limited continues to operate as always.

The Addendum we intended to publish was that Labsupply Pierce NZ Limited are no longer the agents for *Applied Science* products and the suppliers of Applied Science products are now *Alltech Associates NZ.*

We regret any inconvenience caused to readers and Labsupply Pierce NZ Limited.

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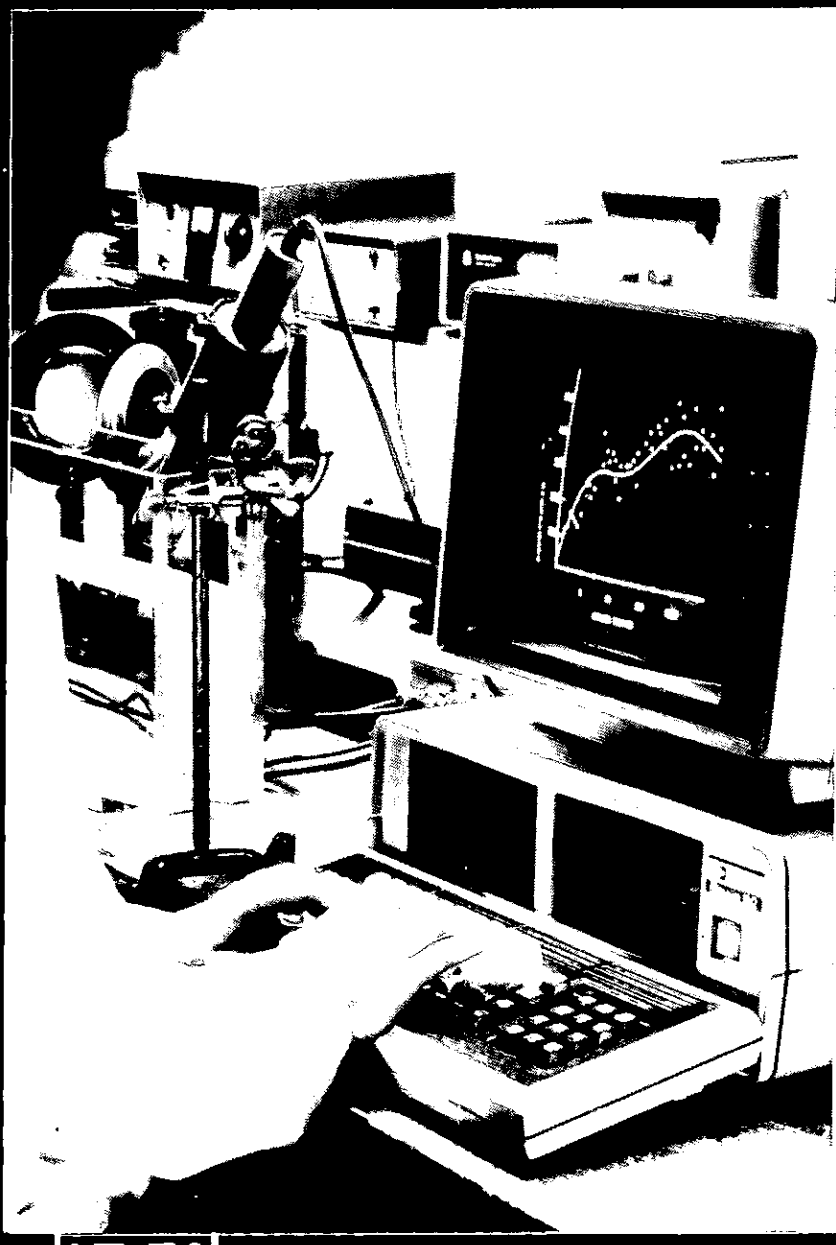

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ANALYSIS OF BRINE BY ATOMIC ABSORPTION

WITH THE GRAPHITE FURNACE USING DIRECT SAMPLE INJECTION.

MARGARET M. MURNANE,

Tasman Pulp & Paper Co. Ltd.,
KAWERAU.
NEW ZEALAND

Margaret Murnane who gained her QTA in 1979 and NZCS (Biochemistry/Biology) from Waikato Technical Institute in 1981 has had more than seven years practical experience with atomic absorption systems. Three years at the Biochemistry Unit, Princess Margaret Hospital in Christchurch involved trace metal assays of whole blood and serum, by flame and furnace techniques. This was followed by two years in the Plant Analytical Chemistry Section at the Ruakura Research Centre in Hamilton where a wide variety of plant materials and pastures were analysed for major and trace elements. For the past two years she has worked in Research and Development at Tasman Pulp and Paper at Kawerau setting up routine analysis of brine solutions. She is presently setting up analytical methods for wear metal analysis in lubricating oils, monitoring boiler corrosion and water effluent monitoring.

ABSTRACT

Graphite Furnace Atomic Absorption Spectrophotometry is an accurate method for the determination of concentrations of calcium and iron in saturated brine solutions. The analysis of low levels of these elements by other methods is hampered by interference from sodium chloride and requires lengthy extraction procedures.

Procedural details of analysis of brine samples by direct sample injection into a graphite tube with controlled heating of the sample and gas flows, is discussed. The direct analysis of brine using Graphite Furnace Atomic Absorption and the developed program has achieved levels of 5% coefficient of variation, in the µg/L range.

INTRODUCTION

The industrial production of 20% NaOH and chlorine by Tasman's Chlor-alkali Plant using Asahi membrane cells, requires an intake of saturated brine of a very high standard and purity.

The chlor-alkali process is carried out in electrochemical cells or electrolysers. The anode and cathode are separated by a semi-permeable membrane. The electricity for electrolysis is supplied to the terminal cells of the electrolyser.

Brine is circulated through the anolyte compartment and caustic soda through the catholytic compartment. (see Fig 1.).

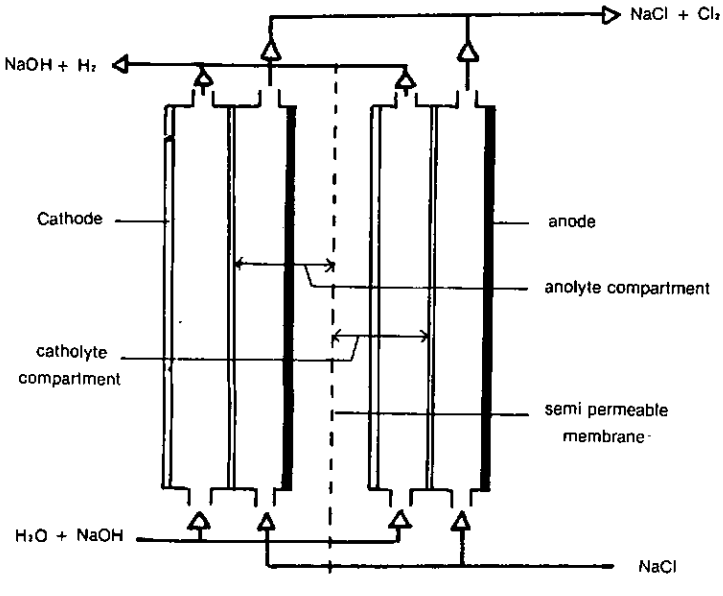

FIG. 1 CROSS SECTION OF A CELL UNIT

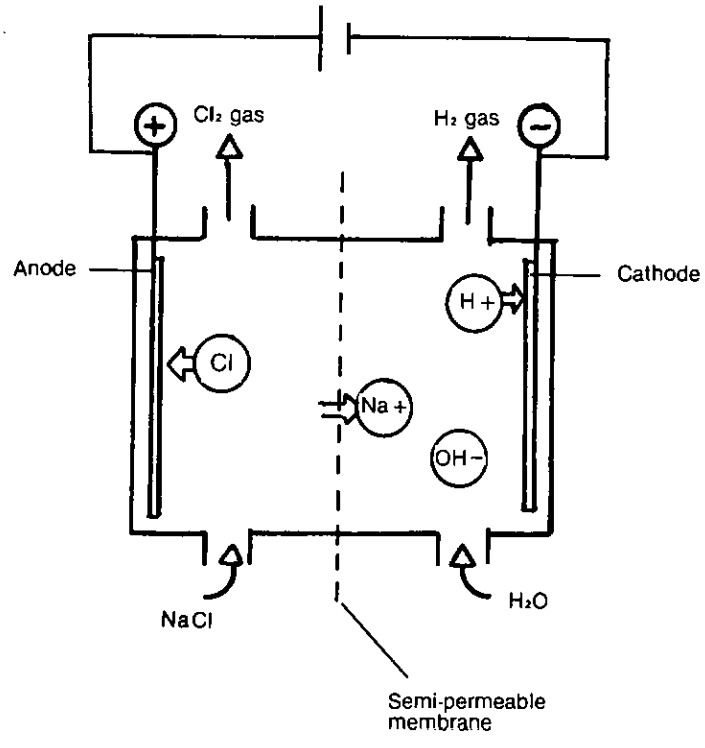

FIG. 2 THE CHLOR-ALKALI ELECTROCHEMICAL CELL

The following reactions are produced by the passage of electric current:

Anode: $Cl^- \rightarrow \frac{1}{2} Cl_2 + e$

Cathode : $H_2O + e \rightarrow \frac{1}{2} H_2 + OH^-$

Combined reaction: $NaCl + H_2O \rightarrow NaOH + \frac{1}{2} Cl_2 + \frac{1}{2} H_2$

The sodium ions migrate to the Catholyte compartment by selective permeation through the membrane (which is itself negatively charged), Sodium hydroxide is produced on reaction with water, while hydrogen gas is formed at the cathode.

Negatively charged chloride ions are repulsed by the membrane, but some hydroxyl ions do enter it.

If metal cations such as Ca^{2+}, Mg^{2+}, Fe^{2+}, are present in the anolyte, precipitates of metal hydroxides form on the membranes that separate the two halves of the electrochemical cell.

This results in a reduction of sodium ion migration, an increase in electrolyser voltage, and ultimately serious damage to the cell membranes. Therefore it is essential that the level of calcium and iron in the brine feed to the cells is kept below 20 µg/L.

Saturated brine has traditionally been a difficult medium to analyse quantitatively for trace concentrations of calcium and iron, due to the high concentration of sodium chloride (300 g/L), causing gross background interference.

After a close study of various alternatives, it was decided Graphite Furnace Atomic Absorption Spectrophotometry would best quantify the low level concentrations of calcium and iron required in the purified saturated brine.

A Varian AA-975 Atomic Absorption Spectrophotometer equipped with a GTA-95 Furnace, ASD-53 autosampler, Epson MX 80 printer and a Hewlett Packard HP-85 desktop computer were chosen to achieve the analytical objectives. The successful brine treatment program has achieved good precision with a coefficient of variation of 5%.

INSTRUMENTATION

The AA-975 and GTA-95 is a fully automated and programmable system. (Ref. to Fig. 3).

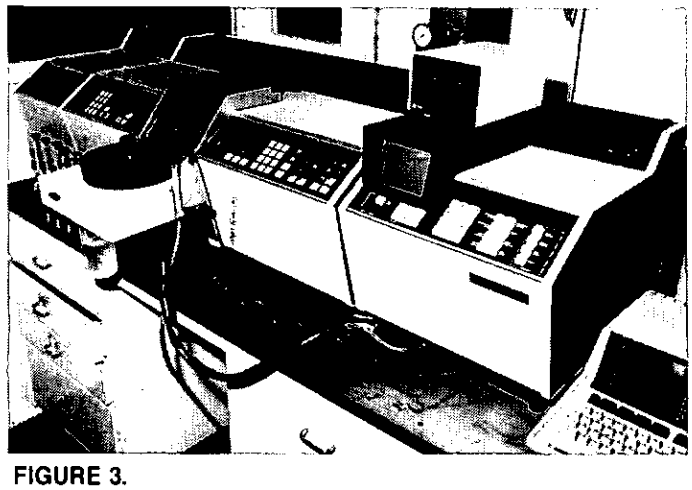

FIGURE 3.

The main microprocessor controlled components are, the twelve lamp turret, the graphite furnace, motorized monochromator, slit width drive, floppy disc storage unit, alpha numeric displays, screen for sample monitoring, and programmable gas control for flame and furnace analysis.

TABLE 1. INSTRUMENTAL CONDITIONS OF SPECTROPHOTOMETER

PROGRAM ID	Fe	Ca
INT TIME sec	2.0	2.0
WAVELENGTH nm	248.3	422.7
SLIT nm	0.2	0.5
LAMP CURRENT mA	5	10
EXPN FACTOR	1	1
STD 1 µg/L	10.0	4.0
STD 2 µg/L	25.0	10.0
STD 3 µg/L	50.0	20.0
MODE	ABS/CONC, Peak Height	ABS/CONC. Peak Height
BACKGROUND CORRECTION	OFF	OFF

TABLE 2. GTA-95 FURNACE OPERATING PARAMETERS - Ca AND Fe IN BRINE

STEP NO.	TEMPERATURE °C	TIME SEC	GAS FLOW	GAS TYPE	READ COMMAND	
1	95	5.0	3.0	NORMAL		
2	95	12	3.0	NORMAL		
3	110	50	3.0	NORMAL		
4	125	23	3.0	NORMAL		DRYING
5	165	25	3.0	NORMAL		STAGE
6	280	20	3.0	NORMAL		
7	490	23	3.0	NORMAL		
8	700	18	3.0	NORMAL		MELT
9	850	2.0	3.0	NORMAL		STAGE
10	1080	0.5	3.0	NORMAL		
11	1200	17	3.0	NORMAL		
12	1200	10	3.0	NORMAL		ASH
13	1300	0.5	3.0	NORMAL		STAGE
14	1300	15	3.0	ALTERNATE		
15	1300	1.0	0	ALTERNATE		
	Ca Fe					
16	2600 2300	0.7	0	ALTERNATE	*	ATOMISE
17	2600 2300	0.7	0	ALTERNATE	*	STAGE
18	2700	2.0	3.0	NORMAL		
						TUBE CLEAN STAGE

PROCEDURAL DETAILS

The direct analysis of brine on the GTA-95 is made possible by the programmable control of the sample treatment. The programme variables being number of steps, temperature, time, gas flow and gas type.

The brine analysis programmes for calcium and iron are given in Tables 1, 2 and 3.

TABLE 3

SAMPLER PARAMETERS — NORMAL CALIBRATION

SAMPLES AND TYPE	LOCATION	VOLUME	BLANK VOLUME	MODIFIER VOLUME
BLANK	-	-	10	
STD 1	51	2	8	
STD 2	51	5	5	
STD 3	51	10	0	
STD 4				
STD 5				
SAMPLES	-	10	0	

LAST SAMPLE NO. = 45 MULTIPLE INJECTIONS = 1
NO. REPLICATES = 2 LAST DRY PHASE STEP =
RESLOPE RATE = 10 INJECTION TEMP = AMB
FIRST SAMPLE NO. = 1

SAMPLE BEHAVIOUR IN THE FURNACE

In the early stages of drying the sample, temperature and time parameters are set at a ramp rate which will dry the droplet smoothly and without vigourous boiling. Approximate temperatures for the boiling point of brine and the melting and vaporization points of NaCl are shown in Table 4. Complete evaporation of moisture is obtained by setting the furnace temperature just below the boiling point of the sample and allowing sufficient drying time to prevent the sample from "spitting". Refer Table 2. The melt stage is reasonably rapid where the sample sublimes at the melting point of the sample matrix. However, the temperature must be carefully controlled to obtain acceptable precision.

TABLE 4.

APPROXIMATE BRINE AND NaCl TREATMENT TEMPERATURES

Brine	Boiling Point	105°C
NaCl	Melting Point	780°C
NaCl	Vaporization	1085-1190°C

In the Ash and Vaporization stage, the ramp rate is set to ensure a positive breakdown of the sample matrix. The purging gas carries the decomposition products of the ash stage out through the chimney, while the element of interest remains. A compromise in ramp rate is necessary. If the furnace ramp rate is set too fast or too slow, in reaching the vaporization temperature of NaCl, elimination of the NaCl is incomplete, therefore causing loss of sample and background interference during atomisation of the element. A ramp rate is selected such that the background and atomic signals are separated.

The vaporization of NaCl in brine occurs at 1085°C, to 1190°C, which is high for the recommended ash temperatures for some elements (e.g. Fe maximum ash temperature is 800°C) which may contribute to some loss of the element. However, this loss is quantitative and consistent, therefore an accurate determination of the element in brine can still be obtained.

The depleted brine (anolyte) carrying chlorine out of the electrolyser is analysed for calcium, iron and nickel by the same programme as for saturated brine. The concentration levels must be less than 40 50 and 20 µg/L respectively.

The chlorine must be removed from the anolyte prior to analysis as it contributes to excessive background interference and overloads the background corrector.

GAS SUPPLIES

The GTA-95 Furnace has provision for two types of gas. The analysis brine uses Nitrogen as the "NORMAL" purging gas and Argon as the "ALTERNATIVE" gas. The presence of argon increases the atomic signal. The maximum recommended gas flow rate is used throughout the programme except during the atomise steps when the gas supply should be cut off. A zero gas flow ensures no sample will be purged from the furnace during sample measurement.

GRAPHITE TUBES

Pyrolytic coated graphite tubes have been found to give the most consistent results with improved sensitivity and longer tube life compared to plain graphite tubes.

SAMPLE VOLUME

The sample volume for analysis of brine is 10 µL, volumes exceeding this cause unacceptably long drying times in the relatively long treatment time compared to other sample matrices. Refer to Table 3.

STANDARD AND SAMPLE PREPARATION

Only acidification with 0.5% HNO_3 'Aristar' is required for sample treatment. Water used throughout analysis must be distilled, deionised grade with a resistivity of 18 megohms or greater.

A summary of standard preparation is shown in Table 5.

TABLE 5 STANDARD PREPARATION

	Calcium	Iron	Nickel	Blank
Conc. µg/l	20	50	50	—
Acidification	0.5% HNO_3	0.5% HNO_3	0.5% HNO_3	0.5% HNO_3
Peak Abs.	0.600	0.380	0.250	NIL

CONTAMINATION

Environmental contamination during analysis was a problem particularly for calcium. This problem was reduced considerably by housing the AAS System in a filtered air room.

All glassware used in brine analysis is washed with dilute nitric acid and rinsed thoroughly with high resistivity distilled deionized water.

REFERENCES:

1. M.R. Smith, H.B. Cochran — Olin Corp, P.O. Box 248 Charleston, TENNESSEE 37310.
   Determination of Calcium and Magnesium in Saturated Sodium Chloride Brine by Graphite Furnace Atomic Absorption Spectrophotometry. Atomic Spectroscopy Vol. 2 No. 4 Jul-Aug 1981.
2. E. Rothery — Varian Techtron Ltd. Mulgrave, Victoria, Australia. Analytical Methods for Graphite Tube Atomisers. Jan. 1982.
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   Varian GRA-95 Graphite Tube Atomiser Operation Manual. Sept. 1981
4. J.C. van Loon — Atomic Absorption Selected Methods.
   Academic Press, New York. 1980
5. Standard Operation Instructions and Standard Analysis Instructions for Membrane Chlor-alkali Process
   Asahi Chemical Industry Co. Nobeoka, Japan. May 1981.

ACKNOWLEDGEMENT

The author thanks the following people for their valued assistance during the optimisation studies, and commissioning of the instrument.

P. Bennett, Product Line Manager Varian Techtron Pty Ltd, Mulgrave, Victoria, Australia.

P. Hubbard, Sales Manager — Wilton Instruments, Smith Biolab Ltd, Auckland, New Zealand.

Thanks to Tasman Pulp and Paper Ltd. for their permission to publish this work.

COUNCIL NEWS

Prof. R.D. Batt presided over meetings of Council in Wellington on Wednesday and Thursday 8 and 9 February. After welcoming Prof. G.B. Petersen, 2nd Vice-President, Dr. W.A. Denny, Auckland Branch delegate and Dr. J.R. Cretney, Canterbury Branch delegate as new members of Council the President expressed his pleasure at having been elected an Honorary Fellow of the Royal Australian Chemical Institute during his term of office. Professor Batt plans to visit Australia in July.

HONORARY FELLOWSHIP

On the 1st May 1959 Mr D.J. Hogan was appointed Registrar. As a mark of appreciation of 25 years of devoted service, Council has resolved to elect Denis an Honorary Fellow on the 1st May 1984.

THE ARTHUR C. KENNETT MEMORIAL AWARD

Council has decided to sponsor jointly with the Australasian Corrosion Association "The Arthur C. Kennett Memorial Award" and to donate $1,000 to the capital fund. It is proposed to make the first award in 1984 at the Annual Conference of the ACA in Rotorua 19/23 November.

The conditions of the award for which entries close on 31st July 1984 will be set out in the June issue.

Arthur Kennett was a member of the staff of Chemistry Division and an active member of the New Zealand Institute of Chemistry.

An Adhesives Symposium organised by him in April 1983 on behalf of the Polymer Chemistry Group resulted in a $1,300 profit for the NZIC.

SUBSCRIPTIONS

Council will maintain subscriptions at the 1983/84 level in 1984/85 having regard to the continuing of the freeze on salaries.

1983 AAVA CHEMISTRY V PRIZE

Mr Mark E. Bowden, a student of Wellington's CIT, was awarded the $50 prize for the candidate gaining highest marks in the AAVA Chemistry V examinations at the end of 1983.

OVERSEAS VISITORS

Dr G. Dodson (Dr E.N. Baker) in July and early August, Dr Anne Dell (Dr C.B. Johnson) in September and Professor R.E. Hester (Dr McQuillan and Professor Campbell) are visitors (and their sponsors) expected to speak to Branches in 1984.

NZIC TIE AND SCARF

On the recommendation of Dr D.E. Wright an order has been placed for 500 ties featuring the NZIC logo in gold on a choice of blue, brown and maroon material. Members wishing to obtain ties (cost $10) are asked to order them through their Branch secretaries. Delivery is expected by July or August 1984. Orders will also be taken for scarves.

COUNCIL APPOINTMENTS

Dr L. Eyres was reappointed Honorary Librarian and Dr R.F.C. Claridge as Archives Officer.

ACTING GENERAL SECRETARY

Dr John Rogers has been appointed by the United Nations Industrial Development Organisation as a consultant for a month to the Government of Pakistan on the establishing of a Fertilizer Research and Development Institute. For the period of Dr Rogers' visit to Pakistan (Islamabad, Lahore, Faisalabad) and UNIDO's headquarters in Vienna in March and April, Council elected Denis Hogan as Acting General Secretary.

MEMBERSHIP

The following nominations were approved at the Council Meeting on February 8th 1984.

Members

BLAZEY, Neil David BSc. (Hons) (Well). New Zealand Pharmaceuticals Ltd., P O Box 1869, Palmerston North. (Chief Chemist)

RALPH, John BSc. (Hons) (Cantuar) PhD. (Wisconsin). Forest Research Institute, P B Rotorua. (Scientist)

Graduate Members to Members

AHLERS, William Walter NZCS, MSc. (Auck). Chemistry Dept., University of Otago, Box 56 Dunedin. (Scientific Officer)

CHRISTMAS, Michael John MSc. (Cantuar). Empire Rubber Mills Ltd., Christchurch. (Industrial Chemist)

PATEL, Vinod BSc. B P Chemicals NZ Ltd., Lower Hutt. (Devel. Chemist)

YOUNG, Margaret Dora BSc. (Hons) (Otago). Southland Boys' High School, Invercargill (Teacher)

Technician Members

JENNINGS, William Thomas NZCS. Pharmaceutical Sales & Marketing Ltd., P O Box 40-079 Glenfield Auckland 10. (Chemist)

SIMES, Mrs. Heather Grace NZCS. Croda Chemicals Ltd., 15 Kalmia St., Ellerslie, Auckland. (Sales Rep.)

Graduate Members

MARTINUS, Ryan Dennis BSc. University of Waikato. (Student)

Technician to Graduate Members

HULSE, Carol Ann NZCS. BSc. (Hons) (Cantaur) Redwood Valley, Richmond.

Life Members

H.S. Ayling, C.F. Denmead, R.N. Seelye, (Auckland), D.R. Llewellyn (Waikato), J.R. Beck, R.C. Lawry, J.N. Smith (Wgtn.) W.R. McKeegan (Canty.)

Resignations

P.C. Betts (Auck.); J.B. Collett (Wgtn.)

Errata

The entry under HARRIS in the February issue's membership listing should have read MARRIS, Alistair Cedric MSc (Cantaur) Wheat Research Institute, Christchurch (Scientist). Our appologies to Mr Marris.

BRANCH NEWS

AUCKLAND

The Auckland Branch is organising a one-day symposium for mid-June 1984, on the theme of "Health Hazards of Chemicals in the Workplace". Papers to be presented will cover the type and nature of the hazards, biological monitoring and monitoring of the workplace, and it is hoped to have a range of presentations from industry on current practises. Further information is available from *Dr B Graham*, Department of Health, 2 Edenvale Road, Mt Eden, Auckland.

WAIKATO

Leslie Bretherick, an industrial chemist formerly with British Petroleum in the United Kingdom, addressed the March branch meeting. He gave a very informative talk on "Chemical Reaction Hazards: Causes and Prevention", which was well received by a larger than average audience. Various factors associated with chemical reaction hazards were condsidered, including energy changes, chemical reactions which can produce hazardous situations, theoretical and experimental assessments of the stability of reaction mixtures and the reactivity of reaction products.

WELLINGTON

Ms Janet Burns from Victoria University of Wellington addressed the February Branch meeting on the topic 'Student Attitudes to, and Understanding in, Chemistry'.

Chemistry has become the least popular science subject in secondary schools, and this clearly has considerable long term implications. The concern of members present was reflected in the extensive questioning of the speaker, which was continued through supper time.

CANTERBURY

Branch activities for 1984 commenced in February with a well attended visit to the new Ilam Research Centre. Sited on the University of Canterbury campus, the Centre is staffed jointly by Chemistry Division D.S.I.R. and the Wheat Research Institute.

The meeting started at 5pm with light snacks, after which W.R.I. Director *Tom Mitchell* and Government Analyst *Dr Max Robertson* outlined the role of their respective organizations. Members were then taken on a conducted tour of the spacious and well equiped facilities by W.R.I. and D.S.I.R. staff members. The buildings have been occupied since late last year and were to be officially opened by the Minister of Science *Dr Ian Shearer* on March 20 (as this issue went to print).

OTAGO

Bruce Collier, of New Zealand Cement Holdings, Dunedin, reports that a new sulphate-resistant cement has been developed at the works in Burnside. 8000 tonnes of the cement have been sold over the last 12 months Bougainville Copper Mines in New Guinea. The cement is currently being tested and evaluated by the N.Z. Concrete Research Association with a view to using it to construct cooling towers at the Ohaki Power Project. Only a modest increase in price is involved over regular grades of cement.

GENERAL NEWS

NEW ZEALAND FORENSIC SCIENCE SOCIETY FORMED

At a recent meeting in Wellington a panel consisting of two expert witnesses, the prosecutor and one defence counsel discussed the medical and scientific evidence, from the Kensington Street Homicide and the effect of this evidence on the trial where two Wellington gang members were convicted of murder.

Following the panel discussion, the 48 people present, representing scientists, medical practitioners, lawyers and police officers, resolved to form a New Zealand Forensic Science Society.

A steering committee including Drs P.L. Cropp and G.J. Sutherland of DSIR was elected at the meeting to consider the structure and functions of the society.

There will be another two meetings of the N.Z. Forensic Science Society in 1984.

1. A meeting at the Police College in Porirua on 25 May 1984 in conjunction with the New Zealand Society of Pathologists.

2. A symposium on 'Certainty and Probability in Forensic Science Results' on 24 August following the N.Z. Institute of Chemistry Conference at Victoria University of Wellington.

Forensic Science Societies exist to facilitate the understanding of Medicine, Science and the Law, in areas where they interact, by organizing meetings, lectures and discussions and by maintaining contact with similar organizations overseas. In New Zealand there are several specialist groups with some members involved in forensic work. The Forensic Science Society will provide a common link between specialists in different fields.

Members of the NZIC who are interested in the Forensic Science Society, or the symposium on 24 August, please contact

Dr P L Cropp
Chemistry Division
DSIR
Private Bag
PETONE

DULUX UPDATE LABS

Dulux New Zealand have modernised their Lower Hutt laboratories with new equipment for work involving chemical analysis, colour measurement, computerised formulation, resins, coil coatings, electrodeposition coatings and quality control. Analytical equipment, consisting of high performance liquid chromatograph (HPLC), gel permeation chromatograph (GPC), gas chromatograph (GC) and infra red spectrophotometer (IR), has been installed and interfaced with a data station. This equipment facilitates accurate and detailed qualitative and quantitative analysis of coating products and their associated raw materials. The colour measurement section has been equipped with an automatic Matchscan II spectrophotometer, interfaced with a computer, to provide instantaneous colour measurement and formulation.

SEAWEED EXTRACT REPORTS

The NZ Herald recently quoted two Australian reports on the merits of seaweed extract as plant food. The first from the Victoria Department of Agriculture suggested that pure seaweed extract has no practical value as plant food. The second report from Dr Colin Young, senior lecturer in chemistry at Melbourne points out that although the pure extracts are low in nitrogen, phosphorus and potassium, they contain plant hormones such as auxins and cytokinins which can be readily taken up by plants when applied as a foliar spray.

NEW SOIL CLEANSER

A new portable reactor has been developed by the J.M. Huber Corporation for the decontamination of polluted soil by subjecting it to temperatures of more than 2000 °C. Environmental Protection Agency officials say the high temperature fluid wall may prove the most economical method yet for sterilising soil that contains dioxin, PCBs and other toxins.

FERTILIZER TECHNOLOGY

Marcel Dekker (Inc.) New York are to publish an international journal "Fertilizer Technology" with Cornelius Keleti as Editor and an International Editorial Board which includes NZIC Hon. Gen. Sec. John Rogers.

The first issue is targeted at the first quarter of 1985 with three issues per year. The Editor seeks contributions through the members of the Editorial Board on fertilizer manufacture, transport, storage and handling, commercial considerations, agriculture and microbiology wherever new developments in these fields may influence the technology of fertilizer production. Controversial contributions are welcomed with space for letters to the Editor.

$ZnSO_4$ PRODUCTION

N.Z. Farmers' Fertilizer Co has recently commenced manufacture of zinc sulphate at its Otahuhu chemicals plant. The product is made by reacting scrap zinc with sulphuric acid and crystallizing from hot liquor. Their production will replace imports, used mostly in fertilizers, for control of facial eczma and in the new field of combatting footrot in sheep.

JOURNAL COPIES IN ARCHIVES

Rod Claridge of the NZIC Archives Committee advises that he has available spare copies of most issues of the Journal. If members want back numbers to complete collections or copies of articles, contact Dr R.F.C. Claridge at the Department of Chemistry, University of Canterbury and he will try to supply them.

GOVT DEPTS AND RESEARCH INSTITUTIONS

DSIR MT ALBERT

Dr Don Burns, head of the Processing section of DHP has returned to MARC after spending 17 months in the U.S.A. studying new aspects of food processing.

Norman Lodge is visiting a number of countries in association with a local food processor in order to assist with licensing arrangements for the manufacture of a locally developed fruit beverage.

John Dunbar, a recent PhD graduate from Waikato University, has joined the Processing section of DHP. Before joining the division, John was doing post-doctoral studies in Germany.

Work on the new building at MARC to house the Auckland branch of Chemistry Division is progressing rapidly.

RUAKURA AGRICULTURAL RESEARCH CENTRE

Dr John Watkinson presented a paper on "Prevention of Deficiency in Grazing Stock by Topdressing with Selenium in Fertiliser" at the 19th Technical Conference, organised by the N.Z. Fertiliser Manufacturers' Research Association. New Zealand is the first country in the world to permit top dressing of pasture with selenium. The talk reviewed research and farm experience since the authorisation of selenium topdressing in April 1982.

HEALTH DEPARTMENT

Three regional seminars and workshops on the 'Management and Disposal of Hazardous Wastes' sponsored by the Commission for the Environment, Department of Health and Ministry of Works and Development were held in February in Auckland, Palmerston North and Christchurch.

The keynote speaker was *Errol Samuel* of the Metropolitan Waste Disposal Authority in Sydney.

Other speakers included representatives of the regional authorities, industry and the three sponsoring departments.

CHEMDIV DSIR GRACEFIELD

P.J. Grosvenor has transferred from the Industrial Processing Division, DSIR to Chemistry Division where he is working on the Chemistry of paints in the Applied Chemistry Section.

Dr. M.E. Lawton has transferred from the Chemistry Division Gracefield laboratory to the Auckland branch laboratory where she will be head of the Forensic Section.

Ms H.M. Beaumont has received the 1984 Australasian Corrosion Association Jubilee Award. This was awarded to the best student overall in the 1984 course for the Certificate in Corrosion Technology.

The water section of Chemistry Division DSIR has transferred to the Ilam Research Centre in Christchurch. Staff from Gracefield who have moved with the section include *Dr F.R. Grasse* and *G.N. Mills.*

CHEMDIV DSIR CHRISTCHURCH

In December, *Peter Grounds* spent a week completing work on pesticides found in commonly used foods in a New Zealand FAO/WHO survey.

Richard Van Oort spent a week in Hamilton in November on a capillary gas chromatography course in November in anticipation of new equipment expected in Christchurch.

Geoff Plowman attended a course at Massey in February sponsored by the N.Z. Society of Dairy Technologists.

Lyn Farr is currently taking 3 months leave of absence.

UNIVERSITIES AND TECHNICAL INSTITUTES

AUCKLAND

Visitors to Chemistry Department in the first term 1984 will include *Prof Yamamoto*, Professor of Inorganic Chemistry in the Resources Division of the Tokyo Institute of Technology and *R. Richards*, Professorial Fellow from the Australian National University.

WAIKATO

Student numbers in Chemistry have risen a little in 1984, with a pleasing intake at M.Sc., level. However, the dearth of D. Phil. candidates is disappointing.

Dr Chris Hendy had a successful summer season in the Antarctic, accompanied by two Waikato students, *Fiona Judd* and *Jan Clayton-Green*.

Mr Leslie Bretherick visited the department in March and gave a seminar on safety and storage of hazardous chemicals which attracted a wide general and University audience.

The Waikato Branch N.Z.I.C. Prize for the best second year student (instituted as a Memorial to J.E. Allan) has been awarded this year to *Miss Jan Whittaker.*

For the first time, this summer, one of our students was awarded one of the summer studentships at A.N.U.: *Miss Laurie McLeod* has recently returned from work on a geochemistry project in Canberra.

Dr Paul Reynolds will be joining the thermophile research group in March to work on Celluloses from extreme thermophiles. Dr Reynolds is a New Zealander, but arrives from the University of Missouri, Colombia, USA.

CENTRAL INSTITUTE OF TECHNOLOGY

M A Trevean from the School of Pharmacy has been awarded a World Health Organization Fellowship to complete a Masters degree in Health Personnel Education at the University of New South Wales. The W.H.O. Fellowship is awarded to one New Zealander each year.

Dr B J Wilkins from the School of Pharmacy is currently taking six months Technical Refresher Leave at the School of Pharmacy at Sydney University.

Dr R Ledger from the School of Pharmacy is visiting the University of Iowa for one year to continue his research into the isolation of receptors.

VICTORIA

Dr P Tyler has left the Chemistry Department at Victoria University and joined DSIR Chemistry Division, and not the MAF Invermay Research Station as previously reported.

Dr H D Ellerton has resigned from the Biochemistry Department and returned to Australia.

Dr W H Robinson from the DSIR Physics and Engineering Laboratory recently addressed the Chemistry Department on the topic 'Sea Ice'.

CANTERBURY

Dr Allan Happer has recently been promoted to the position of Reader in the Department.

Drs Murray Munro and *John Blunt* have received grants from Sea Pharms (USA), the Golden Kiwi lottery fund, and the Canterbury Medical Research Council to establish on antiviral assay in the Chemistry Department and to support graduate and post doctoral research into activiral agents from marine invertibrates.

Prof Leon Phillips and *Dr Colin Freeman* attended a RACI sponsored conference on molecular dynamics in Levra N.S.W. in November and *Dr Vida McKee* attended a COMO conference in Hobart in January.

Dr Don House has accepted responsibility for the Chemical Process Technology course run in the Chemistry Department which was developed by the late *Dr Allan Metcalfe.*

Dr Joel Tellinghuisen (Van der Bilt University, Nashville) is visiting the Department until June. He has previously spent time in the Department as a post doctoral student. Visitors expected in the near future include *Prof Arthur Adamson* (U.S.C.) in March, and *Dr Bob Gilbert* (University of Sydney) in March/April.

The visiting teacher in the Department this year is *Mr Groves* from Ellesmere College.

The Department of Chemical and Process Engineering is Hosting Three Visitors at Present.

Tasman Visiting Fellow, *Prof J.R. Bourne*, of the Swiss Federal Institute of Technology, Zurich, is visiting the Department for a period of 6 weeks, during March and April. He is involved with teaching and research seminars, in the Chemical and Process Engineering and Chemistry Departments. His topics include the influence of mechanical mixing on the selectivity of fast chemical reactions.

Dr D. Reay, Head of the Chemical Engineering Science Group in the Engineering Science Division of the AERE, Harwell, is spending 5 months in the Department. Areas of interest include solids drying, particle manufacturing processes, energy conservation, and the management and marketing of R & D. He will be lecturing and assisting with research projects.

Prof Ma Kecheng of Chengdu University of Technology, Chengdu, Sichuan Province of the People's Republic of China is visiting the Department for a period of residence of one year. He will be associated with all aspects of the teaching and research programme, with particular interests in fluidbed operation and drying.

OTAGO

Prof Marion Robinson (Nutrition Department) has now returned from study leave which she spent in Europe and the United States. Her objective was to collect information about selenium to determine whether New Zealand residents are disadvantaged by having unusually low levels of selenium in their bodies. She attended the International Symposium on Health Effects and Interactions of Essential and Toxic Elements held in Sweden at which the hazards of supplementation and fortification of foods and "mega-dosing" with trace elements were discussed. She also spent 3 months at the U.S.D.A. Human Nutrition Centre's Vitamin and Mineral Laboratory in Beltsville, Md., where she continued collaborative studies with Dr. Orville Levander begun in 1982. Also in the Nutrition Department, *Dr Laurie Melton* and *Jeanette Samundson* have begun the second controlled-atmosphere storage trial on apricots from Central Otago.

In the Pharmacology Department, *Prof I. Ralph Edwards* has returned from Hawaii where he attended a U.S. Food and Drug Administration hearing on the registration of a new drug. *Dr Garry Blackman* has returned from study leave which he spent primarily with *Prof Don Jenkinson*, Chairman of the Pharmacology Department at University College, London. While there, he completed programmes for the microcomputer which simulate the pharmaco-kinetic behaviour of drugs. He also took part in studies of potassium conductance changes in membranes of isolated liver cells. While returning, he spent 5 weeks visiting institutions in the U.S.A. which are involved in studying the intrinsic nerve supply of the respiratory tract. There have been major advances in this field over the past 5 years which as yet remain unpublished.

Visitors to the Chemistry Department have included *Prof John Osborne* from Strasbourg University, France, who visited *Prof D.A. Buckingham's* group in January. Prof. Osborne is interested in metals in their lower oxidation states and their use in industrial processes. *Dr Trevor Kemp*, of V.G. Analytical in the U.K., gave an illustrated talk on mass spectrometry, detailing recent advances in the field and capabilities of their own instruments. Now, *Dr Robert M. Moore* has arrived from the Department of Oceanography, Dalhousie University, Nova Scotia, to spend 6 months in the Department as a William Evans Visiting Fellow. Dr. Moore is interested in the surface chemistry of thorium in the ocean and in Arctic oceanography. He is scheduled to present a course of lectures on marine chemistry in the Marine Science M.Sc. programme in April.

Dr Keith Hunter will be a visiting lecturer at the Division of Physical and Chemical Sciences, Deakin University, for a month in April. *Dr Roy Tasker*, who gained his Ph.D. at Otago under Prof. David Buckingham, has now taken up a Senior Tutorship in the Department of Physical and Inorganic Chemistry at the University of Adelaide. *Paul Sutton* has returned from Perth to continue with Prof. Buckingham, and six students from the 1983 Honours Class in Chemistry have returned to research in the Department. Reorganisations in the Chemistry Department have resulted in the Nicolet I.R. spectrometer being digitalised and placed with other measuring instruments and a computer terminal in a new temperature-controlled instrument room. Also, a PU 9000 atomic absorption spectrophotometer, with flame and flameless auto samplers, and purchased in conjunction with the Nutrition Department, arrived in January.

In the Biochemistry Department, *Dr George Emerson* has returned from leave at Heriot-Watt University where, with *Dr Bob Sturgeon*, he studied cell wall antigens of Aspergillus fumigatus (a pathogenic fungus). This was a prelude to collaborating with the Otago Candida group who have an interest in morphogenesis. *Dr Peter Stockwell* spent 1983 at the Imperial Cancer Research Fund laboratories in London, applying computers to DNA and protein sequence analysis. While there, Peter noticed the similarity in amino acid sequence between the growth factor PDGF and the putative protein product of the sis oncogene. This discovery is of considerable importance in understanding tumour formation. In a similar vein, *Dr Tony Reeve* and his

cont. p45

CONFERENCES

1984 NZIC — Biochemistry Society Conference
See update on P.31

Corrosion Technology — 1984 and beyond
The Australasian Corrosion Association is holding its annual conference in Rotorua 19-23 November 1984. The Conference incorporates two major symposia, "Corrosion in the Pulp and Paper Industry" and "Corrosion in Geothermal Systems". The principal guest speaker is Prof. Digby Macdonald, Director of the Fontana Corrosion Centre, Ohio State, and two other overseas speakers are expected.
Papers are being called for and intending authors should submit titles plus a 200 word summary to the Conference Secretary before 30 April 1984. Contact: The Conference Secretary, Australasian Corrosion Assoc., P.O. Box 5961 Auckland.

HPLC Workshops
The NZIC Chromatography Group and Waikato Technical Institute are running two HPLC Workshops in Hamilton in May 1984. The first, Basic HPLC Instruction Course runs from 1p.m. May 14 to May 16. Workshop 2 consists of seminars by various experts on particular aspects of HPLC, followed by experience with different HPLC equipment, May 17-18. Contact: Dr Peter Robinson, Science Department, Waikato Technical Institute, Private Bag, Hamilton.

OVERTASMAN

Deformation, Failure and Strengthening of Polymers
An intensive three day symposium, 23-25 May 1984, Melbourne. Contact Dr R. A. Shanks, Applied Chemistry, RMIT Box 2476V GPO Melbourne Vic. 3001 Australia.

Chemistry and Physics of Elastomers
An introductory short course, 9-11 July 1984, University of N.S.W. Contact Dr. R. P. Burford, Dept of Chemical Engineering and Industrial Chemistry, University of N.S.W. P.O. Box 1, Kensington, N.S.W. 2033, Australia.

N.I.R. '84
An international symposium on Near Infrared Reflectance (Spectroscopy) to be held in conjunction with the 24th Annual Conference of the Cereal Chemistry Division RACI. 15-19 October 1984, Melbourne. Contact N.I.R. 84, c/o Ms D. Miskelly, Bread Research Institute, Private Bag P.O., North Ryde N.S.W. 2113, Australia.

Polymer 85
An international symposium on the Characterisation and Analysis of Polymers. 11-14 February 1985, Melbourne. Closing dates, titles of papers July 1, 1984; Abstracts November 1, 1984; Registrations (before late fee) December 1, 1984. Contact Polymer 85, Royal Australian Chemical Institute, 191 Royal Parade, Parkville, Vic 3052, Australia.

OVERSEAS

Chemrawn III
Chemical Research Applied to World Needs, IUPAC sponsored. 25-29 June 1984, The Hague. Contact CHEMRAWN III Congress Bureau, QLT Convention Services, Keizersgracht 792 1017 EC Amsterdam, The Netherlands.

Xth IUPAC Symposium on Photochemistry
22-27 July 1984, Interlaken, Switzerland. Contact PD Dr A. M. Brawn, Institut de chemie physique, EPFL, Ecublens, CH-1015 Lausanne, Switzerland.

XXIII International Conference on Coordination Chemistry
IUPAC sponsored, 29 July-3 August 1984, Boulder Colorado. Contact Prof. P. Pierpont, Secretary XXIII ICCC, Campus Box 449, University of Colorado, Boulder CO 80309 USA.

The Physical Chemistry of Colloids and Macromolecules
A IUPAC sponsored international symposium celebrating the 100th anniversary of the birth of Theodo Svedberg. 22-24 August 1984, Uppsala, Sweden. Contact The Svedberg Symposium, Uppsala University, Box 256, S-751 05 Uppsala Sweden.

7th International Symposium on Organosilicon Chemistry
9-14 September 1984, Kyoto. Contact Prof. M. Kumada Chairman, Seventh ISOS, The Chemical Society of Japan, 1-5 Kanda-Surugadai, Chiyoda-ku, Tokyo 101 Japan.

UNIVERSITIES

(Continued)

co-workers in the Molecular Carcinogenesis Laboratory have discovered that in several cases of Wilms' tumour (a common kidney tumour in children) the H-ras oncogene has been deleted, implying that tumour development may involve a genetic change near this locus.

Dr Kevin Farnden has been awarded a 3-year D.S.I.R. research contract to study gene expression in legume-Rhizobium symbiosis. This will allow him to extend his in vitro translation studies with leghaemoglobin to look at the biosynthesis of peribacterioid membrane proteins. *Dr Clive Trotman* has been re-elected N.Z. committee member and local agent for the Australia and New Zealand Society for Cell Biology.

Dr Paula Jameson of the Botany Department will visit the University of Canberra in May to collaborate on a research project with *Dr Leatham.* Afterwards, she will attend a conference at the University of Sydney. At Otago, Dr Jameson has started an investigation of the cytokinins in Maxicrop with M.Sc. student, *Kevin Sanderson.*

Dr Rob H. McKeown of the Pharmacy Department, while in Australia (as reported previously), completed arrangements there for the commercial synthesis of a new drug. In connection with the transfer of the Pharmacy Department from the Faculty of Science to the Faculty of Medicine, $550,000 has been assigned to make alterations to the Adams Building preparatory to the arrival of the Pharmacy Department. It is hoped that the transfer will be completed by early 1985.

COMO-12 — A NEW ZEALAND PERSPECTIVE

The very successful COMO-12 conference was held at the University of Tasmania splendidly organised by Peter Smith, Michael Hitchman, Allen Canty and Rudi Thomas of the Chemistry Department.

The conference followed the established COMO form, with a limited number of invited plenary and section lectures and the main emphasis on posters. The New Zealand contribution included a plenary lecture on iron porphyrins and cobalt oxalate chemistry by Professor David Buckingham from Otago; and section lectures on electron chain transfer catalysis in synthesis by Jim Simpson from Otago, copper sulphur complexes paralleling copper proteins by Eric Ainscough from Massey, and structural and spectroscopic studies of two- and three-coordinate d^{10} complexes of copper, silver, gold and mercury by Graham Bowmaker from Auckland.

These, together with Ken Mackay and Derek Smith (Waikato), Vickie McKee (Canterbury), Mike Taylor and Peter Boyd (Auckland) made up the New Zealand contingent who also contributed some half dozen posters. This New Zealand work spanned the main areas of interest at the Conference:- classical coordination chemistry, organometallic chemistry, bonding and methods, and biological inorganic chemistry. Despite this excellent and exciting work, the most widely appreciated New Zealand contribution was undoubtedly Derek Smith's splendid speech at the Conference Dinner!

Further highlights of the Conference, in addition to a very strong series of plenary lecturers from United States and Europe, included the 7th Burrows lecture on molecular models, given by David Kepert from the University of Western Australia and the Tilden lecture on the spectroscopy of mixed valence complexes, given by Robin Clark of University College, London (whom we naturally claim as a New Zealand contribution).

The Inorganic and Organometallic Specialist Group of the NZIC are regarded as group members of the COMO division of the RACI. The division, incidentally, has just decided to change its name to the Inorganic Chemistry Division. At the AGM, held at the Conference, David Buckingham retired as the New Zealand representative on the division committee and was replaced by Ken Mackay. It is appropriate to acknowledge the tremendous work done by David over the last few years in bringing the Australian and New Zealand inorganic chemists closer together. The last few COMO meetings, including the first New Zealand one at Queenstown in 1981, have seen a major implementation of "closer relationships" at least in this field.

K.M. Mackay

BOOK REVIEW

WATER, by Felix Franks
Royal Society of Chemistry
Paperback
ISBN 085 186 4937 pp. 96

This book in 14 short chapters summarises the unique physical properties of water. However, despite the ubiquitous nature of water and its involvement in the chemistry which most of us practice, I would see the reader audience limited to those who are directly concerned with the physical, solvent or structural chemistry of water; e.g. teachers at tertiary level and geothermal, carbohydrate and protein chemists.

Aspects of the book which made for interesting or informative reading were:

(i) the interpretation of water structure and structure of hydrated ions from X-ray and neutron diffraction measurements,

(ii) the 'dual structure' (or two environment) model for water inferred from Raman measurements at different temperatures or pressures (and implying the existence of water molecules with different degrees of hydrogen bonding),

(iii) the distinctive hydration energies ascribed to axial and equatorial-OH groups in sugars, and

(iv) the excellent descriptive chapter on the role of water in the stabilization of biologically significant structures.

Concerning solubility of substrates in water the author carefully focusses attention on the effect of the solute on the solvent, an aspect which is overlooked when only solute solvation energies are considered, although is implied but probably not understood in the statement 'like dissolves like'.

The book is presented as a *review* and it draws heavily on the seven volumes that make up *"Water — a comprehensive treatise"*, by the same author. It attempts to "condense the present state of our knowledge of liquid water — its remarkable physical properties, how these properties give rise to a unique liquid 'structure', its influence on the interactions between dissolved solutes, its role in maintaining biologically active molecular structures, its involvement in chemical reactions". It is undoubtedly an up to date review but the reader is frustrated by a complete lack of references, save to the Treatise mentioned above. Perhaps 'The physical chemistry of water' would have been a more appropriate title. For those who are rusty on physical chemistry, some sections will be hard going.

H.K.J. Powell

John Dalton at Kerikeri

This is an account of material held by John Dalton at Kerikeri.

John Dalton (b1766), the founder of the atomic theory and John Dalton of Kerikeri are distant relatives for their great and great to the fifth grandfathers were brothers.

Dalton started life as a village schoolmaster and subsequently taught at New College, Manchester. Apart from his chemical investigations he studied meteorology, 'Meteorological observations and essays' and colour blindness, 'Extraordinary facts relating to the vision of colours'.

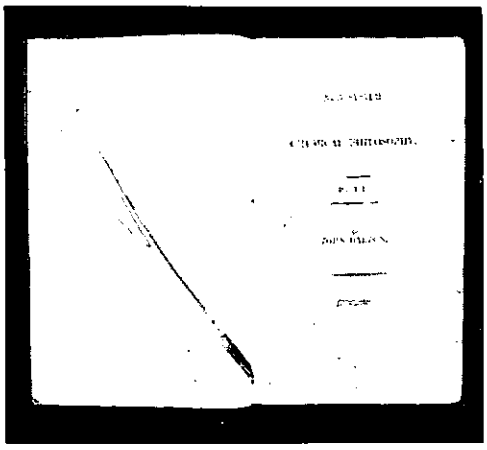
Of interest to chemists is his formulation of the atomic theory. This was first perceived by the Greeks but it was not until the time of Robert Boyle that a definition of a chemical element similar to that used today was formulated.

By examining the work of others on the combination of elements and using his own comparatively unsophisticated apparatus for experiment he established the atomic theory which postulates that elements are composed of tiny indestructible particles called atoms that are all alike and have the same atomic weight.

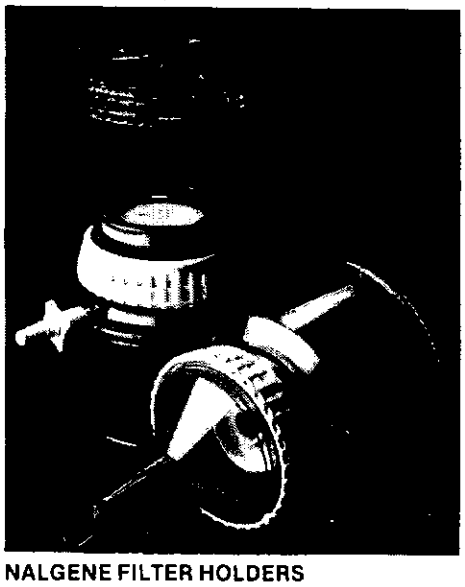
This work was included in his New System of Chemical Philosophy (part 1, 1808, part 2, 1811) the front pages of which are shown below.

His only fault was a failure to recognise hydrogen on which he based his weights was diatomic and this was later corrected by Avagadro to give us our modern table of weights which in turn has been refined by the discovery of isotopes.

He was a life long bachelor and died in 1844. John Dalton at Kerikeri has the pen he wrote with on the day of his death as well as an extensive genealogical table. In addition to the copies of the 'New System of Chemical Philosophy' shown in the photo he also has the non chemical writings mentioned above.



NEW PRODUCTS



NALGENE FILTER HOLDERS

New Nalgene Filter Holders will take either 47 or 50mm membranes and are designed for either vacuum or pressure filtration at up to 10 psig.

Made primarily of polysulfone (PSF), the Holders are clear allowing visual monitoring of the filtration process. They withstand autoclaving many times better than polycarbonate holders. also, the chemical resistance to acids, bases and detergents is much better than for polycarbonate.

They are lightweight and very break resistant, thus reducing replacement costs. In addition, the initial cost is less than that for polycarbonate, glass, or stainless steel holders.

Both holders include a graduated, 250-mL upper chamber with screw-on cover having two Kraton capped ports. The cover and port design permits asceptic addition of samples, making the units suitable for sterility testing of pharmaceuticals. All ports accept either ¼" I.D. tubing or male luer slip fittings, such as syringe filters or valves.

The Holders feature an independent locking ring to prevent any demage to the membrane when assembling the unit. This is an important advance in design over competitive plastic filter holders. The independent locking ring prevents torque from being imparted to the membrane during assembly.

The Holder with Receiver includes a graduated, 250-mL receiver having two side arms which allow decanting of filtrate. A cover is provided for convenient storage of filtrate in the receiver.

Each Holder will include two different membrane support plates. The analytical support plate, which maintains a flat membrane, facilities visual or microscopic inspection of particulates, cells or microbes. The sterilization plate provides maximum flow rate while filtering tissue culture media or reagent.

The Holder with Funnel can be used with any standard vacuum flask or manifold. The Funnel Conversion Assembly,. Cat. No. 305-4000, allows users easy conversion of a holder with receiver to the funnel configuration. The funnel is especially useful for vacuum filtration of larger sample volumes.

New Zealand agents Watson Victor Ltd., circle **9** on the reader reply card for further information.

NEW CALIBRATION CENTRE

Auckland Glass — Scientific Division has established a "Telarc" Registered Laboratory for calibration of mercury and spirit in glass thermometers, electronic digital thermometers and analog thermometers. Situated in the Hamilton Medical Laboratory Building. For further information circle **8** on the reader reply card.

AMICON LISTS AVAILABLE

Wiltons have both a price list and a stock list for products from the Amicon Corporation. The company manufactures products mainly for the biochemical and cell biology fields, such as preprative hollow fibre cell culture systems, ultrafiltration systems and sheet membrane systems. For further information circle **19** on the reader reply card.

NEW PREMISES FOR ALLTECH

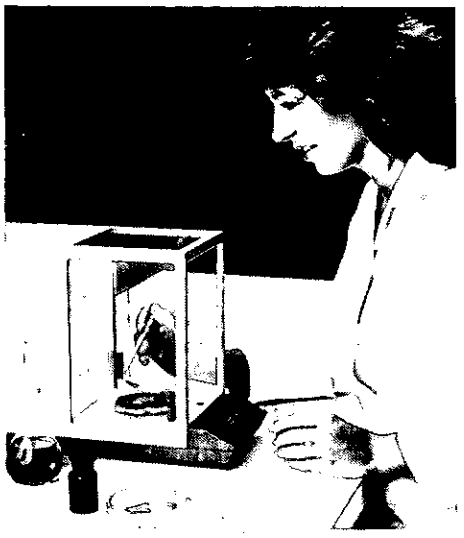
Alltech Associates NZ are moving to new office and warehouse premises on the 1st May 1984. Their new location will be at Unit 13, 46 Ellice Road, Glenfield, while their P.O. Box and telex numbers remain unchanged. Alltechs new telephone number will be (09) 444-3230.

NEW PRODUCTS

NEW ELECTRONIC ANALYTICAL BALANCE FROM METTLER

The AE100 balance is a new addition to Mettler's AE line (AE160/AE163) of electronic analytical balances. An alternative to conventional mechanical balances and an economical solution for those applications for which a balance with a capacity of 109g is sufficient.

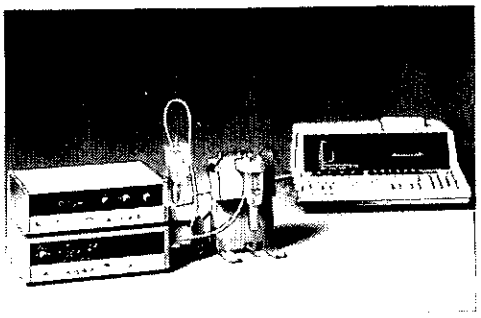
It has a weighing range of from 0 . . . 109g and a readability of 0.1mg. The single control bar assures maximum operating convenience and the weighing pan is positioned only millimeters above the countertop for fast, easy weighing in. The weighing chamber is roomy and is accessible from both sides and the top. An optional data output makes it possible to reliably transfer measuring values to a printer, calculator or computer.



The AE100 is extremely easy to operate. No knobs and switches to turn, the control bar operates

— switching on/off
— taring/zero-setting
— calibrating (built-in 100g calibration weight!)
— integration time setting and stability detector.

New Zealand agents, Watson Victor Ltd. For further information circle **10** on the reader reply card.



COMPUTER-TITRATION EQUIPMENT INTERFACE

Radiometer introduces the D470 TITRATION KIT for connecting titration equipment to a Hewlett-Packard HP-85 Personal Computer.

The kit includes all interface connections and fully documented software necessary to convert the HP-85 to a powerful titrator. The standard tape included with the kit is preprogrammed to perform automatic titrations in the simplest possible manner, as only 4 soft keys need to be manipulated in routine titrations. Results and curves are displayed on the screen of the HP-85 and can be printed by the built-in printer/plotter.

In addition to the D470 TITRATION KIT and the HP-85 Personal Computer, a complete titration set-up includes a research pH meter, an autoburette and a stirring device.

Radiometer agents in N.Z. are Watson Victor Ltd. For further information, circle **11** on the reader reply card.

ANION CHROMATOGRAPHY

Perkin-Elmer's anion analysis system is a low-cost liquid chromatograph designed to separate inorganic anions. The system consists of the company's Series 10 liquid chromatograph, 7125-S loop injector, LC-21 conductivity detector, and a 302-IC anion column.

The common anions — chloride, nitrate, bromide, and sulphate — may be routinely analysed in as little as 10 minutes with this system. Certain organic anions, such as acetate and formate, can also be determined.

Applications of the anion analysis system include the analysis of natural and potable waters, industrial effluents, plating solutions, and foods.

For further information circle**12**on the reader reply card.

REFRACTIVE INDEX DETECTOR WITH IMPROVED TEMPERATURE STABILITY AND SENSITIVITY

A new refractive index (RI) detector that is sensitive enough to detect nanogram quantities of compounds has been introduced by Hewlett-Packard Company.

The universal response of RI detection makes it useful for samples which do not show some unique property — for example, the absorption of UV radiation.

The major reason for the high usable sensitivity of the HP 1037A refractive index detector is the temperature stability of its flow-related components. These are housed in a rugged aluminium block containing an electronically controlled thermostat.

The new detector compares the refractive index of the pure mobile phase to be used (reference solvent) with that of the mobile phase plus the compound(s) to be analyzed (sample). When a change of analysis is required, the reference cell is quickly and easily flushed by switching the reference valve lever.

Elimination of temperature fluctuations maintains baseline stability. This is particularly important in GPC analysis, an area where RI detectors are widely used.

The HP 1037A offers RI detection with high sensitivity, improved baseline stability and ease of operation for a variety of HPLC and GPC applications in such industries and areas as food and beverage, plastics, polymer, rubber, environment and energy.

SIGNAL RANGE:
Refractive Index — 1-1.75
Measurement (full scale) — 32 x 10^{-5} Δ RIU to 1/64 x 10^{-5} Δ RIU

SIGNAL CHARACTERISTICS:
Noise (p-p) — 5 x 10^{-8} Δ RIU
Wander — 2 x 10^{-7} Δ RIU
Drift — 2.5 x 10^{-5} Δ RIU

DIMENSIONS:
Width — 350mm (13.8").
Height — 168mm (6.6")
Depth — 400mm (15.7")
Weight — 19kg (41.9 lbs)

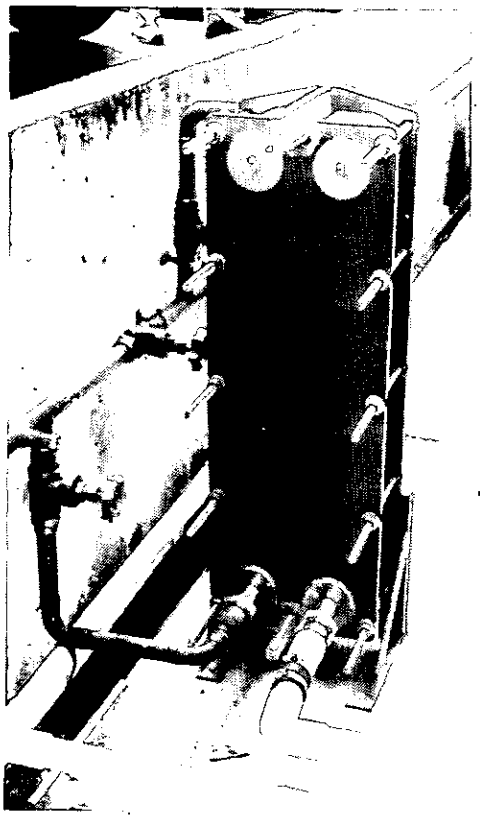
For further information, contact the New Zealand distributors for Hewlett Packard, Northrop Instruments and Systems Ltd, or circle **13** on the reader reply card.

NEW PRODUCTS

PLATE HEAT EXCHANGERS PLAY ROLE IN COST SAVINGS

Heat recovery is one of the major features of VIKO HOLDINGS LIMITED Photograhic Processing Laboratory recently opened in Newmarket. The new plant gives a large increase in processing capability utilising new equipment together with some of the existing machines from the old laboratory.

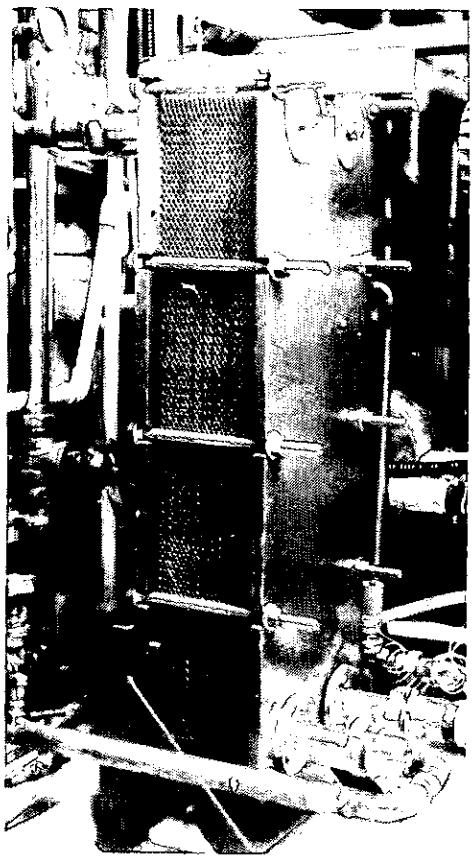
During the early design stages of the new laboratory it was realised that a large quantity of hot water would be required to run the processing machines and the cost of energy for producing this hot water would be expensive. In association with MacEWANS MACHINERY LIMITED Viko investigated methods of utilising the available energy which originated from two main sources; firstly the processors themselves send to waste large quantities of warm water from which heat could be recovered, secondly the equipment, the people and the lighting systems give off large quantities of heat which had to be removed by air conditioning units. The cooling water used during the air conditioning process is heated, and gives an ideal source of waste heat which could be tapped.



The preheating heat exchanger which is installed outside without protection.

The waste water from the processing machines is passed through the first of the two MacEwan Pasilac Type H17 plate heat exchangers to transfer the heat from the water to incoming clean mains water. This achieves an initial temperature increase of 10 degrees C (using summer ambient water at 17 degrees) to 27 degrees. The pre-heated water at 27 degrees is then further heated by the second of the two heat exchangers to 45 degrees C using the air conditioning cooling water which is at 50 degrees C. This in turn drops the temperature in the air conditioning water back to 35 degrees C which is being continually circulated in a closed loop throughout the air conditioning system. The final result achieves a constant supply of 10,000 lph of water at 45 degrees C to the processing machines without an outside heat source.

As John Finlay, the Operations Manager says, "the total energy available which is dissipated into the air by equipment, people and lighting is, in our case, roughly equivalent to the energy required to raise the cold water to operating temperature at the required flow rate." He is also quite quick to add that from their knowledge of the photographic industry there is no other photographic laboratory in the world which has utilised heat recovery to the same extent that Viko have and with the same amount of success.



Final heating unit installed in the plant room along with the air conditioning equipment.

Advantages of the Viko system are of course obvious in that they have eliminated almost exclusively the cost of energy for heating hot water to process film. The fuel costs are only at the beginning of any processing cycle when the machines are first turned on. The pay back on the complere installation including the capital cost of machines is very short as energy costs these days are so high. The amount of space the plate heat exchanger occupies for the flow rate that it is processing is extremely small. The low maintenance cost of the Pasilac Plate Heat Exchangers is an added bonus.

As a result of the success achieved, Viko are now planning the purchase of further plate heat exchangers to simulate their Auckland experience in their Sydney and Wellington Laboratories.

For further information and advice on how your company can benfit from heat recovery systems, contact the Plate Heat Exchanger Section of the Process Engineering Division, MacEwans Machinery Limited, by circling **15** on the reader reply card.

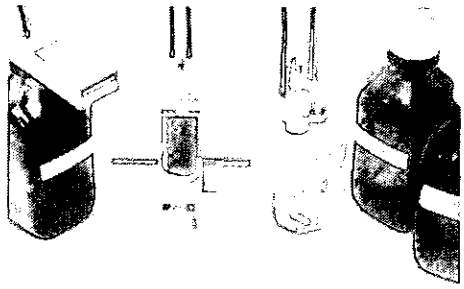
ALLTECH — APPLIED SCIENCE CATALOGUE COMING

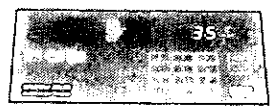
The new Alltech-Applied Science Catalogue number 60 will soon be available. The catalogue listing over 12,000 chomatrographic lines will be sent automatically to chemists who receive the Alltech New Zealand newsletter, additional free copies can be obtained by circling **16** on the reader reply card.

AUTOMATED KARL FISCHER TITRATIONS

Mettler, has introduced their DL18 Karl Fisher Titrator, a microprocessor controlled precision instrument that carries out water/moisture determinations at the press of a button. The DL18 allows the user to cover the entire range of water/moisture determination from trace analysis up to high water content.

Measuring results are automatically displayed in per cent or ppm water. The time required for titration is between one and two minutes per sample, thus making it possible to analyse large numbers of samples in routine operation.



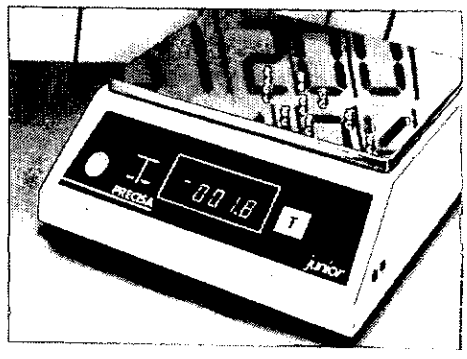


Extras such as drift compensation, freely selectable stirring time, calculation of blank, etc. are standard features in the Mettler DL18. In addition, a balance and printer can be connected directly to the built-in input/output port.

NZ agents are Watson Victor Ltd. For further information, circle **17** on the reader reply card.

TOP-PAN BALANCES FROM PRECISA

PRESCIA has announced two new top-pan balance models weighing range 5000g or 500g, readibility 1g or 0.1g. With the optional rechargeable NiCD battery, operating time approx 6 hours, both models can be operated off mains. A digital data output RS232/V24 can be installed as a further option. Two footscrews and the level window, a stability detector, an overload protection and a large weighing pan 195 x 140mm, a bright and clear fluorescent display are features, which are normally being offered only by much more expensive balances.



NZ agents Kempthorne Medical Supplies Ltd, for further information circle **18** on the reader reply card.

KONTRON MEDICAL

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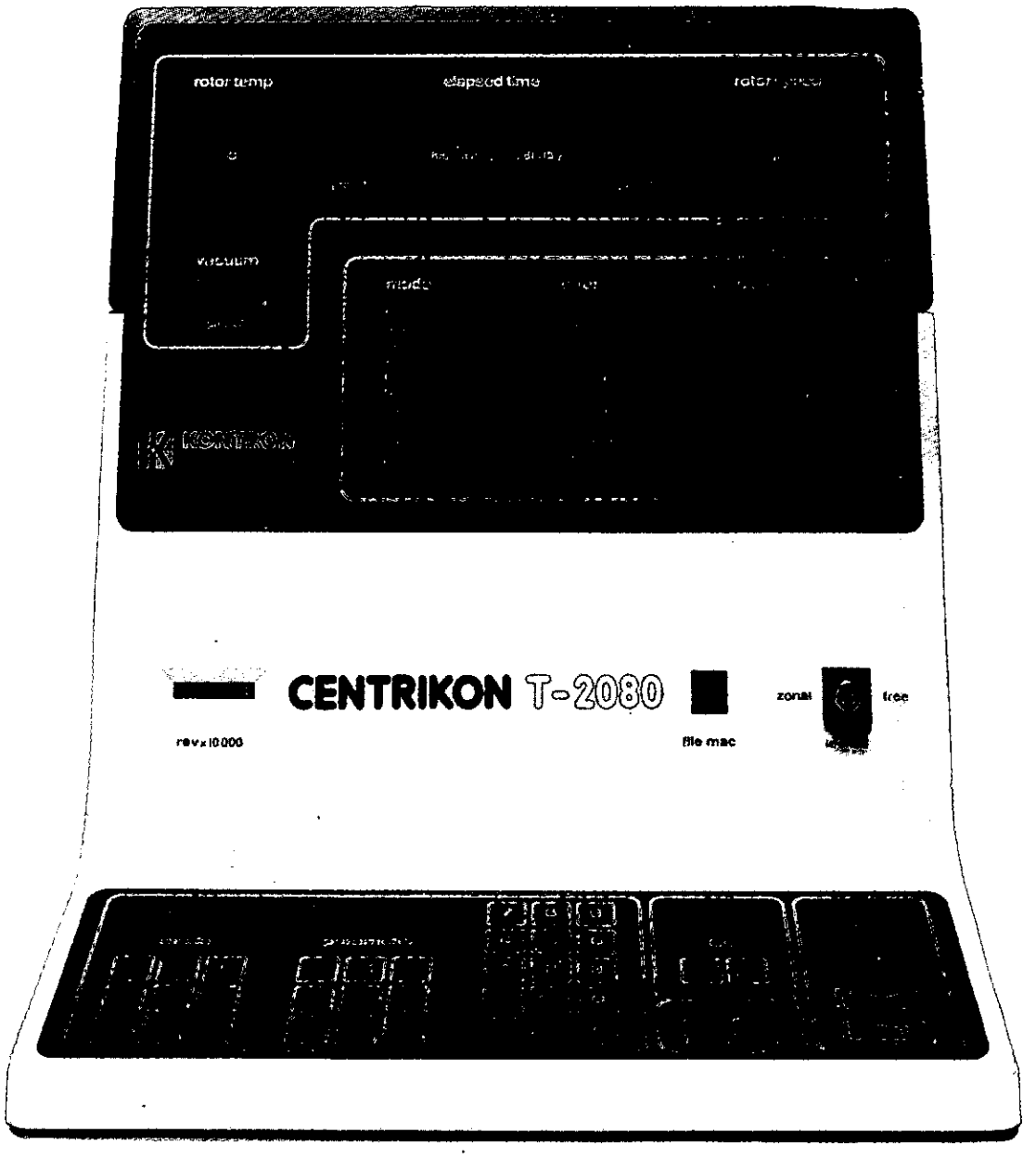

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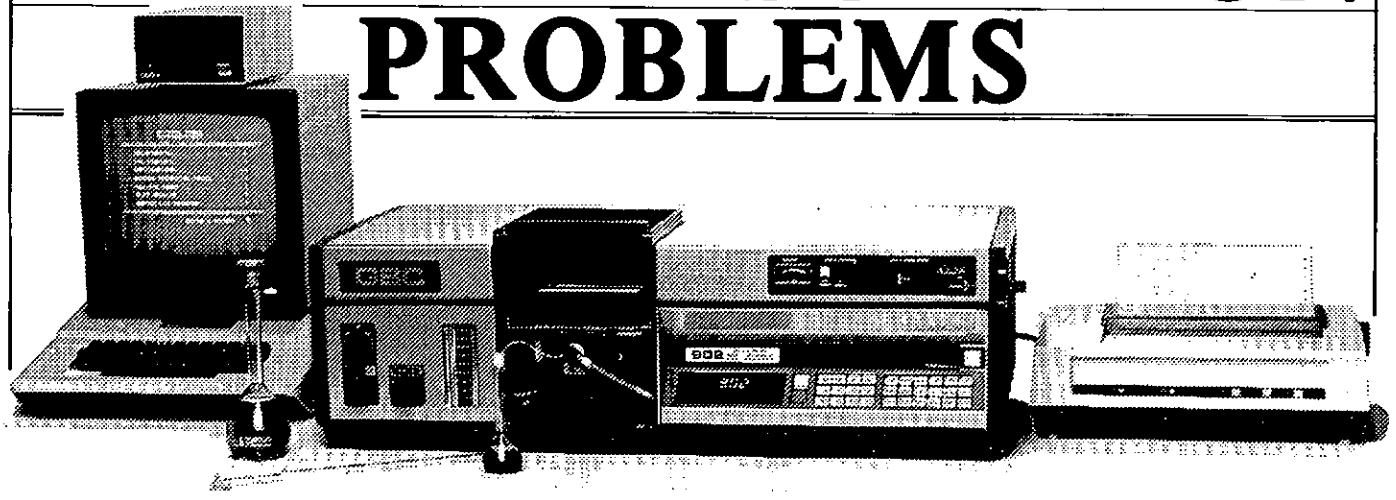
For further information circle 20 on Reader Reply Card

GBC 902 DOUBLE BEAM SOLVES YOUR ATOMIC ABSORPTION PROBLEMS



WHAT MORE COULD YOU WANT?

Micro computer electronics
Easy operation is the keynote of the 902.
An alphanumeric display guides you through previously complex tasks with simple cues.
The ergonomically designed keyboard uses real switches with 'feel' to ensure positive operation.
Calibration in concentration units on up to 10 stds is easy.

Optics
The optical system features toroidal mirrors to maintain precise beam geometry, ensuring optimum sensitivity and stability.
Quartz overcoatings protect the mirrors from corrosive environments and allow easy cleaning.
A large ½ metre monochromator with adjustable bandpass and slit height puts research lab versatility in a routine laboratory instrument.

Unique signal processing
The 902's unique signal processing utilizes twice as much of the available signal time as conventional instruments, lowering photon noise by 40%.
The 400Hz deuterium arc background corrector easily removes transient non-atomic absorbances.

Expanded time modes
In peak modes the micro computer takes a snapshot of the peak to be replayed at one tenth real time.
The 902 can resolve graphite furnace peaks of lead in 1% sodium chloride without background correction.

Performance
Check these figures against your old AA system.

Copper 5ug/ml at 324.7nm 0.5nm SBW 3.0 mA - guaranteed 0.7 absorption.

Sensitivity ug/ml*			
Element	**902**	**Element**	**902**
Al	0.5	Mo	0.11
As	0.64	Na	0.004
Ba	0.18	Ni	0.04
Cd	0.009	Pb	0.06
Cr	0.06	Si	1.5
Cu	0.025	Sn	0.72
Fe	0.05	Ti	1.1
Hg	1.6	V	0.5
K	0.008	W	5.8
Mn	0.018	Zn	0.006

*Concentration of an element which will produce a 1% transmittance or 0.0044 ABS.

Accessories
The 902 is supported by a fast growing range of accessories including:

HG900	vapour generator
GF900	graphite furnace atomizer
Apple II™	computer with AA software package

Hollow cathode lamps - Photron Pty. Ltd.

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