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NZIC

Chemistry

IN NEW ZEALAND

ISSN 0110-5566

Focus on Plastics, Resins, Coatings, Paints, Inks

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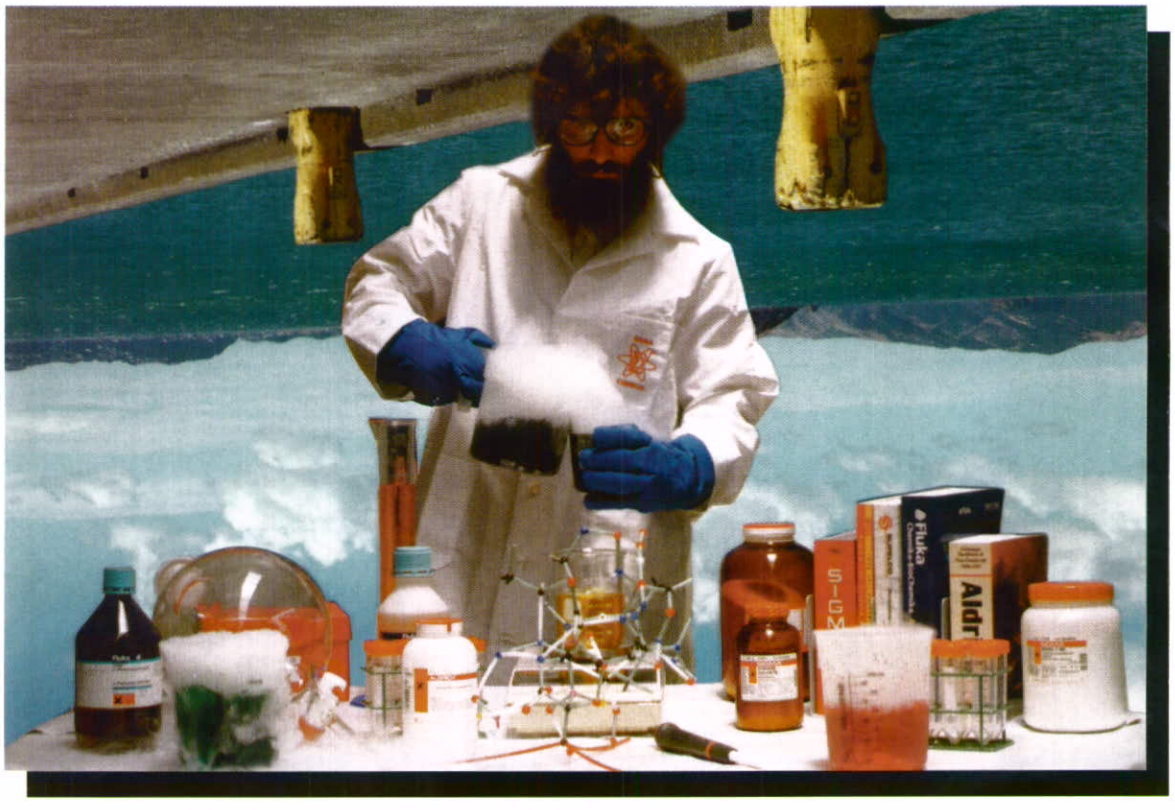

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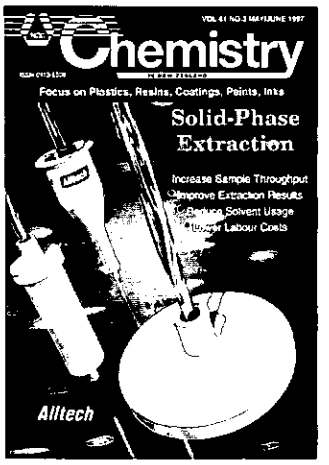
UP FRONT ...

Solid-Phase Extraction (SPE) is a sample preparation technique that cleans up and/or concentrates samples before analysis. Compared to liquid-liquid extraction, SPE is faster, uses less solvent, eliminates emulsions, and saves money. SPE provides clean extracts and high recoveries.



For further information see the cover story article on page 2

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COMING UP ...

July 1997 - Nutrition, Pharmaceuticals, Cosmetics

September 1997 - The Dairy Industry

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5th of the month of publication

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COVER STORY

ALLTECH SOLID PHASE EXTRACTION

Solid-Phase Extraction (SPE) is a sample preparation technique that cleans up and/or concentrates samples before analysis. Compared to liquid-liquid extraction, SPE is faster, uses less solvent, eliminates emulsions, and saves money. SPE provides clean extracts and high recoveries.

Generally, SPE products are used in one of two ways. The simplest method involves passing the sample through an SPE packing bed that retains interfering sample components while the analytes of interest pass through unretained. The second, more common, method passes the sample through an SPE packing bed that retains the analytes of interest and, possibly, interfering sample components. Interfering components are washed off the packing bed before the analytes are eluted. Elution is done with a small volume of solvent which concentrates the sample, increasing detection limits and making the analysis easier.

The most common SPE packings use irregular shaped, 50 µm particle size, 60 Å pore size silica as the base material. Alltech manufactures a variety of reverse-phases and normal-phases on this silica. Larger pore size and particle size silicas are used to manufacture several variations of the standard C18. In addition, unbonded silica, Florisil™, aluminas, and graphitised carbon are available packing materials. Alltech use styrene-divinylbenzene resins in the ion exchange SPE products. These resins have more exchange capacity and better pH stability than silica-based ion exchangers.

SPE packings are available in a variety of housing formats to meet most extraction requirements. **Extract-Clean™** tubes are standard syringe barrel tubes and come with polyethylene frits. **Extract-Clean RC** tubes are polypropylene tubes with polyethylene frits and feature a built-in reservoir for larger sample volumes. **Ultra-Clean™** tubes are syringe barrel tubes that are more inert than Extract-Clean tubes. They come with Teflon™ frits and are designed for trace level analyses. **Extract-Clean ESP** is Alltech's most inert tube product. These tubes are made from pure Teflon and use Teflon frits. They feature the same large reservoir as Extract-Clean RC tubes. **Maxi-Clean™** cartridges fit on the end of a syringe. They are made from polypropylene and use polyethylene frits. **Novo-Clean™** membranes are Alltech's newest products. They include C18, silica, or ion exchangers impregnated in a PTFE membrane.

For more information on Alltech's full range of SPE products:

Contact: Alltech Help Desk
Freephone: 0800 2558324, Fax: (09) 4442399
Email: alltech@alltech.co.nz

circle number 1 on the reader reply card

REVERSED-PHASE (To isolate relatively non-polar compounds from a polar matrix)

A *Conditioning*
Rinse tube with 3-5 mL of methanol followed by 3-5 mL of deionised water/buffer (do not allow the tube to dry before next step).

B *Sample Application*
Apply sample to the top of the tube and draw through the packing bed (drop-wise flows of 1-5 mL/min. are optimal).

C *Tube Wash*
Wash with 5 mL of a polar solvent if analyte is to be retained (deionised water, buffer or aqueous/organic mixtures are most often used).

D *Elution*
Elute analyte into a collection tube with 1-5 mL of a non-polar solvent.

NORMAL-PHASE (To isolate polar compounds from a non-polar matrix)

A *Conditioning*
Rinse tube with 3-5 mL of non-polar solvent.

B *Sample Application*
Apply sample to the top of the tube and draw through the packing bed (use drop-wise flows).

C *Tube Wash*
Wash with 5 mL of a non-polar solvent if analyte is to be retained.

D *Elution*
Elute analyte into a collection tube with 1-5 mL of a polar solvent.

ION-EXCHANGE (To isolate charged or potentially charged compounds)

A *Conditioning*
Rinse tube with 3-5 mL of deionised water or low ionic strength buffer (0.01 M).

B *Sample Application*
Apply sample to the top of the tube and draw through the packing bed (ion exchange kinetics are slower than reverse or normal phase, keep flow slow).

C *Tube Wash*
Wash with 5 mL of deionised water or low ionic strength buffer.

D *Elution*
Elute analyte into a collection tube with 1-5 mL of buffer at high ionic strength (0.5-1 M) or modified pH such that analyte is uncharged).

LOCAL NEWS

ALLTECH APPOINTED VYDAC DISTRIBUTOR FOR NEW ZEALAND

Alltech is pleased to announce that they have been appointed the exclusive distributor of Vydac Separations Group HPLC columns in New Zealand. Vydac-silica based ion exchange columns are noted for their unique selectivity differences from polymer-based inorganic ion columns. Vydac reverse-phase columns for protein and peptide and pharmaceuticals analysis have long been recognised as offering unique selectivity and long life in the often harsh mobile phase buffers used for these separations. For more information and a copy of the latest Vydac Separations Group catalogue:

Contact: Alltech Help Desk
Freephone: 0800 255832 Fax: (09) 4442399
Email: alltech@alltech.co.nz

HANNA CHANGES POSTAL ADDRESS

Hanna Instruments advise a change of postal address. As of 5 May, 1997 the postal address will be:

P O Box 1005
Braeside, VIC 3195
Australia

Telephone and fax numbers remain unchanged:
Tel: (+61-3)-97690666 Fax: (+61-3)-97690699

SIGMA-ALDRICH UPDATE

Just five months ago, Sigma-Aldrich Pty Ltd (Australia) began offering their new direct phone and fax ordering service to New Zealand customers. This service enables New Zealanders to immediately contact Sigma-Aldrich via toll-free phone and fax numbers and place their orders or make toll-free enquiries.

In addition, a concentrated effort was made to improve delivery times. The results of these efforts are that when orders are placed before 4.00 pm (Australian time), and the products are in stock, the order will leave the Sydney warehouse that evening. Delivery times to Auckland for non-hazardous, stock items are usually two days. However, the drive to reduce this time is continuing.

To provide New Zealanders with all the information that they need to take advantage of this service, Sigma-Aldrich has produced a "New Customer Pack". Please contact Sigma-Aldrich for a copy. For those customers who have used the service and would like to provide comment or feedback as to where you believe improvements could be made, please contact Sigma-Aldrich. Our contact details are as follows:

Sigma-Aldrich Pty Ltd
P O Box 12423, Penrose, Auckland
Freephone: 0800 936666, Freefax: 0800 937777
Email: sigmaa@ibm.net

STAFF CHANGES AT COAL RESEARCH LTD

Jim Aylor is CRL's new marketing manager. He holds a Bachelor of Science in Chemical Engineering from the Colorado School of Mines, USA and has over 16 years of successful technical sales and marketing experience. His career includes positions dealing with oil and gas production and servicing as well as specialty chemicals, all with firms in the USA.

Malcolm Watts is now managing the CRL Greymouth Laboratory. Malcolm has had experience with CRL in both the coal sampling and coal analysis areas. He has most recently been managing the CRL Home Heating Test Centre. Mark Taylor, who has managed the Greymouth laboratory since its start-up in November 1996, has returned to work at the Gracefield site.

1997 ROYAL SOCIETY OF CHEMISTRY AUSTRALASIAN LECTURER - NEW ZEALAND TOUR

The 1997 Royal Society of Chemistry Australasian Lecturer, Professor Bob Cattrall will lecture in New Zealand during September. Dates are listed below, along with a brief abstract of his lecture.

Studies of Chemical Sensors and Their Application in Analytical Chemistry

Some recent results relating to the effect of the hydroxide ion on the response of the fluoride ion-selective electrode will be discussed as well as the "ageing" phenomenon associated with extensive use of the fluoride ISE. An automated flow system will be described for the fast determination of fluoride at low concentrations.

The lecture will also discuss recent work on the development of optical chemical sensors, "optodes", for metal ion and redox active analyte sensing and their application in a sequential injection flow system.

Auckland: Tuesday 9 September 1997
Dunedin: Friday 12 September 1997
Christchurch: Monday 15 September 1997

Bob Cattrall graduated DSc, PhD from the University of Adelaide, South Australia and was awarded the RACI Analytical Chemistry Division Medal in 1995. He was appointed to a Personal Chair in Analytical Chemistry at La Trobe University in Melbourne in 1996. His research interests include chemical sensors, flow methods of analysis and solvent extraction chemistry.

CLIMATE IMPACTS ANALYSES STILL UNCERTAIN

Dr Tim Carter of the Finnish Agricultural Research Centre discussed ways of analysing the vulnerability and adaptation of different countries to climate impacts at his recent presentation to the Royal Society of New Zealand. He also looked at the

IPCC's attempts to standardise the approaches taken by different countries to assess climate change impacts.

Impacts analysis estimates the direct costs of adapting to climate change, and compares them with the costs of reducing greenhouse gas emissions. Some developing countries (particularly the island states) would be the most affected if climate impacts prove to be severe.

Dr Carter cautioned that reliable impacts research is still in the preliminary stage and there are major uncertainties in the analyses. He considered that there was insufficient attention being paid to the policy questions arising from the Framework Convention on Climate Change and thought the question "Is greenhouse policy running ahead of the science?" should continue to be asked.

IEA GREENHOUSE GAS R&D PROGRAMME ON-LINE

The IEA Greenhouse Gas R&D Programme is now on-line (at http://www.ieagreen.org.uk). It is situated on a fast server, and with compressed graphics, the home page is quick and easy to access. There are four main links from the home page. The "What is?" feature leads to a description of the Programme, the full text of the annual report and a who's who of the executive committee members.

The "Science" section covers the basics of global warming and the greenhouse effect. It includes text on trends in greenhouse gas and aerosol concentrations and also, the stabilisation of greenhouse gas concentrations. In addition, a smaller section covers the chemistry and properties of carbon dioxide. Detailed descriptions are on-line and links to other groups' home pages for further reading are also available.

The "Technical Solutions" section contains the full text and illustrations from the recent "Phase 1 Summary Report". This covers the first three years' work of the programme, being mainly dedicated to carbon dioxide removal and disposal and the full fuel cycle studies. There are also sections on more specific problems associated with carbon dioxide removal and disposal, and a discussion on combined removal of SOx, NOx and carbon dioxide. In addition, there are pages discussing fuel switching and energy efficiency.

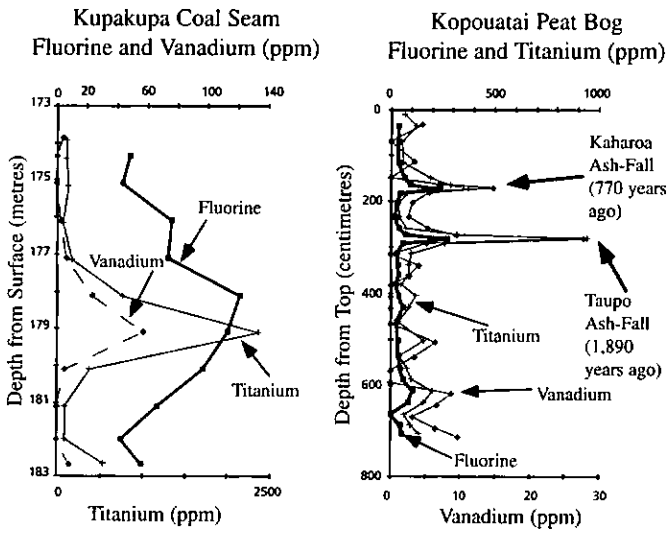
The final menu choice takes you to the full text of the last five newsletters, recent conference papers presented by the programme team, and a complete listing of all of the programme's publications, together with ordering information. Also included is a comprehensive listing of all major conferences and workshops in the field and a jump site to relevant organisations interested in global warming and greenhouse gas mitigation technologies.

TRACE ELEMENTS IN NEW ZEALAND COAL: ORIGINS OF UNDERSTANDING

The Foundation for Research, Science and Technology (FoRST) and the Coal Producers Federation of New Zealand (CPFNZ) have jointly funded a research project to study the content and distribution of trace elements in coal. The focus of the initial two-year programme is on Waikato coals, specifically on the concentration and occurrence of trace elements in the Kupakupa seam. The research project will include an investigation of trace element distribution in a modern Waikato peat bog, to help understand trace element emplacement in coal seams.

Samples were collected from the Kupakupa coal seam in the Rotowaro, Huntly and Maramarua coalfields. Similar types of samples were taken from the Kopouatai peat bog near Paeroa. A total of 150 samples of coal and peat were analysed at the CRL laboratories, using a new technique called Proton Induced X-ray Emission (PIXE) spectra.

Preliminary analysis of the data has already shown some interesting trends. For example, a substantial peak in titanium, fluorine and vanadium shows up in a small interval of low-ash (<5%) coal within the centre of the bed (see graphs below). This same interval shows up in the other two cores analysed within the same area. Similar variations in trace element occurrence were found within the Kopouatai peat bog. There, the increases in these elements coincide with the presence of two ancient volcanic ash-fall layers.



This finding has shown not only how certain elements in the Kupakupa coal are distributed, but also why they are present. This knowledge is fundamentally important in the prediction of trace elements in a coal seam. This study is not finished yet and the trends and distributions of the other measured traced elements will need to be interpreted. In the final phase of the project, information from boiler simulation tests will enable a model to be constructed of what happens to trace elements when coal is burned.

The crux of this research is that it is following the trail of trace elements, from initial emplacement in the peat-forming environment, to its distribution within the coal bed and then its final fate upon combustion. From this unique approach it is hoped that New Zealand's coal resources, and their potential, will be more fully understood.

This project will bring together the skills and resources of several organisations. The research team comprises geologists Jane Shearer (Victoria University of Wellington), and Tim Moore (CRL); environmental specialist Joanna Deely (Environment BOP); and energy researchers Tony Clemens and Len Damiano (CRL). The project is benefiting from the pioneering work of Ian Vickeridge of the Institute of Geological and Nuclear Sciences in the application of the PIXE analytical technique.

* * * * *

Patent Proze

by Jane Calvert and Greg Lynch

In the last issue of *Patent Proze* we provided an outline of the procedure for obtaining a patent in New Zealand. One of the requirements for ensuring a patent is valid is that the subject matter of the patent must be novel.

NOVELTY

By its very nature, an invention is something created or devised which is new. It is a statutory requirement for the grant of a patent that the "invention" for which patent protection is sought, is novel.

When considering whether or not an invention is novel, it is necessary to know the date at which the novelty requirement is determined. For example, if a patent application is filed at the Patent Office on a particular date and one week later, a patent application covering the same invention is filed by another person, who has the rights to the invention? As one might expect, the rights belong to the applicant with the earlier filing date. The filing date is known as the priority date. Any publication or use of the invention before the priority date may jeopardise the grant of a valid patent. Conversely, publication or use of the invention subsequent to the priority date will not.

Naturally, it is desirable to protect an invention by filing a patent application as early as possible, thus avoiding the advent of a novelty-destroying publication.

In most cases, an inventor has good knowledge of the area of technology from which the invention has developed. Nevertheless, we recommend that a search of the New Zealand Patent Office records is undertaken to assess novelty prior to filing a patent application. Searches through foreign patent specifications should be conducted whenever an applicant is also interested in seeking patent protection in other countries. Even though these searches are comprehensive there is still no guarantee that no other relevant document exists.

During examination of a patent application at the Patent Office, the examiner is required by law to undertake a search of various records and databases for any publication which may describe the invention for which protection is sought. It is, however, possible for a relevant publication to escape the search. Such a publication may be used to challenge a patent at a later date. Novelty requirements can vary significantly between different countries. There are three basic types of novelty known as local, relative, and absolute novelty.

New Zealand adheres to the rules of local novelty. This means that any public use or publication of the invention before the priority date will not destroy novelty unless the use occurs in New Zealand or the publication is available in New Zealand.

Most countries, have relative novelty requirements (e.g. Australia) or absolute novelty requirements (e.g. Europe). Relative novelty means that a publication available in any country will destroy novelty but use of the invention outside the country in which protection is sought does not. Absolute novelty is where publication or use of an invention anywhere in the world will destroy the novelty of an invention. New Zealand is one of the few countries having local novelty requirements. However, it is likely that this will change following the introduction of new patent law in New Zealand. The timing of the law reform is uncertain but may occur within the next few years.

There are some exceptions to the novelty rules. For example, the secret use of an invention for the purpose of experimental trials prior to filing a patent application will not jeopardise patent protection. Public disclosure of an invention at certain industrial shows or exhibitions, such as the National Field Days at Mystery Creek, will not affect patent protection provided a patent application is filed within six months of the disclosure. We recommend that inventors do not rely on these exceptions.

If you are undertaking research which you believe may be commercially important and for which patent protection is desired, it is imperative to file a patent application before submitting a manuscript for publication in a journal or publicly disclosing the invention in a forum such as a conference.

If you wish to get any further information, please direct queries to: *Patent Proze*, Baldwin Son and Carey, PO Box 852 Wellington, Email: email@bscwlg.baldwins.co.nz

Jane Calvert

Jane Calvert and Greg Lynch are both employed in the patent department of Baldwin, Son & Carey, Patent and Trademark Attorneys, and Solicitors, where they specialise in chemistry patents. Jane joined Baldwins after completing a PhD in chemistry at the University of Canterbury in 1994. Greg also joined Baldwins in 1994 after three years research at Industrial Research Ltd in Wellington. Following completion of a PhD in chemistry at the University of Otago in 1989, he spent a two year period as a post doctoral researcher at Oxford University in the United Kingdom.

Greg Lynch

International News

SURVIVAL STRATEGIES

COMPANY EXECUTIVES TALK TO DR SALLY WAUGH ABOUT THE LAB BUSINESS IN 1996 AND THEIR PLANS FOR 1997

Strategic Alliances, partnering, and continued merger and acquistion activity are expected to dominate the analytical instrument industry throughout this year, forcing further concentration on core business areas and an increased focus on value-added products and services, according to senior industry executives surveyed recently by Technology Editor Dr Sally Waugh for Analytical Instrument Industry Report.

Dr Waugh, a physicist specialising in scientific instruments, surveyed company CEOs in Europe, the Americas and Asia. Her analysis reveals that many manufacturers and distributors worldwide have been forced to trim sales forces and accept lower margins. In contrast, "by focusing on improving business processes and productivity, responsive companies have boosted profitability considerably". Consolidation at major customers, is expected to be the dominant feature of 1997. As a result, many instrument companies and distributors, "are losing the ability to compete independently and face the prospect of selling out to bigger companies" says Waugh.

One result of this trend is that many distributors having long-established relationships with analytical instrument and laboratory equipment manufacturers are finding that agreements are being terminated as new owners integrate global distribution networks and exclude former representatives. Waugh says, "for some distributors this means job losses, and sometimes closure; for others, survival may mean using the years of investment in the local market and experienced personnel to set up in competition to the former principal". Key survival strategies, concludes Waugh, include: "focus on core markets where you have expertise and a real desire to succeed; concentrate efforts on improving competitiveness; embrace cost reduction as a key part of business operations; add value by differentiating your products and services; build a good reputation for quality service and support; and bring new products to market as quickly as possible, through in-house development, partnering or acquisition".

For a free copy of Dr Waugh's report, available in *Analytical Instrument Industry Report*, volume **13**, issue 24,

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P O Box 78, East Grinstead, England RH19 2YW
Tel: (+44-1342)-835935 Fax: (+44-1342)-833488
Email: analytical@compuserve.com

PITTCON EDITORS' AWARDS, 1997

Fifteen editors attending Pittcon '97, held from 16th to 20th March at the Georgia World Congress Centre in Atlanta, voted late afternoon on Wednesday, 19 March on what they considered to be the best new product introductions at the show.
After voting on the 27 nominations submitted during the week, the coveted *Pittcon Editors' Gold Award,* presented in recognition of the Best New Products at Pittcon '97, went to UK-based Micromass for its Platform ICP, an ICP-MS instrument which uses a proprietary declustering technique to eliminate interferences and give a 10-fold increase in sensitivity with almost baseline resolution. Hewlett-Packard won the Silver Award with its powerful GeneArray optical reader, while the Bronze Award went to PerSeptive Biosystems for its Mariner LC-MS.

Highly commended, in the order of votes received, were: PT-1000 (Yokogawa); LC-MSD (Hewlett-Packard); UV6000 LP (ThermoQuest); Jaguar TOFMS (Sensar); Turbo-Flow Chromatography (Cohesive); S-2000 (Ocean Optics); Ethos (Milestone); Biomek (Beckman); and SpectrAA-220 FS (Varian).

As with many of the products nominated, improved industrial design and electronics, leading to easier manufacture, lower part count and higher reliability; better software, especially CD-ROM-based training and maintenance programs; and miniaturisation were widely in evidence at the show. Keywords for instruments at Pittcon '97 were: tougher, faster, smaller, smarter and more productive. Business strategies now appear to focus increasingly on customer needs. Sample preparation devices were in abundance, from simple liquid handling devices to automated processing systems for multiple samples on microplates, especially in high throughput screening and combinatorial chemistry applications. Mass spectrometry, especially LC-MS and TOFMS, was undoubtedly the technique attracting most visitor attention.

LETTER TO THE EDITOR

Dear Sir,

CHEMISTRY IN NEW ZEALAND

I continue to be impressed with the quality of the Journal. The technical articles are great, even if sometimes a bit beyond my limited chemical knowledge (which of course is good for me). The other features are always interesting and informative.

However there is a tiny improvement you may be able to make:
The type used for "Letters to the Editor" makes them stand out, but I find that the very thin letters are sometimes difficult to read under some lighting conditions. Of course my eyes are not as good as they were, but other people have commented on this too.

Could you possibly use a bold version?

With regards,

Lester Stonyer

Dear Lester,

Thank you for your comments, hopefully the above bold courier font is an improvement. - Ed.

Plastics In Non-Traditional Uses

D A Hills, Materials & Quality Consultancy Limited, P O Box 20-311, Christchurch

Many people think of plastics as being relatively recent introductions to the range of materials in common use. In fact, plastics are far from being modern materials. The first man-made plastic (cellulose nitrate) was developed more than 130 years ago. One of its uses was as billiard balls, in place of the traditional ivory. Most of the developmental work on plastics and synthetic rubbers prior to World War I was in an effort to duplicate natural products.

It is true that new plastics, whether new polymers or variations on existing types, seem to appear at regular intervals. However, most of these are "improved" types, which will probably replace plastics already in use. It is equally true that "old" plastics are slowly finding their way into "new" uses.

In the past 40 years, plastics have found their way into many applications where their use would once not have been considered. If we take the plumbing/drainage field as just one example, the traditional materials in domestic use in the 1950s were galvanised iron and lead for plumbing, and earthenware pipes for drainage. Today, the predominant materials are copper and plastic. The word "plastic" here of course refers to a range of plastics, chosen from dozens of types and hundreds of grades. As an analogy, the word "steel" can refer to any one of probably thousands of alloys that are recognised. Again, the popular impression of "stainless steel" is as a single material, but it is, of course, available in many grades.

Other common materials in the drainage field were concrete and asbestos-cement compositions. Plastics are making inroads here, as well, although replacing a concrete tank, for example, with a plastic one is still foreign to the thinking of some people who regard concrete as "tried and true".

It is well-known that plastics performed poorly in some applications when they first replaced metals. A case in point was plastic spouting and downpipe; the first use in New Zealand of European-made products resulted in failures because the products did not contain sufficient stabilisers to cope with the higher ultraviolet light levels here, in comparison to their country of origin. Also, the greater thermal expansion of plastics, in comparison with metals, created design difficulties. Today, the use of plastic rainwater systems is well-established.

Perceptions of Plastics

Two factors (among many) which have hampered the introduction of plastics into applications traditionally the preserve of metals, timbers or ceramics, are (a) the perception of plastics as either "cheap and nasty" materials that will fall apart at short notice, or as materials that will never break down if they find their way into "the environment", and (b) the misguided way in which plastics are treated as being somehow similar to metals, timbers or ceramics.

The question of "short-lived" against "long-lived" is of course a very real contradiction; it depends upon the choice of a plastic type for the conditions to be encountered. Price is another major factor. You buy a pink plastic bucket which you then leave outdoors in the garden, and after a few years it has become so brittle due to exposure to ultraviolet light that it shatters when you squeeze it. The writer purchased just such a bucket in a post-Christmas sale for the princely sum of one dollar. If it is used indoors, it will last for many years. If it happens to get outdoors, a dollar for two or three years of use will still be fine. This is exactly how a cheap pink bucket can be expected to behave, although the perception of many people when such a product fails would be "rubbishy plastic", with the initial cost and intended use being forgotten. If the bucket happened to be buried in the ground (away from the effects of UV light) it would remain in sound condition for a long, long time. It all depends upon the inherent properties of the particular plastic type/grade, the way in which it was intended to be used, and the way in which it actually finishes up being used.

Some plastics are able to withstand "weathering conditions" (UV light, visible light, water, temperature extremes, etc.) and others can do so if additives (UV stabilisers, etc.) are added to the base plastic. Some plastics are now made, by way of their chemistry or the use of additives, to be biodegradable, so that they will break down if discarded or dumped.

Past Failures

There are many reasons why plastic products or components have failed in service. In the writer's recent book (1), it was noted that the failures of rubber or plastic products that had come to his attention over the preceding 34 years could be attributed, in the vast majority of cases, to "errors" under one or more of the following headings:

(a) materials selection, (b) product design, (c) manufacturing method, and (d) service environment.

In many cases, especially as regards (a), (b) and (d), failure had resulted because "plastic" had been thought of as one material and/or the chosen plastic had been treated as if it were a metal in terms of design and service conditions. With design, one common mistake is to make parts in the same way as if they had been machined from metal, such as making sharp threads. Because plastics have at least some degree of flexibility, stresses concentrate at nicks, cuts or the base of sharp grooves, and the material is usually thinner at these points. "Rounded" threads or junctions can prevent many of the splitting/breakage failures of plastic products. Plastics expand (and contract) more than metals when subjected to temperature changes, and many problems or failures result because an allowance is not made for this behaviour.

Stresses remaining in the plastic after moulding may result in distortion with temperature changes, or cracking when exposed to ultraviolet light or when solvent vapours are present. This "environmental stress cracking" can occur in plastics under strain and in contact with a liquid, where the strain is much less than

that required for failures in air, and the failure-promoting liquid is neither a solvent for, nor chemically-reactive to the plastic.

Environmental stress cracking can be a problem with metals as well as plastics, but plastics appear to be more prone to it due to a greater range of materials and conditions that may result in the effect. One example quoted by Brostow and Corneliussen (2) was polyethylene (PE) pipe used for natural gas distribution, and expected to last for more than 50 years. In one case, a radial crack was propagated by stress concentration at the boundary between a fitting and the "melt bead" when the fitting was fused to the pipe. Failure occurred ten years after installation. In a second case, failure occurred a year after the pipe was installed due to an axial crack being initiated by tensile stresses induced on the inside surface of the pipe as a result of impingement of a sharp rock on the outside.

Learning From Failures

If the references to failures sounds negative, they can be turned into something positive when considering the use of plastic to replace another material, such as metal or concrete. The consideration must begin with the design necessary to meet the service conditions. For example, plastic replacing metal in a component where strength is critical will probably need to have a more substantial cross-section, but will almost certainly weigh less than the metal part. On the other hand, when replacing concrete as some form of container, the plastic need generally be only a fraction of the thickness of (and therefore considerably lighter than) the concrete, as long as suitable support is provided.

Compared with say the 1970s, there are now better plastics available, there is more experience with their fabrication and use, there is a better understanding by manufacturers and end-users of plastic products, and there is a greater willingness amongst architects and engineers to consider the use of plastics in place of traditional materials. However, this willingness may be tempered as a result of experiences where plastics did not perform well, or by suitable information not being available.

Again referring to plastic pipes, improvements in service behaviour and life have been made over recent years. For example, Ebdon (3) reported on failures with PVC and PE (type not specified, but probably medium density PE) pipes in the Gas and Fuel Corporation of Victoria. In 1983, over 60% of failures were due to creep rupture ("brittle") failures in PE pipe, mainly as a result of point loading brought about by contact with stones or sharp objects (as in the case mentioned above). By 1990, the failure figure was down to 13%, no doubt due to the use of improved bedding techniques. The main cause of pipeline failures in 1990 was of mechanical origin (post hole borers or various types of digging equipment). It is now recognised that sand as a bedding material is a simple way to prevent point loading on buried plastic structures.

Installation methods, welding techniques for fabricated structures, and design criteria are much better understood today than they were even a decade ago. Out-of-service conditions can often cause damage or failures. For example, some PE pipe degradation was found to have commenced due to exposure to UV light during storage and installation. It has been found that the addition of 2 - 3% of a suitable type of carbon black is the most effective stabiliser for PE exposed in this way.

New Uses for "Old" Plastics

There is obviously an overlap between the four key criteria (material, design, manufacture, service). For example, the service conditions will influence the selection of a plastic, which in turn may have an influence on the design and manufacturing method that must be employed.

Let us consider the design and installation of a tank fabricated from a plastic such as high density polyethylene (HDPE) and intended as a holding vessel for sewage and associated liquids. Concrete would be the traditional material. HDPE will satisfy all the necessary requirements as regards contact with sewage and "grey water". It has good resistance to the wide range of chemicals likely to be encountered in such a situation. In the hands of a manufacturer experienced in the use of HDPE in the moulding or fabrication of containers, a satisfactory tank will result. The thickness and structural design of the tank will depend upon the type and level of support that it will receive once placed in service. If it is buried, it will need far less in-built support than a free-standing tank.

Installation will be important for the very reasons illustrated in the case history of the natural gas pipeline. As in that case, contact with sharp stones could induce stresses that would reduce the service life of the tank, and sand should be used as the contact medium between the tank and the ground (bottom and sides, where appropriate). The other aspect of stress cracking, namely residual stresses from the manufacturing process, would need to be taken into account. Controlled cooling or the addition of small amounts of other polymers would help to reduce those stresses.

Why Progress is Slow

One of the problems facing engineers and others considering the introduction of plastics into non-traditional areas is the diversity and often general nature of the information available.

Even replacing one plastic with another may not be as simple as it may at first appear. Let us assume that there is a desire to replace unplasticised polyvinyl chloride (uPVC) with HDPE in a structure where water containing some abrasive particles must flow through a system which includes bends. In this hypothetical case, the engineer associated with the project may identify frictional characteristics as being important in relationship to flow rates, along with abrasion resistance in relationship to the particles, and impact strength in relationship to possible mechanical damage.

Checking a range of reference works on plastics throws up some interesting results. Crawford (4) noted that the British Standards Institution had agreed on safe working stresses in plastic pipe materials at 20 °C as 5.0 MPa for HDPE and 10.0 - 12.3 MPa for uPVC.

This information would be useful to a designer, because the range for uPVC is modest, and is at least double the value for HDPE. But what of the properties identified above? When we come to search for impact resistance values, we strike several complications. Comparison of the impact behaviour of different plastics is difficult because there is a wide range of tests, both standard and arbitrary, which can be used. There is also a range

of test sample geometries. Not all plastics have the same notch sensitivity; notches in impact test-pieces may be smooth, sharp, or non-existent! It is therefore not uncommon to find plastics ranked in different ways depending on the test method.

When the writer consulted several reference works on plastics for impact resistance values, some interesting results emerged. Several works specified the test method and the test-piece thickness and notch type; others did not. This was probably not important for a direct comparison. Only one reference gave single values, namely 5.5 foot-pounds for PVC and 3.0 for HDPE. Another gave Izod impact strengths (notched samples) of 0.4 - 20 ft-lb/inch for uPVC and 0.5 - 2.0 for HDPE. A third reference had values of 0.4 - 22 for uPVC and 0.4 - 4.0 for HDPE. Two other references gave values of 0.5 - 10 and 12 - 20 for uPVC, 1.8 - 2.5 and 1 - 3 for HDPE. Without concerning ourselves with units and test methods, the only thing that could be said with certainty is that most PVC grades have higher impact strength than most HDPE grades, in samples of the same thickness. However, the broad ranges given in some cases disguised the answer to the question "which grades?"

On the basis of strength characteristics, it would be expected that uPVC pipes would be superior to HDPE pipes of similar dimensions. However, the lower density of HDPE would allow structures with thicker walls to be produced, providing components of similar weight and comparable strength.

On the subject of flow rates through HDPE and uPVC pipes, the writer was unable to locate information which would clearly show that one material had an advantage over the other. Surface roughness is one major factor in consideration of frictional characteristics. The other is the coefficient of friction of the material in question.

The mechanical, thermal and electrical properties of plastics are the characteristics most often quoted; coefficients of friction (CoF) are rarely reported. When they are, values may be quoted as dynamic CoF or static CoF. Dynamic CoF can be measured against a variety of metals or plastics, including the same plastic, and sometimes where water or oil may be present, but not actually against water. Most of the reported values are for either "engineering plastics" (a title which does not generally include PE and PVC) or bearing materials. PE grades are well known as bearing materials, PVC grades are not.

Crawford (4) was the only reference checked which listed CoF values for the two plastics in question, being 0.45 for uPVC and 0.3 - 0.7 for PE. Because of the range for the latter, this does not permit an absolute comparison to be made. All that can be said is that the frictional characteristics of the two plastics can be regarded as being similar. Clearly, some grades of PE will be superior to uPVC and others will not.

Related to flow is the question of wear by abrasive particles. Here, once again, the literature was not very helpful. One publication quoted weight loss values in sand slurry testing for a range of metals and plastics that did not include PVC. Another showed the superiority of HDPE and other PE types over "fibreglass" (GRP) or concrete when tested with the Taber Abraser. Out of curiosity, the writer carried out some tests with the Taber Abraser, using a piece of uPVC sheet (source unknown) to compare its abrasion test results with those of a dozen PE samples (type again unknown) that had been tested earlier. The uPVC sample had a wear index (weight loss per 1000 cycles) of 25.1 compared with an average wear index of 8.3 for the PE samples.

On the basis of these tests, the abrasion resistance of PE appears to be about three times as good as that of PVC. However, apart from the fact that the relevant grades of HDPE and PVC were not compared, there is the question about the type of abrasion. Does rubbing wear with the Taber Abraser correlate with abrasion by particles in a water flow? Probably not.

Most of the published information on wear of plastics relates to the use of plastic bearings, an application which does not include PVC. The type of abrasion test needs to be related to the type of abrasion to be expected in service. Anderson and Williamson (5) compared slurry abrasion, fretting, continuous rotation and reciprocation testing of seven plastics. Ultra-high molecular weight PE (UHMWPE) had ratings of 1, 2, 1, 1 (1 being the best) over the four tests. To illustrate the variable behaviour of plastics under different wear conditions, filled polyimide had ratings of 7, 4, 3, 2. The slurry abrasion rating could be the most relevant in terms of our hypothetical example, and the superiority of UHMWPE over other plastics (including polyurethane) suggests that it would have shown a similar superiority over uPVC had it been tested.

Thus, in our example, it can be said that a structure in HDPE, using an appropriate wall thickness should provide comparable strength and flow characteristics to a structure made from uPVC, but should also provide superior abrasion resistance to water-borne particles. The example highlights one of the reasons (lack of ready availability of appropriate, specific information) why the use of plastics in non-traditional applications has been slower to occur than would otherwise have been the case. The other main reason is the perceived failure rate of plastics in past uses.

References

(1) Hills, D A, "Plastics and Rubbers - How They May Fail", monograph published by Australasian Corrosion Association, (1992).

(2) Brostow, Witold and Corneliussen, Roger D, "Failure of Plastics", Hanser Publishers (1986).

(3) Ebdon, M P, *Corrosion Australasia*, **17**, No. 3, 10 (1992).

(4) Crawford, R J, "Plastics and Rubbers - Engineering Design and Applications", Mechanical Engineering Publications (1985).

(5) Anderson, J C and Williamson, P K, in "Polymer Wear and its Control", Lieng-Huang Lee (Ed.), American Chemical Society (1985).

Industry Applications

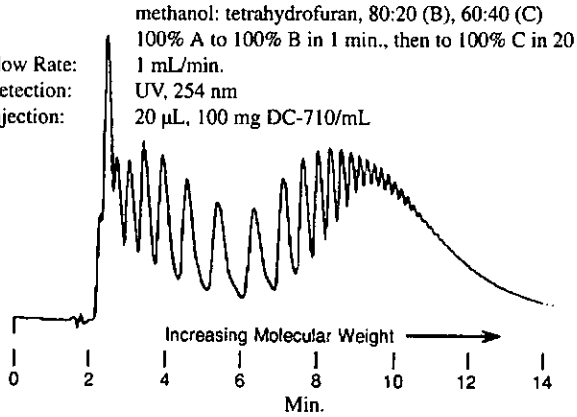
Separating Homologues and Polymers by HPLC

Many products contain an homologous series of components that must be accurately quantitated to ensure product uniformity. Molecular weight determines which method to use in separating homologs and polymers.

Homologues of many industrial polymers, with molecular weights of up to 10,000 daltons, can be separated by weight on reverse-phase or normal-phase HPLC columns. For example, Dow Corning's 710 fluid, a polymeric 50% phenyl silicone used as a lubricant or heat exchange fluid, contains a series of homologues of less than 10,000 daltons. The homologues are resolved accord-ing to increasing weight by using a 100 Å pore reversed phase column, SUPELCOSIL LC-18 (octadecylsilyl bonded phase), and a mild gradient. The chromatogram shown in Figure A is typical of reverse-phase separations of these homology.

***Figure A** - Phenyl Silicone Homologues (<10,000 daltons molecular weight) by Reverse-Phase HPLC*

Column:	SUPELCOSIL LC-18, 15 cm x 4.6 mm, 5 µm particles
Cat. No.:	5-8230
Mobile Phase:	methanol (A)
	methanol: tetrahydrofuran, 80:20 (B), 60:40 (C)
	100% A to 100% B in 1 min., then to 100% C in 20 min.
Flow Rate:	1 mL/min.
Detection:	UV, 254 nm
Injection:	20 µL, 100 mg DC-710/mL



Normal-phase HPLC can also be used to separate polymers with molecular weights of less than 10,000 daltons. This is shown for polyethoxylated octylphenol and nonylphenol surfactants in Figure B. The sample of Triton X-100, containing an average of 9-10 ethoxygroups, was resolved to baseline on a 25 cm SUPELCOSIL LC-Diol column. The surfactant containing 30 ethylene oxide units was analysed within 40 minutes on the same column.

Homologues with molecular weights greater than 10,000 daltons are usually separated on high performance size exclusion chromatography (SEC) columns. The exclusion limits of SEC columns depend on the size of the pores in the packing particles, with larger pores admitting larger molecules into these particles. By combining, in series, columns having different pores sizes, analysts can expand the range of molecular weights that can be separated at one time. In Figure C, polystyrene standards having molecular weights from less than 1000 to over 1 x 10^6 daltons

***Figure B** - Non-ionic Surfactants by Normal-Phase HPLC*

Column:	SUPELCOSIL LC-Diol, 25 cm x 4.6 mm, 5 µm particles
Cat. No.:	5-8201
Mobile Phase:	hexane: methylene chloride, 95:5 (A)
	hexane: methylene chloride: methanol, 50:40:10 (B)
	70% A to 50% A in 8 min., to 40% A in 7 min., to 20% A in 10 min., to 0% A in 10 min.
Flow Rate:	1 mL/min.
Temperature:	35 °C
Detection:	UV, 280 nm
Injection:	10 µL methylene chloride containing 20 µg non-ionic surfactant

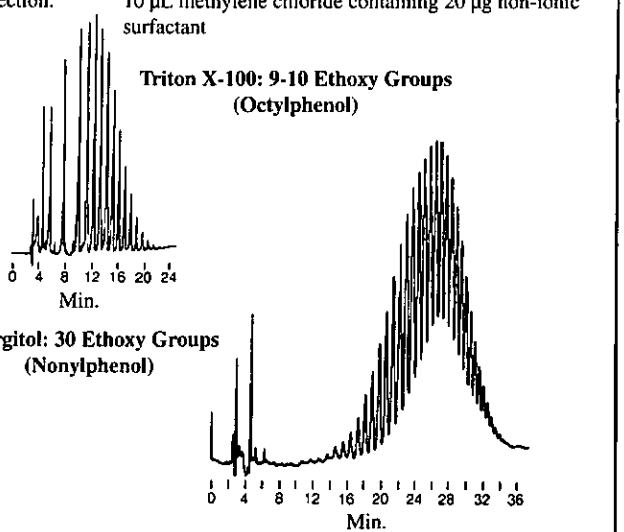
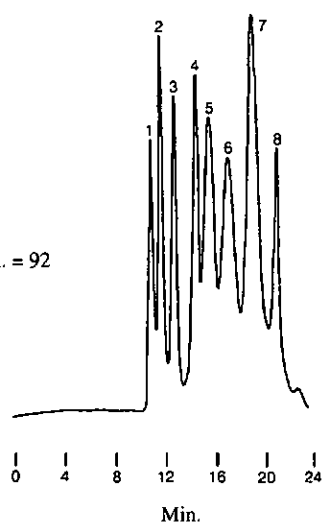


***Figure C** - Polystyrene Standards Using Size Exclusion Columns in Series*

Columns:	SUPELCOSIL LC-1, 25 cm x 6.2 mm, and SUPELCOSIL LC-301, 25 cm x 6.2 mm, in series
Cat. Nos.:	5-8961
	5-8966
Mobile Phase:	tetrahydrofuran
Flow Rate:	1 mL/min.
Temperature:	45 °C
Detection:	UV, 254 nm
Injection:	10 µL tetrahydrofuran, amounts given below

1. 1,800,000 (3.3 µg)
2. 300,000 (3.3 µg)
3. 100,000 (3.3 µg)
4. 35,000 (5.0 µg)
5. 17,500 (6.7 µg)
6. 9,000 (6.7 µg)
7. 2,000 (10.0 µg)
8. Toluene (1.7 µg) Mol. Wt. = 92



were sharply separated on a 100 Å pore and a 300 Å pore column (trimethylsilyl bonded phase). Similarly, these SUPELCOSIL 100 Å and 300 Å pore columns in series (always install the smaller pore size column in front of the larger pore size column) will satisfactorily separate other polymers with molecular weights between 10^3 and 10^6 daltons. Figure D depicts a typical calibration curve for this pair of columns.

SUPELCOSIL size exclusion chromatography columns contain 5 micron spherical silica particles with 100 Å or 300 Å diameter pores. For SUPELCOSIL LC-1 and LC-301 columns, the silica is bonded with a trimethylsilyl bonded phase. The dimensions of these HPSEC columns, 25 cm x 6.2 mm, provide a good compromise between large sample capacity and the most rapid analysis time. Fittings for 1 /16" OD tubing are included with each column.

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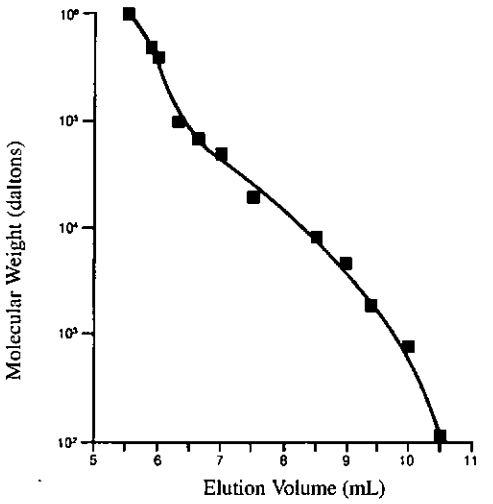
* * * * *

***Figure D** - 100 Å Pore and 300 Å Pore HPSEC Columns in Series Separate Homologs Having a Wide Molecular Weight Range*

Columns:	SUPELCOSIL LC-1, 25 cm x 6.2 mm, and SUPELCOSIL LC-301, 25 cm x 6.2 mm, in series
Cat. Nos.:	5-8961 5-8966
Mobile Phase:	tetrahydrofuran
Flow Rate:	1 mL/min.
Temperature:	45 °C
Detection:	UV, 254 nm
Injection:	20 µL each, 2 mg/mL polystyrene standards in tetrahydrofuran



OBITUARY - Allan L Odell (1922-1997)

Emeritus Professor Allan Odell, an Honorary Fellow of the New Zealand Institute of Chemistry, died recently after a heart attack. Allan's contributions to the academic discipline were in the field of inorganic and radiochemistry, and he was a long time and very active member of the NZIC, having been elected an Associate in 1943.

Allan entered Auckland University College as a 16-year-old student. He graduated BSc and MSc with honours and soon joined the academic staff, first in a temporary and then in a permanent position in 1946. Sporting prowess as a student was recognised by an NZU Blue in hockey and a half-blue in fencing but he was also an enthusiastic tramper and mountaineer, being one of the leaders elected a life member of the AUC tramping club, particularly for his encouragement of climbing - and especially safe climbing - within the club.

Allan's initial teaching in stage one chemistry gave way to an involvement with inorganic chemistry, particularly coordination chemistry, but a PhD in London in the mid-1950s saw his interest extend to the area of stable and radioactive isotope chemistry, using these as monitors to chart the course of chemical reactions.

Worldwide interest in the use of radioisotopes was mirrored at Auckland with the establishment of the Urey Radiochemical Laboratory under Allan and the new head of the department, Don Llewellyn. In all his teaching, Allan pioneered new courses, both in lectures and the laboratory.

Throughout his time on the staff Allan attracted a range of first class research students, many of whom have gone on to careers of distinction: Howard Clark in Canada, Sir Neil Waters, Neil Curtis and, on the Auckland staff, the late Ray Olliff and Charmian O'Connor are just some of the names.

Allan maintained close links with the NZIC. He was elected Fellow in 1963 and Honorary Fellow in 1985. He was Branch Chairman in the Jubilee Year, 1981, having held the post twice before, the first time in 1959. He was also the Institute's representative on the Technicians Certification Authority, a member of the Authority for the Advanced Vocational Awards and a University representative on the Council of the Auckland Technical Institute. Particularly within the University of Auckland Chemistry Department, he was enthusiastic in encouraging support for the Institute.

The qualities of Allan's research publications were recognised by the award of an Auckland DSc and this, and his other contributions, were acknowledged by appointment to a Personal Chair in 1969.

Allan's interest in mountaineering gave way to a love of the sea and sailing and he and his wife Aileen enjoyed cruising in the gulf or further afield. However, health concerns led to an early retirement in 1984, although he continued an active research presence in the department, being particularly involved with the mechanism of the methanol to gasoline process.

Generations of students enjoyed Allan as a research supervisor; his involvement extended beyond the research laboratory to other aspects of their lives and both the Odell's Northcote home and their various yachts were scenes of warm hospitality.

Allan Odell was a man of principle; he had the courage of his convictions and was prepared to speak up for a cause he espoused.

As an active member of New Zealand's chemical community for over 50 years, Allan had a major impact on many aspects of its life and will be fondly remembered by colleagues within and beyond the Institute.

Emeritus Professor Brian Davis

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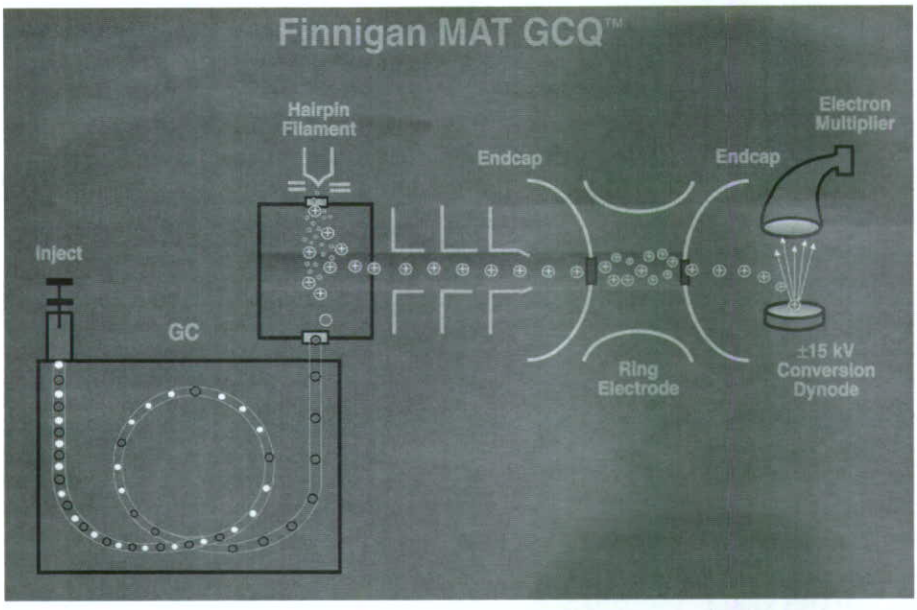

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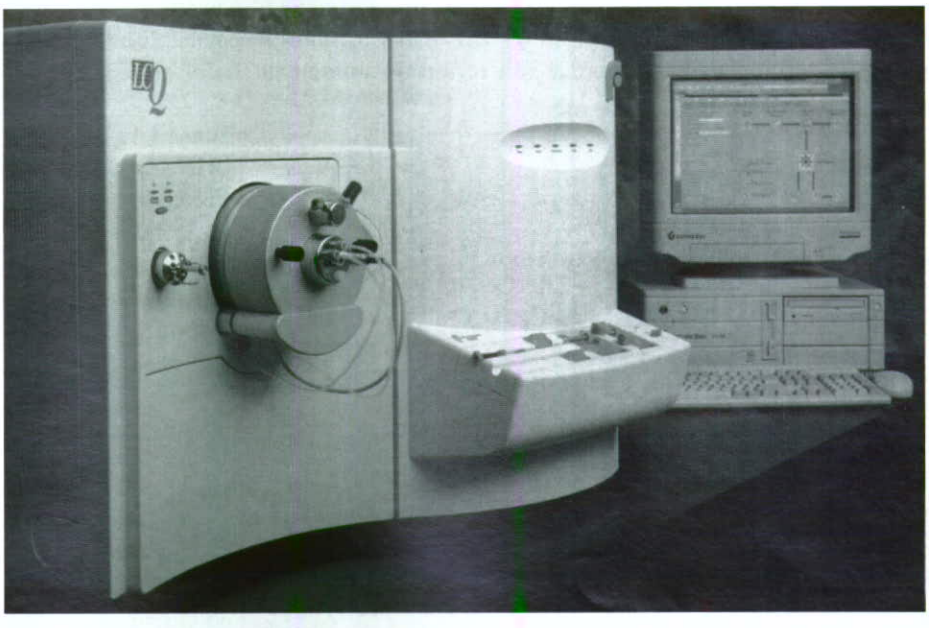

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SWITZERLAND UPDATE

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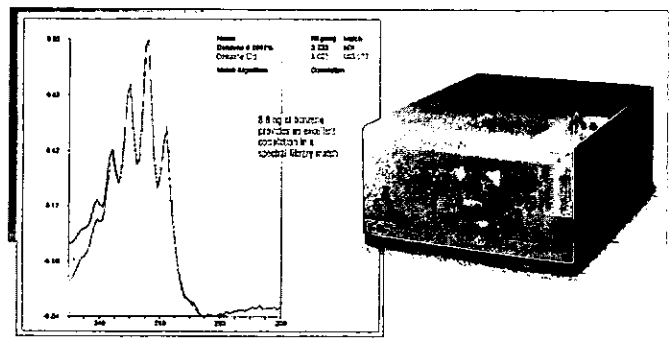
BREAKTHROUGH OPTICAL TECHNOLOGY SIGNIFICANTLY ENHANCES DETECTION SENSITIVITY

Sensitivity is 5X current photodiode array detectors

Thermo Separation Products (TSP) recently demonstrated its patented LightPipe flowcell design, an innovative optical technology, as part of the company's UV6000LP photodiode array detector at Pittcon '97. This new optical design results in detection sensitivity five times that of current photodiode array detectors, well beyond anything available currently in LC detection. TSP's new LightPipe flowcell is five times the length, for five times the signal while flowcell volume is reduced for less chromatographic band spreading. Peaks emerge sharper and higher.



Background

TSP market research identified sensitivity as the single most important criterion in HPLC detection. They found the need is for far lower detection limits, more accurate library searches, higher quality peak purity determination and broader linear dynamic range. The driving force is increased regulatory demands and ever more complex and difficult analyses.

Sensitivity is affected by four major factors: (1) Throughput light level impacted by the amount of light absorbed by the flowcell wall; (2) Stability of the light - impacted by fluctuations in deuterium lamp plasma and tungsten lamp filaments; (3) Electronic signal processing - impacted by electromagnetic interference (EMI) and thermal instability; and (4) The signal filtering algorithms - the determinant in processing data generated as a result of all of the above.

LightPipe Flowcell

To increase the signal-to-noise ratio dramatically, TSP's patented LightPipe flowcell was extended to 50 mm, five times the *de facto* industry standard. This change heightened the signal 400 percent without significantly increasing noise. No light is absorbed, thanks to the LightPipe's special low refractive index polymeric internal surface.

Previously, a longer pathlength provided a higher signal, but increased noise as well. The LightPipe's advanced technology obsoletes the need for a trade-off between signal and noise. Typical short-term noise is better than +/- 0.3 x 10^{-5} AU*/cm. (*as defined by ASTM E 1657-94 with a 5 cm pathlength, 2 sec rise time and 4 mm bandwidth at 254 nm).

Lamp Stability
To limit baseline noise at longer wavelengths, the new technology augments the 35 W deuterium lamp with a tungsten-halogen source. This dual lamp system provides excellent sensitivity across the full 190 to 800 nm spectral range.

Unique Beam Shaper
For best spectral resolution, light emerging from the flowcell should be shaped into a narrow vertical beam for imaging onto the diffraction grating. Rather than the light-stealing mechanical slit employed by conventional photodiode array detectors, the UV6000LP features an optical beam shaper - a specially configured fibre-optic bundle at the LightPipe's aperture. Light emerging from the flow cell is collected by the bundle and reshaped into a narrow beam before continuing to the grating. This ensures that the maximum amount of light in the optimum shape strikes the 512-diode array.

Protected Analog Electronics
Low-level analog signal processing circuitry is subject to EMI and to thermal fluctuations. But the UV6000LP's thermally encapsulated module on the optical bench isolates the components and prevents thermal fluctuations from affecting the low-intensity analog signal from the array. The UV6000LP's own electronic components generate extraordinarily low noise levels. Encapsulating the electronic components and positioning them near the signal source also helps prevent EMI.

Signal Processing
A 20-Hz high-speed diode array allows collection of more data for greater flexibility and less distortion in filtering and compression. Other photodiode array detectors currently available rely on diode "bunching", a simple averaging of adjacent diodes which inefficiently trades off the signal-to-noise ratio for spectral resolution. The UV6000LP takes a more sophisticated approach, using a user-adjustable Savitsky-Golay filter applied across the signal emanating from each diode and its neighbours. This increases signal-to-noise ratio without greatly compromising spectral resolution.

All data is filtered in the time domain with a second-order Bessel rise-time filter to further enhance signal-to-noise ratio. Once filtered, the data may be desampled, then compressed for efficient transmission and disk storage. These features combine to provide effective management of the massive amount of data collected by the UV6000LP in the most useful way - filtering, desampling and compressing the signal.

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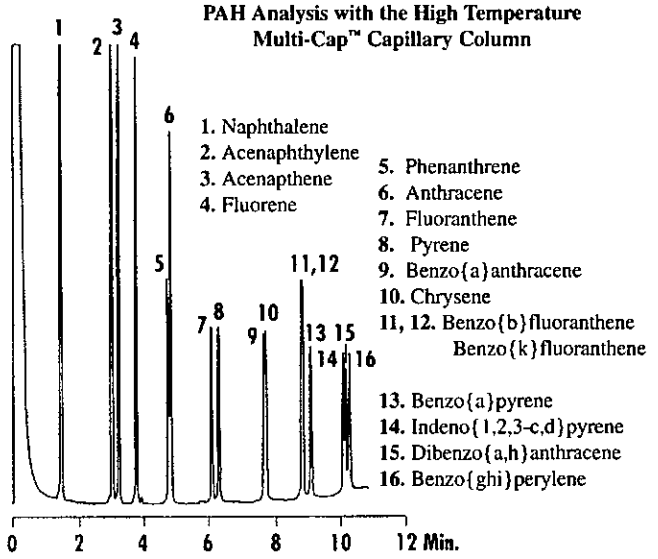
PAH Analysis with the High Temperature Multi-Cap™ Capillary Column



Column:	MC-5ht Multi-Cap™ Capillary Column (Part No. 17081).
Temperature:	75 °C (0.5 min. hold) to 280 °C (0.5 min. hold) @ 20 °C/min.
Carier Gas:	Helium, 45 psig (1 min. hold) to 65 psig (9.5 min. hold) @ 10 psig/min.
Make-up Gas:	None
Detector:	FID at 300 °C

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CAPILLARY DRAW FACILITY

J&W Scientific have just brought their glass draw tower on-line for production of silica capillary tubing. The tower which took 3 years to complete, has several unique features which allow it to produce capillary tubing at greater strengths, higher speeds and more uniform dimensions than previously possible. How does this benefit you as a customer? The strength of silica tubing is an important factor in predicting the useful life of a capillary column. The median tensile strength of the glass coming off the tower is typically greater than 650,000 psi. By comparison, the tensile strength of stainless steel is in the order of 100,000 psi. This strength can be maintained only if the surface of the silica tubing is protected from abrasion. A coating of polyimide resin is applied to the exterior surface of the silica tubing during the manufacturing process to maintain the pristine nature of the tubing surface which the process produces. The entire draw operation takes place in a clean environment. To utilize the draw tower to its fullest capacity and minimise manufacturing overheads, the capillary draw is done at a speed about 40% higher than the industry standard. This is possible through a combination of custom design of the equipment and

a manufacturing procedure, which has been honed to obtain the best results. Dimensional uniformity and reproducibility of the inside diameter of a column are critical to the performance of a gas chromatography column. Some benefits derived from this uniformity are the reduced variability of measurements due to changes in flow resistance, better sample splitting in dual column separations and greater column-to-column reproducibility. The silica capillary tubing being produced by J&W's new tower exhibits a much tighter control of both the outside and inside diameters than were able to be obtained previously.

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MAGIC ON THE J&W WEB SITE

Have you surfed the Web for elves? You may not have seen a photo of the famous elves, but J&W's Web Site contains over 300 pages of GC, SPE and CE data, including a library of over 1,000 chromatograms, complete with cross-link and search capabilities to over 12,000 compounds. You can check out the "What's New" feature that is updated monthly. Also not to be missed are the humorous and fun features included in the "Elf" section. Only J&W offer this unique look into the secret life of J&W's invisible work force - the J&W elves. Just visit http://www.jandw.com with your Internet browser.

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J&W GS-ALUMINA/KCl

J&W expands the PLOT column offering with this new equivalent to Chrompack's CP $A1_2O_3$/KCl columns. The new J & W GS-Alumina/KCl columns provide improved column-to-column reproducibility with minimum stationary phase spiking (alumina particles dislodging from the phase coating).

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THERMAL DESORPTION TUBES FOR TOXIC COMPOUNDS IN AIR

Supelco, a world leader in adsorbent technology, has developed a comprehensive selection of adsorbent tubes. These tubes offer superior performance for trapping and thermally desorbing organic compounds. Supelco offers tubes packed with the widest range of adsorbent materials available, and routinely manufacture tubes for standard methods or for customer specific methods. Supelco supplies glass and metal tubes compatible with commercially available desorption systems, or to your unique specifications.

Contact: Patrick Wesley, Supelco
Ph: 0800 936666, Fax: 0800 937777 or
Alastair Gray, Chromspec Distributors Ltd
Phone/Fax: (09) 4791442
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LARGE OPENING AUTOSAMPLER VIALS

Supelco's new ABC vials eliminate the need for crimpers and decappers in your laboratory. These vials have a unique thread design that allows you to screw the caps on, and still use them in any autosampler that accommodates 2 mL, 12 x 32 mm vials. Our ABC vials have a 40% wider opening than standard screw top vials, and are compatible with most GC autosamplers that accept crimp top vials. The thread on the ABC vials is specially designed to ensure a secure seal. Supelco also offers a comprehensive range of vial, cap and seal combinations for all your needs.

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THE J&W LOW BLEED GC COLUMNS

Column bleed is a common complaint amongst GC users. To address this concern, J&W have concentrated significant research and technology to develop stationary phases that bleed less. J&W now offers an entire family of low bleed GC phases. This new chemistry, improved from the first low bleed phase technology introduced by J&W in 1991, bleeds less at higher temperatures, lasts longer and bleeds in a unique way that is favourable to trace level GC/MS. It's not zero bleed, but it's close. J&W's low bleed family of GC columns is comprised of DB-5 ms, DB-35 ms, DB-XLB and the newest addition, DB-17 ms.

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SGE HIGH TEMPERATURE INJECTION LINERS

The same chemistry used to manufacture high temperature-low bleed BPX columns is used by SGE to deactivate inlet liners. This process produces a very inert, high performance liner capable of analysing difficult acidic and basic compounds. The deactivation is also done at very high temperatures providing excellent thermal stability even at injection port temperatures in excess of 320 °C.

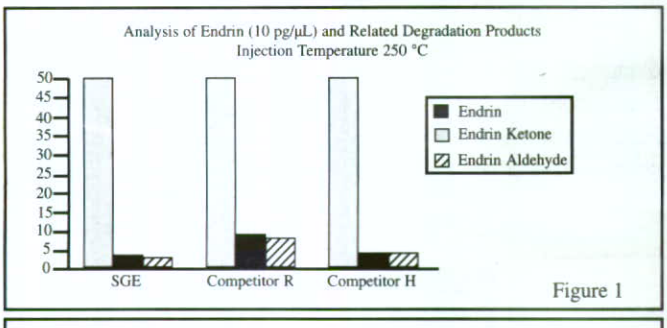

Figure 1

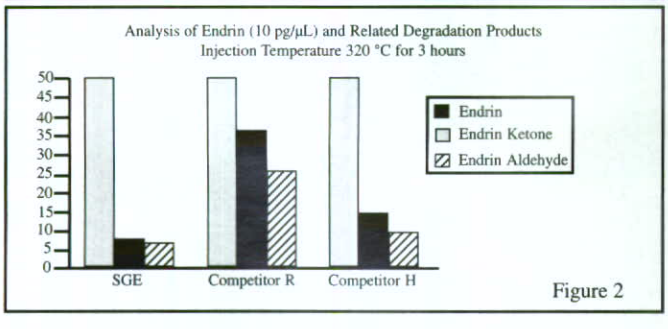

Figure 2

Figures 1 and 2 demonstrate the stability of SGE inlet liners. Using the pesticide endrin and its related degradation products, the level of chemical inertness can be determined. In both cases the SGE liner, when operated with injection temperatures of 250 °C and 320 °C showed lower levels of degradation products (endrin ketone and endrin aldehyde) than both equivalent competitor liners. This is a clear indication of the superior inertness and stability of the SGE liner. For your copy of SGE's Injection Liner brochure:

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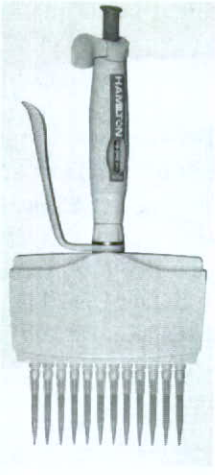
HAMILTON MULTI-CHANNEL PIPETTES

As with all Hamilton pipettes, the Multi-Channel Adjustable Volume Pipettes are designed to be comfortable, smooth, and easy to operate. You'll find these pipettes have the same features as the Adjustable Volume models with these advantages:

- Moveable lower body allows rotation to a comfortable setting
- Ejector lever is easily turned to a comfortable position
- Lever action ejector ensures that the tips are totally ejected with the first stroke.



Also available is the free-standing rack that holds one Multi-Channel Pipette.

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NEW DIFFUSE REFLECTANCE ACCESSORY FOR FT-IR SPECTROSCOPY MAKES SAMPLING DIFFICULT MATERIALS EASY

Perkin-Elmer has introduced a new diffuse reflectance accessory for the company's line of FT-IR systems that makes sampling difficult materials easy. This enhanced accessory requires no alignment; sample focus is the only adjustment required for fast, reproducible measurements. It offers a full range of abrasive sampling choices, including two new unique and powerful sampling options that eliminate sample preparation - silicone carbide pads and diamond sampling sticks with reflective metal coatings.

Featuring Perkin-Elmer's robust design with enclosed optics, the diffuse reflectance accessory includes two purge seals to allow rapid purge of the accessory and beam path while the sample compartment lid is open. A unique multi-purpose sampling cartridge can hold macro- and micro-cups, silicon carbide abrasive sampling pads and diamond abrasive sampling sticks. For extra instrument stability, the accessory also includes baseplate mounting.

The diffuse reflectance accessory comes complete with the traditional standard and micro-sampling cups for the analysis of powdered samples such as KBr mixtures. In addition, the sampling cartridge has reference and sample positions.

The silicon carbide abrasive sampling pads with reflective metal coating provide a convenient method for sampling difficult materials without sample preparation. The material is simply abraded onto the surface by rubbing the pad on the sample. The reflective metal coating significantly increases the efficiency of collecting diffusely reflected light and provides an excellent spectrum much more quickly than conventional pads.

With the coated diamond abrasive sampling stick, a similar metal coating is also applied to a stick with an abrasive diamond tip. This stick allows simple, rapid sampling of large objects or inaccessible surfaces, such as the inside surface of a container.

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THE LATEST FROM J&W SCIENTIFIC

NEW PLOT COLUMN
GS-Alumina/KCl

- Ideal for Light Hydrocarbon Analysis
- Lower Polarity than GS-Alumina
- Column-to-Column Reproducibility Guaranteed

NEW PRODUCTS

J&W's new potassium chloride, deactivated alumina, GC PLOT column is great for the analysis of light hydrocarbons. GS-Alumina/KCl qualitatively separates the high volatile solutes at normal temperature (35 °C). Replaces CP-Al_2O_3/KCl, HP-Plot Al_2O_3 and RT-Alumina Plot.

NEW METAL COLUMN
DB-HT Sim Dis
- For Extended Temperature Simulated Distillation
- 430 °C Upper Temperature Limit
- Rugged Stainless Steel

DB-HT Sim Dis is a new, thin film, stainless steel GC column for extended temperature (430 °C) simulated distillation analysis. Ideal for crude oil and paraffin wax analysis, it exhibits excellent inertness and low bleed. Superior alternative to other metal clad, high temperature, simulated distillation columns.

NEW PHASE
DB-200
- 35% Trifluoropropylmethyl Polysiloxane
- High Polarity Stationary Phase
- Higher Temperature Limit
- Column-to-Column Reproducibility Guaranteed!
- Great for Environmental and Industrial Chemical Applications

J&W introduces their newest GC stationary phase, DB-200, with a 35% trifluoropropyl substitution and temperature limit of 300/320 °C. DB-200 columns have selectivity indistinguishable from other columns of this type. Ideal for the analysis of pesticides, herbicides, silanes, substituted benzenes, solvents, propylene oxide and freons.

CONNEX
GC/MS Users: Save Time and Money with Connex!
Tired of waiting for your GC/MS system to pump down after changing columns? Save time and add convenience to changing GC columns. The Connex system makes leak-free, rapid connections a reality.

NEW APPLICATIONS
DB-XLB for Ylang Ylang Oil Analysis
The Analysis of Opiates Using Low Bleed Columns
Spice up your lab! Low Bleed Columns - Garlic Oil Analysis
Reducing Analysis Time for Haloacetic Acids
DB-17 ms: A High Temperature Mid-Polarity Column for PAHs
Hallucinogens - Unlike Timothy Leary, are making a come back
Vitamin E - A healthy analysis.

Contact: Clare Hodgson, Shimadzu Scientific Instruments
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HPLC COLUMN SELECTION SLIDE CALCULATOR

Alltech, specialists in chromatography offer you an easy to use HPLC Column Selection Slide Calculator. Use the cardboard slide to identify a column mentioned in the literature for example. A window at the bottom of the Selection Guide indicates the appropriate Alltech equivalent and the alternative column with the most different selectivity. The closest Alltech column is one of similar capacity, selectivity and peak shape. The most different Alltech column is one that will give you a different selectivity and a capacity that's within 20% of the column of interest. Alltech employed a sophisticated test sample mix and computer software to prepare the HPLC Column Selection Guide, so it will be simple for you to use and give a predictable and reliable recommendation every time. The Alltech HPLC Column Selector is prepunched to fit conveniently into a ring binder. For your copy:

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THE J&W PRODUCT NEWS VOL. 3, #1

Alltech releases J&W Scientific Product News Volume 3, #1 highlighting the latest GC columns: DB-HT Sim Dis, GS-Alumina/KCl and DB-200. New Megabore Connex systems, and the latest from J&W's Custom Column Shoppe are also featured in this 16-page product bulletin.

High temperature applications are the subject of concern in the release of J&W's new DB-HT Sim Dis for extended temperature (430 °C upper temperature limit) simulated distillation. This durable, thin film, stainless steel GC column proves to be an ideal column for crude oil and paraffin wax analyses, exhibiting excellent inertness and low bleed.

J&W's new alumina GC PLOT column is specifically designed for light hydrocarbons. The resolution of ethylene and propane are illustrated, showing GS-Alumina/KCl to be extremely retentive to qualitatively separate the solutes at normal temperatures (35 °C), despite the highly volatile nature of the hydrocarbon impurities present.

Two complex mixtures of pesticides are exhibited with J&W's new trifluoropropylmethyl polysiloxane, high-polarity stationary phase, DB-200. Great for environmental and industrial chemical applications, this new GC column has a higher temperature limit than DB-210. Another "hot" product announcement included in this brochure is the new "Install-It-Yourself" Connex GC installation system, now also available on Megabore (0.53 and 0.45 mm ID). The Connex systems install your column with a simple "twist and click".

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ADDED VALIDATION AND PRODUCTIVITY TOOLS IN 32-BIT VERSION 5.0 CLASS-VP FROM SHIMADZU

Shimadzu's new 32-bit CLASS-VP version 5 software (Chromatography Laboratory Automated Software System, the VP stands for Validation and Productivity) is the next step in Shimadzu's commitment to laboratory validation and productivity.

Advanced log file is now instrument and method specific and is stored with the data. Data validation is now more complete with method, results, instrument configuration, and log file stored with the data ensuring compliance with regulatory requirements. CLASS-VP version 5 in conjunction with the new VP series HPLC gives the laboratory greater confidence in their validation because of its built-in system checks. The capability to use titre plates or to programme the autosampler for user-defined racks will increase sample throughput resulting in increased productivity. New Custom Reporting capabilities allow chromatograms and reports from different runs to be in the same report. Improved System Suitability reporting allows use of a custom print template for reporting purposes. The network version of CLASS-VP version 5 running on networks that have PC client support offers the data security that is required in today's world.

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DX 500 ION CHROMATOGRAPHY SYSTEMS EXPAND CAPABILITIES

A.i. Scientific announce the addition of the Dionex LC25 Chromatography Oven to their popular DX 500 Ion Chromatography System. The compact PEEK-based LC25 provides the modular IC system with a new look and a new level of performance. Features include an electric Rheodyne injection valve and an integrated fluent organiser. The new oven allows the column, injector, suppressor and conductivity cell (optional electrochemical cell) to be held at temperatures of 5 °C above ambient to 45 °C. Since the critical components will be held at a constant temperature, users will benefit from more reproducible results, especially in the case of lab-to-lab, site-to-site or instrument-to-instrument comparisons. The compact DX 500 IC system offers the highest performance available for ion analysis. Quaternary gradient or isocratic pumps deliver precise, accurate flow and suppressed conductivity detection with Auto Suppression is provided by the CD20 detector. Full PC-based system control is possible via the PeakNet Chromatography Workstation. The new PeakNet 5.0 release is a full 32-bit application that provides powerful new capabilities while retaining the user-friendliness of the proven PeakNet Workstation.

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SHIMADZU ANNOUNCES THE GC-17A VERSION 3 GAS CHROMATOGRAPH

Shimadzu Scientific Instruments announces the release of the third version of the GC-17A gas chromatograph (GC). The GC-17AV3 incorporates new features intended to help laboratories meet increasing validation requirements while continuing to improve productivity. The GC-17AV3 includes support for up to 14 advanced flow (AFC) or pressure (APC) control channels including atmospheric pressure compensation. This capability allows the operator to specify electronic control of all types of gases used by the GC including all carrier and detector gases. AFC and APC control is supported from the GC keyboard or Shimadzu's Class VP Chromatography Data System, guaranteeing that the desired parameters are reliably set, stored and reproduced. The new AFC/APC is also available in a high pressure, high flow version, to accommodate the needs of fast, narrow-bore capillary chromatography, which provides for faster analyses while consuming less carrier gas. Additional automation features include: clock-based event programmer and carrier gas saver. New validation features include User Login on the GC itself. The GC-17AV3 is the answer to validation and productivity problems in the laboratory.

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NEW PERKIN-ELMER SPECTRUM 2000 EXPLORER FT-IR SYSTEM PROVIDES RESEARCH GRADE PERFORMANCE AND UPGRADEABILITY AT AN AFFORDABLE PRICE

The new Spectrum 2000 Explorer FT-IR System from Perkin-Elmer is a fixed-configuration, mid-infrared spectrometer with a changeable beamsplitter that is optimised to satisfy the most demanding application requirements. The Spectrum 2000 Explorer System is built using the same technology and quality optical design as the proven Spectrum 2000 FT-IR, used in hundreds of laboratories worldwide. The basic, entry-level system is ideal for users with a limited budget and a routine

application today, who want a research-grade instrument plus the flexibility for future growth. Upgrade paths are available, allowing users to add sample stations, a microscope, Raman, TGA, GC and application software as needed.

Key standard features of the Spectrum 2000 Explorer include: sealed and desiccated optics; a Peltier-cooled DTGS detector; a wide-range KBr beamsplitter; validated software; and Spectrum Search, Beer's Law Quant, and COMPARE™ software.

The Spectrum 2000 Explorer's research pedigree also features a baffled, air-cooled Kanthal AF source, which ensures channelled heat loss to the covers, minimising instability due to convection currents around the interferometer. Its Peltier-cooled FR-DTGS detector overcomes the dependence of DTGS responsiveness on temperature. In addition, the proprietary DTGS element design provides 30 percent greater detection capabilities than average with a higher energy capacity to maintain linearity. The Spectrum 2000 Explorer also features Perkin-Elmer's patented DynaScan™ interferometer which is self-compensating for tilt and shear. Replicated power mirrors transfer the IR radiation from the source to the detector. Other features include a lapped beamsplitter assembly, Application-Specific Integrated Circuits (ASIC) technology, a specially designed baseplate with air-damped vibration-isolated ribbed architecture, and Automatic Interferometer Management (AIM).

In addition, a number of future upgrade paths are available. The Spectrum 2000 Explorer FT-IR is compatible with the full range of Spectrum 2000 sample stations, accessories, and software, including a dual-sample compartment, sample shuttle, integrating sphere, and photoacoustic detector. FT-IR microscopy, Near-IR FT Raman, GC-IR, and TG-IR are all possible with a single instrument. For maximum performance, easy-to-use software provides users with the ability to control auxiliary detector stations, a source carousel, a filter wheel, dual-iris apertures and polarisers.

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PERKIN-ELMER SPECTRUM QUANT+ SOFTWARE SETS A NEW STANDARD FOR FT-IR ANALYSIS

Perkin-Elmer has introduced Spectrum Quant+ software, the latest addition to the company's popular line of Spectrum™ software offerings. Spectrum Quant+ is a quantitative software package that combines the ease of use and flexibility of Spectrum for Windows® software with the powerful and enhanced chemometric features of the highly acclaimed Quant+ software to set a new standard for FT-IR analysis. The software can be used with both mid-IR and NIR spectra.

Spectrum Quant+ software includes a variety of features designed to make FT-IR analysis fast, easy and reliable. Method development time is dramatically reduced with the unique Expert Assist system, which assists in the development of robust calibrations even when the calibration data contains errors. Expert Assist emulates the experienced chemometrician's interpretation of the Quant+ models using the numerous statistical diagnostics available within the software. The Method Wizard feature guides users, step by step, through the interactive method generation process. Parameter entry is minimised with the Smart Parameter Entry and Definition function which automatically sets up parameters according to the data to be analysed. Spectrum Quant+ software is also fully compatible with methods developed using Quant+ v2.0 or higher.

For improved data pre-processing, extensive data pre-treatment algorithms are available within Quant+ that have been further enhanced with Standard Normal Variate (SNV) and de-tending (DT), state-of-the-art algorithms for NIR method development. For easy integration, Spectrum Quant+ software is fully compatible with the entire Perkin-Elmer line of Spectrum software. Users simply drag and drop to transfer spectra from one application to another. In addition, a sophisticated calibration review module allows users to customise diagnostic templates.

Learning to use Spectrum Quant+ software is fast and easy with interactive on-screen tutorials for both mid-IR and NIR users. The tutorials cover all aspects of method development, calibration, review and prediction.

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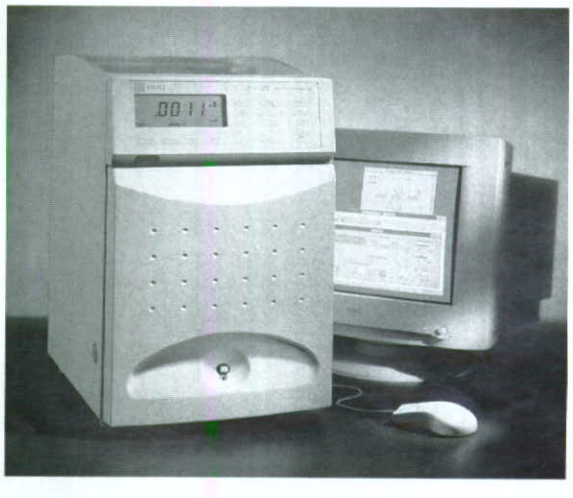
NEW DIONEX DX 120 ION CHROMATOGRAPH DESIGNED FOR ROUTINE, HIGH-THROUGHPUT APPLICATIONS



A.i. Scientific is proud to announce the release of the new DX-120 Ion Chromatograph from Dionex. The DX-120 is an affordable, fully integrated system that performs all types of isocratic ion chromatography (IC) separations using conductivity detection. The system was designed for routine, high-throughput

applications where economy, reliability and simplicity are primary considerations. To make installation as easy as possible, the DX-120 is shipped ready for immediate use and pre-configured for single and dual column operation with all necessary components, including injector, pump and high sensitivity conductivity detector. Compact size and a minimum number of connections allow the user to set up the system in a matter of minutes without special tools or installation requirements. The system can be operated as a stand-alone instrument or fully automated using the new PeakNet 5.0 Chromatography Workstation via built-in, high speed DX LANw communications. The DX-120 is compatible with all Dionex anion and cation exchange columns. Built-in digital conductivity detection and Auto Suppression technology using the Dionex Self-regenerating Suppressor (SRS-II>) provide highly selective and sensitive analysis, superior detection limits and broad dynamic range. For applications that do not require high sensitivity and specificity the system can be also used without suppression. In the dual-column configuration the DX-120 can switch from one column/suppressor/eluent combination to another at the push of the button. Column switching can also be automated through PeakNet. Logical organisation and user-friendly features such as a large LCD display, built-in diagnostics, leak detection, error condition alarms and an eluent/accessory tray make the DX-120 easy to operate and maintain. Electronic injection valves and an improved pulse damper enhance reliability and the flow path is constructed entirely of PEEK to eliminate corrosion.

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TRYING TO FIND THE RIGHT POLYMER?

Look no further than the Aldrich range of polymer products. With over 1,400 polymers and even more additives and products for polymer synthesis, our products will meet your requirements. As an aid to finding the appropriate polymer amongst this extensive range, Aldrich has a produced a comprehensive listing of its chemicals specifically developed for the preparation and formulation of polymeric materials. This guide to Aldrich polymers, additives and monomers divides each product type into classes, enabling you to find the products which interest you with ease.

For a copy of the guide to Aldrich Polymer Products,

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INTERESTED IN COMBINATORIAL CHEMISTRY?

From titre plates to test tubes, Sigma-Aldrich has the solutions for combinatorial chemistry. Now available is a guide from Sigma-Aldrich Corporation listing all their combinatorial chemistry products, making it easier to find the products you require. This guide contains all the major groups of combinatorial chemistry products, from resins, amino acids attached to resins, TentaGel, Linkas, polymer supported reagents, coupling reagents, even down to related products. By combining the resources of Sigma, Aldrich, Fluka and Supelco the guide provides you with access to products from around the globe. For your copy of the guide to Products for Combinatorial Chemistry,

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FINNIGAN
THE NEXT STEP IN GC-MASS SPECTROMETRY

Finnigan introduced the world to Ion Trap Mass Spectometry in 1983 with the ITD-700. Then the design was enhanced to the ITMS but still it was an Internally Ionised Ion Trap MS. Now Finnigan takes the next step with the GCQ and the marriage of the external ion source with the ion trap mass analyser.

The GCQ brings to a benchtop GC-MS capabilities that were previously only available in research grade high cost systems.

Design features of the GCQ include:
- The GC and MS are developed together so there are no compromises in chromatography and mass spectrometry.
- MS/MS eliminates matrix interference to yield incredible detection capabilities down to ppt levels for real-world samples.
- True high pressure +/- CI which is only possible with an external ion source. This is seen with the formation of adduct ions and the lack of EI artefacts in the CI spectra. Negative CI brings the dimension of selective ionisation and improved CI sensitivity.
- Optional TPI (Temperature Pressure Inlet for large volume injection) for multi-mode sample introduction.
- Direct Probes for non-GC sample introduction allows quick screening to non-volatile samples.
- EPC (Electronic Pressure Control) injections with a rapid cool-down oven are standard.
- Research grade detector and ionisation source coupled with the Ion Trap make the GCQ a very powerful instrument that runs on a PC-based data system and Windows NT software that is true 32-bit processing.

Sounds too good to be true?

Contact: Stuart Tyler, Alphatech Systems
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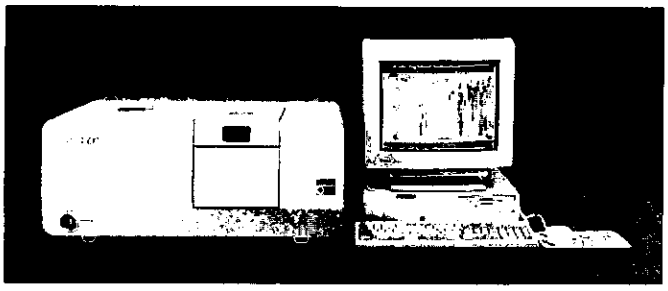
USING THE FREEPOST
READER REPLY CARD**

JASCO MODEL FT/IR-600 SERIES FOURIER TRANSFORM INFRARED SPECTROMETERS



The new JASCO FT/IR-600 Series has been designed to meet the most advanced requirements for research:

- wide wavenumber range, from visible to far infrared with the same hardware
- very high sensitivity through the use of high aperture interferometer optics
- wide choice of beam splitters, light sources and detectors
- auto-alignment feature for fixed mirror to allow easy/quick exchange of beam splitter
- economic evacuable versions for far IR and water vapour-free operation
- possibility to expand to FT/Raman, GC-FT/IR, TG-FT/IR, Micro FT/IR etc.

Three basic versions are offered:

- the model FT/IR-610 with resolution limited to 0.5 cm^{-1} for most applications
- the model FT/IR-615 with improved resolution to 0.25 cm^{-1}
- the model FT/IR-620 with gold coated interferometer mirrors and fast scan option - the logical starting point for FT/Raman.

All units feature as standard conventional Ge coated KBr beam splitter, high sensitivity thermally insulated DLATGS detector and an innovative, patented, high temperature source. The interferometer has a 28° incidence angle to reduce polarisation effects and the aperture system gives the best possible optical resolution.

Unique in this range of instruments is the availability of three relatively inexpensive vacuum versions, which may also be used for the mid-IR region, removing from background the water/ CO_2 absorption bands, allowing practical higher sensitivity over the complete wavenumber range.

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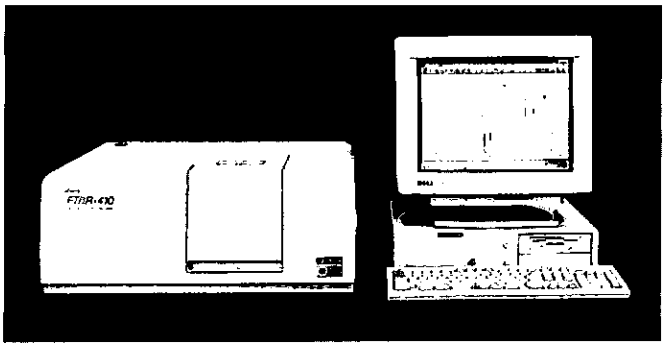
TJA ADVANTAGE SERIES PLASMA ICP EMISSION SPECTROMETERS

Thermo Jarnell Ash have announced new low-cost, simultaneous plasma emission spectrometers utilising the patented CID solid-state array detector, in a self-contained benchtop package.

- Direct Current Plasma - rugged, simple, reliable
- DCP handles high solids, slurries, sludges, and organic solvents with ease
- Low argon consumption, standard VAC power requirements, low operating costs
- ThermoSPEC/Win™ software allows the use of other Windows applications while operating the instrument
- IRIS Advantage - Echelle optics with CID array detector offers full emission spectrum coverage
- Simultaneous analysis using any wavelength
- Full spectrum image storage for qualitative analysis
- Signal-to-noise advantage of simultaneous background correction
- High resolution option (<0.006 nm @ 200 nm) for demanding applications.

Contact: Andrew Pearce, SciTech
P O Box 663 Dunedin
Ph: (03) 4777860, Fax: (03) 4777870
Email: scitech@scitech.co.nz
circle number 47 on the reader reply card

JASCO 400 SERIES FOURIER TRANSFORM INFRARED SPECTROMETERS



The new JASCO FT/IR-400 series were developed by JASCO in response to the technical requirements and limited budget of the modern laboratory. The new FT/IR-400 series models feature a very compact and stable optical bench with specifications you would expect from larger more costly instruments. The FT/IR-400 Series consists of three unique models - all fully PC controlled via JASCO'S comprehensive FT/IR software running under Windows 95.

- The Model FT/IR-410 is a cost effective 0.9 cm^{-1} resolution optical bench equipped with a KBr beamsplitter. The FT/IR-410 is the right choice for the majority of IR applications.
- The Model FT/IR-420 features more complex optics and electronics resulting in increased sensitivity for the discriminating researcher. A CsI beamsplitter can also be supplied as an option.
- The Model FT/IR-430 offers 0.5 cm^{-1} resolution with excellent sensitivity for varied and complex applications. A CsI beamsplitter can also be supplied as an option.

Innovative light source
The FT/IR-400 series uses a patented high intensity light source with much higher black body emission than conventional nichrome elements. Higher black body emission equates to better

sensitivity over the entire wavenumber range, particularly in near IR range.

Sealed interferometer
The FT/IR-400 series incorporates a compact, 45° incidence angle Michelson interferometer. The high intensity light source is directly focused on the interferometer by an off-axis parabolic mirror, without the use of energy sacrificing apertures. The interferometer is completely sealed and features permanently aligned corner cube mirrors (KBr exit window is standard, KRS-5 type can be supplied on request), as well as purging facilities and a stable mechanical bearing drive with variable speeds to match detector frequency response.

Small beam size in the sample compartment
A small beam size at the focal point of the FT/IR-400 series allows the use of virtually any type of commercial FT/IR sampling accessory. The sample compartment can be equipped with an optional purging facility which is standard in the CsI versions.

Detectors
The FT/IR-400 series instruments are supplied with a thermally-insulated DLATGS detector and elliptical focusing mirror. A liquid nitrogen cooled MCT detector with computer-controlled switching mirror can be supplied as an option.

Far infra-red versions
Both FT/IR-420 and 430 models can be supplied with CsI beamsplitter extending the wavelength range down to 220 cm^{-1}.

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P O Box 663 Dunedin
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Email: scitech@scitech.co.nz
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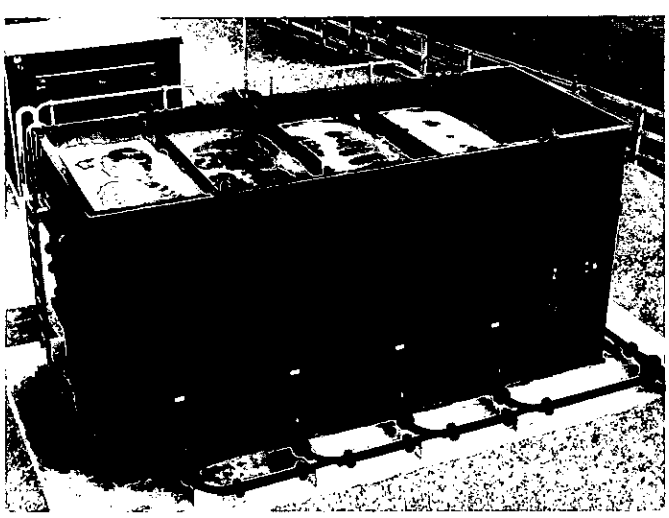
NEW WASTE TREATMENT TECHNOLOGY



A licensing agreement has been signed between Anglian Water International (NZ) Ltd and Sulzer NZ Ltd for Sulzer to manufacture, market and distribute Anglian's Black Box packaged sewage treatment plant.

The Black Box embodies the latest technology, using the proprietary Kaldnes system for high performance wastewater treatment. The Kaldnes system was chosen for the Wellington Wastewater treatment project, which AWE is currently undertaking.

The Black Box is particularly suitable for small communities of up to 700 people, for hotel and resort development, and for smaller scale industries in brewing, primary product processing, food manufacture, etc.

The Black Box is portable, easily maintained, economical, and suitable for a variety of wastewater treatment applications.

Sulzer will be marketing and distributing the Black Box throughout New Zealand, the Pacific Islands and Indonesia. It will be featured at the New Zealand Water & Waste Association's August 1997 Conference in Rotorua.

Anglian Water's New Zealand General Manager, Fraser Sparks, commented "This is an exciting step for both companies, bringing a unique product to the New Zealand market just when it is seeking innovative solutions to a range of wastewater problems".

Ron Middleton, Sulzer NZ's Chairman, said that Sulzer looked forward to a productive association with Anglian Water . "The Black Box represents a significant advance in cost-effective wastewater treatment, ideally suited to New Zealand needs in local government, property development, and small scale industrial sectors".

Contact: Judie O'Connell,
Anglian Water International (NZ) Ltd
Phone: (04) 4999182, Mobile: (025) 415911
circle number 49 on the reader reply card

NFR LABELLING SYSTEM

Lab Safety Supply 'National Fire Rating' (NFR) Labels conform to specifications developed by the National Fire Prevention Association for the Identification of Fire Hazards of Materials. The rating system used is a simple numeric code 0-4 marked in a coloured square to identify the degree of hazard to: Health (Blue), Flammability (Red), Reactivity (Yellow) and any specific other hazard. The NFR system is easy to use and to understand. The NFR label is a diamond, subdivided into 4 coloured diamonds, Blue for recording the degree of injury that may result from acute exposure (Health), Red recording the degree of which the material is susceptible to fireburst (Flammability), Yellow recording the degree to which the material is susceptible to explosion (Reactivity) and White to cover special properties of interest to firefighting or emergency response teams. Labels to fit every size of container mean you can use one system throughout your workplace to simply identify all chemical hazards.

Contact: Alltech Help Desk
Freephone: 0800 255832, Fax: (09) 4442399
Email: alltech@alltech.co.nz
circle number 50 on the reader reply card

THE NEW ULTROSPEC 1000 UV/VISIBLE SPECTROPHOTOMETER

The all new Ultrospec 1000 now offers real UV capability at a lower price.

The Ultrospec 1000 is aimed at the bioscience, education, and industrial markets where the need to teach and demonstrate to students the characteristics of nucleic acids is ably fulfilled. Another market is industrial quality control where a simple, robust, inexpensive instrument is required for process control and monitoring.

The Ultrospec 1000 offers nine modes of operation; absorbance, %transmission, factor concentration, time intervals, scan to recorder, standard concentration, standard curve, reaction rate, and multi-wavelength equation entry.

A key feature of the Ultrospec 1000 is the facility to customise the product by making available only the specific mode or stored method required for the particular laboratory, thus simplifying use and avoiding errors.

Up to nine methods can be stored and results can be output to a parallel printer, chart recorder or sent to a PC for further analysis and achiving.

Function keys with screen prompts, a removable sample compartment and a range of accessories make this latest offering from Pharmacia Biotech a worthy addition to their comprehensive range of UV/visible spectrophotometers.

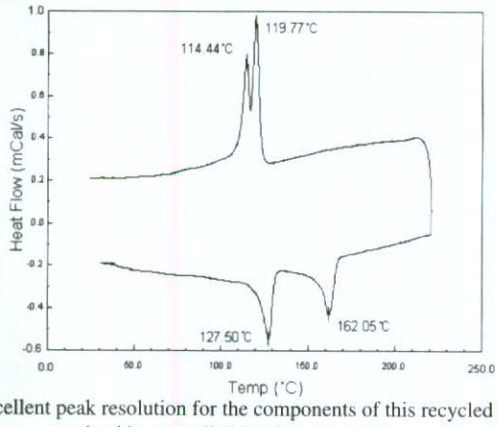
Contact: Andrew Pearce, SciTech
P O Box 663 Dunedin
Ph: (03) 4777860, Fax: (03) 4777870
Email: scitech@scitech.co.nz
circle number 51 on the reader reply card

RHEOMETRIC SCIENTIFIC DIFFERENTIAL SCANNING CALORIMETERS

Differential scanning calorimetry is the most widely used technique for measuring heat flow changes as a function of sample temperature, associated with transitions, reactions, decompositions, and heat capacity changes.

Rheometric Scientific's DSCs are heat flux plate differential scanning calorimeters designed to measure energy changes in materials over a temperature range from -170 °C to 770 °C.

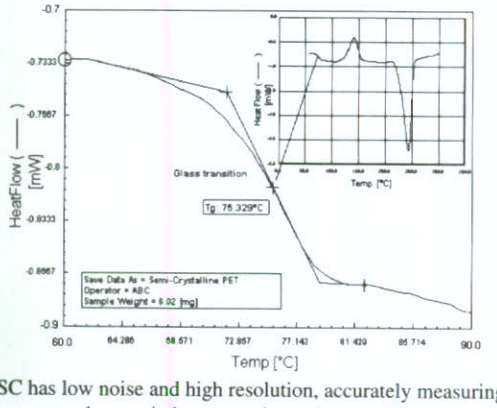
The DSC comprises, in a compact, single unit, the DSC cell with low swept volume (< 2 mL), the control electronics, and an integral gas switching unit. The DSC has a sensitivity of 3 μW and a time constant (τ) of < 2.5 sec. This short time constant enables the DSC to provide excellent resolution between reactions in close sequence, especially those of disparate energy values.



Excellent peak resolution for the components of this recycled blend is attained in controlled heating and cooling regimes

The Rheometric Scientific DSC-SP Model offers all of the advantages of the Rheometric Scientific DSC along with extra sensitivity: down to 0.8 μW.

The DSC and DSC-SP have been designed to provide high quality research data, and yet perform effectively in a rigorous, large volume quality control and routine testing environment. The compact design requires little bench space, and the user-interactive front panel displays vital operating information.



The DSC has low noise and high resolution, accurately measuring small changes in heat capacity at the transition

The DSC and DSC-SP can be equipped with a full range of accessories and options, including precision AutoCool and an encapsulating tool for sealing crucibles for work in pressures of up to several atmospheres. These accessories extend the capability of the instrument to meet the most demanding requirements.

Rheometric Scientific DSCs are easy to use, with new RSIOrchestrator software on a Windows 95 platform for instrument control, and for data acquisition, storage, and processing with minimum user intervention. RSIOrchestrator software incorporates a comprehensive multi-tasking, multi-modular control and acquisition capability. Also, simultaneous operation of up to seven different instruments or modules is possible, reducing the cost of setting up a full materials analysis facility.

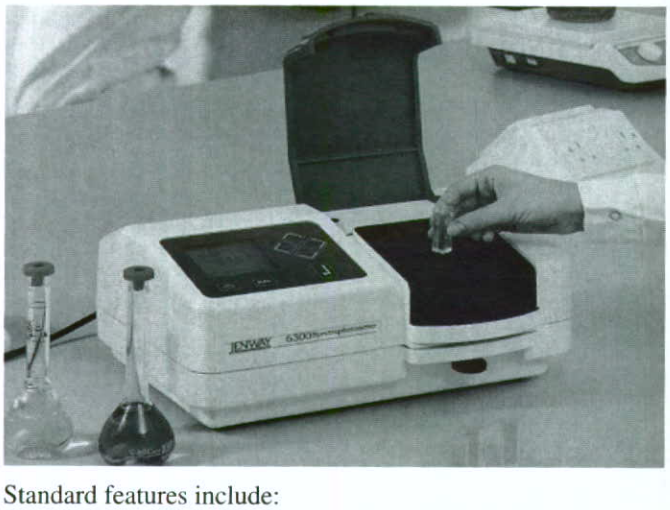
Key Features

- Easy to use
- Highly sensitive for the most demanding sample
- Rugged for reliable day-to-day use
- Compact for economical use of bench space
- Outstanding repeatability and reproducibility
- Wide temperature range: -170 °C to 770 °C
- Short time constant for superior resolution
- Small swept volume cell
- Integrated gas switching
- Controlled sub-ambient cooling using liquid N_2
- Alternative cooling for labs without liquid N_2
- RSIOrchestrator software, Windows®95 platform

Contact: Andrew Pearce, SciTech
P O Box 663 Dunedin
Ph: (03) 4777860, Fax: (03) 4777870
Email: scitech@scitech.co.nz
circle number 52 on the reader reply card

NEW JENWAY VISIBLE SPECTROPHOTOMETER

Jenway UK have released the new model 6300 Visible Spectrophotometer, incorporating features normally found only on significantly more expensive instruments. Wavelength range is from 320 nm to 920 nm selected by motorised push-button controls.



Standard features include:

- Choice of four operating modes - % transmittance, absorbance, concentration and factor
- Accepts cells with pathlength from 10 mm to 100 mm and test tubes up to 25 mm diameter
- Automatic zero calibration
- Dual graphics mode liquid crystal display
- Bi-directional RS232 interface.

Contact: Labsupply Pierce (NZ) Ltd
P O Box 34234 Birkenhead, Auckland 10
Ph: (09) 4435867, Fax: (09) 4447314, Freephone: 0800 734100
circle number 53 on the reader reply card

BPX50 AND BPX1-SimD CAPILLARY COLUMNS FROM SGE

SGE have two new additions to the BPX column range. These are BPX50 and BPX1-SimD. The advanced phase chemistry of these columns have the following benefits:

- Extremely low column bleed
- Resistance to degradation by oxygen and water
- Excellent chemical inertness

These features make BPX superior to all MS grade and exceptionally low bleed columns on the market.

- BPX50-50% phenyl polysilphenylene-siloxane.
- Replacement for: Rtx-50, DB-17ms, DB-17ht, SPP-50, HP-50+, HP17 and AT-50.
- Application areas: trace analysis especially for pesticides/ herbicides and life sciences.
- Operating temperatures up to 360/370 °C
- Dimensions: This column is available in lengths of 15, 30, and 60 metres, with ID's of 0.25 mm, 0.32 mm, 0.53 mm and film thicknesses of 0.1 µ, 0.25 µm and 0.53 µm.

BPX1-SimD (Aluminium Clad Fused Silica)

- Application areas: simulated distillation analysis.
- Operating temperatures: up to 430 °C.
- Dimensions: This column is 6 m in length with an ID of 0.53 mm and 0.1 µm film thickness.

Contact: Alltech Help Desk
Freephone: 0800 255832, Fax: (09) 4442399
Email: alltech@alltech.co.nz
circle number 54 on the reader reply card

NEW MINISHAKER MS1 FROM IKA TECHNOLOGY FOR MORE APPLICATIONS

Reproducibility, safety and versatility to handle a wide range of applications are the major requirements for routine instruments in today's laboratory.

The new Minishaker MS1 from IKA for shaking test tubes and small reaction vessels meets these demands.

- Uniform reproducible shaking frequency due to electronic motor speed control.

- Slow and/or smooth shaking jobs are handled with ease and changing the pressure (weight) on the shaking plate causes no change in shaking frequency.

- Shaking motion is constant right across the shaking plate making the MS1 ideal for shaking multi-sample containers such as microtitre plates.

- An orbital shaking motion with a diameter of orbit of 4.5 mm and a speed range of 200-2200 revolutions per minute gives the MS1 a wide application range.

- A removable, soft cellular foam plate is provided as standard and allows the operator to use a wide range of sizes of reaction vessels. An optional microtitre plate holder is also available.

Contact: Labsupply Pierce (NZ) Ltd
P O Box 34-234 Birkenhead, Auckland 10
Ph: (09) 4435867, Fax: (09) 4447314, Freephone: 0800 734100
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WHATMAN GD/X SYRINGE FILTERS GO TO GREAT DEPTHS TO DOUBLE YOUR FILTRATION EFFICIENCY

Membrane Filter Media
CELLULOSE ACETATE (CA) • Aqueous and some organic samples GLASS MICROFIBRE (GMF) • Aqueous and/or organic; high loading capacity NYLON (NYL) • Aqueous and/or organic samples; hydrophilic POLYPROPYLENE (PP) • Aqueous and organic samples POLYSULFONE (PSU) • Aqueous-based samples; low protein binding POLYTETRAFLUOROETHYLENE (PTFE) • Organic-based samples; hyrophobic membrane POLYVINYLIDENE FLUORIDE (PVDF) • Aqueous- and/or organic-based samples; low protein binding membrane POLYETHERSULFONE (PES) • Aqueous-based samples; low protein binding

Whatman GD/X Syringe Filters are designed to enable filtration of difficult or viscous samples. They are available in a wide variety of filter choices with a polypropylene housing and utilise the most advanced construction methods and design features available today.

Whatman GD/X Syringe Filters contain a unique pre-filtration stack of Whatman Multigrade GMF 150 (10:1 µm) and Grade GF/F (0.7 µm) pre-filters.

Multigrade GMF 150 is a combination of two glass microfibre filters in one. Manufactured from 100% borosilicate glass, its construction consists of a coarse layer on top, meshed with a fine layer below.

The grade GF/F filter will retain fine particles down to 0.7 µm. These pre-filters, when combined with the favourable apparent pressure generated within the device, allow filtering of even the most difficult samples with less hand force than ever before. Compared to an unprotected membrane, the volume of sample filtered can be three to seven times greater.

Contact: Labsupply Pierce (NZ) Ltd
P O Box 34234 Birkenhead, Auckland 10
Ph: (09) 4435867, Fax: (09) 4447314, Freephone: 0800 734100
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* * * * *

NCRL

NATIONAL CHEMICAL RESIDUE LABORATORY

A laboratory with over 25 years experience and expertise in analytical chemistry, particularly residue analysis. NCRL provides a comprehensive analytical and consultancy service, including:

• Veterinary Drugs • Pesticides • Herbicides
• Environmental Contaminants • Trace Elements
• Field and Animal Trials • Heavy metals • Vitamins
• Protein & amino acids • Fat fibre and moisture content

The laboratory is well equipped with modern instrumentation, including:

• Atomic Absorption • HPLC • GC • GC/LC-MS

Audited by US Department of Agriculture and the European Commission.

For further information
Dr Anton Erasmuson – National Chemical Residue Laboratory
Wallaceville Research Centre, P O Box 40-063, Upper Hutt
Telephone (04) 528-0718, Fax: (04) 528-1375

BVQi ISO 9002

MAF Quality Management

circle number 8 on the reader reply card

"GAS TRAPS AND LIQUID SOLUTIONS" - INJECTION TIPS

Brought to you by Alltech's Chromatography Help Desk

Why should I alter my sample size when injecting into a different manufacturers GC?

The injection port of a gas chromatograph has a finite volume which can be different from one GC to another, and may be varied within a particular GC by changing the injection liner. If the volume of vapour produced by the injected sample is greater than the volume of the injector, it can make its way into the cavity outside the liner and to other cooler areas within the injector, where the larger molecules can condense, only to reappear later as ghost peaks. It follows then, that what may be an appropriate size injection for one particular GC/liner combination may be inappropriate for another. A Hewlett Packard 5890 GC fitted with a 2 mm ID injection port liner can accommodate about 245 µL of vapour whereas a Perkin-Elmer 8500 also fitted with the same size liner can accommodate approximately 315 µL of vapour. Of course switching from an on-column injector to a split/splitless injector or from a packed column injector to either of these others will also require a substantial adjustment in sample size.

My supervisor tells me that if I change my solvent, I may have to change the injection size. Why is this necessary if I am working at the same concentration?

Full marks to your supervisor. If you remember back to your physical chemistry, a gram molecular weight of a volatile substance occupies 22.414 litres at Standard Temperature and Pressure (STP). It follows that the volume of vapour produced on injection is a function not only of injection size but also of the molecular weight of the solvent. From Table 1 we can see that 1.0 mL injection of hexane or acetone will be fine and probably also methylene chloride and even carbon disulphide. But when it comes to methanol or water however, there is a serious risk of flooding the injector and a reduction in sample size should be made.

Table 1

Sample Size: 1 µL Injection Port: 250 °C
Head Pressure: 22 psi

SOLVENT	VOLUME OF VAPOUR PRODUCED
Hexane	132 µL
Acetone	235 µL
Methylene Chloride	268 µL
Carbon Disulphide	285 µL
Methanol	425 µL
Water	952 µL

For assistance with your chromatography questions,
Contact: Alltech Help Desk
Freephone: 0800 255 832, Fax: (09) 4442399
Email: alltech@alltech.co.nz
circle number 57 on the reader reply card

Book Review

THE ELEMENTS OF PHYSICAL CHEMISTRY
By P W Atkins
Second Edition, Oxford University Press, Oxford, 1996
499 pages, NZ$59, ISBN 0 19855953 4 (Paperback)

The author states that the aim of this book is, as in the first edition, "to present an introduction to the essentials of physical chemistry without too much mathematics". He states further that this revision was prepared primarily with students of the life sciences in mind, "but the text should be useful to anyone wanting an introduction to the subject". In reviewing this book, it is useful to relate it to the well-known text "Physical Chemistry" by the same author. The content of the present book is clearly closely related to that of the latter, more advanced, text. Similarities in the style of presentation of the material are also evident. For example, the use of illustrations (over 300 in the present edition) and the presentation of lengthy or calculus-based derivations as "Justifications" which are separate from the main flow of the text are features that greatly enhance the readability of both books. While the mathematical content of the present text is considerably less than that of the advanced volume, the use of mathematics has certainly not been eliminated, the essential equations that are required for an understanding of the more important aspects of thermodynamics and quantum mechanics are given, and there are several worked examples and exercises that illustrate the application of such equations. One of the main concessions that has been made in the name of reduced mathematical content is the absence of any equations involving partial derivatives, and this clearly limits the extent and the rigour of the coverage of several areas of physical chemistry. As expected for an elementary text, the depth of coverage and the range of topics are also restricted; topics such as surface chemistry, statistical thermodynamics, molecular dynamics, macromolecules, and dynamic electrochemistry are not covered, or are mentioned only briefly. The content corresponds approximately to that of a second year university physical chemistry course in New Zealand, but the level of treatment of the topics lies somewhere between our first and second year courses. The author makes every effort to bring the subject alive by including new and "fashionable" topics, and there are occasional historical references and humorous comments that add to the appeal of the text. An exercise on page 92 reads: "A hard-working human brain, perhaps one that is grappling with physical chemistry, operates at about 25 W. What mass of glucose must be consumed to sustain that output for an hour?". Despite the limited level of coverage of the subject in the present text, there is still plenty of potential for glucose consumption by the reader! Although one would not recommend this text for students who are proceeding further in chemistry, it would certainly provide an excellent introduction to physical chemistry for other categories of students, particularly those in the biological sciences, to whom this edition is aimed. It is another well-conceived and superbly presented text by an author who is a widely recognised leader in this field.

G A Bowmaker
Department of Chemistry, University of Auckland

CONFERENCES & SEMINARS

1-7 June 1997

9th International and 6th European Joint Symposium on Purine and Pyrimidine Metabolism in Man

Venue: Gmunden, Austria

Contact: Dr Andrea Griesmacher
Institute of Laboratory Diagnostics
Kaiser-Franz-Josef-Hospital
Kundratstrasse 3
A-1100 Vienna, Austria

5-9 June 1997

Second International Congress in Philosophy, Phenomenology and the Sciences of Life

Venue: Gdansk, Poland

Contact: A T Tymienicka
The World Phenomenology Institute
348 Payson Road
Belmont, MA 02178, USA

9-14 June 1997

ACHEMA 97 – The International Meeting Place for Chemical Technology, Environmental Protection and Biotechnology

Venue: Frankfurt am Main, Germany

Contact: Dr Christina Hirche
Dechema e V
Postfach 15 01 04
D-60061 Frankfurt am Main
Germany
Tel: (+49-69)-7564277
Fax: (+49-69)-7564272
Email: presse@dechema.de

28 June - 2 July 1997

6th International Symposium on Perspectives on Protein Engineering

Venue: Norwich, England, UK

Contact: POPE6 Secretariat
Biodigm Ltd
64 Langdale Grove, Bingham
Nottingham NG13 8SS, England, UK
Fax: (+44-1949)-876156
Email: biodigm@dial.pipex.com
www: http://www.cryst.bbk.ac.uk/CEC/pope6.html

7-10 July 1997

Chem Ed '97 Putting the Elements Together

Venue: Massey University, Palmerston North

The Biennial conference for chemistry educators focussing on everyday contexts, assessment and the learning industry.

Contact: The Secretary
Department of Chemistry
Massey University
Private Bag 11-222
Palmerston North
or: Kath Fletcher
Central Hawkes Bay College
P O Box 482
Waipukurau
Tel: (+64-6) 8589203
Fax: (+64-6) 8587003

13-19 July 1997

VIII Pacific Science Inter-Congress: Islands in the Pacific Century

Venue: Fiji

Contact: Fax: (+679)-314007
Email: pas@usp.ac.fj
or http://www/usp.ac.fj/'psa

14-18 July 1997

Advanced Methods for Protein Analysis

Venue: University of Hertfordshire, England, UK

Contact: Professor John M Walker
Division of Biosciences
University of Hertfordshire
Hatfield, Herts AL 10 9AB, England, UK
Fax: (+44-1707)-284514

20-23 July 1997

Food Microbiology Conference

Venue: Sydney, Australia

Contact: Email: reply@icmsaust.com.au

20-24 July 1997

4th International Conference on Essential Fatty Acids and Eicosanoids

Venue: Edinburgh International Conference Centre, Edinburgh,Scotland, UK

Contact: Vicki Grant/Wendy Adegesun
c/o Meeting Makers, 50 George Street
Glasgow Gl IQA, Scotland, UK
Tel: (+44-141)-5531930
Fax: (+44-141)-5520511
Email: mm@meetingmakers.co.uk

20-25 July 1997

Biennial Meeting of the International Society for Neurochemistry and the Annual Meeting of the American Society for Neurochemistry (Joint Meeting)

Venue: Boston, USA

Contact: Mr Bill Doak
'97 ISN/ASN Secretariat, 1531 Pontius Avenue
Suite 200, Los Angeles, CA 90025, USA

27-30 July 1997

6th International Symposium on 'The Maillard Reaction'

Venue: London, England, UK

Contact: Department of Food Science and Technology
University of Reading
P O Box 226, Whiteknights
Reading RG6 6AP, England, UK
Fax: (+44-1734)-310080
Email: Maillard@afnovell.reading.ac.uk
www: http:\\www.fst.rdg.ac.uk/people/aamesjm/maillard.htm

18-21 August 1997

Plant Protection in a Green Oasis: The Next 50 Years, 50th New Zealand Plant Protection Conference

Venue: Lincoln University, Canterbury, New Zealand

Contact: Don Grabb
Fax: (03)-3252960

CONFERENCES & SEMINARS

18-22 August 1997

8th European Congress on Biotechnology,
70th Event of The European Federation of Biotechnology

Venue: Budapest, Hungary
Contact: Professor Laszlo Nyeste
Department of Agricultural Chemical Technology
Technical University
Budapest, H-1121 Hungary
Tel/Fax: (+36-1)-463220

25-27 August 1997

National Agriculture/Horticulture Science Convention: Boffins and Beancounters: is science driving the economy?

Venue: Lincoln University, Canterbury, New Zealand
Contact: Don Grabb
Fax: (03)-3252960

25-29 August 1997

5th International Conference on Amino Acids

Venue: Chalkidiki, Greece
Contact: Professor Dr M Liakopoulou-Kyriakides
Aristotle University of Thessaloniki
Department of Chemical Engineering
540 06 Thessaloniki, Greece
Fax: (+30)-31996193
Email: markyr@vergina.eng.auth.gr

28 August - 2 September 1997

Structure and Mechanism of Oxidases and Related Systems

This meeting will focus on recent advances on structure and mechanisms of oxidases and related iron-containing enzymes including peroxidases and catalase, di-iron enzymes, P-450 and oxygen-binding proteins

Venue: Devon, England, UK
Contact: Kelly Alderton
The Biochemical Society
59 Portland Place
London W1N 3AJ, England, UK
Tel: (+44-171)-5803481
Fax: (+44-171)-6377626
Email: meetings@biochemsoc.org.uk

1-14 September 1997

Biomolecular Recognition

Venue: Spetsai, Greece
Contact: Professor Dr Brian F C Clark
Department of Biostructural Chemistry
Institute of Chemistry, Aarhus University
Langelansgade 140
8000 Aarhus C, Denmark
Fax: (+45)-86196199

6-9 September 1997

38th International Conference on the Biochemistry of Lipids

Venue: Assisi, Italy
Contact: Secretariat, 38th ICBL
Institute of Biochemistry
University of Perugia
Via del Giochetto 3, 06122 Perugia, Italy
Tel: (+39-75)-5853419
Fax: (+39-75)-5853428

7-9 September 1997

NSW Southern Highlands Conference on Heterocyclic Chemistry

A multi-disciplinary conference in the style of the Burgenstock, Gordon and Grasmere conferences on the general theme of heterocyclic chemistry.

Venue: Milton Park, Bowral, NSW, Australia
Contact: Professor David St C Black
School of Chemistry
University of New South Wales
Sydney, NSW 2052, Australia
Fax: (+61-2)-93856141
Email: d.black@unsw.edu.au

21-26 September 1997

XXX Colloquium Spectroscopicum Internationale

Venue: World Congress Centre
Melbourne, Australia
Contact: The Meeting Planners
108 Church Street
Hawthorn, Victoria 3122
Australia
Tel: (+61-3)-98193700
Fax: (+61-3)-98195978

29 September - 3 October 1997

International Symposium on Biotechnology of Tropical and Subtropical Species

A symposium run by the Commission Biotechnology and the Commission Tropical and Subtropical Horticulture of the International Society for Horticultural Science

Venue: Brisbane, Australia
Contact: Organisers Australia
P O Box 1237
Milton, Queensland, Australia
Tel: (+61-7)-33697866
Fax: (+61-7)-33671471
Email: oa@bnec.design.net.au

12-16 October 1997

Second International Conference on Isotopes (2ICI)

Venue: Hyatt Regency Hotel, Sydney, Australia
Contact: Dr Clarence J Hardy
P O Box 85
Peakhurst, NSW 2210, Australia
Tel: (+61-2)-95796193
Fax: (+61-2)-95706473
Email: cjhardy@ozemail.com.au

15-17 October 1997

7th New Zealand Coal Conference

Venue: Park Royal Hotel, Wellington
Contact: The Conference Secretary
Seventh New Zealand Coal Conference
P O Box 31-244
Lower Hutt
Tel: (+64-4)-5703700
Fax: (+64-4)-5703701

CONFERENCES & SEMINARS

16-17 October 1997

Second Conference on Nuclear Science and Engineering In Australia (Ana 97)

Venue: Hyatt Regency Hotel, Sydney, Australia

Contact: Dr Clarence J Hardy
P O Box 85
Peakhurst, NSW 2210, Australia
Tel: (+61-2)-95796193
Fax: (+61-2)-95706473
Email: cjhardy@ozemail.com.au

21-23 October 1997

BioTechnica: International Trade Fair For Biotechnology

Venue: Hannover, Germany

Contact: Deutsche Messe AG
Messegelände
D-30521, Hannover, Germany
Fax: (+59-511)-8932626
WWW: http://www.biotechnica.de

26-30 October 1997

5th Pacific Polymer Conference

Venue: Hotel Hyundai, Kyongiu, Korea

Contact: Professor Sung Chul Kim
Secretariat of PPC-5
Department of Chemical Engineering
KAIST
Yusong-gu
Taejon, 305-701
Korea
Tel: (+81-42)-8698431 ext. 3914
Fax: (+82-42)-8698430
Email: kimsc@sorak.kaist.ac.kr
ppc5@cais.kaist.ac.kr

9-12 November 1997

Corrosion and Prevention 97

Venue: Hilton Hotel, Brisbane Australia

Contact: Secretariat
Corrosion Prevention Centre
P O Box 5142
Clayton, VIC 3168, Australia
Tel: (+61-3)-95440066
Fax: (+61-3)-95435905
Email: corrprev@internex.net.au

17-19 November 1997

1997 New Zealand Minerals and Mining Conference

Venue: Auckland

23-25 November 1997

6th Conference of the Society for Free Radical Research (Australasia)

Venue: Dunedin, New Zealand

Contact: Dr Mike Murphy
Biochemistry Department
University of Otago
P O Box 56, Dunedin, New Zealand
Tel: (+64-3)-4797871
Fax: (+64-3)-4797866
Email: murphy@sanger.otago.ac.nz

25-28 November 1997

Pacific Oils 2000: An International Conference on Plant Oils and Marine Lipids

Venue: Conference Centre
University of Auckland
New Zealand

Contact: Professor Con Cambie, Conference Chairman
Chemistry Department
University of Auckland
Private Bag 92019
Auckland, New Zealand
Tel: (+64-9)-3737999 ext. 8259
Fax: (+64-9)-3737422
Email: c.cambie@auckland.ac.nz

30 November-5 December 1997

Nature Conservation in Production Environments

Venue: Taupo, New Zealand

Contact: University of Auckland
School of Environmental and Marine Sciences
Tel: (09)-3737599
Fax: (09)-3737042
Email: sems@auckland.ac.nz

2-5 December 1997

13th Symposium on Biological Macromolecules and Ligands: Structure, Interactions and Applications

Venue: Quezon City, Philippines

Contact: Dr Gisela P Concepion
University of the Philippines
Marine Science Institute
Quezon City 1101
Republic of the Philippines
Tel and Fax: (+63-2)-9213799

6-8 April 1998

Conference on Production and Uses of Starch

Venue: Edinburgh, Scotland, UK

Contact: Dr C M Duffus
Crop Science and Technology Department
Scottish Agricultural College
West Mains Road
Edinburgh EH9 3JG
Scotland, UK

24-26 June 1998

Asia-Pacific Society for Neurochemistry: Biennial Conference

Venue: Seoul, Korea

Contact: Peter Dodd,
Email: peterD@qimr.edu.au

or full details from:
Professor Yoo-Hun Suh
C/- Organising Secretariat of 4th APSN Meeting
Department of Pharmacology
Seoul National University College of Medicine
28 Yongon-dong, Chongno-gu
Seoul 110-799
Korea

13-17 July 1998

MACRO 98 AUSTRALIA

37th IUPAC International Symposium on Macromolecules

Venue: Gold Coast, Queensland, Australia

This forefront conference will bring together polymer-oriented scientists, technologists, educators and students from all areas of the scientific community: academia, industry and government. It will provide an international forum for the communication and discussion of general and specific contemporary topics of interest to the polymer community.

The conference will embrace both the fundamental and applied aspects of polymer chemistry, polymer physics, materials technology and engineering. The program will focus on a number of broad themes which will incorporate a range of symposia, involving plenary and invited lectures, and contributed verbal and poster presentations. Plenary speakers will be Professor J Economy (USA), Professor J Feast (UK), Professor A Khokhlov (Russia) and Professor Y Tabata (Japan). A special International Symposium will be held in honour of the late Professor Jim O'Donnell.

Contact: MACRO 98 Secretariat
Chemistry Department, University of Queensland
Brisbane, Queensland 4072, Australia
Fax: (+61-7)-33654299
E-mail: macro98@chem.chemistry.uq.edu.au
Homepage:
http://www.uq.edu.au/~cmawhitt/macro98.html

2-7 August 1998

The 9th International Symposium on Novel Aromatic Compounds (ISNA-9)

Venue: The Hong Kong Convention and Exhibition Centre

Contact: Professor B Halton
Chemistry Department
Victoria University
P O Box 600
Wellington
Fax: (+64-4)-4955241
Email: brian.halton@vuw.ac.nz

6-11 February 2000

RACI 11th National Convention

Venue: Canberra, ACT, Australia

Contact: Dr W D Cook
Department of Materials Engineering
Monash University
Clayton, VIC 3168, Australia
Tel: (+61-3)-99054926
Fax: (+61-3)-99054940
Email: WDCOOK@eng2.eng.monash.edu.au

14-19 December 2000

Pacifichem 2000

Venue: Waikiki, Honolulu, Hawaii

Contact: Professor B Halton
Chemistry Department
Victoria University
P O Box 600
Wellington
Fax: (+64-4)-4955241
Email: brian.halton@vuw.ac.nz

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PACIFICHEM 2000

CHEMISTRY FOR THE MILLENNIUM

Honolulu, Hawaii, 14-19 December, 2000

PROPOSALS FOR SYMPOSIA - FIRST CLOSING DATE SEPTEMBER 15, 1997.

Pacifichem 2000 will encompass the ten broad areas of chemical sciences listed below. New Zealand individuals willing to organise a symposium on a topic that falls within any category are encouraged to seek co-organisers from two other Pacific Basin countries and submit a proposal for consideration by the Organising Committee in the first round. If Pacifichem '95 is any guide, the majority of proposals that are approved will come from the first round of considerations. Your co-operation in promoting your science is sought now.

1. **AGROCHEMISTRY**
   - including agriculture, cellulose, carbohydrate, pulp and paper chemistry.
2. **ANALYTICAL CHEMISTRY**
   - including clinical, electrochemical and trace analysis.
3. **BIOSCIENCE AND TECHNOLOGY**
   - including microbial and pharmaceutical chemistry.
4. **CHEMISTRY AND THE COMMUNITY**
   - including chemical education (for chemists, non-chemists and the public), chemical economics and business.
5. **ENVIRONMENTAL CHEMISTRY**
6. **INORGANIC CHEMISTRY**
   - including nuclear and geochemistry.
7. **MACROMOLECULAR CHEMISTRY**
8. **MEDICINAL CHEMISTRY**
9. **ORGANIC CHEMISTRY**
10. **PHYSICAL & THEORETICAL CHEMISTRY**

Deadlines:

15 September 1997	for consideration in the first round
15 August 1998	for consideration in the second round
15 January 1999	last date for receipt of a symposium proposal

Further information and symposium proposal application forms are available from:

Professor B Halton, Professor of Chemistry,
Victoria University, P O Box 600, Wellington.
Fax: (04)-4955241, Email: brianhalton@vuw.ac.nz

IUPAC-SPONSORED SYMPOSIA IN 1997-1998

16-20 June 1997
International Symposium on New Approaches in Polymer Synthesis and Macromolecular Formation
Venue: St Petersburg, Russia

20-25 July 1997
9th IUPAC Symposium on Organometallic Chemistry Directed Towards Organic Synthesis
Venue: Göttingen, Germany

27 July - 1 August 1997
8th International Conference on Bioinorganic Chemistry
Venue: Yokohama, Japan

17-22 August 1997
36th IUPAC Congress
Venue: Geneva, Switzerland

18-22 August 1997
13th International Symposium on Plasma Chemistry
Venue: Beijing, China

24-29 August 1997
32nd International Conference on Coordination Chemistry
Venue: Santiago, Chile

25-28 August 1997
12th Bratislava IUPAC International Conference on Polymers – Modified Polyolefins for Advanced Polymeric Materials
Venue: Bratislava, Slovak Republic

21-26 September 1997
30th Colloquium Spectroscopicum Internationale
Venue: Melbourne, Australia

23-27 November 1997
International Conference on Biodiversity and Bioresources – Conservation and Utilisation
Venue: Phuket, Thailand

16-21 August 1998
14th International Conference on Physical Organic Chemistry
Venue: Florianópolis, Santa Catarina, Brazil

30 August - 4 September 1998
33rd International Conference on Coordination Chemistry
Venue: Florence, Italy

For further information, please contact:
The NZIC Secretariat
P O Box 12-347, Wellington
Tel: (+64-4)-4739444
Fax: (+64-4)-4732324
Email: nzic@ipenz.org.nz

PACIFIC OILS 2000

An International Conference on Plant Oils and Marine Lipids

25-28 November 1997

Venue:
The Conference Centre, University of Auckland, Auckland

Programme:
- The commercial environment for new materials and products – specifications, regulations and evaluation.
- Production and processing methods, and technology of plant oils.
- The manipulation of plant materials and crops before extraction to match product specification.
- Analysis, composition and evaluation of products from both essential oils and fixed oils.
- Pharmacological, nutritional and health aspects of plant oils.
- Composition, analysis and commercial aspects of marine lipids.
- Pharmacological effects of marine lipids.

Plenary and Keynote Speakers include:

Dr Bob Ackman	– University of Nova Scotia, Canada
Mr Bryce Bell	– Secretary, Oilseed Federation, Australia
Prof. Carlo Bicchi	– University of Turin, Italy
Mr Tim Denny	– Denny MacKenzie Associates, Australia
Dr Bob Gibson	– Dept. of Pediatrics, Flinders University, Australia
Dr James Henderson	– Stirling University, UK
Dr David Horrobin	– Director of Efamol, UK
Dr Daniel Joulain	– Director of Research, Robertet, France
Prof. Julie Miller Jones	– St Catherine College, Minnesota, USA
Dr Colin Moffat	– Food Science Laboratory, Aberdeen, Scotland
Prof. John Ohlrogge	– Michigan State University, USA
Dr Noel Porter	– Crop & Food Research Institute, Lincoln University, New Zealand
Dr Siew Wai Lin	– Porim, Malaysia
Dr David Topping	– CSIRO, Adelaide, Australia
Dr John Volkman	– CSIRO, Hobart, Australia
Prof. Alistair Wilkins	– Chemistry Dept., University of Waikato, Hamilton
Mr Geoff Webster	– Abels (NZ) Ltd, Auckland

Contact:

Con Cambie
Conference Chairman
Chemistry Department
University of Auckland
Private Bag 92019
Auckland
New Zealand
Tel: (+64-9) 3737999 ext 8259
Fax: (+64-9) 3737422
Email: c.cambie@auckland.ac.nz

Ruth Eyres
Conference Secretary
Oils and Fats Specialist Group
P O Box 99711
Newmarket, Auckland
New Zealand
Fax: (+64-9) 5755982
Email: eyres@iconz.co.nz

NEW ZEALAND INSTITUTE OF CHEMISTRY

MESSAGE FROM THE PRESIDENT

Our membership fees are now down to NZ$85 (including GST and less the prompt payment discount). Can I make a plea for everyone to pay their subscriptions promptly please. Credit card payments or monthly payments by direct debit still entitle you to the prompt payment discount.

Late subscription payments harm the Institute in several ways:

1. We can not plan properly because we don't know how much money we have.
2. We have to carry high reserves to cover us while our subscriptions come in.
3. The executives have to spend a lot of valuable time chasing up subscriptions.
4. It is difficult to keep our membership database up to date.

The reason for the Institute's existence is to provide a network for chemists and a support structure to help members to take initiatives to support and to promote chemistry and the chemical sciences. It is important that as much as possible of our limited time and money is used for these purposes rather than for unnecessary administration tasks such as chasing up membership subscriptions.

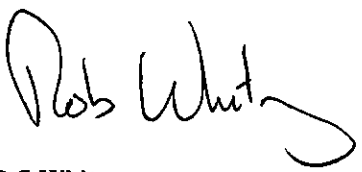
We have reduced our fees so that they are not a barrier to anyone being a member of the Institute. A further innovation is to reduce the fees to NZ$30 for anyone who is not currently in the workforce, this includes undergraduate and post graduate students, life members, and members not working because of family commitments or for other reasons. Our next initiative is to look at offering reduced fees to potential members who are also in kindred organisations such as the Science Teachers Association.

Full membership is now open to anyone with an interest in the chemical sciences. In the past membership grades have been structured to match our qualification system, this has been a barrier to increasing our membership. As there are now well recognised academic qualifications in chemistry at all levels, and accessible to everyone, it is no longer necessary for membership of the Institute to function as a substitute for formal qualifications.

In the new membership structure the grade of Fellow takes on a new importance. It will demonstrate both a commitment to chemical sciences, and peer recognition of scientific and professional experience. We want a lot more Fellows, it is not Council's intention to lower the requirements for recognition as a Fellow, but we do want to broaden them. We want to make them more flexible and less exclusive, and give increased weight to a member's demonstrated commitment to chemical sciences (such as participation in Institute activities).

The success of all these changes will be measured by a rise in membership over the next few years. We need to aim at a 15% increase per year. Those of us with children and teenagers will recognise the importance of peer pressure, this is one way you can participate in raising the profile of the Institute. Try and persuade your colleagues to join, talk about meetings and other events, if you are interviewing someone for a job ask them if they are in the Institute, use the journal more, for example, for job advertisements.

Council is trying to create a momentum for change, **if you want change, do what you can to help build this momentum.**



R S Whitney
President, NZIC

NZIC COUNCIL NEWS

MARCH COUNCIL MEETING - HIGHLIGHTS

Welcome to:

- 2nd Vice-President, Associate Professor George Clark from Auckland.
- New branch delegates, Dr Owen Curnow from Canterbury and Dr Bruce Graham from Auckland.

Business Plan:

- A VISION STATEMENT for the Institute was brainstormed (see insert).
- Next years plan to be prepared by Alastair MacGibbon (1st Vice President).
- The financial year to change to the calendar year (it currently runs from May to April), this will be phased in with two 10 month subscription years.

Subscriptions:

For May 1997 to February 1998

- Members - NZ$85 including rebate for prompt payment (NZ$95 full rate).
- Fellows - NZ$120 including rebate for prompt payment (NZ$130 full rate).
- Discount fee - NZ$30 for chemists not currently in the workforce, including students and Life Members. Includes rebate for prompt payment (NZ$35 full rate).
- Overseas - NZ$75 including rebate for prompt payment (NZ$85 full rate) for Members and Fellows.

Qualifications for Membership:
Membership will be open to anyone with an interest in chemical sciences who is prepared to adhere to our code of ethics. This means that the student members and associate members automatically qualify for full membership, students will of course only have to pay the discounted membership fee of NZ$30 until they get a job.

The requirements for Fellows will remain much the same but will be applied in a more flexible and inclusive manner. Fellowship of the Institute is a mechanism for peer recognition. FNZIC will demonstrate excellence and commitment to chemical sciences, and is intended to complement rather than substitute for formal University and Polytechnic qualifications.

Code of Ethics:
Nath Pritchard (Immediate Past President) will be updating our Code of Ethics. It needs to be simplified and brought up to date.

Conferences:

- 1996 conference — Otago Branch were thanked for organising this very successful conference.
- 1999 conference — Wellington will organise the next conference in early 1999 in conjunction with the IC'99 (RACI Division) Conference.
- 1997 Chem Ed Conference — The Institute is supporting this conference being held at Massey University. The President will address the

Exams and Quizzes:
The Institute will continue to support three exams for secondary school students, the Manawatu Branch Exam, The RACI Quiz, and the Canadian Chem 13 Exam. Further details are available from the Executive Officer.

NZIC COUNCIL ELECTIONS

Rule 16.2 states:-

"The President, Vice-Presidents, Honorary General Secretary and Honorary Treasurer shall be elected annually from nominations made by Branches, or by any six corporate members, and forwarded to the Executive Officer by September 30".

Please forward nominations to reach the Executive Officer by 30 September 1997.

P O Box 12-347
WELLINGTON
Fax (04) 473 2324

A A Turner
Honorary General Secretary for Council

STUDENTS HEAD FOR CHEMISTRY OLYMPIAD IN MONTREAL

The Chemistry Olympiad National Camp was held in the University of Auckland Chemistry Department during April 21-25, 1997. It was the biggest camp ever with twenty-one students from across New Zealand attending. This year we had a larger than usual contingent from Auckland (15), and, in addition there were three from Christchurch, two from Wellington and one from Te Kuiti. The attendees were part of a group of 30 students who had been participating in a correspondence training program organized by Dr Robert Maclagan of the University of Canterbury and Dr Sheila Woodgate from the Chemistry Department, University of Auckland. The training program involved six assignments and two tests covering topics which included acid-base and solubility equilibria, gas laws, volumetric analysis, atomic structure and covalent bonding, thermodynamics, and organic chemistry.

Sheila organised and ran the camp with help from Robert and Dr Jan Giffney from Birkenhead College. Each day we started at 8:30 am and finished at 8 pm having had two lectures, two problem-solving sessions and three hours of laboratory. We were most impressed with the enthusiasm and overall standard of performance of the students both before and during the camp period. However, at the end of it all, four students were sufficiently clear of the rest on the basis of the practical and theory assessment to be chosen as those who will accompany Sheila and Tim Oughton from the Christchurch College of Education to this year's Olympiad at Montreal.

The team members are: Alexander Ng (Auckland Grammar), Nick Webb (Shirley Boys' High, Christchurch), Luke Baxter (Westlake Boys' High, Auckland), and Malcolm Lowe (Auckland Grammar). The reserve is Jonathan Randle (Christchurch Boys' High). Luke is a sixth former, and he, Nick and Jonathan had not done Bursary Chemistry before this year.

In Montreal, they will face two exams - a practical and theoretical exam, each lasting about five hours. As well they will have the opportunity to meet and get to know students from about fifty other countries. Last year Ben Clark, a student from Wellington College won a silver medal at the Olympiad held in Moscow.

Thanks also goes to our sponsors: Ministry of Research, Science and Technology, Fletcher Challenge Trust, Tasman Pulp and Paper Company, Rohm and Haas, Unifoods, NZ Refining Company, and NZIC Canterbury Branch.

For further information,
Contact: Dr Robert Maclagan
Phone: (03) 3642456, Home: (03) 3599215, Fax: (03) 3642110

NZIC PRIZES AND AWARDS

SGS PRIZE

This prize of NZ$1,000.00 and a plaque has been donated by SGS (New Zealand) Ltd.

1. The prize shall be awarded to a member of the Institute

who, in the opinion of the Council, has made a significant contribution to some branch of chemical science, the contribution to be judged by research work published during the five years immediately proceeding 30th April in the year of the award.

2. Applications by members or nominations which may be submitted by Branch Committees or individual members must be received by the Executive Officer, P O Box 12347 Wellington by 30th June each year and must be accompanied by copies of papers presented in support of the entry. The Council itself may nominate candidates for the award.

3. A nomination or application, once made, shall stand for five years and material which fails to satisfy clause 1 shall automatically be deleted and additional material may be presented at any time.

4. If, in the opinion of Council, there is no candidate of sufficient merit, the Council may refrain from making the award.

5. The prize shall be presented at the Annual Conference of the Institute or at a meeting of the Branch to which the prize-winner belongs.

6. A member to whom the prize has been awarded shall not be eligible for re-nomination for future SGS prizes.

SHELL PRIZE FOR INDUSTRIAL AND APPLIED CHEMISTRY

A prize of NZ$1,000.00 and a certificate will be awarded annually by Shell New Zealand Holding Co. Ltd. to further the recipient's studies in industrial chemistry and to commemorate the achievement.

1. The prize will be awarded for meritorious achievement in the field of industrial or applied chemistry.

2. The prize will be restricted to financial members of the New Zealand Institute of Chemistry of any grade of membership. In the case of joint work the prize may be shared between two or more members.

3. Applications should include a written statement of the industrial or applied chemistry activities or achievements of the candidate(s) and their significance in terms of improved technology, new products or other benefits to industry and/or the community. Supporting documents and publications may be submitted with the application and **will be held to be confidential to the assessors.** If possible, the value of the work should be attested by an accompanying statement from the manager, or directors or head of the organisation. There is no limit on the period of time over which the work was carried out.

4. Applications for the prize may be made by individual members or nominations may be made by Branch Committees or by corporate members of the Institute. A nomination or application, once made, shall stand for five years.

5. Two or three assessors will be appointed by the Council of the Institute to consider the applications and make recommendations. The final decision on the award will be made by the Council. Council reserves the right to make no award in the absence of a suitable candidate.

6. Applications or nominations must be received by the Executive Officer, P O Box 12347, Wellington by 30th June each year.

AWARD FOR CHEMICAL EDUCATION

The Council of the Institute has established an award for chemical education consisting of a certificate and a prize of NZ$250.00. The award is to be made in compliance with the following rules:

1. The award will be made annually unless, in the opinion of Council, there is no candidate of sufficient merit.

2. The award shall be made to a person who, in the opinion of Council, has made an important contribution to Chemical Education in New Zealand. (Note: the award will normally be made to a secondary teacher actively involved in teaching chemistry.)

3. The award shall consist of a certificate and a prize of NZ$250.00.

4. The award is not restricted to financial members of the Institute.

5. Application for the award may be made by individuals, or nominations may be made by any Branch Committee or by any individual financial member of the Institute.

6. Applications or nominations must be received by the Executive Officer, P O Box 12347, Wellington by 30th June in the year of the award. Each application or nomination must include a full curriculum vitae and two independent supporting statements from referees commenting on the educational activities of the candidate and their significance to chemical education.

EASTERFIELD AWARD

The Medal was donated by the Royal Institute of Chemistry (now the Royal Society of Chemistry) in honour of the late Sir Thomas Hill Easterfield KBE MZ(Cant), PhD(Wutzburg) FRSNZ, FRIC, HonFNZIC, who was well known for his contribution in the field of chemistry and will be remembered particularly for the inspiration and encouragement he gave his students during the many years he was Professor of Chemistry at Victoria University College and for his infectious enthusiasm for chemical research.

Sir Thomas was the first chairman of the New Zealand section of the Royal Institute of Chemistry and also one of the early presidents of the New Zealand Institute of Chemistry. It is therefore fitting and in accordance with the wishes of the Council of the Royal Society of Chemistry that the two should act in association.

1. The medal shall be awarded to chemists in New Zealand in recognition of the quality and originality of their research work.

2. Candidates must be under 35 years of age as of 30th April in the year of their application for consideration for the award.

3. The award will be open to all chemists whether or not they are members of the Royal Society of Chemistry or the New Zealand Institute of Chemistry.

4. The major portion of the candidate's research work submitted must have been carried out in New Zealand.

5. No person may be awarded the Easterfield Medal more than once.

6. The successful candidate will be requested to deliver a lecture on the subject of his/her research at the Annual Conference of the New Zealand Institute of Chemistry or on some other suitable occasion.

7. The medal shall be awarded biennially and presented to the successful candidate on the occasion of his/her lecture.

8. The Selection Committee reserves the right to make no award in any year if the standard of work submitted is not of sufficient merit.

9. Expenses necessarily incurred by the Medallist in connection with the delivery of his/her lecture will be defrayed.

10. Applications by or on behalf of candidates for this award must be received by the Executive Officer, NZIC, P O Box 12-347, Wellington, by the 30th June and must be fully supported by all relevant papers (either published or unpublished).

11. The award will be made by the President of the Royal Society of Chemistry on the recommendation of a selection committee comprising the New Zealand Corresponding Secretary of the Royal Society of Chemistry, the President of the New Zealand Institute of Chemistry or his/her personally nominated representative and a Professor of Chemistry from one of the New Zealand universities.

This committee will have the right to co-opt one suitable person in an advisory capacity.

NZIC BRANCH NEWS

AUCKLAND

The Auckland branch kicked off its 1997 year with an entertaining talk entitled "Sushi, Strawberries, and Sugars" by Professor Laurie Melton. The snacks beforehand included said sushi - unfortunately, strawberries were out of season! Laurie joined the University of Auckland at the beginning of this year to take up the post of inaugural Director of Food Science, and is busy developing courses and setting up research space on the top floor of the Chemistry building. He is ably assisted in the latter effort by Tracey Bootten, the Food Science technician.

The Auckland branch is pleased to announce that Heather Charlton has been awarded the NZIC (Auckland branch) prize at the Auckland Institute of Technology and Matt Sidford has been awarded the NZIC (Auckland branch) prize at the University of Auckland. Heather has just started work as a technician at HortResearch in Mount Albert. Matt is currently writing his MSc thesis, and intends to continue on to a PhD.

UNIVERSITY OF AUCKLAND NEWS

Graham Bowmaker has returned from a period of research and study leave in 1996 which was spent working with Professor Hubert Schmidbaur in the Inorganic Chemistry Institute at the Technical University of Munich, Professor Notker Rösch in the Department of Theoretical Chemistry at the same University, and Professor Robin Harris in the Department of Chemistry, University of Durham. The Munich work involved structural, vibrational and nuclear magnetic resonance studies of Group 11 metal complexes. Topics studied included the phenomenon of propeller isomerism in two-coordinate complexes involving chiral ligands, and a direct physical proof of the relativistic contraction of the bond lengths in gold (I) complexes. The Durham work involved investigations of structure and bonding in mercury (II) compounds by solid-state 199Hg MAS (magic angle spinning) NMR spectroscopy. During this leave period, Graham visited colleagues and gave research seminars at twelve universities and other institutes in Australia, USA, Germany, Sweden, France and the UK, gave invited lectures at two international conferences, and attended a summer school on solid-state NMR spectroscopy.

Peter Schwerdtfeger has been invited to present the annual Research Lecture at the Hungarian Academy of Sciences in Budapest in December.

Graham Wright maintains his active interests in electrochemistry and corrosion science. Ellen Carter and Paul Kilmartin have obtained their PhDs from his group this year. Paul has stayed on with the department to act as a senior tutor for the analytical and physical sections.

Peter Boyd is currently visiting Professor C A Reed at the University of Southern California and is presenting a paper at the Fullerenes Symposium during the 191st meeting of the Electrochemical Society in Montreal, Canada.

Penny Brothers attended the Organometallic conference in Brisbane in July 1996, and Penny and David Ware have been continuing their research on the application of coordination chemistry to medicinal problems, and three of their PhD students travelled to Vancouver for the ICCC meeting in August. Helen Palmer has just successfully completed her PhD on cobalt complexes as hypoxia selective anticancer drugs, and has left to take up a postdoctoral position with Nick Farrell in Virginia. PhD student Peter Craig plans to attend the ICBIC conference in Japan later this year.

James Wright and Warren Roper have had an active and productive year and gave presentations at both the RACI Inorganic Chemistry Division National Conference in Townsville, and the XVIIth International Conference on Organometallic Chemistry in Brisbane in July last year. Three PhD students, Trish Yap, Scott Woodgate and Stephen Horner, and the German Post-Doctoral team, Klaus and Ute Hübler, also attended these two conferences and between them presented a total of thirteen posters. In addition to the science, some important sightseeing was also squeezed into the trip. Sadly, Klaus and Ute Hübler returned to Stuttgart in February this year after completing a very productive and enjoyable 20 months postdoctoral studies at Auckland. Jens Heimann returned to Munster in March after spending six months completing a Post-graduate Diploma of Science research project as well as taking some of the fourth year chemistry papers. Gary Schwarz, Sarah

Turnwald and Alex Clark all had their MSc degrees conferred in the April graduation ceremony and Rachael Simms graduated with a BSc(Hons) degree. Alex Clark has stayed on to complete a PhD degree. Alex Williamson began a postdoctoral position in November last year and is studying transition metal-boron chemistry. Alex graduated from the University of Sheffield where his PhD research supervisors were Duncan Bruce and Mark Winter. New MSc students are Sudhara Sotheeswaran and Yoke Ping Chaw.

Michael Taylor (Honorary Research Fellow) continues to pursue the coordination chemistry of gallium and indium. He is once again to spend July and August at Lund University, Sweden, as a member of the research group of Lars Bengtsson-Kloo, and will visit the UK briefly during this period.

The Analytical Section has undergone quite a few changes recently. Jim Metson is now the section's head, while Mike Fitzpatrick has been employed as a Senior Tutor in the Analytical Section for 1996 and 1997. Mike's research interests include the study of phytoestrogens in soy-based products and fungal generation of toxic gases from mattress materials. Mike has been filling the space (literally and figuratively) left by Peter Hauser's departure to the University of Basel, Switzerland. Peter's last two MSc students, Julie McCullagh and Brian Mills, have submitted their theses. However, Peter's influence at this university continues, with Peter Boyd and PhD student Mike Hodgson working on a porphyrin-based ion selective electrode. Bruce Grigor supervised MSc student Li Fong Leeong on a study of non-aqueous reversed-phase separation of triglycerides. Douglas Lai (Charmian O'Connor's group) has won an Honoured Student Award and the Manucher Eijadi Award from the American Oil Chemists' Society, and is presenting a paper on "Investigation of the activity and stability of enzymes of caprine origin" at their annual conference in Seattle, Washington during May.

Gordon Miskelly

MANAWATU

The 1997 Young Chemists meeting was held on Monday 17 March 1997 in the Hort+Research cafeteria. It began with dinner for about 27 people and included a chemical trivia quiz organised by Branch Committee member Clyde Smith. After the dinner, Selwyn Yorke, Head of the R&D Department at New Zealand Pharmaceuticals (NZP) spoke on "Applications of Chemistry in New Zealand Pharmaceuticals". He mentioned that NZP was owned by ICI, had 74 staff of which 8 were in R&D, and spent 6% of sales in R&D. The current products that NZP produces include proteins/amino acids (ferritin, thymus peptides, peptones, taurine), steroids from bile acids, and glycosaminoglycans (e.g., chrondoitin sulphate, and heparin). NZP produce heparin themselves but everything else that goes to the pharmaceutical industry is in the form of raw materials, with the core business being products from bile acids. Selwyn pointed out that the R&D staff were involved in a wide range of chemistry associated with separation science and technology - organic, physical, bio, and analytical. NZP are aiming to obtain more products from marine and plant sources. Selwyn stated that the ideal product would be one where the raw material was unique to New Zealand, grew well in New Zealand, had measurable biological activity, quantifiable chemical constituents, and there was a buyer available. NZP works with other organisations on product development, e.g., on D-Pinitol (provided by a certain type of tree in New Zealand), and on extracts from the herb Echinacea, which provides an immune system stimulant (Echinacea is a native American plant which grows well in New Zealand). NZP are currently involved in a number of new products, such as purified conjugated bile acid, desalted protein solutions, culinary herbs, and natural colours. In his summary, Selwyn emphasised the multidisciplinary nature of the downstream processing at NZP. He concluded by referring to NZP's firm safety policy for its operations and told the students present that vacation work was available for chemistry and biochemistry students as well as for technology students.

Gerard Kleywegt, Department of Molecular Biology, Uppsala University, Sweden addressed the Branch at a meeting of about 25 people on Thursday 17 April at the New Zealand Dairy Research Institute Seminar Rooms, on the topic "The structural basis of the interaction of a snake toxin with its target, acetycholinesterase (AChE)" or "why you want to stay friends with your pet green mamba". The function of AChE is to terminate nerve impulse transmissions by hydrolysis of the neurotransmitter acetycholine. Work has been done to determine the structure of AChE and elucidate the active site. Mamba venom is a cocktail of proteins and low molecular weight substances working synergistically. The toxins include fasciculins which specifically target AChE. Their action allows acetycholine to accumulate and cause muscle tremors and consequent damage to the nervous system. Gerard described work on the structures of fasciculins (Fas I and Fas II) and the structure of the complex resulting from the interaction between toxin and enzyme. The crystal structure of the AChE-Fas(II) complex has been solved. To obtain the complex, Fas-II was taken from green mamba venom and the AChE from an electric ray from the Pacific Ocean!

Congratulations to several members of the Branch Committee for recent achievements - Tony Burrell for promotion to Senior Lecturer in the Chemistry Department, Massey University, and to Mark Smales, current Branch Secretary, for recently completing a successful oral defence of his PhD in Chemistry thesis "Characterisation of lysozome-steroid glucuronide conjugates".

Geoff Jameson, Department of Chemistry, Massey University, played a major role in the organisation of a joint crystallography conference, CRYSTAL XX, of New Zealand and Australia which was held at the Lakeland Hotel in Queenstown 2-5 April, 1997. Ninety-six crystallographers attended this meeting, 60 from Australia, 21 from New Zealand and a further 15 from further afield. The Massey Crystallography group was well represented by 13 crystallographers who provided 10 research posters and 2 oral deliveries.

Sir John Meurig Thomas FRS, Master of Peterhouse, University of Cambridge, and Professor of Chemistry at the Davy Faraday Research Laboratory of the Royal Institution of Great Britain, visited Palmerston North on Tuesday 8 April. Sir John has been awarded many honours, amongst these being the Davy Medal of the Royal Society and the Faraday Medal of the Royal Society of Chemistry. In addition to his research in the fields of heterogeneous catalysis, solid state chemistry, materials, and surface science he has done much to popularise science among adults and children. Sir John gave an illuminating talk on the on the "World of catalysis", to a crowded Aston 1 lecture theatre

at Massey University (estimated audience of 130-150). He pointed out that catalysis goes well back in history and is now vital to the manufacture of a wide variety of materials including petrochemicals, pharmaceuticals, foodstuffs, and fertilisers. In fact, something like 90% of manufactured goods involve catalysis in their processing. Catalysts have usually been found or developed by trial and error, but the aim today is to assemble new catalysts rationally. Sir John described various kinds of catalysts including solid surfaces, metal complexes, enzymes, and artificial (miniature) catalyst types of various kinds. New techniques have been developed for characterising active sites in solid catalysts such as the parallel recording of x-ray absorption spectra and x-ray diffraction patterns, to give bonding distances, and coordination and oxidation states at the active site. Some active sites have acid catalytic functionality and some have redox functionality. One new catalyst "CoAPO-36" is a cobalt aluminium phosphate where Co replaces some Al in Al phosphate. This catalyst has acidic functionality and is shape selective for the catalytic dehydration of methanol to ethene, propene, and butene only. Sir John pointed out that a large number of materials can be synthesised as solids which are microporous (pores of 4-15 Angstrom units) or mesoporous (pores >15 Angstrom units) and can be manipulated with respect to active site production.

Later in the evening, Sir John gave the Rutherford Memorial Lecture at the Manawatu Science Centre on "Davy and Faraday - Tale of contrasting geniuses". Sir Humphrey Davy (1778-1829) and Michael Faraday (1791-1867) first worked together in 1813 at the Royal Institution, their work (together and separately) in chemistry and physics was to change the way in which society lived and worked. Sir John, in an excellent lecture, told the large audience (about 70 people) how Davy and Faraday worked and presented their findings not just to better scientific understanding but to improve society at a time when few people cared anything about science.

Harry Percival

WAIKATO

Dr Doug Wright, former president of the Institute and current convenor of the Possum and Bovine Tuberculosis Control National Science Strategy Committee has been appointed to the Marsupial Cooperative Research Centre's (CRC) Advisory Group and elected Chairperson. The CRC with its headquarters at Macquarie University, NSW was established by the Australian Government for the purpose of undertaking research and education programmes towards the conservation of threatened species of marsupials and the development of humane management strategies to control problem species. The participants in the CRC include Manaaki Whenua Landcare Research. The Advisory Group comprising representatives of stakeholders in marsupial conservation and/or management, will provide a link to the CRC and assist the CRC in its strategy development, its research priorities and the transfer of technology.

Congratulations go to Melanie Snow who won the ICI Prize for Best Student in First Year Chemistry at Waikato, 1996. This is the first year that the ICI prize has been instituted and it carries a generous award of $300.00 for the recipient.
Congratulations also go to Dr Vickery Arcus who has a Foundation post-doctoral position at Ruakura Research Centre in Hamilton. Vickery was a former illustrious Masters graduate student of this department who later went to Cambridge to obtain his PhD. Vic's present work involves working on proteins which bind insulin-like growth factors and control their availability to the IGF receptors. He is cloning one of these proteins with a view to over-expressing it in bacteria to produce enough protein to do some structural work with NMR as a principal technique.

Dr Bill Henderson has recently returned from a period of event-filled study leave in Japan where he was based at the National Institute of Materials and Chemical Research (NIMC) in Tsukuba, Ibaraki Prefecture. While he was there, he served on a National Committee of the Chemical Society of Japan on water-soluble metal complexes and gave a 50 minute presentation on water-soluble phosphines and their applications. He also wrote a contribution towards a report that is to be published by the Chemical Society of Japan. Bill also visited the Tokyo University of Agriculture and Technology as an honorary visiting Professor and gave a lecture on Electrospray Mass Spectrometry. Also while attending the 72nd Annual Meeting of the Chemical Society of Japan in Rikkio University, Tokyo, he gave a 30 minute invited lecture on the Applications of Electrospray Mass Spectrometry in Organometallic Chemistry. Yet another lecture was given on Electrospray Mass Spectrometry at the National Institute for Resources and the Environment at Tsukuba. In addition, he visited the University of Kyoto and presented a seminar on the Metallacyclic Chemistry of the Platinum Group Metals and Gold in the Faculty of Engineering and in the Department of Energy and Hydrocarbon Chemistry as well as a seminar on Hydroxymethylphosphines in the Department of Chemistry in the Faculty of Science at the University. Bill also found time to pursue some research into metal colloid formation using ultrasound as well as scanning tunnelling microscopy for probing the formation of anchored Fe-incorporated phosphines on mica surfaces.

The GRIF DPhil Fellowship for Calcium Phosphate Precipitation from Whey Permeates in the Dairy Industry is still open and candidates are urgently required before the funding offer expires in June. Could interested candidates send their CV to Dr Michael Mucalo, Chemistry Department, University of Waikato, Private Bag 3105, Hamilton, as soon as possible. Further information on the position can be found on the web page at http://www.waikato.ac.nz (make your way to the Chemistry web page and then the web page of Michael Mucalo).

The next issue of the New Zealand Physical Chemistry Newsletter will be out in July 1997 and I would, therefore, appreciate contributions relating to Physical Chemistry or Chemical Technology to be sent to me by June 15, 1997. You may send these by (snail) mail to Dr M R Mucalo, C/- Chemistry Department, University of Waikato, Private Bag 3105 Hamilton, or (preferably) via email to m.mucalo@waikato.ac.nz.

Michael Mucalo

WELLINGTON

The March meeting of the Wellington Branch comprised briefing sessions from three local students two of whom had been sponsored to recent events of significance. The availability of free drinks for university chemistry students at the pre-talk gathering set a relaxed tone to the evening and the student speakers complemented this with interesting and informative talks.

The first speaker, Jeremy Kennard from (St. Patrick's College, Silverstream) reported on his attendance at the Fletcher Summer Science School, and although disappointed with the lack of chemistry related activities at the school, he clearly enjoyed his time there and considered the school a success. For a relatively inexperienced speaker, he spoke confidently and clearly. The second speaker, Ben Clark, now attending Victoria University, spoke of his experiences gained from the 1996 Chemistry Olympiad in Moscow. His talk focused both on the selection for the New Zealand team and the Olympiad itself. It became quite clear that the Chemistry Olympiad had involved a lot of work, both for students and supervisors alike. However, the rewards were found in the sense of community enjoyed by the participants at the Olympiad. He also left no doubt that Moscow would not be high on his all time favourite places for tourists list "unless of course you like lots of old buildings".

The final speaker for the evening, Michael Dee, spoke on the topic of "Chemiluminescence in Model Lipid Systems" summarising his recent summer research at Victoria University. This served to complete research work undertaken during his Honours year in 1996. The three talks were well delivered and well received, and they made for a very enjoyable event.

The April meeting, held as this was about to go to press, involved a marking of the centenary of the electron by way of a lecture giving a fascinating perspective from Dr Jeff Tallon (IRL Ltd) organized by the New Zealand Institute of Physics and held jointly with NZIC - a more pertinent view of the electron's contribution to chemistry is to be provided in September by Dr Gerald Smith (IRL Ltd).

VICTORIA UNIVERSITY

The restructuring of Victoria University through "Devolution and Refocussing" (not revolution and defocussing as many of us would perhaps infer) has progressed to the level of the individual Departments. The 98 year history of the Chemistry Department came to a close on April 11 with its amalgamation with the former Physics Department from April 14. The event was commemorated by way of a wake over a longer than usual lunch period. Logic has prevailed in naming the new creation as School of Chemical and Physical Sciences (School-CAPS?). Neither of the former Professorial Departmental Chairmen, John Spencer (Chemistry) and Joe Trodahl (Physics) were available for appointment as the new full-time Head of School and this role has now been assumed for its first five-year tenure by Jim Johnston (Associate Professor of Chemistry); he was selected by the complement of staff from a group willing to make themselves available.

NEWS FROM BRANZ

Dr Stephen Meyer, a recent PhD graduate from Victoria University, has joined the Durability Section. He will be working on corrosion issues, especially the modelling of corrosive environments.

The Fire Section, with Colleen Wade taking the lead, have been formulating some proposals on how combustibility of claddings should be assessed for the Building Industry Authority. This issue is important in terms of the spread of fire up the cladding or from one building to another. The proposal encompasses use of the cone calorimeter to measure the rate of combustion whereby a sample of the actual material (including any protective coatings) is exposed to a well-defined radiation source. Mass loss and depression of the oxygen concentration in the gas stream are used to measure the rate of combustion and heat release which is taking place. This should allow for a scientific approach to selecting appropriate cladding systems.

Brian Halton

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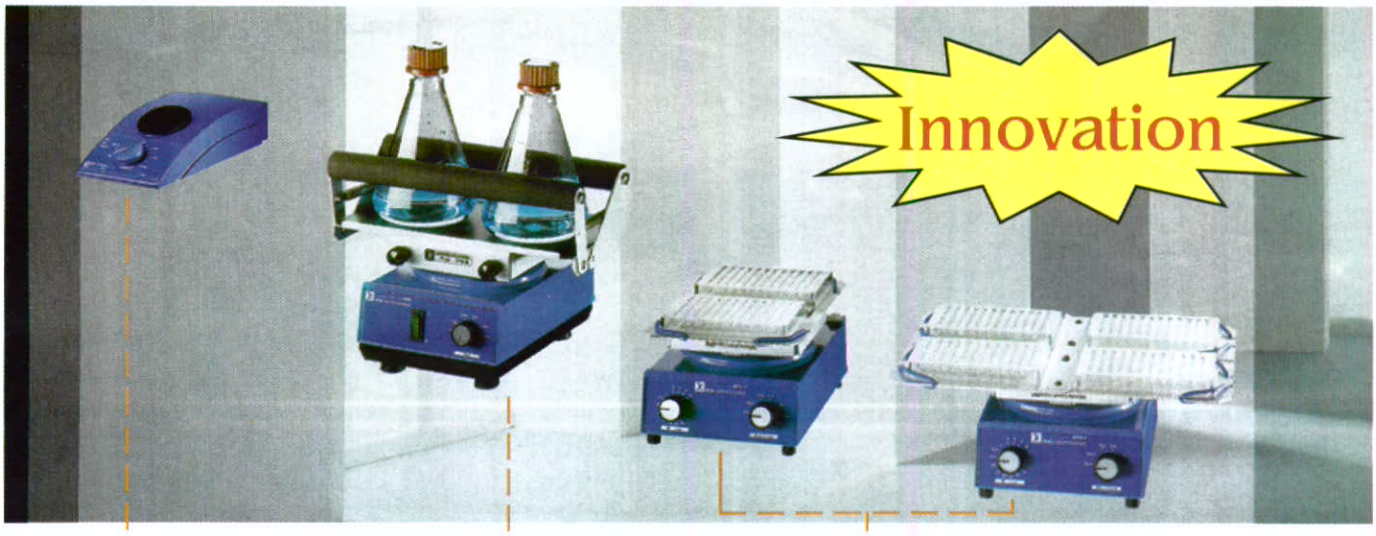

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