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NZIC Chemistry IN NEW ZEALAND

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IN NEW ZEALAND

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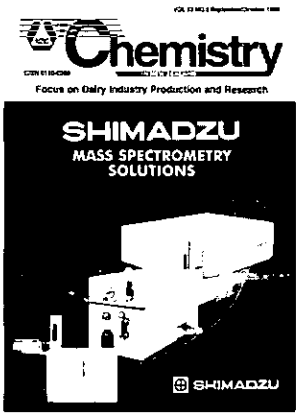

Coming Up ...

November 1999 Nutrition, Pharmaceuticals, Cosmetics, Microbiology, pH, Titration, Mixing

January 2000 Environmental Control and Testing, GC, GC/MS

Deadline for material *5th of the month of publication*

COVER STORY

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Whether you require an MS system for standard MS analysis or have demanding requirements for specialised product determination Shimadzu have a range of MS solutions to meet your needs.

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Shimadzu have two GCMS solutions available. The QP-5000 is available as a low cost, entry level system with full mass range and software capability. The QP-5050A is has an extended mass range, and is available in EI, CI and negative CI models. The Direct Insertion option enables samples difficult to chromatograph to be analysed routinely.

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The LCMS-QP8000a is the only fully integrated LCMS system currently available. For ease of use the Shimadzu system has been designed with the HPLC user in mind rather than the mass spectrometry specialist.

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International News

RESEARCH & DEVELOPMENT TAX CREDITS IN THE UNITED STATES

The Republican Tax Cut Bill, passed largely along party lines just before Congress went on its August recess, is facing a certain veto from President Bill Clinton once it lands on his desk in September. It appears, however, that a compromise might be reached, one that would retain many of the industry and environmental provisions now in the bill. The $792 billion tax cut is far beyond what the Clinton Administration has said is acceptable. It thinks a cut of around $250 billion would be just fine. If Republicans can get close to this figure and the cuts go mostly to middle-class individuals, then business and other provisions are very negotiable.

One provision likely to be included in any compromise is the reinstatement of the corporate research and development tax credit, which encourages companies to increase spending on R&D. Congress usually gives this 20-year-old break single-year extensions, although many have tried to make it permanent. The present extension expired 30 June 1999. This year, the Senate voted for a permanent credit, but the House approved a five-year extension. The House version prevailed. Early estimates are that this provision would cost the government about $13 billion in revenues over 10 years.

The bill also extends for four years tax credits to companies that produce electricity from wind and biomass sources. It adds poultry manure to the list of biomass sources eligible for the credit. At the other end of the energy spectrum, the law expands the tax deductions available to nuclear power facilities to help them be more competitive in today's energy market.

YOUNG SCIENTISTS TRAVEL FELLOWS' SYMPOSIUM

Applications are being called for sponsorships to attend the Young Scientists Travel Fellows' Symposium that is associated with the 18th International Congress of Biochemistry and Molecular Biology at the University of Birmingham to be held in Birmingham from 13 to 16 July 2000.

For further information, email: info@iubmb2000.org

NZ Science Scene

TECHNOLOGY FUNDING EXCEEDS PREVIOUS RECORDS

Technology New Zealand has just reported a record year, with more than $25 million allocated to businesses this year (July 1998-June 1999).

It is the largest amount of funding ever allocated by the Government's eight year old business technology fund scheme. Last year, $20 million was allocated.

A record number of 1,000 projects was funded during the year, more than double that of last year (464). This year has also been notable for the larger number of applications for funding coming from businesses new to Technology New Zealand.

Dr Steve Thompson, Chief Executive of the Foundation for Research, Science and Technology, which administers Technology New Zealand, says the growth reflects a 'coming of age' for many New Zealand companies, who are recognising the value that innovation contributes to wealth creation.

"The results are particularly pleasing, given that records set in previous years were beyond Technology New Zealand's expectations," he says. "Projects are represented right across the board, from small technical consultancy jobs through to clustering assistance and large scale leading-edge development projects. Businesses are also using Technology New Zealand to access help through TechNet, a source of expertise in specialist technical areas."

Preliminary figures indicate that around a third of the projects were funded under Technology New Zealand's Technology for Business Growth Programme. Almost 100 Fellowships were awarded to tertiary students in the Graduates in Industry Fellowships Programme during the year. To date, a total of 285 tertiary students and graduates have received funding from Technology New Zealand to carry out research within companies.

FOOD IRRADIATION

Trans-Tasman authorities have adopted an Australian-drafted standard covering irradiation of foods, which health officials say may help reduce food-borne disease and improve border security against unwanted pests.

The Australia New Zealand Food Standards Council - made up of the two countries' health ministers - recently signed the standard, on which New Zealanders made submissions earlier this year.

Technically, it will tighten up the present arrangements, so that no irradiated food can be sold in New Zealand or Australia until it has been assessed for safety by the Australia New Zealand Food Authority (ANZFA) and approved by the two countries' health ministers.

Under the new standard, the public would be consulted, a safety assessment of the product carried out, and the applicant would have to prove that irradiation was needed to destroy contamination or pests or to extend shelf life. And any food allowed onto the shelves would be labelled.

Irradiation exposes products such as dried spices, fruit and meat to tiny amounts of electron beams that kill deadly bugs such as *E. coli* 0157:H7, a virulent form of bacteria that can cause serious food poisoning.

Irradiated food does not become radioactive, because the gamma rays used are not energetic enough, and the food does not come into physical contact with radioactive material.

Until now, regulations under the Food Act 1984 have theoretically allowed

the sale of irradiated food with the permission of the health minister, but a policy developed in 1989 said use of the process or its products should not be permitted in New Zealand.

Official approval is only known to have been given once, for a shipment of paprika, a spice often contaminated with salmonella bacteria. But Health officials have admitted that despite the moratorium on irradiated food, other irradiated spices have entered the country since 1989.

Current food regulations permit the treatment of spices with a chemical, ethylene oxide (ETO), but this was thought to be a carcinogen and had been banned in many countries.

Health Ministry advisers have described irradiation as a highly effective method of destroying micro-organisms in food, including those which might spoil it or cause illness, "purportedly without compromising safety or affecting nutritional and sensory - taste, flavour, texture - quality".

Irradiation can change the taste of some food, as does other food processing systems such as heat. Many dairy products develop objectionable changes in flavour, odour and colour even at low radiation doses, and whole eggs were also difficult to treat.

The Ministry of Health is aware it is particularly difficult to ensure the safety of spices through means other than irradiation, because alternative methods involve toxic fumigants which can leave residues in foods and can be unsafe for workers using them. For this reason countries are increasingly looking for food irradiation as a safe and useful way to treat food.

An ANZFA official is quoted as saying that it was not immediately clear what implications the trans-Tasman food standard held for New Zealand exporters keen to irradiate fruit such as apples, and strawberries, or meat, before export.

DAIRY INDUSTRY AND BIOTECHNOLOGY

The Dairy Board says it will boost its research spending by up to $150 million over the next five years to "investigate the potential" of biotechnology.

The board already invests $55 million a year in research and development - about 0.8 percent of its turnover - and uses another $13.5 million in state science funding. The latest boost - between $20 million and $30 million annually - will take its total research investment to over 1 percent of turnover.

The board, which has spent years saying it would follow consumer demand in any use of technologies such as engineered hormones, cloning and cattle with modified milk, has been signalling such an investment since industry restructuring went into high gear last December.

Dairy Board chairman John Storey, emphasised the industry would always be "acutely sensitive" to consumer perceptions and maintaining the confidence of its customers. But Mr Storey also said it was "imperative" to ensure the industry stayed abreast of developments in the field. "Our competitors are making large investments in this area and we need to ensure we keep abreast of the science involved," Mr Storey said.

Advances in biotechnology - such as genetic engineering or cloning plants and animals, and the use of synthetic hormones to boost production - represented both a serious threat and huge opportunity for the agricultural sector.

The New Zealand dairy industry's trump card was pasture-based low cost production.

The industry's own studies showed the potential returns from biotechnology were big, even though it would be at least five years before new products or processes emerged from the programme.

Dairy Board research and development general manager Kevin Marshall said the use of biotechnology by foreign competitors had the potential to severely erode New Zealand's current advantage.

One challenge was already coming from the crop sector, where researchers were developing maize and soy plants capable of producing soy oil similar to milkfat, or proteins similar to those found in milk.

"These opportunities and threats are so significant that we must undertake research. For the dairy sector, technologies such as genetic engineering were attractive because they allowed the acceleration and better control of traditional breeding processes in both plants and animals.

"Biotechnology will have an incalculable impact on New Zealand's $13 billion agricultural export industries," he said "Research is required to understand the full impacts of biotechnology," he said. "Research is also required to stay in the technology race to keep open the commercial options."

The initial focus was likely to be on improving pastures, speed up the genetic gain in animals, and then, in the longer term produce new dairy products.

Mr Marshall said it was important people realised that not all production advances would rely on actually changing the genetic make-up of plants or animals.

Significant gains in efficiency could be made though simply being able to "map" the genes of a dairy cow, and identify them sufficiently to be able to select specific animals from conventional breeding lines for special-purpose herds.

JAMES COOK RESEARCH FELLOWSHIPS

The Royal Society of New Zealand, which administers the James Cook Research Fellowships, is calling for applications in the following research categories:

- Social Sciences
- Research of relevance to the peoples of New Zealand and/or the South West Pacific
- Biological Sciences (including biotechnology)
- Health Sciences

The Fellowships are awarded to senior researchers who are recognised leaders in their respective fields, have the requisite qualifications and experience and are able to demonstrate that they have achieved national and international recognition in their area of scientific or technological research.

The closing date for applications is 22 October 1999.

For further information about the Fellowships, guidelines, and application forms, please access the Royal Society's web page
http//:www.rsnz.govt.nz/awards/cookinfo.html
or email: awards@rsnz.govt.nz

SEAWEED-BASED ANTI-INFLAMMATORY GEL DEVELOPED

"Significant sales" are being negotiated in the United States of a seaweed-based anti-inflammatory gel that has been developed by Dr Ian Miller of Lower Hutt-based Carina Chemical Laboratories Ltd. Dr Miller has been helped in his programme by Dr Richard Furneaux and Dr Ruth Falshaw, both of Industrial Research Ltd, and Dr John Blunt of the University of Canterbury. The gel has been developed for medical purposes such as skin conditions, and reducing swelling in sports injuries. The research is an investment of the Public Good Science Fund. The manufactured products use materials (polysaccharides) extracted from seaweed.

LABOUR PROMISES R&D RELIEF

Full tax write-offs for research and development expenditure and accelerated depreciation for investment in technology are being promised by Labour if it gets into power. Labour Leader, Rt Hon Helen Clark, said the moves would be part of her government's moves to facilitate business for knowledge-based companies.

The Labour Party would also develop a new economic assistance fund to support local and regional governments developing economic growth strategies as well as local clusters of industries. "Existing programmes like Technology for Business Growth run by Technology New Zealand will be promoted and expanded so that our companies can become greater earners of wealth for the country and larger employers of skilled labour," Ms Clark said.

Labour also saw a role in addressing market failures by providing financing for small- and medium-sized business. Labour would set up a new foreign direct investment division in the New Zealand Trade Development Board to promote foreign direct investments, she said.

SELECT COMMITTEE QUESTIONS R&D POLICY

One of the significant differences of an MMP Parliamentary system is the greater influence and independence of the select committees of the House. The Education and Science Committee has just called the Government to account for falling behind its self-imposed target for public spending on research, science and technology. In reporting on the estimates of expenditure, the committee said "This Budget (99/2000) takes us into the 21st century, but does not signal the financial commitment to research and development the next century will demand."

The committee also expressed concern that there appeared to be no way of measuring the effectiveness of the more than $400 million spent through the RS&T vote. It felt that though the MoRST publication "Blueprint for Change" sets out in general terms the outcomes sought, "There appears to be a lot of faith that the new policy will achieve its aims but there is no measurable way of knowing when they are achieved."

Hon Maurice Williamson, Minister of RS&T, defended the "Blueprint for Change" against charges by certain committee members that the document was "incomprehensible".

Current members of the select committee are: Tony Steel (Chair); Belinda Vernon (Deputy); Shane Arden; Donna Awatere Huata; Helen Duncan; Liz Gordon; Neil Kirton; and Janet Mackey. The chair doesn't have a casting vote and the Government is not in the majority.

TEAM OF SCIENTISTS TO PREPARE INVENTORY OF LIFE ON EARTH

A group of countries has decided to prepare "the equivalent of a world telephone book of life on Earth", a project that promises to revolutionise the study of biology and influence international environmental policy.

At present, there is no single place that has recorded the scientific names of all species that have been named. The project's main goal is to create a worldwide electronic information network called the Global Biodiversity Information Facility. Scientists hope it will become the single database that pools all the recorded but widely scattered data about the Earth's animals, plants, and micro-organisms. The database is to be made accessible via the Internet.

Work on the facility is to start this year. It is being launched under the aegis of the Organisation for Economic Cooperation and Development, a Paris-based research group that encompasses the 29 most industrialised nations. Science ministers from the organisation approved the plan in June and in August specialists, with an initial budget of US$3 million, began setting up a work programme.

The global network is to include both the domestic biodiversity of each participating country and the data about its stored materials that have been collected around the world. Designers say the database will have to be flexible enough to adapt as science gains a greater understanding of organisms and redefines categories.

A number of countries, including Australia, Britain, Canada, and the United States, already have on-line programmes offering biological information on their main domestic species, but even in these countries the biodiversity inventories are not complete. Moreover, many of the world's historical collections, like those in Britain, France, Germany, and Russia, often dating back to the 18th century, have not been entered into computer records.

1999/2000 INTERNATIONAL SCIENCE AND TECHNOLOGY (ISAT) LINKAGES FUND

The first round of funding from the 1999/2000 ISAT Linkages Fund has been completed. Applications were of a high standard with interest shown from researchers in 20 different institutions (8 CRIs, 7 Universities, 2 Research Association, 1 Polytechnic, and 2 Other). 53% of the applications were for funding from the Bilateral Research Activities Programme (BRAP); 37% from the NZ/USA Cooperative Science Programme (CSP); and 10% NZ/Deutsche Forschungsgemeinschaft (DFG) Programme.

58% of the successful applications were in the BRAP programme; 32% in CSP; and 10% in DFG. The countries involved in the successful BRAP applications include Argentina, Australia, Brazil, Chile, China, Denmark, Israel, Japan, Korea, Russia, Singapore, The Netherlands, and the United Kingdom.

Of the successful applications, 41% were in the Life Sciences; 24% Physical Science/Engineering; 8% Biochemical and Biomedical Sciences; 17% Earth Sciences and Astronomy; and 10% Social Sciences.

FOREST RESEARCH OPENS NEW MILLENNIUM RESEARCH FACILITY

The need for a state-of-the-art nuclear magnetic resonance (NMR) facility at Forest Research in Rotorua has led to the upgrade and expansion of the magnetic resonance suite with the latest digital NMR spectrometers, purchased at a capital investment of $900,000. The Hon Simon Upton, Minister for Crown Research Institutes, officially opened the facility on August 5 1999.

The understanding of the chemical structure and interactions of organic compounds within complex matrices such as wood is needed by a large range of scientific disciplines. The new facility has extended the range of work that can now be completed at Forest Research.

2000 INTERNATIONAL SCIENCE FESTIVAL

New Zealand's Official Millennium SciFest.

From 1 to 16 July 2000 the International Science Festival will focus on Global Change. Global Change encompasses the principles and applications of science and technology that impact on, and enable us to reflect upon, understand and predict changes that affect our world and our future.

The 2000 International Science Festival will focus on the physical, chemical, biological, ecological and human interactions of our world, including:

- prehistoric and historical global changes;
- changes in global, national and local human activities;
- the impacts and implications of ecological and environmental global change;
- scientific and technological advances and related ethical issues;
- Global change and its impact on research, education and our society into the 21st Century.

The Festival provides the ideal opportunity for science, technology and research organisations, and educational institutions from around New Zealand to showcase their work, raise awareness for the issues of Global Change, and raise the profile of their institutions.

The organisers are currently calling for registrations of interest in contributing events, to the 2000 International Science Festival.

For more information and to register your interest in participating in the 2000 International Science Festival please email director@scifest.org.nz

NEW ZEALAND TRAILS IN THE KNOWLEDGE RACE

The percentage of New Zealanders with university qualifications is well behind OECD averages, putting at risk the country's ability to develop a knowledge-based economy.

University of Auckland Pro Vice-Chancellor (Equal Opportunities), Professor Dame Anne Salmond FRSNZ, says that while worldwide participation in education beyond the compulsory school years is rising, the percentage of New Zealanders with university qualifications is well behind the rates achieved in other developed countries and falling.

"Although the proportion of New Zealanders attaining university qualifications has risen recently, it is not increasing sufficiently fast for New Zealand to keep pace with other developed countries. In fact, in the first semester this year, university student numbers fell for the first time in a decade," she says.

In New Zealand, 11% of the population aged 25-64 has university qualifications compared with 13% in the UK, 17% in Canada, and 26% in the USA. Professor Salmond said New Zealand's failure to keep pace had economic implications for individuals and the country as a whole. "Employers place a premium on qualifications and in fact university graduates in OECD countries typically earn 30-60% more than other tertiary graduates by mid-career. In New Zealand, the figure is 62% more. "Those without tertiary qualifications can expect to spend more than twice as long unemployed and to spend twice as long out of the labour market as tertiary graduates. When employment is secured, it tends to be in low-earning fields. "There is the potential for New Zealand to deteriorate into a low level economy."

Professor Salmond said New Zealand needed to lift the level of participation in university education.

"We are among a small number of countries which reduced the percentage of direct public spending on education relative to GDP between 1990-95. Although there are signs this trend is slowly being reversed, spending has yet to return to the levels experienced earlier this decade. Yet the global push for increased knowledge demands growing participation in a strong, diversified and internationally competitive tertiary education sector."

GEOLOGY RESOURCE KITS PRODUCED FOR NEW ZEALAND SCHOOLS

The Department of Geological Sciences at the University of Canterbury has begun a major initiative to help teachers in New Zealand schools teach the earth sciences curriculum. The first of a planned series of nine resource kits has already been produced and distributed to about 50 intermediate and secondary schools. Devised and developed by Dr Kerry Swanson, Mr Arthur Nicholas and Mr Glen Vallender, the modules build on the successful "Geology is." posters distributed several years ago. Few teachers have formal training in geology and the intention of the modules is to provide ideas on the kinds of areas they could cover in their syllabus.

The first module investigates the black sands of West Coast beaches, specifically those of Tauranga Bay near Westport. The distribution of heavy minerals in the sands alters with different wave action, topography and obstacles on the beach, and students can reproduce these patterns and effects by mixing water with the contents of the resource kit, a packet of Tauranga sand and a metal tray. The sands can also be used for other activities.

Dr Swanson and Mr Nicholas are now working on the second model which covers microfossils. Tentative topics for modules 3 and 4 are building stones and coal.

For further information about the resource kits,
email: geol021@canterbury.ac.nz

MARSDEN FUND AWARDS $9.6M TO RESEARCH PROJECTS

The Marsden Fund has awarded new grants worth $9.591 million this year, providing funding for 74 research projects at the international cutting edge of their discipline. The money is this year's share of an annual $23 million commitment by Government to the Marsden Fund. Each successful project receives funding for up to three years.

The biggest grant of the 1999 awards goes to a group of six researchers in a major initiative looking into the fundamental principles of gene regulation. The scientists who last year succeeded in producing the mysterious fifth state of matter known as the Bose-

Einstein condensate received funding to continue their landmark work.

Other successful projects range from investigations of the early development of memory to innovative ideas in climate research; from research into the origin of interstellar dust to novel approaches to mining texts for relevant information; and from studies of molecular architecture to explorations of the navigational skills of fish larvae. To see the full list of successful applicants, access http://www.rsnz.govt.nz/marsden

The 74 projects receiving funding have been selected in a two-step process. From 773 applications, 132 were asked to submit a full proposal, which amounted to requests for more than $24 million. The Marsden Fund Committee noted that all full proposals were worthy of funding and that some difficult decisions had to be made in allocating from the amount available.

The Marsden Fund supports excellent fundamental research, irrespective of topic or science area. Government provides funding for projects that will widen the knowledge base in New Zealand, enhancing the country's ability to participate in, and benefit from, research of an international standard.

The Marsden Fund is a contestable fund administered by the Royal Society of New Zealand.

NEW BOARD MEMBERS FOR FOUNDATION FOR RESEARCH, SCIENCE & TECHNOLOGY

"Key "new economy" areas such as electronics, biochemistry and the environment will be boosted by the appointment of three new members to the Board of the Foundation for Research, Science and Technology", Minister of Research, Science and Technology, Maurice Williamson said when announcing the new appointments recently.

Mr Williamson said Neville Jordan, Maxine Simmons and Dr Andrew Pearce have been appointed as members of the FRST Board from 1 October 1999 to 30 September 2002.

Neville Jordan is founder and former Chief Executive of MAS Technology, a successful hi-tech company. He is a former Crown Research Institute director and has chaired several commercial companies and Crown bodies.

Maxine Simmons is Founder and Executive Director of Immuno-Chemical Products Ltd - a biochemical manufacturing business. Ms Simmons has a strong science background, business acumen and science skills. She is a member of the New Zealand Biotechnology Association (BIOTENZ) and the New Zealand Institute of Directors.

Dr Andrew Pearce has been Chief Executive of Landcare Research Ltd, a Crown Research Institute specialising in environmental research, since 1992. Dr Pearce is a director of several research-focused companies in New Zealand and Australia.

An existing member, Rick Christie, has been appointed as the Deputy Presiding Member of the Board until 1 August 2000. Mr Christie is the longest serving Foundation board member.

"The new members are familiar with the issues involved with moving technology from the research bench into the wider economy, as they have significant research, innovation and business experience," Mr Williamson said.

The members finishing their terms on the Board are Dr Margaret Loutit (Deputy Presiding Chair), Mr Pat Garden, Dr Geoffrey Page, and Professor Ian Smith.

1999 FUTURE DIRECTORS' AWARD WINNERS PUTTING SCIENCE AND TECHNOLOGY INTO NEW ZEALAND'S BOARDROOMS

This year there was a high degree of interest in this award which is administered and funded by the Ministry of Research, Science & Technology, with over 35 applications being received. Overall the extremely high calibre of applicants made the selection process very difficult.

Applications were assessed on a merit basis, consistent with the objectives of the scheme. Consideration was also given to leadership potential, appropriate management experience and likelihood of appointment in the near future.

The successful applicants were:

- Mr Peter Barrowclough, Manager, Crop and Food Research Ltd
- Ms Vicki Hyde, Managing Editor, South Pacific Information Services Limited
- Professor Ray Winger, Professor of Food and Technology, Massey University
- Dr Douglas Sheppard, Director, Geochemical Solutions
- Dr David Bibby, General Manager, Industrial Research Limited
- Dr Valerie Orchard, Science and Research Manager, Environmental and Scientific Research Ltd

The selection panel this year comprised Hamish Campbell (Adviser, Ministry of Research, Science and Technology), Ron Hamilton (Director of Appointments and Governance, Crown Company Monitoring Unit), and Sally Davenport (1997 Award Winner, and School of Business & Public Management, VUW).

CALL FOR "APPLICATION FOR SUPPORT" FOR ANTARCTIC AND SOUTHERN OCEAN RESEARCH

Antarctica New Zealand is now accepting applications for support for Antarctic and Southern Ocean research for 2000/2001 and/or 2001/2002 seasons. All researchers seeking logistic support from Antarctica New Zealand for the 2000/2001 and/or 2001/2002 seasons must fill out an "Application for Support" application pack.

All applications will be assessed according to the principles and priorities outlined in the Antarctica New Zealand 1998 Strategy entitled, "A New Zealand Science Strategy for Antarctica and the Southern Ocean". The Antarctic Research Committee will rank the proposals according to scientific merit, relevance to the strategy, and logistical feasibility.

If you are interested in applying for Antarctic research support, please email d.peterson@antarcticanz.govt.nz for an application pack. Forms are also available on the Antarctica New Zealand website http://www.antarcticanz.govt.nz/

A Copy of the strategy document is available upon request. "Application for Support" forms are due 15 October 1999. No late applications will be accepted.

LOTTERIES BOARD ENCOURAGED TO REINSTATE RESEARCH FUNDING

The Association of University Staff has called on Internal Affairs Minister Jack Elder to restore the $1 million-a-year Lottery Science Fund, previously available to researchers to buy equipment. Association president-elect Neville Blampied said in Christchurch recently that the Lotteries Board, chaired by Mr Elder, had cut the funding in 1997 because of insufficient money. "The Lotteries Commission has recently announced a profit of $139.7 million, up $1 million on the figure for the previous year," Mr Blampied said in a statement. Restoring the grant to enable researchers to obtain vital pieces of equipment would be in accordance with the Government's Bright Future policy, Mr Blampied said.

PLASTICS EXPERT TAKES UP CHAIR AT UNIVERSITY OF AUCKLAND

A world expert in the processing behaviour of plastics has taken up a chair in the Mechanical Engineering Department, University of Auckland. Professor Roy Crawford, who emigrated to New Zealand from Ireland to take up his new position, is the inventor of plastics-related products and processes. These range from the plastic reed for bagpipes (a worldwide market estimated at $45 million) to a mould pressurisation system to remove the pin-holes which have characterised and dogged rotomoulded products since that process was first developed.

Throughout his 27-year career at Queen's University, Belfast, Professor Crawford combined scientific rigour with work having a direct practical relevance to industry. He will continue this mix in New Zealand, and already has plans to establish a plastics and composites research centre within Mechanical Engineering as a focal point to attract industry and research funds into the University. He will run a one-day training course in October to make people in industry aware of what the University is trying to do.

Roy Crawford was Professor of Engineering Materials at Queen's University before becoming director of the Polymer Processing Research Centre there. He gained all his degrees at Queen's, including his PhD and a DSc in 1987.

NEW DEGREES AT MASSEY UNIVERSITY

Massey University is to introduce three new science degrees for 2000 — food science, human nutrition, and sports science. Head of Massey's Institute of Food, Nutrition and Human Health, Professor Paul Moughan, said the introduction of the courses was a response to the Government's recent announcement that it planned to invest in science-related education.

SCIENTISTS BELIEVE SPONGE CAN HELP MEDICINE

A newly discovered New Zealand marine sponge previously thought to have been extinct for more than 60 million years can help modern medicine, marine biologists Dr Michelle Kelly of NIWA and Professor John Buckeridge of Auckland Institute of Technology believe. They have been awarded $140,000 by the Marsden Fund to study a group of deep sea lithistid sponges, described as living fossils.

Dr Kelly, one of the world's top sponge experts, said the lithistid group of sponges, found in water 200m-800m deep, were of special interest because DNA testing revealed they were made of similar materials to sponges which existed millions of years ago, and could provide a key to the origin of other sponges around the world. Dr Kelly and colleagues at NIWA were also studying whether the structural properties of deep-sea sponges could be used in surgery and technology. They believed they were the first scientists in the world to study the possible use of sponge fibres in medicine.

UNIVERSITY OF AUCKLAND APPOINTS NEW DIRECTOR OF EXTERNAL RESEARCH PROGRAMMES

Dr Ellen Förch, the University's new Director of External Research Programmes, has a career spanning hands-on research, research management and being an end-user of research.

Her most urgent task at the moment, and one she has had to "hit the ground running" on, is getting to grips with the meaning of the changes to criteria for the Public Good Science Fund.

"The whole scene has changed," says Dr Förch, who a few years ago worked as a project manager for the Foundation for Research, Science and Technology Public Good Science Fund. "How the process will work is not clear, but part of my job is keeping very close liaison with developments as they happen and making sure that key players are aware of and involved in the developments."

Dr Förch gained her PhD in zoology from Victoria University of Wellington and worked as a deep-sea-going marine scientist. With motherhood, she became interested in science education. This resulted in two stints as consultant to the children's science museum, Capital Discovery, in Wellington, and further study to gain a postgraduate diploma in museum studies through Massey University.

After working for FoRST, she became a consultant for the Ministry of Research, Science and Technology, and was contract researcher for NIWA. Then she became research manager for the Open Polytech "where my interest was the nature of research cultures and the conditions necessary for people to be able to research effectively and for research to flourish".

BrightFuture

5 STEPS AHEAD

The Bright Future Package announced last month is the Government's action plan to meet the challenges of the knowledge age, Enterprise and Commerce Minister Max Bradford says.

Max Bradford

"The world is changing into a global market place as we go through a revolution in information and communications technology. Things we used to dream of are becoming possible at an amazing rate. Increasingly, what's in our heads is becoming as valuable as what's in our paddocks, our forests and oceans. In this environment, New Zealand needs to step up a gear to ensure it continues to prosper. Bright Future is the Government's considered response to this challenge. The package totals $223 million over four years and includes $47 million of new spending, up to $137 million of reallocated funds and $39 million from contingencies and savings. It draws on the ideas raised by more than 2000 people at 25 forums around the country earlier this year. The Government listened and now it is acting," Mr Bradford said.

"Bright Future is about giving New Zealanders the skills to excel in the knowledge era, building the capability of our workforce and generating and funding good ideas. The wide range of initiatives has been carefully designed to improve our ability to innovate. The Government is helping businesses to get the skills they need. It is up to businesses to decide what skills they want. The scholarship programme and the enterprise education review will engage industry more actively in education. The post-graduate scholarships and the review of higher learning will focus resources on the creation of more world-class centres of academic excellence. The New Economy Research Fund will complement these centres of academic excellence with centres of research excellence. The redirection of CRIs, the incubator programme and the expansion of Technology New Zealand, coupled with improvements in access to finance, will all help to build high technology clusters of firms feeding off the centres of research excellence. The general reduction in compliance costs and the promotion of the spirit of success will provide a more conducive environment for innovation," Mr Bradford said.

"The changes are essential to the future of rural industries. We must increase the level of high value added produce from the land through biotechnology and other research. The New Economy Research Fund is designed to do just that."

Mr Bradford said the Government would consider changes to the taxation of research and development.

"Research costs can currently be expensed in the year they are incurred. We are looking at whether it is appropriate to extend this tax treatment to development, however, we do not want to create large tax loopholes or perverse incentives in the process. We have therefore decided to have a good hard look at factors affecting research and development, rather than rushing it," he said.

"Bright Future will spearhead our efforts to make New Zealand the best country to live and do business in. It's an investment in our future. We are aiming high, but we'll not break the bank. These initiatives show how the Government is prepared to provide leadership and to play its part. We invite all New Zealanders to join us," Mr Bradford said.

SUMMARY OF KEY INITIATIVES

Overview

The package is worth around $223 million over 4 years. This includes $47 million of new spending, up to $137 million reallocated from the Public Good Science Fund, and $39 million from contingencies and savings.

Tertiary Education/Research and Development Initiatives

- $30 million a year in new scholarships, consisting of:
  - 1500 Enterprise Scholarships a year, to be co-funded with industry; and
  - 80 doctoral scholarships a year, worth around $40,000 each per annum
- Higher Learning Sector Taskforce to develop shared vision for the structure of the tertiary sector, expected to report by June 2000;
- $36 million New Economy Research Fund;
- $7.25 million per annum for post-doctoral fellowships;
- Review of factors affecting investment in research and development, including tax deductibility of research and development, to report by March 2000;
- Enterprise Education Taskforce to report by June 2000;
- Proposed expansion of Technology New Zealand.

Secondary Education Initiatives

- Around $10 million over 3 years for teacher fellowships and study awards in maths, science, enterprise and technology;
- Up to 1200 awards a year of $500 for the top maths, science and technology bursary students, providing they continue their study at tertiary level;
- Up to 90 awards each year for all round top bursary students, ranging from $2,500 to $8,000;
- $1 million over 3 years to raise entrepreneurial skills in school children.

Access to Capital Initiatives

- Government support for small business stock exchange;
- About $2 million a year for new 'ideas' incubators to help get ideas to market;
- Changes to Securities Act to reduce the costs of raising capital;
- Aggressive promotion of New Zealand to overseas investors through targeted conferences and information to key investors.

Initiatives to Reduce Regulation

- Small Businesses test panels to review and reduce the costs of regulation;
- Government Departments to cut regulations by 12-25%;
- Initiatives to reduce the costs of paying tax, announced last month by Revenue Minister Sir William Birch;
- Simple online guides to laws to be added to BIZinfo website.

Initiatives to Promote Success

- Prime Minister's Awards targeting science, technology, innovation and enterprise;
- Innovate New Zealand Council to develop a shared view of New Zealand's future;
- Website and newsletter to be launched to build links with New Zealanders overseas.

Growing Good Ideas and Making Them Work

The Government will help grow ideas and match them with investors, Minister for Research, Science and Technology Maurice Williamson, and Enterprise and Commerce Minister Max Bradford announced last month.

"The Government will increase the New Economy Research Fund (NERF) by $25 million, from $11.25 million to $36.25 million in 2000/2001, through a transfer of existing funds from the Public Good Science Fund," Mr Williamson said.

"The increased contestable NERF funding will be available for research into uncharted areas with the aim of creating ideas that will form tomorrow's businesses. The Government has also agreed in principle to increase the funding of the existing Technology New Zealand scheme, and to extend its scope to encourage research skilled people to commercialise their ideas into business ventures," Mr Williamson said.

Minister for Crown Research Institutes Simon Upton said the Government, as an owner of CRIs, was a major player in growing ideas and making them work. We want to ensure that there is every incentive for CRI research to get to market," he said.

Mr Williamson said the Government would also spend over $2 million a year on a national 'ideas' incubator to ensure ideas left the laboratory and entered the economy.

"In a knowledge economy ideas are our greatest assets. We have to nurture them and ensure that good ideas are not stifled by an inability to raise development funding, or by regulations that act as roadblocks. The incubator will provide business expertise to get companies to the point where others can invest in them. It

Securities Act, New Capital Market and Incubator Programme - Key Facts and Figures

Securities Act
The Securities Act 1979 will be amended, with a view to increasing fundraising options for small and medium size enterprises. Changes to the Securities Act will make it cheaper and easier for SMEs to raise capital by way of issuing equity securities. Changes will include:

- **Freeing up the current requirements governing pre-prospectus advertising** by enabling intending issuers to determine the level of public interest in a potential offer, before incurring the compliance costs associated with prescribed disclosure under the Securities Act. This would be conditional on any resulting offer of securities being made subject to the disclosure requirements of the Act.

- **Providing for an exemption from the mandated disclosure requirements of the Act** for offers made only to "wealthy and experienced" investors or to persons who have appropriate knowledge of the particular investment.

- **Expanding the current power, in section 5 of the Act, to provide for the Securities Commission to grant exemptions** to "persons or classes of persons" by clarifying that, without limiting that power, exemptions may be granted on any of the following grounds:
  - By reference to the characteristics of the person to whom the offers are made or who are entitled to subscribe;
  - According to the manner in which the activity is conducted;
  - By reference to any conditions or qualifications or restrictions applying to participation in the activity;
  - By reference to warnings, or acknowledgements or other indications of awareness of risk that might otherwise apply to participants in the activity or to whom the liability might otherwise arise.

New Capital Market
Government will provide financial assistance to the New Zealand Stock Exchange to help design and develop a new capital market for innovative ideas and small and medium enterprises. Support for the New Zealand Stock Exchange to develop a new capital market for small and medium enterprises consists of:

- Contributing $169,000 toward the development of the new capital market;
- Providing expert assistance in the detailed design of the new capital market.

The market should be in operation by April 2000.

- The New Capital Market is aimed at creating a mechanism to raise equity for companies that do not meet the $5 million threshold to list on the NZSE;
- The initiative is focused on companies seeking capital of between $500,000 and $1,000,000;
- Companies that list on the new capital market can either be 'shell' (do not have a product or service) companies established to fund a reputable business individual's future projects or companies that have been created to undertake a specific, already defined venture;
- A company wanting to list on the new capital market will have to prepare appropriate disclosure documents;
- The NZSE will vet the directors and promoters of the company.

Incubator Programme
Introduction of a national incubator programme aimed at providing capable individuals and SMEs with skill-based assistance to develop their ideas to the point where others can invest in them.

- The design and delivery of the incubator initiative will be determined by 30 September 1999;
- A possible could operate along similar lines to BIZ where:
  - the objectives and types of services required could be specified;
  - specialists would be contracted through a contestable process to deliver the programme;
  - the programme would be developed through close consultation with specialists and evaluation of the assistance;
  - the programme addresses the specific skill issue of commercialising ideas by providing individuals with innovative ideas with a "hands-on" combination of investment facilitations, technological development, risk management and business planning expertise;
  - funding of $1.125 m in 1999/00 and $2.25 m in 2000/01 to deliver the incubator programme;
  - the programme will be operational before April 2000

will be a mechanism for testing good ideas, fostering fledgling entrepreneurs and turning embryonic businesses into winners," Mr Williamson said.

Mr Bradford said the design and delivery of the incubator initiative would be finalised by September 30 1999.

"We are also going to make it easier for bright ideas to attract the investment they deserve. The Government will help the New Zealand Stock Exchange to design and develop a new capital market that can turn people's innovative ideas into commercial reality. This market will organise investors and encourage Kiwis to back innovative ideas and become skilled risk-takers. The new capital market will focus on companies seeking between $500,000 and $1 million and will be up and running by April next year," Mr Bradford said.

"We will also reduce the costs to firms of raising capital by amending the Securities Act. This will increase fundraising options for small and medium enterprises (SMEs) and make it cheaper and easier for them to raise capital by way of issuing equity securities," Mr Bradford said.

Building New Zealand's Knowledge Base

The Government will spend up to $37 million a year to fund more than 1600 tertiary education scholarships.

"The scholarships will encourage a greater number of young New Zealanders with the potential to build New Zealand's knowledge base to get skills in the science and technology area. They will also help focus research into areas that will be the source of New Zealand's future wealth," Mr Bradford said.

"The scholarships will increase the supply of highly-trained researchers and graduates, as well as providing incentives for stronger links between tertiary education providers and business enterprises," he said.

Mr Bradford announced that three new tertiary level scholarships would be launched:

Market Reaction

... from business

Business leaders generally supported the Bright Future package of initiatives unveiled by the Government, but some executives and organisations were sceptical that the policies were not comprehensive or bold enough. They said a failure to reduce taxes was the biggest element missing from the 30 initiatives.

The package "points in the right direction. It is a significant down-payment on further policies," said Simon Carlaw, chief executive of the Manufacturer's Federation. But while the federation welcomed the new programmes and funding in areas such as education, the real key to innovation was low taxation.

"A significant reduction or elimination of corporate tax would be the quickest way to stimulate employment, economic growth and research and development," Mr Carlaw said. "We need a comprehensive review of the tax system and a plan for tax cuts. Australia has already signalled it's going to 30 c. We need to get under that right away."

Short of a reduction or even outright elimination of corporate tax, the next best option would be mechanisms such as accelerated depreciation rates.

One of the least desirable ways would be research and development write-offs because they were prone to causing distortions.

As expected, the Government failed to move on research and development funding, although it said a taskforce would report by next March on factors affecting research and development spending, including whether to offer tax incentives.

The Employers and Manufacturers Association (Northern) called for tax relief on research and development by October 1 1999. "We welcome and applaud the Bright Future programme," said Alasdair Thompson, the association's chief executive. "But come on, Government, show some real conviction and urgency. Announcing tax write-offs of 125 percent for company research and development would turn on a great big green light for this first-rate change in direction."

The programme was also supported by the agricultural sector. The chairman of the Dairy Board, John Storey, said the policies would help traditional industries create value through greater innovation and the exploitation of new technologies.

Dr Keith Steele, chief executive of AgResearch, said the Government "recognises that many business opportunities based on innovation can come from our existing economic base in the primary and food sectors."

"This is not about throwing out the old and starting something brand new. It is about using our existing knowledge and building on it with innovative ideas and appropriate research."

While there was widespread support of Government efforts to promote more effective relationships between business, research organisations and the tertiary sector, some concern was expressed about the Government's focus on tertiary education as the prime mover in innovation.

David Mair, an executive director of Interlock, the window fixtures manufacturer, said: "The real innovators come from within companies. Smart, small companies are usually started by innovators with a good idea, not by graduate engineers."

The sentiment was echoed by Warwick Bishop of the Institute of Professional Engineers. "We're one of the few OECD countries producing more scientists than engineers. Research and development is being done, but there's no transfer mechanism. We're short of the wealth creators who can use that technology."

... from education

Government moves to prevent science students at the highest levels of academia being tempted overseas, have drawn positive responses from tertiary students.

Virginia Owen, 23, a masters student at the University of Auckland exploring the use of optical modulators, had decided against the four years of PhD study because of the cost. "If there is a possibility of a scholarship, then the attraction of stopping studying isn't so great," she said. "You wouldn't have to get a loan, and part of the attraction of going overseas is to pay off your loan more easily."

She is delighted at the Bright Future initiatives, which will see 80 doctoral scholarships worth $40,000 for study here or overseas, and the doubling of the number of post-doctoral fellowships. "This is the first time something positive has happened, something that will help us," said Miss Owen. "We were all getting rather depressed."

Source: *New Zealand Herald.*

Enterprise Scholarships - Government will contribute up to $20 million for new funding annually by 2004

- For advanced tertiary study, jointly agreed between student, education provider and enterprise;
- Jointly funded with industry to increase the pool of people with specialised skills;
- Next year around 500 students will receive enterprise scholarships, rising to 1000 in 2001 and 1500 from 2002 onwards;
- Scholarship value around $8000 per annum, per student.

Top Achiever Doctoral Scholarships - $10 million of new funding each year by 2002

- Up to 80 scholarships for study each year here or overseas;
- Worth around $40,000 each per year;
- Recipients will be bonded.

Post-Doctoral Fellowships - worth $7.25 million a year

- Will allow students who have completed their PhD in New Zealand to complete post-doctoral research here or overseas;
- Funding will be reallocated from existing programmes, including $2 million from the Public Good Science Fund;
- Will allow approximately 26 new fellowships to be awarded - double the number currently available in one year.

"Backing our brightest and best will strengthen New Zealand's ability to innovate and create value," Mr Bradford said. "In the knowledge economy our ability to embrace new technologies, develop new ideas and make them work for us, will be more important than our ability to simply farm or manufacture efficiently," he said.

1999 NZIC Conference

"Chemistry in New Zealand - a Showcase of Activities and Opportunities"

21 November - 24 November 1999
at
Victoria University of Wellington

A Special Carbohydrate Symposium in honour of Emeritus Professor Robin Ferrier will be held during the Conference on Tuesday 23 and Wednesday 24 November.

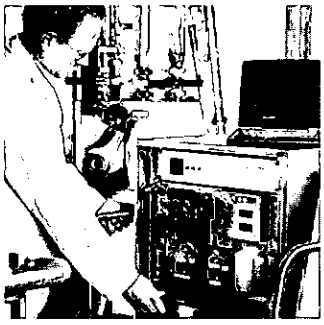
Contacts:
Chairman Of Organising Committee:
Associate Professor Jim Johnston,
Victoria University of Wellington
Conference Office:
School of Chemical and Physical Sciences,
Victoria University of Wellington
Email: Margaret.Brown@vuw.ac.nz
Web Site: www.vuw.ac.nz/chemistry/nzic99

Dairy Industry Applications

AUTOTRACK - THE NEXT GENERATION IN DAIRY MONITORING

Biotrace International Plc has developed a fully automated, portable, ATP monitoring system, called AutoTrack, which continuously checks for microbial contamination in air or water and gives real-time results.

The patented and now licensed technology is the result of a close working relationship with the Ministry of Defence in the UK and *in situ* in the Gulf. Despite its military roots, AutoTrack is a major development particularly in the milk industry.



AutoTrack in action.

With promises of reduced wastage, reduced water consumption and lower chemical and laboratory costs, improved product quality and safety, extended shelf life, minimised production downtime caused by contamination and cleaning, it is easy to see why since its launch, AutoTrack has quickly attracted a number of major dairies. But how does AutoTrack work and what can it really do?

The Technology Behind the Development

As with all of Biotrace's rapid detection technologies, AutoTrack is based on the measurement of ATP - the energy currency chemical for all animal, vegetable, bacteria, yeast and mould cells.

When ATP is brought into contact with the firefly reagent luciferin luciferase, a reaction takes place, which results in the production of light. The higher the microbial contamination in a liquid or air sample, the more ATP present and the more light produced.

By measuring ATP levels, Biotrace's systems indicate within seconds if a sample is contaminated. This is in stark contrast to traditional techniques, which take days and involve skilled laboratory technicians growing cultures.

AutoTrack vs Typical Rapid Systems

So far, the technology does not sound too different from other rapid systems. However, AutoTrack goes way beyond established ATP technologies. Whereas in the past, rapid testing systems have only been able to measure single, discrete samples of water or single points on a surface, AutoTrack is the only system in the world that can work in-line continuously measuring the microbial contamination of water or air.

According to Biotrace the difference is dramatic. It's like the difference between using a stills camera and a video. With traditional ATP technologies the user can take a single swab to get a snap shot view of the hygiene status on a line or in a clean-in-place (CIP) operation. With AutoTrack a company can take the equivalent of 60 swabs per minute. As a result, with the water testing version of AutoTrack, a company can, for the first time, get an entire, on-going picture of what is happening throughout its CIP operation - from start to finish. Such "video footage" is invaluable. It can show the user how effective its CIP protocol is and whether time, water or biocide is being wasted. The sensitivity of AutoTrack is increased to 100 times greater than conventional ATP testing.

The water version of AutoTrack is the first to be commercially rolled out; the air version will follow in January 2000. Dairies, which have been shown the technology, have been amazed by its potential power - as this small selection of trials shows.

AutoTrack in Action

A major UK dairy company, which supplies two of the top five retailers, trialled AutoTrack to test its potential for the dairy sector and, in particular, to illustrate its potential impact on CIP processes. The trial was held in the South East of England at a dairy, which typically produces 4 million litres of product per day. At the dairy, a typical CIP cycle consists of a 10 minute pre-rinse, a 30 minute caustic wash and then a 15 minute final rinse/sanitiser.

Complete confidence in the product with AutoTrack.

The aim of the trial was to demonstrate that AutoTrack could effectively monitor and optimise the CIP cleaning processes - if possible reducing effluent and water used during the process. However, during the trial the AutoTrack not only effectively tracked cleaning efficiency, but at this state-of-the-art dairy, which currently uses the latest verification measurements, it clearly identified a defective CIP cycle - far more rapidly than traditional techniques would allow - in eight minutes rather than five days.

Verifying and Trouble-Shooting

This trial highlights the power of AutoTrack and the limitations of other techniques for checking CIP operations. CIP cycles are normally measured through pH, conductivity, time, temperature and flow rate. However all of these are indirect measures - they indicate the microbial contamination which should be present - but not what's really happening. Furthermore these

measures have a blind spot - conductivity will not pick up neutral products such as milk or dairy-based products.

In contrast, the "video" effect of the AutoTrack is the equivalent of a swab a second. The sheer volume of information gives the users an insight to their process that has been unavailable until now. As one dairy customer put it "our current methods are like calculating the temperature of a boiler from the amount of fuel and oxygen being added. The AutoTrack is like a thermometer - you are directly measuring the contamination, the very thing you want to look at!"

Not only does AutoTrack enable the dairy to measure the contamination and accurately know if a clean-in-place operation is working effectively, but by continually charting microbial levels throughout the clean, dairies can identify exactly at what point things are going wrong - and therefore very quickly deduce why.

Figures 1 and 2 below show the AutoTrack profiles of effective and defective CIP processes monitored during the aforementioned trial. In the defective process, there are noticeably low ATP levels during the pre-rinse cycles. This suggests that soilage removal is ineffective at the start of the process. Equally, with the defective CIP operation, the high exit levels of ATP during the sanitiser cycles suggests the caustic wash is ineffective. The caustic and peracetic acid could be being mixed in the pipes through a faulty valve and counteracting each other.

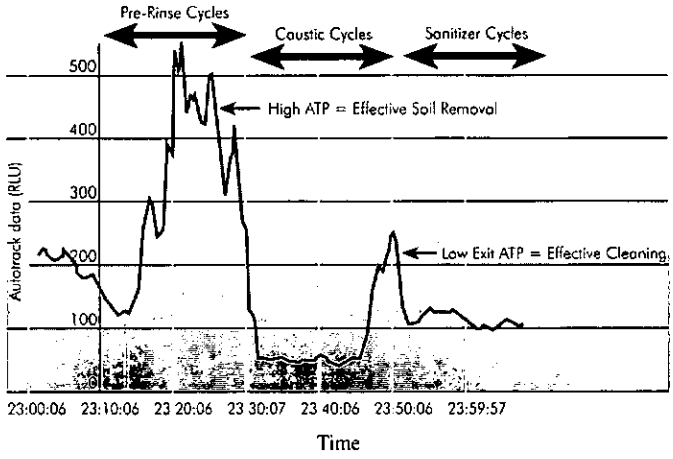


Figure 2. *AutoTrack profile of defective CIP cleaning process of 'Product Holding Tank'*

This ability to link cause and effect in the CIP process is invaluable. For example, another dairy, which has trialled AutoTrack, was recovering caustic soda as a cost saving exercise. The caustic soda was being used in three CIP cycles. AutoTrack tested the impact of this and showed the dairy that the ATP results were getting exponentially worse with each re-use. The acceptable exit level of 600 RLUs for the first CIP operation was 1,000 for the second and reached 2000 with the third cycle.

Refining Cleaning Operations

In addition to verifying the standard of the CIP operation, and helping to identify and trouble-shoot problems, AutoTrack can also be used to track cleaning efficiency under differing conditions. Using this data, effluent output and water usage plus the time taken to complete the CIP cycle can be minimised. The latter is a considerable commercial benefit - a North American dairy trialing the technology has predicted that, ignoring all of the other benefits, AutoTrack could shave sufficient time off its CIP cycle to produce an extra $4,000 of product per week.

It is easy to see how such additional production figures are arrived at. If AutoTrack enables only 15 minutes to be taken off a CIP operation, a major dairy, with say 40 clean downs a day could gain an additional 10 man hours of production per day.

Furthermore, although AutoTrack provides continuous testing it can also perform intermittent sampling. This enables trends to still be spotted and savings still to be made - but with reduced sampling costs.

Since its recent launch companies within not only the dairy but also the food, paper and brewing sectors have been quick to respond to the technology - over 30 advance orders have already been taken within Europe.

Bottom-Line Benefits

For a typical dairy Biotrace predicts that AutoTrack will deliver at least a 5% fall in water usage, 10% reduction in chemical costs and 12% reduction in effluent.

Increasing the shelf life of the product, increasing production capacity by reducing downtime for cleaning and reducing external laboratory costs are other financial benefits to consider. Solving a trouble-shooting problem in 8 minutes rather than in days is another significant advantage. Real-time results also allow production teams to act immediately on potential contamination problems, whilst the

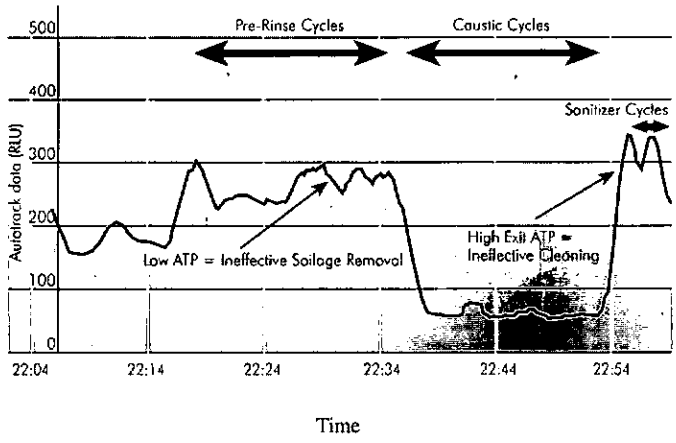


Figure 1. *AutoTrack profile of effective CIP cleaning process of 'Product Holding Tank'*

production down-time caused by contamination and re-cleaning is also reduced. Lastly, product quality and safety is improved. The chance of product and line contamination is significantly reduced. As a result, the chance of product recall - and the enormous damage this can have to a company or brand's reputation is minimised. These are sizeable benefits, but with new trials taking place and the technology offering dairies a level of meaningful hygiene data which they have never been able to access before, many further benefits are still emerging. This is why Biotrace reports that it will be sometime before the full potential of AutoTrack on the industry is realised.

For more information on AutoTrack or other Biotrace products,

Contact: Acorn Scientific Limited
Phone: (09) 5338941, or (09) 5338942, Fax: (09) 5342512
Email: acornsci@ihug.co.nz
circle number 51 on the reader reply card

NIR ADAPTED FOR CHEESE ANALYSIS

Developments in Near Infrared (NIR) technology have long provided adequate substitutes for traditional methods of testing the composition of powders and liquids. The analysis of cheese by this method had until recently, been unreliable. Many factors were responsible for the inconsistencies experienced during the repetitive analysis of the various cheese types: the main problem being the non-homogenous nature of the product.

A high precision Bran+Luebbe analyser has been combined with a large rotating cup eliminating the problem of non-uniformity throughout the sample.

The IA2000 rotating cup analyser was tested in a large single site New Zealand dairy company. The results from the instrument were consistently as good as the reference method to which they were compared. Sample preparation is simple with a rotating cup. With cheese, the sample is grated and the large cup loosely filled with cheese.

The IA2000 belongs to the Bran+Luebbe range of NIR instruments. It is fully automated with integrated PC for production monitoring and quality control of raw materials and finished products. It is specifically designed for the analysis of powdered, semi-solid, liquid and intact products. The IA2000 is a fixed filter instrument with 19 discreet filters. Its Peltier-cooled detectors and narrow band NIR filters give it excellent precision.

Other NIR instruments made by Bran+Luebbe range from the six-filter IA260, through the scanning IA500 to online powder and liquid instruments, the InfraPowder and the InfraPrime. Typical applications of NIR analysers are determination of properties such as moisture, protein, fat, sugar, alcohol, iodine number, starch, crude fibre, and oil content in food production. Advantages of the analysers include analysis results within 30 seconds, all properties are determined simultaneously, minimal sample preparation, no chemicals needed, easy to use, no computer necessary for day to day operation, local service support.

Contact: Grant Muir, Analysing & Automation Services
Phone: 021 943386, Fax: (07) 8473535
circle number 52 on the reader reply card

Cheese Ripening Research at the New Zealand Dairy Research Institute

Ross Holland, Tim Coolbear, Julian Reid and Vaughan Crow
New Zealand Dairy Research Institute, Private Bag 11 029, Palmerston North

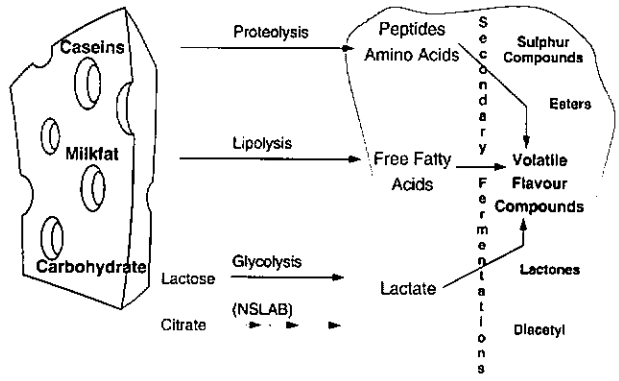
Cheese making is an age old process

Cheese making is a classic example of food preservation which has been carried out for thousands of years as an artesanal craft. Today, however, the process is a highly evolved technology with large factories producing thousands of tonnes of cheese in a season. In New Zealand, cheese manufacture is a multi-million dollar industry which contributes to the wealth of our country. 265,000 tonnes of cheese were produced during 1997/98, in cheese plants that are among the biggest in the world. While the scale of cheese making has changed from handcrafted blocks to 100 tonne production runs, the basic process has remained the same. Rennet is added to cheese milk to form a curd and the curd is acidified by fermentation with lactic acid bacteria. The solid curd is separated from the whey, milled into even sized granules, salted, and pressed to form the Cheddar cheese block.

Cheese making is a classic example of food preservation.

Starter bacteria are essential to cheese flavour development

The bacteria used in cheese making are called starter bacteria and are usually *Lactococcus lactis*. As well as being critical to the manufacturing process, these bacteria are also prerequisite to flavour development as the cheese is stored and ripened. They can be regarded as bags of enzymes which are trapped in the curd in high numbers during manufacture. The starter bacteria lyse during ripening, releasing their intracellular enzymes to act on cheese substrates i.e., casein proteins and milk fat. Starter bacteria are the major agent of flavour development during the first three months of cheese ripening (1). After three months, the non-starter lactic acid bacteria which occur naturally in the cheese begin to dominate the cheese microflora and to contribute to the flavour reactions.



The starter bacteria release their intracellular enzymes to act on cheese substrates - casein proteins, milk fat and lactose.

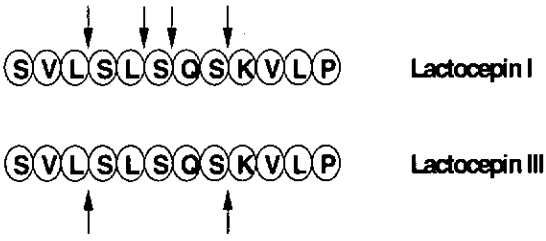
Starter bacteria are a major focus of cheese ripening research at the New Zealand Dairy Research Institute

Our research on the definition of the ripening biochemistry of cheese starter bacteria has contributed significantly to the fine control of the cheese ripening process in commercial cheese production. We can now meet defined flavour end points consistently over large production runs. Flavour consistency is essential for meeting the requirements of our customers in the global market.

The starter proteinase primes proteolysis

The hydrolysis of casein proteins to peptides and amino acids is the major chemical change that occurs during ripening, leading to texture changes and flavour development. Starter bacteria have one cell surface proteinase, now called lactocepin (2). There are different specificity types of the enzyme, ranging from type I to type III. The different types have different substrate specificities, even though the enzymes are 98% identical in their amino acid sequence. The lactocepins have been characterised extensively, with the New Zealand Dairy Research Institute making a major contribution to this research. There are major differences in the way in which lactocepin I and lactocepin III hydrolyse α-, β- and κ-caseins (3,4,5,6). One classic difference is in their action on β-casein. The initial action of lactocepin I on β-casein is to cleave mainly in the C-terminal region of the protein. Although lactocepin III also cleaves in the C-terminal region it does so at different sites. However, one of the first peptide bonds cleaved by lactocepin III is in the N-terminal region. In the test tube this actually presents as a visible difference. The cleavage event releases a phosphoserine-rich, hydrophilic peptide from β-casein. The remaining C-terminal peptide is hydrophobic and falls out of solution until it is further hydrolysed. This is visible

as the reaction mix first goes cloudy and then clarifies. Lactocepin III is less stable in the cheese environment than lactocepin I (7). This means that its hydrolytic potential is shorter lived than that of lactocepin I. These differences between proteinase enzyme types result in flavour differences in cheese, notably that starters possessing lactocepin III activity tend to give rise to less bitter cheeses than do starters possessing lactocepin I activity.



There are a number of major differences in the way lactocepin I and lactocepin III hydrolyse caseins.

Lactococcal starters have a raft of intracellular peptidases which hydrolyse peptides to small peptides and amino acids

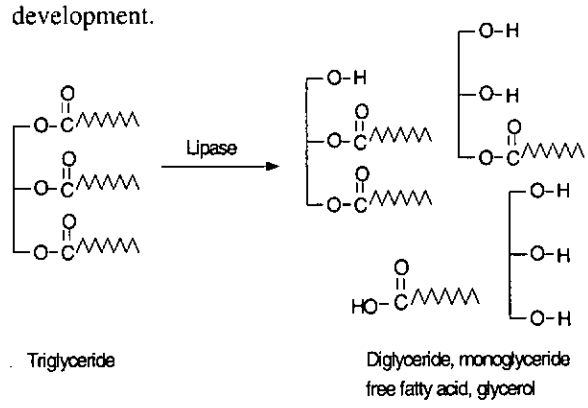
Lactococci possess two or more intracellular endopeptidases with different specificities, as well as various aminopeptidases, a prolyliminopeptidase, dipeptidases, tripeptidases, and dipeptidylaminopeptidases - but no carboxypeptidases (7). The levels of these enzymes vary between strains. The implications of individual peptidase enzymes for flavour development are not yet defined. Because these enzymes are intracellular, lysis is prerequisite to their involvement in cheese peptide hydrolysis.

Milk fat is another major cheese substrate

Cheddar cheese contains around 33% fat. In most cheeses, lipolysis and the release of free fatty acids is not extensive. For example, approximately 2% of the free fatty acids in milk triglyceride is released as free fatty acids, as Cheddar cheese matures over 12 months. However, the short chain fatty acids, particularly butyric acid, are potent flavour compounds and contribute to the flavour balance of cheese.

The starter lipase causes lipolysis in the early stages of cheese ripening

Lactococcal lipase was first identified and purified at the New Zealand Dairy Research Institute (9), and is currently the focus of kinetic studies. The enzyme is not a true lipase and is better defined as an esterase. Studies with synthetic lipid substrates show that the enzyme is slow to break down triglycerides but is highly active on diglycerides and monoglycerides. In a collaboration between the New Zealand Dairy Research Institute and The Netherlands Institute for Dairy Research (NIZO), the starter lipase gene has been cloned and over-expressed in an experimental lactococcal strain. The lipase gene contains a lipase consensus sequence (GXSXGG); however, there is little homology with other published lipase sequences and the enzyme appears to be of a type which has not been defined before. In collaboration with Dr Gill Norris at Massey University, we are doing further kinetic studies and also working to determine the three-dimensional structure of the enzyme. The discovery of altered or enhanced activity in commercial starter strains would create opportunities for accelerated cheese ripening and targeted cheese flavour development.



Milk fat triglyceride is a major cheese substrate.

Secondary fermentations also impact in cheese ripening

Secondary fermentations are the ripening reactions which use the products of proteolysis, lipolysis and glycolysis as substrates, and result in an even greater diversity of flavour and aroma compounds, such as esters, ketones and sulfur compounds. The secondary flavour reactions are diverse and are both hydrolytic and synthetic. The enzymes involved in these reactions originate from both the starter bacteria used for acid development during manufacture and also from the non-starter bacterial population (usually *Lactobacillus*) which grows in cheese. The reactions are often physiological i.e., they require a live microbial system to occur. The secondary fermentation reactions increase and eventually dominate as a cheese ages. Research at the New Zealand Dairy Research Institute is concentrating on ester synthesis (10) and amino acid metabolism.

The comprehensive biochemical model of cheese ripening that we are developing at the New Zealand Dairy Research Institute allows us to achieve faster, more predictable flavour development

Faster, more predictable development of cheese flavour is essential to meet diverse market requirements and to keep manufacturing costs to a minimum. The biochemical models of cheese ripening that we have developed to date have had an impact on Cheddar cheese manufacturing and have played a role in the development of new cheese types in the New Zealand cheese manufacturing sector. The direct links between the New Zealand Dairy Research Institute and the manufacturing and marketing arms of the New Zealand dairy industry ensure that this strategic research is rapidly transferred to industrial application.

This research is supported by the New Zealand Foundation for Research, Science and Technology.

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THE POWER OF TWO FROM THE NEW UNICAM SOLAAR GENERATION

The all new SOLAAR M Series offers ergonomically designed, dual atomisation multi-element AA systems in an amazingly compact spectrometer – with a footprint of less than 0.5 m^2. Employing a unique and patented Echelle optical system, the pre-aligned flame and furnace atomisers are instantly selected purely by software. Automated changeover, within a method is therefore easily possible. Atomisation conditions may be optimised automatically. The M5 system offers flame and furnace combination, whilst the M6 provides a flame and Zeeman furnace equivalent – all in the same remarkable footprint.

The world's first, no compromise dual atomiser AA spectrometer is stunningly simple to use – no atomiser changeover or alignment, a new wizard driven user interface to the Windows 32-bit software and an optional high resolution, quarter VGA LCD local control. A 6-lamp, auto-aligning turret, new pencil beam optics and patented Stockdale double beam optics all combine to provide exceptional and unrivalled trace detection capability. QuadLine background correction is standard on both systems – even with additional Zeeman correction. An automatic binary flow gas management system provides reproducibility and safety.

Outstanding flame performance is guaranteed thanks to the design of the spray chamber and burner system. This system is optimised for use with any analyte, matrix or flame type without user intervention, and is therefore ideal for long, multi-element analyses. Additionally, the rear drain and hydrophilic front end to the spray chamber ensure the lowest possible memory effects. Use of the STAT (Slotted Atom Trap) improves measurement sensitivity even further and automatic flame and spectrometer optimisation is provided as standard.

Outstanding furnace performance is guaranteed with either the normal or Zeeman versions of the GF95 furnace and FS95 sample preparation system, so flexible it can even intelligently dilute the sample, prepare standards, help optimise the ash/atomise conditions and provide up to 6 matrix modifiers, as well as instruct the operator on the optimum sample carousel layout.

Continuous flow vapour analysis and segmented flow injection analysis options are equally impressive.

The SOLAAR M Series really does redefine Atomic Absorption.

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VALIDATION IN ATOMIC ABSORPTION

To complement the new SOLAAR range of AA systems, Unicam takes pride in announcing another significant benefit for its Atomic Absorption spectrometers. For customers working in a regulated environment we can supply a complete, automated system validation package for the new SOLAAR systems.

SOLAAR Validator*plus* provides a substantial time and cost saving by permitting fast and efficient validation of our AA systems. Comprehensive documentation and accessories are provided for spectrometer performance validation and system qualification. Installation (IQ), Operation (OQ) and Performance (PQ) Qualification processes are fully documented and tested. SOLAAR Validator*plus* provides all the necessary protocols to ensure proper use and performance of your AA spectrometer, and documentary evidence for demonstrating total compliance to regulatory bodies.

The new Calibration and Validation Unit (CVU) allows automation of the OQ procedure and a wizard-based user interface guides the user through the PQ process with full working SOPs. All results are stored in a rational database for future inspection or printing in the Logbook format. A complete software audit trail and password security protection is also provided in the new SOLAAR software.

Only Unicam takes quality so seriously. If you need AA validation and qualification you need SOLAAR, the AA systems designed and manufactured to ISO 9000 standards and offering you regulatory compliance from the moment of installation.

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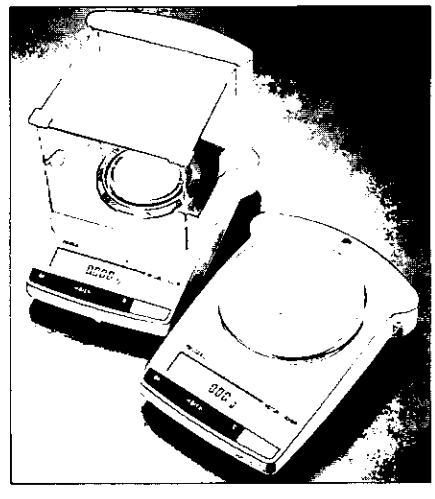
METTLER TOLEDO'S NEW BASIC LEVEL BALANCE LINES (AB-S AND PB-S)



The pressure to cut costs in the laboratory is particularly high when only simple weighing operations need to be performed at the workplace, and then rarely in large numbers. With the new "Basic Level" balance lines (AB-S and PB-S) from Mettler Toledo GmbH, this requirement has been addressed by deliberately keeping their technical features simple. Their quality design gives them a long service life: the new generation of MonoBloc weighing cells ensures reliable functioning and accurate measuring for many years to come. The one-piece balance housing is an all-metal construction, but high quality materials are also used for all other components. Particular attention has been given to ease of cleaning. There are no edges, corners, grooves or holes where dirt can collect. The large surfaces can be washed down quickly and easily. A replaceable in-use cover fits over the complete instrument for additional protection when working with substances that are liable to drip, or when used by inexperienced personnel. But, whether experienced in weighing or not, the user is helped at every stage of the weighing process by the clear digital display and the large, sensitive operator key using modern touch key technology. On the other hand, applications programs have been omitted. An RS interface is available as an inexpensive option for connecting to a printer for GLP reports or to a PC. The ranges of balances now available comprise various analytical and precision models with a readability (depending on the model) between 0.1 mg and 0.1 g. All details and technical data are given in Mettler Toledo's newly published laboratory catalogue.

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Medic Watson Victor, Medic Corporation Ltd
Freephone: 0800 508070
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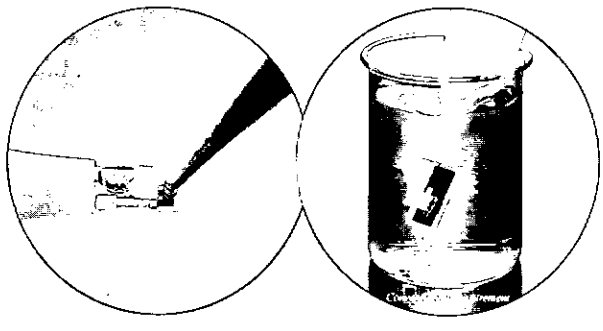
INTRODUCING THE NEW KS701 FOURTH GENERATION ISFET pH METER



This is a low-cost but high performance Ion Sensitive Field Effect Transistor pH Meter.

Perfect for everyday use, the KS701 is a reliable, handy, non-glass electrode pH meter. It is sturdy and extremely easy to use. The KS701 is splash-proof and offers fast response times. The sensor does not suffer from the same problems associated with glass pH electrodes and is ideal for measuring tris buffers, spot pH checking, field work etc.

The pH range is from pH 2 to 12 with an accuracy of ±0.1 pH units. It offers full automatic temperature calibration and single-point calibration. Sample sizes as small as a drop can be measured.

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EUTECH INSTRUMENTS FOR pH MEASUREMENT AND WATER ANALYSIS

Alphatech Systems is proud to represent Eutech Instruments, manufacturers of a comprehensive range of laboratory and field instrumentation for water analysis. Eutech also produces on-line process instruments for water quality monitoring and control. Innovative products from Eutech include:

- Pocket-sized testers
- Waterproof testers
- Hand-held portable series includes: Ecoscan, Cyberscan and Waterproof meters
- Laboratory bench meters *
- Industrial process controllers

* Eutech now offer four models of economical quality, bench pH meters: the microprocessor-based Cyberscan series Models pH 500, pH 1000, pH 2000 and pH 2500. All models include an exterior mains adapter, an ATC temperature probe and several free buffer sachets. The customer having a choice as to the type of pH electrode preferred and a laboratory stand if required.

The Cyberscan pH 500 being the basic 'no frills' meter with a number of easy-to-use features is ideal for daily laboratory use.

- Multi-parameter measurement (pH or mV) with temperature at the touch of a button.
- Up to 3-point calibration with auto-buffer recognition.
- Analogue recorder output.

The Cyberscan pH 1000 is a powerful instrument ideal for research laboratories and can be customised to simplify measurement routine.

- Customisable functions including pH resolution, auto-off.

- Up to 5-point auto buffer recognition including a special CAL Edit function, for non-standard buffer values.
- Non-volatile memory of up to 16 sets of measurements.

The Cyberscan pH 2000 is similar to the pH 1000 but offers data log/print and bi-directional RS 232 communication with Windows version DAS software (3.5 inch diskette) included and all for less than a budget of less than $1000.

Eutech's latest bench model pH 2500 offers the additional capability of measuring ion concentration directly. It's easy-to-use, programmable features offer greater flexiblity and convenience to the user.

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Alphatech Systems Ltd
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SOLID RELIABLE AAS DESIGN INCORPORATES RADICAL NEW PATENTED TECHNOLOGY

Having taken a design proven in over 1,000 laboratories and employed state-of-the-art patented technology, GBC Scientific Equipment introduces the double beam 932Plus and single beam 933Plus atomic absorption spectrometers.

The heart of these instruments is the patented Application Source which addresses new levels of performance, simplicity and cost savings in AA spectrometry. The Application Source is configured to provide line spectra for specific tasks including environmental, mining, food and beverage, petroleum and clinical applications. In addition the Application Source can be configured to meet the customer's specific requirement.

Futuristic in their approach, the 932Plus/933Plus series offer true uncompromised multi-element analysis, returning the highest integrity in results at a fraction of the cost of traditional means.

Designed around simplicity, users no longer need to change lamps when changing elements, enabling seamless operation. In addition, the 932Plus/933Plus series offer further benefits of greatly reduced operating costs. The Application Source offers
dramatic savings in source lamp costs and the high intensity deuterium lamp offers unrivalled lifetime performance with enhanced operation of up to 1000 hours, even at full current.

The 932Plus/933Plus series sets new prerequisites in AAS technology - uncompromised performance, ease of use and dramatic cost savings ... a real 'plus' for any working laboratory.

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PATENTED TECHNOLOGY INCORPORATED INTO RUGGED AA DESIGN FROM GBC

Industrial laboratories are about to encounter the latest phase in atomic absorption technology. Noted manufacturer, GBC Scientific Equipment is set to launch the next step in leading edge spectrometry instruments. Included in this new series, a purpose-built model for mining and corrosive environments - the ProspectorPlus.

Employing a patented light source technology, the ProspectorPlus addresses new levels of performance, simplicity and cost savings. The patented Application Source is configured to provide line spectra for specific applications in fields such as environmental, mining and petroleum. In addition, the Application Source can be configured to meet the customer's specific requirement.

Simplicity is a key to this instrument, the user selects the next element and continues with their work - it's that easy and truly seamless.

While providing a unique user interface, the Application Source also offers dramatic savings in source lamp costs and the high intensity D2 lamp offers enhanced operation of up to 1000 hours, even at full current. In addition, the ProspectorPlus has provision for conventional hollow cathode lamps, enabling laboratories to deplete surplus stock.

It goes without saying, the ProspectorPlus offers stringent specifications for harsh environments. The design of the instrument body ensures total protection from attack in corrosive, humid or dust-filled environments. To guarantee its longevity, specialised seals protect against dust, vapour and liquid spillage.

Featuring the newest innovation in AA technology combined with its rugged design, the ProspectorPlus will meet any challenge.

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J&W SCIENTIFIC INTRODUCES µPAGE-10 CE COLUMN & BROCHURE

J&W Scientific, known for manufacturing the highest quality polyacrylamide fixed gel filled columns available, introduces µPAGE-10 (10%T, 0%C) columns to their µPAGE gel column product line. With the introduction of the new column comes a new brochure and reference guide loaded with information for pharmaceutical and DNA analysis.

The new µPAGE-10 column provides high resolution capabilities for the separation of antisense therapeutic agents, primers and probes as well as oligonucleotides of pharmaceutical interest. µPAGE columns are the most direct vehicles to transfer all applications from slab gel to capillary electrophoresis (CE), enjoying the automation, high speed, high resolution, and quantitative advantages of CE. The µPAGE-10 is readily affordable. Starter kits include three capillaries, an oligonucleotide standard, capillary cutting tool and magnifying viewing tool. These components, as well as individual column testing ensure column reproducibility and longevity.

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UNIMETRICS RELEASES NEW PRODUCT BROCHURE

Unimetrics, manufacturer of syringes and syringe accessories for nearly 30 years and now owned by J&W Scientific have released a product brochure displaying their new 9000, 5000, 4000 Series and standard plunger syringes specifically designed for GC or LC use.

A new Unimetrics line of standard plunger syringes, affordably priced, come with the reliability Unimetrics is known for and the legendary quality users have come to expect from J&W Scientific. The new series of standard plunger syringes are individually packaged for superior protection of needle and plunger.

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VARIAN HELPS EUROPEAN LABORATORIES MANAGE THE BELGIAN FOOD CRISIS

Varian's analytical products are helping European laboratories test for the toxins responsible for the food scare that originated in Belgium. Immediately following the initial crisis, Belgium's Ministry of Agriculture and private European food and toxicology laboratories faced significantly increased demand for testing food samples for contamination. The crisis focused on Belgian meat and dairy products distributed throughout Europe, which were contaminated by two toxic compounds: polychlorinated biphenyls (PCBs) and dioxins. Varian's revolutionary CP-Select for PCB 28/31 column, rapid PCB screening, is allowing these laboratories to test for PCBs in half the time of other columns. Once laboratories detect PCBs in food products, they must further test the samples for the cancer-causing chemical dioxin. For this process Varian provided the innovative CP-Sil for Dioxins column. This column offers powerful sample separation, allowing laboratories to accurately determine precise dioxin levels to establish the severity of contamination. At the height of the crisis Varian Europe received orders for its columns from 10 separate laboratories in less than a week. Laboratories in Italy and Spain also placed orders for Varian's Saturn 2000 GC/MS/MS, a powerful analytical instrument these laboratories will use to test food samples.

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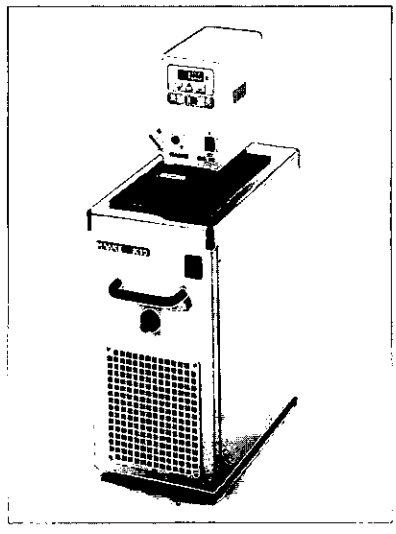
COMPACT HAAKE REFRIGERATED CIRCULATOR K10 - HIGH POWER OUTPUT AND COMPACT DESIGN



The new HAAKE refrigerated bath K10 used in combination with the C/DC range circulator control units (C10, DC10, DC30 and DC50) features a cooling capacity of 240 watts at 20 °C and requires a minimum amount of space on the laboratory table-top. The base area is 19.5 cm x 36 cm. This is scarcely more than a sheet of normal writing paper.

A minimum temperature of -10 °C can be reached with a temperature accuracy of up to ±0.01 °C. The bath volume

of 3 litres enables rapid cooling down times that outmatch some even larger refrigerated circulators.

These unit combinations are often used for temperature controlling applications at ambient temperature in order to replace expensive tap water cooling systems. Temperature controlling small external systems at ambient temperature, e.g. refractometers, is however also possible.

The compact refrigerated bath K10 is suitable for even the tightest of budgets and is excellent value for money.

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NEW I-CHEM SOIL-READY VOA VIALS FOR EPA METHOD 5035 ARE CONTAMINANT-FREE ... FOR CLEANER SAMPLES, CLEANER DATA

I-CHEM introduces new "Soil-Ready VOA Vials", which are I-CHEM Certified to be contaminant-free, resulting in cleaner samples and guaranteed adherence to EPA VOA Method 5035 requirements. The exclusive I-CHEM Soil-Ready design includes a guaranteed leakproof closure, plus a low-bleed septum that helps to ensure clean data by reducing interference peaks due to siloxane bleed. I-CHEM Soil-Ready VOA Vials may be ordered with either 5 mL sodium bisulfate, or organic-free DI water, and an optional stir bar. A pre-applied label on each IC-CHEM Soil-Ready VOA Vial provides a manually-readable bar-code, and lot number and individual container number so each sample can be uniquely identifiable and traceable. Tare weight is recorded on each label to the nearest 0.01 g to ensure accuracy in meeting EPA Method 5035 requirements.

Other I-CHEM products include methanol ICHEMpule ampoules for EPA 5035, in 5 mL, 10 mL, and 25 mL sizes; a sodium bisulfate I-CHEMpule ampoule with 5 mL of 20% sodium bisulfate solution; and I-CHEM Certified 40 mL vials with low-bleed septa (tare-weighed optional), and tare-weighed 60 mL soil jars.

For a complete catalogue,

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NEW MID-POLARITY CHROMPACK GC/MS COLUMNS INCREASE SAMPLE THROUGHPUT BY 10%

A.i. Scientific introduces the new Varian/Chrompack CP-Sil 24 CB lowbleed/MS mid-polarity columns. Designed with the latest arylene phase technology, these high performance columns offer better stability and near zero bleed at elevated temperatures. This translates into less instrument downtime and increases sample throughput by 10%. The Varian/Chrompack CP-Sil 24 CB lowbleed/MS columns provide a wider range, longer column lifetimes and shorter cycle times with faster column bake out. Because they are near zero bleed, these columns increase confidence in MS spectral confirmations. Unlike competing columns, Varian has specified a bleed limit for the CP-Sil 24 CB of 6 pA @ 330 °C. The CP-Sil 24 CB columns replace the standard 50% phenyl, 50% dimethylpolysiloxane columns and are ideal for applications using MS and ion trap MS as well as ECD, NPD, FID and PID detectors.

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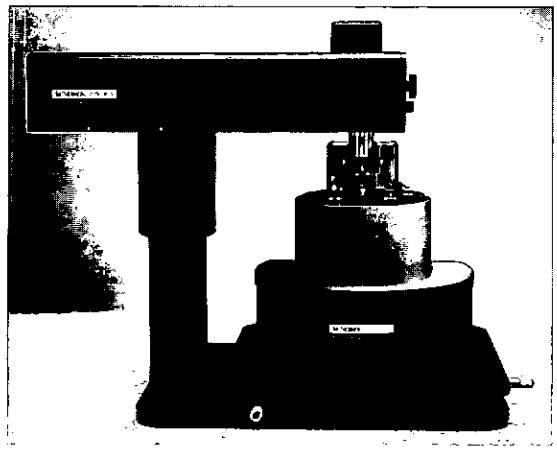
THERMOMICROSCOPES ADDS SCANNING CAPACITANCE, FORCE MODULATION, AND PHASE IMAGING IN THIRD-GENERATION AUTOPROBE CP RESEARCH SCANNING PROBE MICROSCOPE



ThermoMicroscopes has introduced the new AutoProbe CP Research, the latest member of this well-known family of research-grade scanning probe microscopes. The new microscope integrates more imaging modes in a single instrument than any other commercially available system to provide the flexibility and convenience required by research and analytical laboratories that routinely study a wide range of materials. The AutoProbe CP Research adds the advanced capabilities of scanning capacitance, force modulation, and phase imaging to a full selection of conventional imaging modes - contact, intermittent-contact and non-contact atomic force, magnetic force, lateral force, and scanning tunnelling. For convenience and flexibility all imaging modes are available without changing the microscope's scanning head. Best of all, the CP Research offers all this flexibility and convenience without sacrificing any of its industry-leading imaging performance, routinely achieving atomic-level resolution.

The AutoProbe CP Research's user-friendly design includes a new ergonomic laser alignment system and increased range in the photodetector positioning system, promising significant gains in throughput and productivity. Enhancements in the electrical and mechanical performance of the cartridge and a doubling of the signal processing bandwidth ensure fast, high quality images in all modes.

The refined design of the AutoProbe CP Research reflects its heritage as the third generation in this respected line, while its advanced capabilities secure its position at the cutting edge of SPM technology.

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NEW PROPAC WCX-10 AND PROPAC SCX-10 COLUMNS SEPARATE PROTEINS THAT DIFFER BY AS LITTLE AS A SINGLE AMINO ACID RESIDUE

A.i. Scientific introduces the new Dionex ProPac WCX-10 and ProPac SCX-10 cation exchange columns for the analysis of proteins with small differences in charge. The ProPac WCX-10 is a weak cation exchange column and the ProPac SCX-10 has strong cation exchange properties. Both columns have unique non-porous pellicular resin design with a very hydrophilic coating that eliminates protein resin hydrophobic interactions. Linker arms containing the cation exchange functional groups are covalently attached to this hydrophilic coating, making a durable, selective surface. The columns are ideal for characterisation or quality control assays of closely related protein variants. The columns enable scientists in biotechnology, pharmaceutical and food and beverage laboratories to separate and maximise resolution of closely related protein species.

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NEW J&W GC/MS COLUMN SOLUTIONS AND REFERENCE GUIDE

J&W Scientific, the world's largest manufacturer of high resolution capillary GC columns, has released a new *GC/MS Column Solutions and Reference Guide.* This reference guide features products and technical applications for anyone performing trace level GC analysis where sensitivity and instrument performance are important.

Column bleed is a significant contributor to noise, it decreases MS spectral integrity, reduces instrument up-time, decreases column lifetime and decreases analytical reproducibility especially at trace levels. Many GC detectors (MS, FID, PID, ECD, NPD, SCD) are sensitive to contamination from column bleed and will require less maintenance when using GC/MS columns.

The new guide features important information regarding, how to choose a GC/MS column, selectivity options for GC/MS analysis, benefits of using ion trap tested columns, the unique technology of the GS-GasPro PLOT column for GC/MS, custom built DuraGuard columns with built-in guard column or transfer lines, a selection of GC accessories, R&D Separations' MegaSorp helium gas purifier and dozens of chromatograms for easy reference.

Contact: Barbara Bogue, J&W Scientific
91 Blue Ravine Road, Folsom, CA 95630, USA
Phone: (+1-916) 9857888, Fax: (+1-916) 9851101
Website: www.jandw.com
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NEW DATA PLOTTING AND SERVICE SOFTWARE THERMPLOT95PLUS FOR HAAKE CIRCULATORS

It is now possible to use the advanced ThermPlot95plus software package for data plotting with all new HAAKE circulators which have a computer interface in the F, N and DC range. All that is required for software usage is a free RS232C interface on the computer and Windows 95, 98 or NT.

ThermPlot95plus features numerous functions for data plotting, various graphic display modes and a range of service tools.

Operation is easy to learn and requires no more than basic PC user skills.

Both temperature values and control parameters can be plotted using ThermPlot95plus. The actual and set temperatures can be plotted against each other in an on-

line graph. The current measuring values are also displayed as numerical values. The graph can be freely scaled according to user wishes and a zoom function is also included. Each measurement can finally be documented with name and number specifications and additional notes (laboratory journal function).

The built-in service function is a very important feature of ThermPlot95plus. This enables the user to document control parameters such as heating or cooling capacity during the measurement or to test a connected cooling unit. This data can be used for remote fault diagnosis in case of malfunctions and can thus in many cases contribute towards problem solving.

The full ThermStar95 version with extended program features is necessary for entering set temperature values.

ThermPlot95plus can be downloaded free of charge from the HAAKE website at www.haake.de

Contact: GBC Scientific (NZ)
P O Box 68-330, Newton, Auckland
Phone: (09) 3600928, Fax: (09) 3600683
Email: gbcaec@xtra.co.nz
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ALPHATECH INTRODUCES THE J.P. SELECTA RANGE OF PRODUCTS

Alphatech Systems is proud to represent the J.P. Selecta Group of companies based in Barcelona, Spain. This company's new Scientific Equipment Catalogue 2000 consisting of 256 pages, coincides with its 50th Anniversary.

The high quality and yet amazing affordability of their large product range, places them well in our highly competitive New Zealand market.

Just a few of the Selecta products already sold into the New Zealand market include:

- Bacteriological Incubators
- Bank of Heating Mantles for Extraction and Kjeldahl
- Chest Freezers
- Centrifuges (small bench to large, refrigerated floor-standing models)
- Colony Counters
- Dispensing Pipettes
- Hotplates (Magnetic Stirrers)
- Laboratory Jacks, Flocculators
- Refractometers (both hand-held, and digital Abbe bench types)
- Water and Oil Baths (including refrigerated, pumps, shaker types etc.)

Contact: Peter Hassan, Product Manager
Alphatech Systems Ltd
Phone: (09) 3770392, Fax: (09) 3098514
Email: sales@alphatech.co.nz
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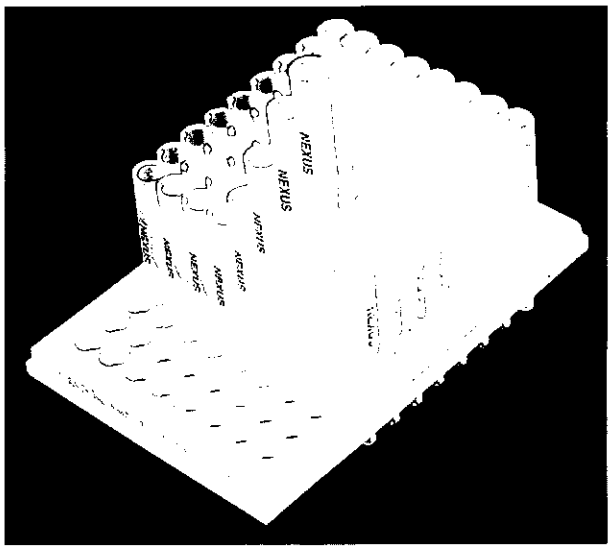
VARIAN INTRODUCES A NEW 96-WELL PLATE SYSTEM FOR RELIABLE, CUSTOMISED SOLID PHASE EXTRACTION



Varian recently introduced Versaplate, a revolutionary 96-well plate system that offers quick, inexpensive customisation of 96-well solid phase extraction (SPE). Extremely adaptable, the Versaplate system allows users to easily switch from single tube processing to 96-well parallel processing without method revalidation.

Varian's Versaplate system provides users with the flexibility to customise their individual well plates by bed size and sorbent type. Constructing a customised 96-well plate is as simple as snapping the individual Versaplate tubes into the desired configuration. This eliminates partially used and wasted plates, saving users valuable time and money.

Versaplate tubes are compatible with vacuum manifolds and are effortlessly snapped in place with luer fittings. The individual tubes fit into the plate itself, eliminating the need for additional method validation when scaling up to a 96-well plate. Plus, the Versaplate system allows users

to screen multiple sorbents or optimise sorbent bed masses on a single plate.

The high-performance sorbents from Varian's Bond Elut® and abselut™ product lines are available in the Versaplate system. The time-tested sorbent used in Bond Elut products offers high recovery rates, reproducible results, and cleaner extracts. The revolutionary sorbent in the abselut products delivers non-conditioned solid phase extraction, reducing sample preparation steps by 40% while continuing to achieve high quantitative recoveries. Users of the new Versaplate system can simply order pre-assembled Versaplate 96-well plates containing their preferred Varian sorbents and masses.

Contact: Mark Albertson, A.i. Scientific (NZ) Ltd
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LIVE KARL FISCHER WATER DETERMINATION

The advantages of classic volumetric Karl Fischer titration have been brought together with the possibilities offered by modern digital technology in the form of the latest Metrohm Titrino, the 758. A powerful microprocessor ensures rapid data processing and smooth control of the connected instruments, while you can follow the course of the titration on the screen. Parameters can even be modified and optimised during a titration if required.

Two further methods have been built into the 758 to increase its flexibility. The MEAS mode turns the instrument into a complete pH meter with automatic buffer recognition. The SET mode allows fully automatic titrations to a pre-set endpoint. This is commonly used for acid-base titrations, chloride determinations and p&m values, to name a few.

Contact: MEP Instruments
P O Box 113125, Broadway, Auckland
Phone: (09) 3661236, Fax: (09) 3661235
Email: info@mep-instruments.co.nz
Website: www.mep-instruments.com
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UV-PROBE SOFTWARE NEW FROM SHIMADZU

The highly flexible, easy to use, UV Probe software for Shimadzu's 1601, 2401 and 2501 UV-Vis spectrophotometers is one of the most advanced spectroscopy packages available.

Reprocessing of UV PC data is also possible for users of UV-2101PC and UV-3101PC systems.

Operating under both Windows 95/98 and NT 4.0 it offers intuitive operation with customised screens and report generation.

The enhanced security capabilities and an instrument history log of UV Probe makes GLP compliance easy. When security is enabled each user is required to log on, and from then on all operations on the instrument and software are recorded with the stamp of the specific operator.

The multi-tasking capability of UV Probe enables the user to set up methods, perform manipulations and create and print reports while the system continues to acquire data.

UV Probe allows the user to easily perform unlimited custom equations and enzyme kinetic assays. Multiple Michaelis Menten calculations can be performed including Hill and Inhibitor tables with definable orientation of the graphs.

Multiple spectra can be displayed to allow comparison of raw or derivative data. In addition unlimited numbers of peaks and valleys and their corresponding wavelengths and absorbances can be displayed in point pick or peak pick tables. Samples can be merged together into one graph or separated for further examination.

UV Probe software will be available as an optional accessory for new and existing Shimadzu spectrophotometers.

Contact: Clare Hodgson, Shimadzu Scientific Instruments
Free Phone: 0800 735725, Fax: (09) 8367757
Email: clareh@shimadzu.co.nz
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ANTON PAAR'S NEW PORTABLE DENSITY, SPECIFIC GRAVITY AND CONCENTRATION METER, THE DMA 35N

Anton Paar has introduced a powerful, yet very lightweight, portable density meter. Weighing only 270 grams, the new DMA 35N is sturdy enough to operate in the harshest industrial environments and a wide range of applications.

Measures exactly
The DMA 35N determines the density of liquids to 0.001 g/cm^3. Measuring results are displayed clearly.

Fills rapidly
Very often liquid chemicals need to be checked quickly upon delivery. The DMA 35N detects low quality on the spot. Within seconds you know whether the product meets the specifications or not.

Displays temperature compensated density
The results are displayed already compensated for temperature, this is one reason why many hydrometers are being replaced by this versatile digital density meter.

Complete documentation
How convenient that you can store 1024 measuring results in the meter's memory! These can then be read back later using the display or sent to a printer or PC. So the DMA 35N fulfils all the demands of modern operational analysis.

Contact: MEP Instruments
P O Box 113125, Broadway, Auckland
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Website: www.mep-instruments.com
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SYRINGE SIPPER

You asked and we listened. The new sippers from Shimadzu use syringe-type pumps, so tubing problems associated with peristaltic pumps have been eliminated.

Use with most aggressive solvents is possible without requiring specialised equipment.

The syringe sippers are lightweight and free-standing with a small footprint allowing accurate dispensing and measurement of precious samples as little as 400 µL.

The flowcells of the new sippers can also be changed easily to any other type. That means a micro sipper without temperature control, can be converted to a water-jacketed type with a standard sized flowcell.

The sippers connect to the standard sample compartment of the UV-1240, UV-1601 and UV-2401/2501PC and can be controlled by the UV-1240 and UV-1601 stand alone and from your PC using the UVPC control software (standard in the UV-2401/2501PC, optional in the UV-1601).

Contact: Clare Hodgson, Shimadzu Scientific Instruments
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MICRO-MULTICELL HOLDER MMC-1600 REVOLUTIONARY 8- AND 16-CELL MICRO SAMPLE HOLDER

Now you can analyse up to 16 samples at a time with as little as 100 µL sample volume using your standard multi-channel pipette.

The Micro-Multicell Holder is a cell holder capable of using 8- or 16-series micro multi-cells with sample capacity of as little as 100 µL The sample are transferred from standard microplates to the multi-cell using standard multi-channel pipettes.

The micro-multicell holder can be used with the UV-1240, UV-1601, UV-2401PC and UV-2501PC. The Quartz 8- and 16-micro-multicell allows measurement in the wavelength range of 190 to 1100 nm.

Contact: Clare Hodgson, Shimadzu Scientific Instruments
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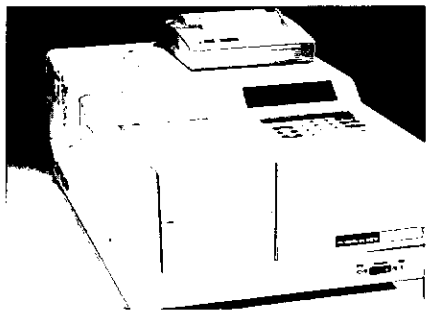
WHAT'S NEW IN PERKIN-ELMER UV/VISIBLE SPECTROSCOPY?

The Pittsburgh Conference in early March has seen the arrival of our new range of UV/Visible instruments, which now completes our product offering in this area. In addition to the well-established and proven Lambda series 20 and 40 are now the EZ150, EZ201 and EZ210.



Lambda EZ 150
The Lambda EZ150 has been designed as a low cost entry-level UV/visible spectrometer without sacrificing optical performance. Its compact space-saving design and stable optical bench makes it an ideal choice for routine analysis. The control panel on the Lambda EZ150 is quick to learn and easy to use and the instrument's robust design ensures reliable measurements for multi-user laboratory environments. The Lambda EZ150 offers a number of sophisticated features. The instrument contains a customisable wavelength ratio method that allows any two analytical wavelengths to be defined, and it will conveniently give you Absorbance Ratio and Absorbance Difference at the press of a button. Another added benefit is the automatic verification capability (via an optional printer), which checks its correct operation and optical performance for regulatory compliance. A number of

sample handling accessories are also available for the Lambda EZ150. A long-path cell holder, a test tube holder, and microcell holder (minimum sample volume = 50 µL). Additionally, an optional printer nests on top of the instrument to save precious bench space.

Lambda EZ201 and EZ210

The Lambda EZ201 and Lambda EZ210 UV/visible spectrometers are next in line. They are designed to fit into busy laboratory operations. Both models also provide the convenience of compact size and quick data collection. The Lambda EZ201 and the Lambda EZ210 share a common optical and electronic design; the difference between the two models is the choice of user interface. The Lambda EZ201 has a built-in graphical LCD display and keypad that make the spectrometer truly compact. Even with an optional printer, the Lambda EZ201 will only take 960 mm (38 inches) of valuable bench space. Up to 20 methods can be named and stored for quick recall and execution. The Lambda EZ210 has no built-in user interface; it is controlled exclusively with an industry-standard PC and the PESSW software. Controlling the Lambda EZ210 from the Windows® environment provides the benefits of unlimited data and method storage, electronic sharing of results, and more convenient formatting of spectral data for reports.

Contact: Laurence Van Dam, Perkin Elmer Pty Ltd
P O Box 107-077, Airport Oaks, Auckland
Free Phone: 0800 776767, Free Fax: 0800 776000
Email: perkin-elmer@clear.net.nz
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PILOT INTERNSHIP PROJECT WITH UDINE UNIVERSITY, ITALY

The University of Udine plans to organise a 3-6 month internship programme for its graduate students in foreign institutions. In turn, the University of Udine offers free meals and accommodation at their student house and free attendance at University courses for the period of the internship.

Members of the NZIC are invited to contact Francesca Giorgetti directly if they are interested.

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STUDENTS RETURN FROM CHEMISTRY OLYMPIAD IN BANGKOK WITH MEDALS

The 1999 New Zealand Chemistry Olympiad team returned from the 31st International Chemistry Olympiad held in Bangkok, Thailand with 3 bronze medals. Medals were won by Desmond Chun Fung Chik, a student of Auckland Grammar School, Tim King, a student of Wellington College, and Richard Kramer, a student of Westlake Boys' High School, Auckland. The fourth member of the team was Stephen McCracken, a student of Avondale College, Auckland. In Bangkok, they faced 2 exams - a practical exam and theoretical exam, each lasting about 5 hours. The result is outstanding for a small country. New Zealand's placing in the competition is roughly half way down the list of competing countries, equal to The Netherlands and the Czech Republic. The majority of countries ahead of New Zealand receive large government grants for their Olympiad organisations allowing more training of their teams. The students were selected after training and selection camps held in the Departments of Chemistry at the Universities of Auckland and Canterbury. They were being accompanied by Dr Robert Maclagan, of the Chemistry Department, University of Canterbury and Dr Sheila Woodgate, University of Auckland. At the Olympiad Dr Woodgate was elected to the Steering Committee of the International Chemistry Olympiad as representative of the Asia-Pacific Rim countries.

ORGANOCHLORINES IN THE SERUM OF NEW ZEALANDERS

Introduction

A study that has measured the levels of organochlorines (dioxins, PCBs and persistent organochlorine pesticides) in the serum of New Zealanders is nearing completion. Data from this research will be important in assessing the levels of risk these substances can pose to human health. This article presents the preliminary results of this research. The objectives of the serum study were:

1. to obtain estimates of baseline levels of dioxins, PCBs, and chlorinated pesticides in serum sampled from the New Zealand population

2. to determine the relationships of organochlorine contaminant body burdens to age, sex, ethnicity, and geographic region

3. to obtain data that can be used, under the Resource Management Act 1991, to develop national environmental standards for the protection of human health and the environment from organochlorine contaminants.

Research design and methods

Between December 1996 and November 1997, samples of blood were collected from 2,925 people across the country. The serum component was separated from the blood and sent for chemical analysis to the Centres for Disease Control and Prevention, Atlanta, USA. Because only a small quantity of blood was collected from each person, it was necessary to pool individual samples of serum to obtain a sufficient volume for the full range of organochlorine analyses to be undertaken. Following extensive discussions, serum was pooled into groups according to the following criteria for region, sex, age, and ethnicity:

Region	Sex	Age	Ethnicity
Northland/Auckland	Male	15-24	Maori
Bay of Plenty/Waikato	Female	25-34	Non-Maori
Lower North Island		35-49	
South Island		50-64	
		65+	

This study was designed to establish a base-line reference of organochlorine levels for the general New Zealand population, and was not intended to identify or characterise highly exposed or at-risk populations. Therefore, any blood samples from individuals who reported that they may have been occupationally exposed were not included in the pooled samples analysed. The research design and methods followed in this study were reported in *Organochlorines Programme*, Ministry for the Environment, Bulletin No. 7 (September 1998).

Results

This section presents some of the preliminary results from the analysis of serum for organochlorines.

Low levels of dioxins were found in all pooled samples. When measured as toxic equivalents (TEQ), these levels ranged from 5.1-26.7 pg TEQ/g of serum lipid[3]. Within an age group, the dioxin levels found in each region were generally similar. However, in all regions, the average concentrations were found to increase with age. This variation with age is shown in Figure 1.

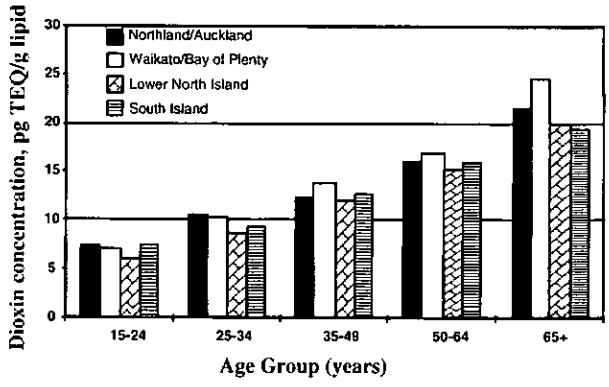

Figure 1. *Average dioxin levels in serum for each region and age group.*

The study found that little variation in dioxin levels was associated with sex or ethnicity. Thus, the dioxin levels for males and females, Maori and non-Maori were generally similar, as shown in Figure 2. The concentration in female Maori in the 50-64 year age group stands out above the other results for that age group. However, this female Maori result is based on only a small number of individual serum samples, and, therefore, may not be particularly representative of that population group.

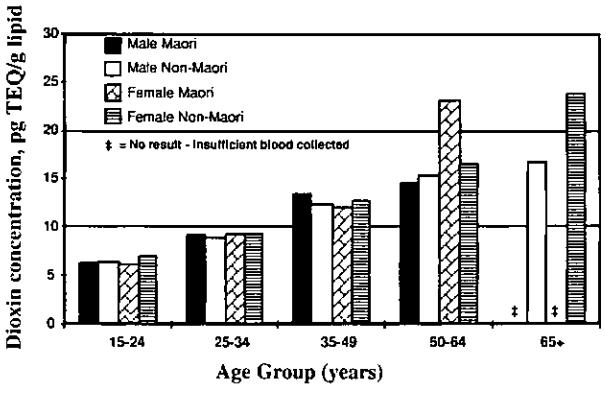

Figure 2. *Average dioxin levels in serum for sex and ethnicity with each age group.*

There was an insufficient number of serum samples collected for measurements to be obtained for Maori (both male and female) in the 65+ age group. In that age group, non-Maori females had appreciably higher dioxin levels

that non-Maori males. This may be because the life expectancy of women is longer than men, and the average age of the women in that age group is greater than that of the men.

Generally, the levels of dioxins measured in this study are lower than levels reported in non-occupationally exposed populations from other countries. For example, concentrations of dioxins in blood of the US population have been reported in the range 15.1-58.0 pg TEQ/g lipid.

Serum samples were also analysed for persistent organochlorine pesticides. The most commonly detected pesticides were beta-hexachlorocyclohexane (β-HCH), dieldrin, and DDE (a metabolite of the pesticide DDT). Concentrations of β-HCH and dieldrin were measured in the range <7-73.1 ng/g lipid and <8-28.4 ng/g lipid respectively[4]. DDE concentrations were typically ten to a hundred times higher - between 306-2060 ng/g lipid. For both DDE and dieldrin, the older age groups tended to have the highest concentrations in their serum, although there was more age variability for β-HCH. The variation in DDE concentration by region and age group, is shown in Figure 3.

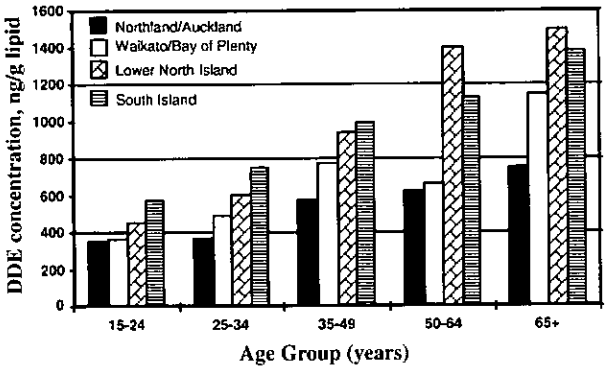

Figure 3. *Average DDE levels in serum for each region and age group.*

The highest DDE levels were consistently found in the Lower North Island and South Island regions. This may reflect historic use patterns of these materials.

[3] Dioxins are a family of 210 individual compounds, and generally occur in the environment, and in human tissue, as complex mixtures. To simplify the reporting of dioxin concentrations for use in risk assessment, it is common for the relative toxicity levels of each of the individual dioxin compounds to be added up to give a single value, known as the toxic equivalents (TEQ), that reflects the complete mixture. Because dioxins are lipid (fat) soluble, they accumulate in the fat of people's bodies. It is normal therefore, the data from the analysis of serum to be reported as a concentration in serum lipid. Such data is often measured in picograms (pg), where one picogram is one million millionth (1×10^{-12}) of a gram.

[4] One nanogram (ng) is one thousandth millionth (1×10^{-9}) of a gram.

HEALTH EFFECTS OF DIOXINS

How people are exposed to dioxins and the health effects of these chemicals has been well studied. This section provides a brief synopsis of our current understanding in this area.

Exposure to dioxins

Exposure to dioxins is generally of two kinds. Low level background exposures, as for the entire population, and higher exposures that are normally restricted to smaller groups of people, such as may occur in the workplace.

Exposure to dioxins for the general population

Dioxins can be found almost everywhere in our environment. Most people are exposed to very small background levels of dioxins when they consume food, and to a lesser extent, when they breath air or have skin contact with dioxin contaminated materials.

The World Health Organisation (WHO) has recently revised the tolerable daily intake for dioxins, and recommended a range of 1-4 pg TEQ per kg body weight per day. Importantly, the New Zealand exposure levels are below this WHO tolerable daily intake range, and are also below dietary exposures of other countries where comparable studies have been undertaken.

For the general population, over 90% of exposure to dioxins and PCBs is through the diet, with food such as meats, dairy products and fish, usually being the predominant sources. Unborn children can be exposed to dioxins *in utero*, and nursing infants are exposed to the dioxins present in breast milk.

Dioxins in our food mainly result from its deposition from air onto pasture and its uptake by grazing animals, from where it contaminates the animal's meat and milk. Another exposure pathway results from the discharge of dioxin containing effluents to waterways, where the dioxins can the bioaccumulate in fish and shellfish. The application of waste materials, such as sewage sludge, to farm land might also enhance the entry of dioxins into food produce.

Information from studies in Europe and North America indicate a daily intake of dioxins for these regions in the order of 1-3 pg TEQ per kg body weight per day. If the "dioxin-like" PCBs[5] are also considered, the daily TEQ intake can be two or three times higher. A recent study of the New Zealand diet has estimated the daily intake of dioxins and dioxin-like PCBs by New Zealanders to be 0.33 pg TEQ per kg body weight per day for an adult male, and 0.76 pg TEQ per kg body weight per day for an adolescent male.

Recent studies from a number of northern hemisphere countries, including the Netherlands, United Kingdom and Germany, show decreasing levels of dioxins in people's diets and their bodies. This has been attributed to measures taken since the late 1980s to reduce dioxin emissions to the environment from industrial processes, and bans on the use of certain chlorinated chemicals such as pentachlorophenol and the PCBs.

The relatively low level of dietary exposure to dioxins and PCBs in New Zealand is consistent with the low levels of these contaminants in the serum of New Zealanders (see previous article). A study of levels of organochlorines in the breast milk of New Zealand women carried out in 1987/88 also showed comparatively low levels of dioxins and

PCBs. These levels were generally in the low to mid-range relative to the levels of these contaminants found in the breast milk of women from other countries. The 1987/88 study is currently being repeated (*Organochlorines Programme*, Ministry for the Environment, Bulletin No. 7, September 1998), and this should show whether dioxin levels in New Zealand have also fallen over the last decade, in line with the fall observed overseas.

Accidental and occupational exposures

Some people may be exposed to dioxins in the work place, and sometimes people have been exposed to very high levels from industrial accidents. The most well-known accident occurred in Seveso, Italy, in 1976, when an explosion at a chemical manufacturing plant sent a cloud containing 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD)[6] over the surrounding area. The exposed population has been studied closely since that time.

Occupational exposures have generally been associated with the manufacture or use of industrial chemicals contaminated with dioxin, including chlorophenols and the phenoxy herbicide 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). In New Zealand, the past use of pentachlorophenol in the timber industry is believed to have resulted in occupational exposure to dioxin contaminants for some timber workers. A study, published in 1992, reported that the dioxin blood serum levels of pesticide applicators involved for many years in ground-level spraying of 2,4,5-T in New Zealand were found to be significantly higher than those of a comparison group. Pentachlorophenol and 2,4,5-T are no longer used in New Zealand.

Other exposed groups that have been studied include the American servicemen who sprayed Agent Orange in Vietnam.

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[5] The PCBS are a family of 209 individual compounds, some of which induce toxic responses similar to those observed from dioxins. These PCBs are often referred to as "dioxin-like".

[6] 2,3,7,8-tetrachlorodibenzo-*p*-dioxin is just one of the 210 dioxin compounds. It is often abbreviated to TCDD.

TOXIC EFFECTS OF DIOXINS ON ANIMALS AND HUMANS

Effects on animals

The toxicity data for dioxins comes mainly from high-dose experiments on laboratory animals, such as rats and mice. Most research has been carried out on TCDD, as this is the most toxic of the dioxins. A variety of toxic effects have been reported in studies involving dosing of animals with dioxins. The animal data indicate that TCDD is one of the most toxic substances known.

Adverse effects induced in animals by administration of TCDD include neurobehavioural, developmental, reproductive and immunotoxic effects, as well as cancer.

The susceptibility of different animal species to TCDD varies widely. The characteristic signs and symptoms of lethal doses of TCDD are severe weight loss and atrophy of the thymus gland, which is involved in the immune system. Exposure to non-lethal doses of TCDD can cause a variety of adverse effects in animals, including weight loss and biochemical and degenerative changes in the liver. In many animal species, the immune system appears to be the body system that is most sensitive to TCDD.

TCDD is a very potent animal carcinogen, causing a variety of cancers in several animal species. Rats and mice that are exposed to very small amounts of TCDD in food over a period of time can develop cancers of various organs, including the liver and thyroid gland.

TCDD can also cause reproductive damage and birth defects in animals. Decreases in fertility, altered levels of sex hormones, reduced production of sperm, and increased rates of miscarriages have been reported from various studies. Birth defects induced in animals by TCDD include cleft palate and kidney anomalies.

In general, the doses that have caused adverse effects in the animals studies are considerably higher than background human exposures for the general population.

Effects on humans

As there is a wide range of variation within different animal species in their susceptibility to dioxins, it is unclear from animal studies alone what effects dioxins might induce in exposed human populations. Therefore, it is important to consider the results of epidemiological studies of human populations. Since the most highly exposed groups of people are more likely to produce evidence of health effects associated with dioxins, epidemiological studies have focussed on such groups. However, despite a wide range of studies, evidence of effects that can be clearly attributed to dioxin exposure is still quite limited. For most of the effects that have been induced in animal studies, there is little evidence of similar effects in exposed human populations.

A number of effects have been observed in people exposed to TCDD at levels higher than general background exposures as a result of acute accidental or industrial exposures. The most obvious health effect that occurs is chloracne, a skin disease characterised by acne-like lesions. Chloracne generally occurs on the face and upper body, but may occur elsewhere on the body.

Other effects to the skin, including rashes and discolouration, have been reported in people following high exposures to TCDD. Changes in blood and urine have also been observed that may indicate the occurrence of liver damage. Of the many effects evaluated in the exposed human populations, most were transient and disappeared after the end of exposure. An increase in mortality from cardiovascular and non-malignant liver disease has been observed in association with high level accidental and occupational exposures.

Several studies of workers exposed to high levels of TCDD suggest that this chemical may increase the risk of cancer in people. Based on these and other studies, the International Agency for Research on Cancer concluded, in 1997, that TCDD is a human carcinogen.

Patent Proze

by Jane Calvert and Greg Lynch

PATENT COOPERATION TREATY

You may have heard the term "a worldwide patent". This term is misleading because it is not possible to obtain a single patent that provides effective worldwide protection. A patent provides exclusive rights to an invention for a specific country or region. An inventor must therefore obtain a patent in each country where patent protection is required.

The Patent Cooperation Treaty (PCT) originated as a mechanism for simplifying the first part of the process required for obtaining patent rights to an invention in several countries. A PCT patent application does not, however, lead to the grant of a worldwide patent.

There is a 12-month period of time following the filing in New Zealand of a provisional patent application for completing the application in New Zealand (see "Patent Proze" in *Chemistry in New Zealand*, **61**, 2 (1997)). The same 12-month period is available for filing patent applications in most other countries in order that those patent applications obtain the benefit of the date of filing of the initial New Zealand provisional application.

Prior to the advent of the PCT, an inventor was required to make important decisions towards the end of the 12-month period about countries in which patent protection was desired. Using this "traditional route" an inventor was immediately faced with substantial costs in filing and attending to the processing of a patent application in each country, including obtaining the translations of documents required in non-English speaking countries.

The "PCT route" allows a single international patent application to be filed designating those countries of interest. The primary advantage of the PCT route is that a further 18 months is provided before an election must be made as to which national patents should be pursued. The major costs of patenting internationally can therefore be deferred. It is possible under the PCT route to therefore defer the international costs for a total of approximately 30 months from the date the initial provisional patent application was filed in New Zealand.

New Zealand joined the PCT with effect from 1 December 1992. Currently 104 countries are members of the PCT. A single PCT application can designate one or more of the member countries. Typically a PCT application will designate all the member countries as the cost to select all member countries does not increase once 10 or more countries are selected.

An additional advantage of the PCT route is that an international novelty search is automatically conducted and an international preliminary examination report can be obtained. Resolving matters raised in the preliminary examination report often paves the way for smooth examination at a later date in each of the individual countries, thereby leading to cost savings.

A PCT patent application has an international phase and a national phase. The international phase commences when the PCT application is filed. The international novelty search and the optional international preliminary examination report occur during the international phase. Following international phase, the application must enter national phase in each country where a patent is required. The national phase in each country of a PCT application is essentially the same as a patent application filed in each country under the traditional route.

If you are contemplating seeking patent protection for an invention in a number of countries, we recommend you discuss the matter with your patent attorney. As a general comment, it is usually cost effective to adopt the PCT route when four or more countries are of interest. Please note that there are some countries which are not yet members of the PCT, including Argentina, Chile, Taiwan and Thailand. The traditional route would still need to be employed if patent protection is required in those countries which are not members of the PCT.

A reminder: If you have any queries regarding patents, or indeed any form of intellectual property, please direct them to:

Patent Proze
Baldwin Shelston Waters
P O Box 852, Wellington
Email: email@bswip.co.nz
Internet: www.bswip.co.nz

Jane Calvert

Jane Calvert and Greg Lynch are both employed in the patent department of Baldwin Shelston Waters, Patent and Trademark Attorneys and Solicitors, where they specialise in chemistry patents. Jane joined the firm after completing a PhD in Chemistry at the University of Canterbury in 1994. Greg also joined the firm in 1994 after three years research at Industrial Research Limited 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 in the United Kingdom.

Greg Lynch

CONFERENCES & SEMINARS

20-21 October 1999
8th New Zealand Coal Conference
Venue: Park Royal Hotel, Wellington, New Zealand
Contact: Conference Secretariat
Eighth New Zealand Coal Conference
P O Box 31-244, Lower Hutt, Wellington
Tel: (+64-4)-5703700
Fax: (+64-4)-5703701

26-30 October 1999
International Conference on Sustainable Management of Natural Resources
Venue: University Campus, Peshawar, Pakistan
Contact: office@geog-uop.pwr.sdnpk.undp.org

6-10 November 1999
4th Congress of Toxicology in Developing Countries
Venue: Antalya, Turkey
Contact: Professor Semra Sardas
Gazi University
Toxicology Department
Faculty of Pharmacy
TR 06330 Ankara Turkey
(+90-312)-2123009
Email: ek03-k@tr-net.net.tr

12 November 1999
Women Achieving in Science Conference
Venue: Storey Hall, RMIT, Melbourne, Australia
Contact: Email: pjodsec@iaa.com.au
Website: www.nteu.org.au

14-17 November 1999
Concepts and Needs for Dielectric Constant <0.15 mm Interconnect Materials: Now and the Next Millenium
Venue: Monterey, California, USA
Contact: Dr Kennth Carter
IBM Almaden Research Centre
Tel: (408)-9272617
Fax: (408)-9273310
Email: kcarter@almaden.ibm.com
or Dr Devendra Kumar, Novellus Systems
Tel: (408)-9534057
Fax: (408)-9433450
Email: devendra.kumar@novellus.com

17-19 November 1999
International Conference on Thermophysical Properties of Materials (TTPM99)
Venue: Singapore
Contact: Ms Goh Bee Dee/Ms Merlin Toh
Nanyang Technological University
Tel: (+65)-7994723
Fax: (+65)-7930997
Email: TPPM99@ntu.edu.sg
Website: www.ntu.edu.sg/sas/events/tppm99.html

21-24 November 1999
Eighth Asian Chemical Congress
Venue: Taipei International Convention Centre
Taiwan
Contact: Johnsee Lee, Chairman
Conference Organising Committee
The 8th Asian Chemical Congress
c/o Union Chemical Laboratories, ITRI
321 Kuang Fu Road
Section 2, Hsinchu, Taiwan
Tel: 886-3-5732004
Fax: 886-3-5732000
Email: 730023@ucl.itri.org.tw
Website: www.itri.org.tw/8ACC

21-24 November 1999
1999 NZIC Conference: Chemistry in New Zealand - A Showcase of Activities and Opportunities
Venue: Victoria University of Wellington
Wellington
Contact: Associate Professor Jim Johnston
Victoria University of Wellington
or Conference Office
School of Chemical and Physical Sciences
Victoria University of Wellington
Email: Margaret.Brown@vuw.ac.nz
Website: www.vuw.ac.nz/chemistry/nzic99

23 November 1999
The Analysis of Synthetic Paint Binders
Venue: Auckland Art Gallery, Auckland
Contact: Phone: (+64-9)-3077712

23-26 November 1999
The 3rd Annual Australian Environmental Engineering Research Event
Venue: Victoria, Australia
Contact: Su Lyn Low
Tel: (+61-3)-93444037
Fax: (+61-3)-93444135
Email: s.low@chemeng.unimelb.edu.au

25 November 1999
Royal Society Conference on Research in Science and Technology: Opportunities for Collaboration Between Business, CRIs and Tertiary Institutions
Venue: University of Auckland, Auckland
Contact: Email: usher.s@rsnz.govt.nz

29 November - 2 December 1999
23rd RACI Australian Polymer Symposium
Venue: Geelong, Victoria, Australia
Contact: Associate Professor W D Cook
Department of Materials Engineering
Monash University
Clayton, VIC 3168, Australia
Tel: (+61-3)-99054926
Fax: (+61-3)-99054940
Email: wayne.cook@eng.monash.edu.au

CONFERENCES & SEMINARS

3 December 1999

24th Annual Synthesis Symposium

Venue: Cuming Theatre, School of Chemistry
The University of Melbourne
Melbourne, Victoria, Australia

Contact: Dr John Lambert
Tel: (+61-3)-93447622
Fax: (+61-3)-93475180
Email: j.lambert@chemistry.unimelb.edu.au

13-17 December 1999

International Conference on Cleaner Production and Sustainable Development '99

Venue: Taipei International Convention Centre, Taipei
Taiwan, Republic of China

Contact: Dr Young Ku, Professor
Chairman of Academic Committee
Department of Chemical Engineering
National Taiwan University of
Science and Technology
43, Sec. 4, Keelung Road, Taipei, Taiwan
Republic of China
Tel: (886-2-27376621)
Fax: (886-2-27376644)
Email: ku@ch.ntust.edu.tw

30 January - 4 February 2000

5th IUPAC Symposium on Bio-Organic Chemistry

Venue: New Delhi, India

Contact: Professor S Ranganathan
Biomolecular Research Unit
Regional Research Laboratory
Trivandrum 695 019, India
Tel: (+91-471)-491459
Fax: (+91-471)-490186

6-11 February 2000

RACI 11th National Convention

Venue: Canberra, ACT, Australia

Contact: Dr Graeme Moad
Molecular Science, CSIRO
Private Bag 10, Clayton South MDC
Clayton, VIC 3169, Australia
Tel: (+61-3)-95452509
Fax: (+61-3)-95452446
Email: graeme.moad@molsci.csiro.au

14-18 February 2000

ACUN-2 International Composites Meeting - Composites in the Transportation Industry

Venue: University of New South Wales
Sydney, New South Wales, Australia

Contact: Dr Sri Bandyopadhyay
School of Materials Science & Engineering
University of New South Wales
Sydney, NSW 2052, Australia
Tel: (+61-2)-93854509
Fax: (+62-2)-93855956
Email: s.bandyopadhyay@unsw.edu.au

19-23 March 2000

Water 2000 Conference and Expo - "Guarding the Global Resource"

Venue: Auckland, New Zealand

Contact: New Zealand Water and Wastes Association
P O Box 13880
Onehunga, Auckland, New Zealand
Tel: (+64-9)-6363636
Fax: (+64-9)-6361234
Email: water@nzwwa.co.nz

Website: http://www.nzwwa.org.nz

22-25 March 2000

Chain Growth Polymerisation - New Chemistry for the New Millenium

Venue: Santa Rosa, California, USA

Contact: Professor Bruce Novak
University of Massachusetts
Tel: (413)-5452160
Fax: (413)-5450764

or Kris Matyjaszewski
Carnegie Mellon University
Department of Chemistry
Tel: (412)-2683209
Fax: (412)-2686897
Email: km3b@andrew.cmu.edu

2-5 April 2000

Foods - Nutraceuticals - Confectionery - Beverages and Cosmetics

Venue: Doubletree Mission Valley Hotel, San Diego
California, USA

Contact: Mr P C Hereld
Managing Director
The Hereld Organisation
200 Leeder Hill Drive
Hamden CT 06517, USA
Tel/Fax: +1-203-2816766

4-10 April 2000

10th International Conference on High Temperature Materials Chemistry

Venue: Aachen, Germany

Contact: Professor K Hilpert
Forschungszentrum Julich GmbH
Institut fur Werkstoffe der Energietechnik
52425 Julich, Germany
Tel: (+49-2461)-613280
Fax: (+49-2461)-613699
Email: k.hilpert@fz-juelich.de

21-25 May 2000

10th International IUPAC Symposium on Mycotoxins and Phycotoxins

Venue: Sao Paulo, Brazil

Contact: Dr Myrna Sabino

Instituto Adolfa Lutz
AV Dr Arnaldo 355
Sao Paulo, Brazil, 01246-902
Fax: (+455-11)-8533505
Email: myrna@sti.com.br

1-5 July 2000
13th International Conference on Organic Synthesis
Venue: Warsaw, Poland
Contact: Professor M Chmielewski
Institute of Organic Chemistry
Kasprzaka 44, 01-224 Warsaw 42
P O Box 58, Poland
Tel: (+48-22)-6318788
Fax: (+48-22)-6326681
Email: ichos@ichf.edu.pl

9-12 July 2000
Chemeca 2000: Opportunities and Challenges for the Resource and Processing Industries
Venue: Perth, Western Australia
Contact: Conference Secretariat
Chemeca 2000
C/- Congress West Pty Ltd
P O Box 1248
West Perth, WA 6872, Australia

9-14 July 2000
38th International Symposium on Marcromolecules
Venue: Warsaw, Poland
Contact: Professor Stanislaw Penczek
Polish Academy of Sciences
ul. Sienkiewicza 112, 90363 Lodz, Poland
Tel: (+48-42)-6819815
Fax: (+48-42)-6847126
Email: spenczek@bilbo.cbmm.lodz.pl

9-14 July 2000
34th International Conference on Coordination Chemistry
Venue: Edinburgh, Scotland, United Kingdom
Contact: Professor P Tasker, Chairman
Dr John F Gibson, Secretary
The Royal Society of Chemistry
Burlington House, London W1V OBN
England, United Kingdom
Tel: (+44-171)-4403321
Fax: (+44-171)-7341227
Email: gibsonj@rsc.org

17-20 July 2000
40th Microsymposium on Polymers In Medicine
Venue: Prague, Czech Republic
Contact: Dr Jaromir Lukas
Institute of Macromolecular Chemistry
Academy of Sciences of the Czech Republic
Heyovskeho na. 2, 162 06 Praha 6
Czech Republic
Tel: (+420-2)-360341
Fax: (+420-2)-367981
Email: sympo@imc.cas.cz

6-11 August 2000
7th International Symposium on Polymer Electrolytes
Venue: Noosa, Queensland, Australia
Contact: Dr Astrid Nordmann
Centre for Advanced Materials Technology
Monash University, Wellington Road
Clayton, Victoria 3168, Australia
Tel: (+61-3)-99055791
Fax: (+61-3)-99054998
Email: ispe7@eng.monash.edu.au
Website: www.chem.monash.edu.au/electrolytes/ispe7

6-11 August 2000
16th IUPAC Conference on Chemical Thermodynamics
Venue: Halifax, Nova Scotia, Canada
Contact: Dr Peter G Kusalik
Department of Chemistry
Dalhousie University
Halifax, Nova Scotia B3H 4J3, Canada
Tel: (+1-902)-4943627
Fax: (+1-902)-4941310
Email: kusalik@is.dal.ca

14-18 August 2000
12th International Conference on Thermal Analysis and Calorimetry
Venue: Copenhagen, Denmark
Contact: Dr O Toft Sorensen
Risoe National Laboratory
Tel: (+45-4)-6775800
Fax: (+45-4)-6775758
Email: o.toft.sorensen@risoe.dk

20-25 August 2000
XIIIth International Congress on Rheology
Venue: Cambridge, England, United Kingdom
Contact: Dr D M Binding
Fax: (+45-1970)-622777
Email: rheology2000@aber.ac.uk

1 September 2000
22nd International Symposium on the Chemistry of Natural Products
Venue: Sao Paulo, Brazil
Contact: Dr M Fatima das G F da Silva
Universidade Federal de Sao Carlos
Depto. de Quimica, Via Washington Luiz
km 235, CP676, Sao Carlos, Brazil
Tel: (+55-16)-2748208
Fax: (+55-16)-2748350
Email: dmfs@power.ufscar.br

CONFERENCES & SEMINARS

3-8 September 2000

11th International Biotechnology Symposium

Venue: Berlin, Germany

Contact: Professor G Kreysa, DECHEMA eV
c/o 11th IBS, Theodor-Heuss-Allee 25
60486 Frankfurt/Main, Germany
Tel: (+49-69)-7564205
Fax: (+49-69)-7564201
Email: info@dechema.de

11-14 September 2000

21st International Federation of The Societies of Cosmetic Chemists

Venue: Berlin, Germany

Contact: DGK Secretariat, Konrad-Zirkel-Str 22
D-97769 Bad Bruckenau, Germany
Tel: (+49-9)-7414323
Fax: (+49-9)-7413934
Email: dgk.ev@t-online.de

8-10 November 2000

2nd International Symposium on Food Packaging - Ensuring the Safety and Quality of Food

Venue: Vienna, Austria

Contact: Dr L Contor
ILSI Europe, 83, Avenue E. Mounier
Box 6, B-1200, Brussels, Belgium
Tel: (+32-2)-7620044
Fax: (+32-2)-7710014
Email: laura@ilsieurope.be

19-22 November 2000

Corrosion & Prevention 2000

Venue: Hyatt Hotel, Auckland

Contact: Corrosion Prevention Centre
P O Box 2340, Mount Waverley
Victoria 3149, Australia
Tel: (+61-3)-98095266
Fax: (+61-3)-98095344
Email: corrprev@internex.com.au

3-8 December 2000

Soil 2000: 2nd Joint New Zealand and Australian Soil Science Societies Conference

Venue: Lincoln University, Canterbury

Contact: Helen Shrewsbury
P O Box 84, Lincoln University
Christchurch, New Zealand
Tel: (+64-3)-3252811 ext 8955
Fax: (+64-3)-3253840
Email: shrewsbh@lincoln.ac.nz

9-13 December 2000

Poly Millenium 2000

Venue: Hilton Waikoloa Village, Waikoloa, Hawaii

Contact: William H Daly
Department of Chemistry
Louisiana State University
Email: bill.daly@chem.lsu.edu

14-19 December 2000

Pacifichem 2000

Venue: Waikiki, Honolulu, Hawaii

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

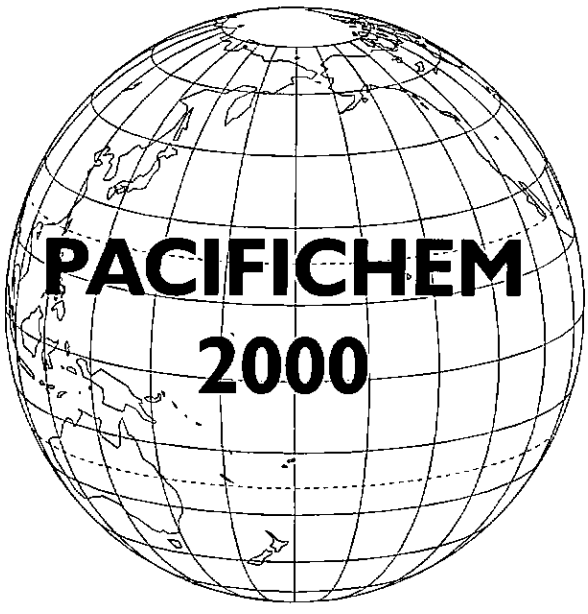
26 August - 1 September 2001

XXXIV International Congress of Physiological Sciences

"From Molecule to Malody"

Venue: Christchurch, New Zealand

Contact: The Conference Company
P O Box 90-040, Auckland, New Zealand
Tel: (+64-9)-3601240
Fax: (+64-9)-3601242
Email: info@tcc.co.nz



CALL FOR PAPERS

Papers Sought for Pacific Basin Chemical Congress

Chemists and chemical engineers in countries bordering the Pacific Ocean and in all other countries are invited to submit papers for consideration and to attend the 2000 International Chemical Congress of Pacific Basin Societies. Scheduled for 14-19 December 2000, in Honolulu, Hawaii, USA, it is being co-sponsored by the American Chemical Society, Chemical Society of Japan, the Canadian Society for Chemistry, the New Zealand Institute of Chemistry and the Royal Australian Chemical Institute. Many of the Chemical Societies in the countries that border the Pacific Ocean are Official Participating Organisations.

Some 6,000 reports on current research and development will be presented in about 179 symposia in oral and poster general sessions. The Congress will also feature specific scientific events, including plenary lectures, an exposition of chemically-related scientific products and services, and pre- and post-tours of neighbouring islands. General tours will also be offered during the Congress to places on Oahu related to the culture and history of the Hawaiian islands that are not normally part of typical tourist activities.

Papers will be presented in symposia and in general oral and poster sessions in the 10 topical areas in which symposia are grouped (see following pages). A few selected symposia will be for invited papers only. It is a requirement when submitting contributed papers for consideration for symposia or general session presentation in either oral or poster that an abstract of approximately 150 words be submitted on the special Congress Abstract Form. In January 2000 the abstract form will be available for electronic retrieval and submission from the Pacifichem 2000 Web page at:

http://www.acs.org./meetings/pacific/welcome.htm#2

Abstracts must be received in Washington by 14 April 2000.

All contributed abstracts for papers should be submitted to the Congress Secretariat at the American Chemical Society. Printed copies of the abstract form and additional information on the submission of papers are available from:

Pacifichem Congress Secretariat
American Chemical Society
1155 Sixteenth St, NW, Washington, DC 20036, USA
Email: pacifichem@acs.org

NZIC Secretariat Office
P O Box 39-283, Howick, Auckland
Email: NZICOffice@nzic.org.nz

Professor B Halton
School of Chemical and Physical Sciences
Victoria University, P O Box 600, Wellington
Email: brian.halton@vuw.ac.nz

Details of the Congress including the updated programme listings are available from the website that can be accessed easily from the Pacifichem listing on the ACS meetings web page at:

http://www:acs.org/meetings

The details for advance Registration, Accommodation, Congress Events and Tours will be made available in the July 2000 issue of *Chemistry in New Zealand*. Registrations fees have yet to be finalised but approximate figures are $US~350 for full registration (PhD students $US~90); a full list will be published once the rates are set.

TRAVEL GRANTS AVAILABLE FOR YOUNG CHEMISTRY SCHOLARS

In addition to providing a full scientific program spanning the major subdisciplines of chemistry, Pacifichem 2000 will provide a unique opportunity for chemistry professionals from all the developed and developing Pacific Basin countries to meet and explore common interests and perhaps devise joint activities. To encourage attendance at the Congress by young chemistry professionals from developing countries that border the Pacific Ocean, the Sponsoring Societies of Pacifichem 2000 are making available up to 40 grants of $US1000 plus complimentary registration to assist with travel and attendance costs. NZIC members aware of possible applicants from the developing regions of the Pacific Basin are asked to encourage such persons to apply.

Eligibility. Applicants for a "Young Scholar" award must:

1. Be 40 years of age or less at the time of the Congress.

2. Be in their first *permanent* position as a member of the professional staff of an educational institution, non-profit organisation or government agency, but not a commercial organisation.

3. Belong to an organisation officially participating in Pacifichem 2000 from a developing country of the Pacific Basin (see accompanying list) *OR*

4. Be a practising chemist in a country that borders the Pacific Ocean that does not have a national society for chemistry or whose society is not officially participating.

5. Be the *principal* author and presenter of a paper submitted and acceptable either for oral or poster presentation at Pacifichem 2000.

6. Enclose with their application:
   i) one copy of a 500-1000 word abstract and
   ii) the required Congress short abstract form duly completed for their paper (or poster) proposal.

Applications. Although there is no special application form, a transmittal letter should state that the application is for "Young Scholar" consideration and it must be accompanied by the following:

a) A cover page giving (IN BLOCK CAPITALS) name, age, date of birth, highest degree (and year awarded), current position (and date of appointment), name of participating organisation, lowest possible cost of return travel, and full international mailing address [include full telephone and facsimile numbers and an electronic mail address (if available)].

b) A curriculum vitae which includes chemical society membership(s).

c) A full list of scientific publications - *but not off-prints.*

d) Any other sources of financial support to assist with the costs of attendance. Note: Applicants are encouraged to seek alternative funding to bridge the gap between these grants and the actual costs of attendance.

e) A statement from the employer signifying that approval and leave to attend the Congress is granted.

Applications should be submitted to the American Chemical Society at the address given below.

DEADLINE FOR RECEIPT OF APPLICATIONS IN THE USA IS FEBRUARY 11, 2000

AWARDS: Applications will be judged by a panel of THREE Professors of Chemistry selected from universities in Pacific Basin countries. The results will be mailed to applicants by about mid-April, 2000. Grants are of $US1000 plus complimentary registration to Pacifichem 2000. ***Monies and registration packages will be available for grantees in Honolulu at Pacifichem 2000 ONLY and NOT in advance.***

ADDITIONAL INFORMATION: For further information regarding the Young Scholars Award program or any other aspect of Pacifichem 2000 write or call:

Mrs C Pruitt
Congress Manager (Pacifichem 2000)
American Chemical Society
1155-16th St, NW, Washington, DC 20036, USA
Email: pacifichem@acs.org

SYMPOSIA APPROVED FOR PACIFICHEM 2000

The full list of approved symposia, preceded by the unique symposium number, follow. Please use the relevant number and symposium name in abstract submission if you wish to be considered for a specific symposium.

AREA 1: Agrochemistry – including agriculture, cellulose, carbohydrate, pulp, and paper chemistry

005 Immunochemical Biomonitoring for Environment Chemicals
006 Molecular Designs of Food Proteins for Industrial Applications
111 Functional Food Ingredients: Trends and Prospects
134 Utilisation of Biomass for the Production of Chemicals in the Twenty First Century
139 Quality of Fresh and Processed Food
145 Industrial Enzymes
152 Chemical Modification, Properties and Usage of Lignin
153 Lignocellulosics Science and Technology: From Laboratory to Market
165 Chemical Ecology and Biochemistry of Plant Resistance to Diseases and Nematodes
192 Bioconversion of Lignocellulosics to Ethanol and Co-Products
202 Food and Beverage Antioxidants in Health and Disease

AREA 2: Analytical Chemistry

021 Electrochemical Sciences
026 Liquid-Liquid Interfaces in Analytical Sciences
031 Soft X-ray Spectroscopy: New Evaluation of Chemical Composition of Functional Materials
074 New Wave of Analytical Reagents for Symbiotic Human Life with Nature
075 Frontiers of Spectroscopic Analysis of the Brain
076 New Optical Probes for Chemical and Biochemical Analyses
113 Ultrasensitive Chemical Measurement and Characterisation
117 Separation Science: Trends for the New Century
121 Novel Measurements of Gas Phase Ions
124 Elemental Mass Spectrometry for a New Millennium
137 Micro-Bioanalytical Chemistry: Separations and Manipulations of Micron Size Domains
154 Chemical and Biochemical Sensors
159 Recent Developments in Field Analysis
171 Raman Spectroscopy: Coming of Age in the New Millenium
204 Chemical Sensors Based on Chemical Recognition
214 Recombinant Proteins in Analytical Chemistry

AREA 3: Bioscience and Technology – including microbial and pharmaceutical chemistry

038 Pyridoxal Biocatalysis: Fine Catalytic Mechanism and Application
040 Chemical Regulation of Bioreactions and Biorecognitions
046 Peptide Chemistry as Life Molecular Science
047 Biomineralisation: Control of Bio-Architecture by Minerals and Organic Molecules

061 Advances in Solid State NMR of Biomolecules and Materials
063 Bioengineering of Extremophiles and Extremozymes
073 Astrobiochemistry and Origins of Life
129 Medical Applications of Nucleic Acid Molecules
158 Biomolecular Structure and NMR
170 Biosynthesis of Natural Products
185 Evolution of Enzyme Function
186 Xenobiotic Enzymology
187 Multiple Solutions to the Same Chemical Problems
188 Nucleic Acid-Protein Complexes as Drug Receptors
194 Metal Thiolate Clusters in Biological Systems: The Biochemistry and Chemistry of Group 11 and 13 Metals and Their Reactions with Metallothioneins, Phytochelatins, Gamma-EC Peptides and Related Metal complexes
196 Environmental Biotechnology: Bioremediation and Bioprevention
201 Marine Bioproducts of High Value
205 Glycobiology

AREA 4: Chemistry and the Community – including chemical education, chemical economics and business, and public education and outreach

041 Environmentally-Benign Chemistry Including Micro Scale and Small Scale Laboratory
051 Changing Chemical Scene in the Pacific Basin
059 International Relationship in Chemical Education
120 Testing with Technology
143 Teaching Aspects in Chemistry: Curriculum Developments in Analytical Chemistry
150 Chemistry for Elementary Schools
184 International Perspectives of Graduate Education
190 Metrology, Standards, Testing, Quality (MSTQ): Keys to the Future for the Chemical Enterprise
195 Catalysis and Catalytic Processes for Efficient Chemical Synthesis
206 Research Supported Teaching/Learning Innovations
207 Laboratory Education in the 21st Century
216 Multimedia and Visualisation in Chemistry for the Major and the Non-Science Major

AREA 5: Environmental Chemistry

112 Environmental Chemistry of Main Group Organo-Metallics
115 Photochemistry of Freshwater and Marine Environments and its Impact on Biogeochemical Cycles
116 Environmental Applications of Ionising Radiation
118 Sampling and Analysis for Verification with the Chemical Weapons Convention
142 Characterisation, Performance and Fouling of Water Treatment Membranes
155 Chemical and Biochemical Technology for Improving the Environment
211 Plasma Chemistry and Technology for Green Manufacturing, Pollution Control, and Processing Applications

AREA 6: Inorganic Chemistry – including geochemistry and nuclear chemistry

002 Selective Chemical Transformation on Late Transition Metal Complexes
009 Selective Catalysis for Environmental Applications
013 Multifunctionality of Inorganic and Organic Hybrid Solids, Part 1. Electric Conductivities and Related Properties
014 Multifunctionality of Inorganic and Organic Hybrid Solids, Part 2. Molecular Magnetism and Related Properties
015 Recent Progress in Rare Earth Chemistry
017 Polyoxometalate Chemistry for Nano-Composite Design
018 Advances in Inorganic Fluorine Chemistry: New Synthetic Methods, Applications in Industries and Material Sciences, and Computational Aspects
019 Inorganometallic Chemistry of Group 13-16 Elements
023 New Trends in Biofunctional Metal Complexes
027 Nuclear Hyperfine and Exotic Particle Techniques for Studying Chemical States
028 Metal Complexation in Colloid and Polymer Systems
032 Fundamental Studies on Coal for the New Century
034 Main Group Chemistry I: Advances in Synthesis, Theory and Applications
037 Structure and Dynamics of Solute-Solvent Interactions
043 Oxygen Activation by Metalloproteins and Their Models
049 Inorganic Organometallic and Biological Chemistry of Metal Sulfides
067 Environmental Chemistry and Microbiology of Actinides
070 Organometallic Chemistry of Early Transition Metals and Lanthanides
072 Bio-inspired Molecular Design of Multinuclear Metal Centres
101 Metal-mediated Nucleophilic Cleavage of Nucleic Acids
105 Main Group Chemistry II: Low Valent, Low Coordinator Number and Cluster Compounds
106 Reservoir Geochemistry
107 Chemistry and Application of Metal Complexes of Mixed-Donor Multidentate Ligands
109 Twenty Years of Organic Superconductors: New Materials - New Insights
130 New Developments and Directions in Inorganic Charge Transfer Complexes
135 Radioisotope Production and Applications in the New Century
148 Fundamental and Technological Advances in Actinide Chemistry
151 Electron and Atom Transfer Chemistry of the Late Transition Metals
166 Chemistry of Thin Film Formation
169 Science with Radioactive Beams
176 Chemistry and Biology of Copper
180 New Materials from Organometallic and Coordination Chemistry
212 Molecular Recognition of Anions and Cations
213 Chemical Effects of Ultrasound

AREA 7: Macromolecular Chemistry

003 Advanced NMR Characterisation of Polymers: Precise Structural Analyses and Molecular Interpretation of Macroscopic Properties

044 Polymer Thin Film Interfaces
050 High Performance Polymers
054 Photonic Processes in Polymers and Self-Organised Materials
055 Structures and Properties of Polymer Alloys
056 Self-Ordering Phenomena in Polymeric Systems: From Microscopic to Mesoscopic Scales
057 Precision Polymerisations and Controlled Supramolecular Architectures
058 Liquid Crystalline Polymers: Self-Organisation of Macromolecules with Well-Controlled Orientation and Polarity in the Liquid Crystalline Field
068 Photophysics and Photochemistry of Polymeric Materials
102 Reactive Polymer Processing
127 Pi-Conjugated Polymers
149 New Methodologies in Polymer Synthesis
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AREA 8: Medicinal Chemistry

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OBITUARY

Francis Brian Shorland

1909-1999

Brian Shorland was born in, and brought up in Wellington, and became a cadet in the Department of Agriculture. This enabled him to attend classes at Victoria University College (as it then was) where he graduated in chemistry. He and his cadet colleague Frank Denz each won the Sir George Grey Scholarship, and both went on to complete an MSc in chemistry under Professor P W Robertson, both winning a Joseph Jacob Scholarship. Among his cadet colleagues at the chemistry laboratory of the Department of Agriculture who took a similar route to become qualified scientists were some who were eventually to become well known in chemistry in New Zealand. Stan Brooker, Norm Clare, Peter de la Mare, and Frank Denz, were among them.

As a member of the scientific staff of the Department of Agriculture for the next three years Brian developed an interest in the chemistry of fats, and decided to go to Liverpool to do his PhD with Professor Hilditch, who was the leading British fats researcher. With his prepared samples of various New Zealand animal and fish oils and fats for analysis, he set off to England at the end of 1934 with a Department of Scientific and Industrial Research Scholarship and a University Free Passage.

Three years later, with his PhD completed (*The Composition of New Zealand Fats with Special Reference to Fish Liver Oils*) he returned to the Chemistry Department of the Department of Agriculture where his first project was to investigate variations in bacon fats.

In 1946 Dr Filmer came from Australia to be Head of the Department of Agriculture. He closed the Agricultural Chemical Laboratory, its personnel being expected to be absorbed by Dr McMeekin's animal production department at the Animal Research Station at Ruakura. Brian had no wish to move to Hamilton, especially as he was told he could not continue with his fats work. Instead he opted to transfer to the Dominion Laboratory in the Department of Scientific and Industrial Research. It so happened that at that time Britain had imposed a food labelling requirement on our exports of butter - every pound of butter had to have its vitamin A content on it. Since Brian was the only scientist in the DSIR with experience of vitamin A analyses, (they had been part of his thesis in Liverpool), Dr Marsden, the Director of DSIR, made him Officer in Charge of the newly established Fats Research Laboratory with the task of investigating fats of economic interest, starting with butterfat.

Brian's laboratory was never a very large one, never more than 21 people, but he said they made a good team. He was always very proud of them and the work they accomplished. They first studied variations in butter quality, then the effects of variable feedstuffs throughout the year, not only on the fatty acid content of butter but on animals' body fat. They found and identified a number of new fatty acids with quite different structures from any previously known. Among them was phytanic acid, which was known to be associated with a human disease, Refsum's disease. Their work on this fatty acid led to an understanding of the cause of this disorder, with possibilities of treatment.

Fractionation columns were at the heart of much of the analysis of fats, and the groups' improvements to them were patented. After World War II technical and instrumental advances led to the advent of gas chromatography. This technique facilitated their analyses making them very much faster, and was used to confirm the work done with the very tedious, "old fashioned" columns. The range of investigations was extended to analyses of various animal feedstuffs, and their metabolism in ruminant and non-ruminant animals. This contributed to a better understanding of the metabolism of the bacteria which inhabited the ruminant gut, and the metabolism of valine. This led Brian to develop a new theory of the evolution of fat metabolism in animals which was accepted; he was invited to contribute a chapter The Chemistry of Lipids, in the prestigious American *Annual Review of Biochemistry*.

When Britain went into the Common Market of Europe, New Zealand was forced to find other markets for its meat and butter, principally in Asia. But there was a problem - the Japanese, who were a potentially attractive market, disliked the flavour of mutton. Brian set up a taste panel in association with the Department of Food Technology at Massey University to investigate the origins of the "mutton" flavour. He showed that changes in flavour could be related to the animal's body fat changes which in turn were associated with changes of pasture. These studies also contributed to an understanding of the chemical source of "warmed over" flavour.

When he retired from the Fats Division in 1969, Brian began a second career as Honorary Fellow at Victoria University Biochemistry Department. He persuaded the department to include biochemistry of nutrition, and lectured and supervised students' theses. He was a constant critic of the knowledge base of nutrition, pointing out how faulty it was, and wrote and lectured on its failures at every opportunity. Earlier, he had been involved in a worldwide request by the United Nations Organisation to scientists to find new sources of protein foods, on the understanding that there was going to be a world shortage of protein. Brian turned wool, both direct from sheep and as discarded socks and jerseys, into an edible protein from which he baked sponge cakes, ginger biscuits and other tasty

products. The tasting panel for these included parliamentarians and the Mayoress of Christchurch's afternoon tea parties.

But having successfully developed a use for our surplus wool, he and other scientists around the world who had worked on the request, found that the United Nations had "got it wrong". It was not a shortage of protein that threatened, but of total food in particular areas of the world where kwashiokor was rife. This experience led him to think very seriously about the general knowledge of human nutrition that was existent, and how much of it lacked an appropriate scientific basis. He was particularly concerned about the faulty interpretations of effects of dietary fats and heart disease and was constant in his condemnation of errors perpetuated by so-called nutrition experts. He clearly distinguished omega-6 fatty acids which are clotting agents found in many polyunsaturated vegetable oils, from omega-3 fatty acids (found in many fish species) which complete with omega-6 and have an anti-clotting effect.

Apart from his interest in the chemistry of fats, Brian was an active member of the New Zealand Institute of Chemistry. He was Chairman of the Wellington Branch in 1948, and was President from 1961-1962. As a Fellow of the Royal Society of New Zealand he worked to increase the standing of chemistry among other scientists, and he contributed much to the development of science in this country. As Editor of *New Zealand Science Review* he wrote editorial after editorial, (55 at least), critiques of Government, directions for science, and criticisms of the way science was being distorted by inappropriate emphasis on its control by market place theory. He was a vigorous supporter of the Popperian view of how science functions, and never flagged in his denigrating of anything but the best in science. There could be no second rate science - anything but the best was not science.

He earned numerous accolades, DSc from Liverpool and from Victoria Universities, the Hector Medal, the Marsden Medal, the ICI Medal, the OBE, The International Order of Merit, and some 23 others. The one he was particularly proud of was "The Jaws Award" of the New Zealand Association of Food Technology Annual Conference, for being the member of the audience with the most to say.

At his home Brian built a variety of windmills and solar panels to generate his own supply of electricity, patenting some of these ideas. He showed that individual houses did not need to be reliant on paying for electricity from the local supplier, and relished being independent. He grew tomatoes in winter in the entrance lobby of his house, by leaving the lights on for the required number of hours per day, cheating the plants to believe it was summer time. He grew his own vegetables with a clever arrangement of composting that required little more than his climbing a ladder propped against the garage, to add the day's collections to the pile of vegetable and grass waste contained by a tall tube of wirenetting alongside. When the pile reached the top of the wire roll, about ten feet tall, he had by then eaten the last crop of vegetables in the garden beside it, leaving a vacant hole the size of the vegetable plot. The clips holding the netting were released and the whole lot fell into the waiting hole, where it could be easily dug in ready for the next planting.

In recent years, Brian caught the local bus every day at the end of his route in Karaka Bay where he lived, and travelled through Wellington and up to Victoria University in Kelburn. There he spent the best part of each day writing, or talking to students and staff, which he referred to as "bothering" them. He loved to disturb a person's individual knowledge-base by questioning and eroding some part of it. He had a kwerky sense of humour which involved never answering a point directly, but by taking a circuitous route through apparent irrelevances. Some people could not tolerate this, but those who did were richly rewarded with ideas and relationships of ideas that they had not recognised before. His university room was piled with the accumulation of a lifetime's papers which over the last months he collated, tidied and filed with the help of several students. He was aiming to have a great 90th birthday, but during his last six months he got physically weaker, finding it hard to move around. Everything had to be done very slowly, yet still his mind was flying along at its usual speed, thinking of new things to say and jokes to crack. And still he slowly climbed aboard the bus five days a week and went to Victoria University.

He seemingly chose to complete what was on his desk, checking a draft of his biography, then died in his sleep. It was three weeks before his birthday. On the day of his birthday, the Royal Society arranged a lunchtime gathering at Science House, various colleagues providing commentaries on his life and work. It's a pity he could not have heard them, but perhaps he had a fair idea of how he mattered to the many colleagues who called him friend.

Brian's expressions of his beliefs in what constitutes real science will be sorely missed, while we who have known and been influenced by scientists such as he, struggle to keep it viable during this time of destructive floods of market place directives. And we will miss the man himself with his extraordinary gift of an unusual sense of humour.

Joan Mattingley

CALL FOR NOMINATIONS TO THE NZIC COUNCIL

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 Honorary General Secretary.

Please send nominations to the NZIC Office by 31 October 1999.

Honorary General Secretary
Freepost 96
New Zealand Institute of Chemistry
P O Box 39-283, Howick, Auckland

Email: Secretary@nzic.org.nz
Fax: (09) 5353476

Going Down The Soviet Road

Leon Phillips, University of Canterbury, Department of Chemistry, Private Bag 4800, Christchurch
2nd Vice President, NZIC

After a year of plodding laboriously through the Foresight process, the Ministry of Research, Science and Technology (MoRST) has produced a list of Foresight Target Outcomes which makes a ringing declaration in favour of the environment, motherhood and Maori aspirations, and against poverty and ill-health. The process that was supposed to generate a set of directions for future research policy has been a complete waste of time and taxpayers' money. So what else is new?

Maurice Williamson's Blueprint for Change (MoRST, May 1999) takes this vacuous document as justification for driving New Zealand science in the same direction that Soviet science was driven for 70 unproductive years. The objectives of all publicly-funded research are to be decided by political commissars (called 'purchasing agents' under the present regime) who will exercise 'smart purchasing' in consultation with 'providers and end-users' to build a 'balanced portfolio' of research programs that are supposed to lead to 'a vibrant and thriving knowledge-based society'. The research will be of 'acceptable merit', but the quality of the science is regarded as less important than its relevance to 'target outcomes' as laid down by the Ministry.

Apart from minor differences in jargon, this is the Soviet system. You can only get money to work on things that the Ministry (a) can comprehend and (b) considers important for political reasons.

The same approach resulted in Soviet scientists missing out on every important scientific or technological discovery that occurred between 1917 and 1989 - antibiotics, radar, plastics, semiconductors, lasers, molecular genetics, computers, to name a few that have obvious economic importance. There were some great Soviet theoreticians during this period, because even the most brutal political commissar cannot control what people are thinking about, but Soviet experimental scientists achieved practically nothing in relation to their country's considerable research investment. Their few successes, such as Sputnik and the Venus probes, were obtained by highly conservative engineering methods that had little to do with science. They had some of the best-prepared (in the sense of best-drilled) students in the world, and they wasted them.

At the time of the first series of oil-price shocks, university libraries everywhere were forced to cancel journal subscriptions to remain within budget. The first things to go were the English translations of Soviet scientific journals, because their content was about 30 years behind the times. During the long existence of the Soviet Union, the undoubted Russian intellectual flair manifested itself in the form of some of the most brilliantly creative chess players who ever lived, plus a few top mathematicians and theoretical physicists. Even after allowing for a couple of major wars and the odd political purge, they should have had five or six generations of equally brilliant experimental scientists, but they didn't, because the direction of their experimental science was controlled by politicians. On the basis of the unfortunate Soviet experience, we can state with absolute certainty that political direction of scientific research prevents scientific innovation.

We in New Zealand should, like Japan, Taiwan, South Korea and Singapore, be copying the highly successful US pattern, with strong, unashamedly elitist universities doing world-leading research as centres of excellence in basic and applied science, in close association with centres of innovation in high-tech industry. Note that strong universities are required. Institutions at the level of purely undergraduate colleges or polytechnics never fill this role. Also, they have to be elitist, because the difference between the top people and the rest, in basic or applied science, is like the difference between Tschaikovsky and Elton John.

Instead, for more than ten years our universities have been subjected to a concerted effort to downgrade them by financing them at the same level as polytechnics and by refusing to provide a contestable source of funding for research equipment, and student-staff ratios have risen to be among the highest in the Asia-Pacific region. We still have a lot of very good young researchers in our universities, but they expend most of their creative energy on finding ways to get at least some worthwhile research done, despite the inadequate funding system and the demands on their time from increasing numbers of poorly-prepared students.

The proportion of young people going into tertiary education has increased markedly since Rogernomics eliminated many of the alternatives, but the number of first-rate students taking advanced science and engineering courses has, if anything, declined. Present Government policy ensures that the financial incentives are elsewhere, and the so-called Foresight outcomes don't even acknowledge that the problem exists. Every published analysis predicts a big demand worldwide for bright young scientists and engineers during the next twenty or thirty years. For a variety of reasons, some of which I have mentioned, the ones that we produce will have no incentive to remain in New Zealand. Certainly, I could not advise them to do so.

This article first appeared in *The Dominion* – June 21 1999, and is reprinted with permission of the author.

Going Down The Soviet Road

Dear Sir,

The article by Leon Philips is a very good critique of the EFTS system from a University point of view, and raises some interesting philosophical points which apply equally to other areas of the education system where EFTS based-funding, or its alter ego, bulk funding, is applied. One of the stated intentions of these systems is to apply a simulated market environment to the education system. As Leon has pointed out, it is not a good simulation.

Real markets rapidly become sophisticated, with a wide range of service or product providers competing for market share in a widely segmented market. Success in these markets depends on perceptions of value for money, a composite measure which includes perceptions of product or service quality, cost, and ability to meet composite needs of sophisticated customers. In such a market, a small producer, producing a small volume of a very high quality, high cost product, or service, can be as successful, or even more so, than a volume producer of a bland product or service.

The pseudo market created by EFTS based- or bulk-funding is totally unsophisticated. The unit of currency is the EFTS, which has the same value regardless of the quality, or lack of quality in the service. In such a market, efforts to increase the quality of the service provided will go unrewarded, but any reduction in cost, regardless of its other effects, will always be rewarded. This is true for all aspects of the service, whether it is the provision of research, learning opportunities, or child minding. The resulting downgrading applies to the whole system, from kindergartens to universities.

Is the alternative a sophisticated education market, where the value of the EFTS funds, on a per student basis, is related to the value of the programme and its graduates to the community? In the current political climate, extra funding is more likely to be employed improving the performance of poorly achieving institutions, thus providing market type rewards for their non-performance.

There is a serious dilemma here, one which indicates that a free market model does not fit education. There is, however, no doubt that the pursuit of excellence in education requires more reward than the simple personal pleasure of achievement.

Yours,

Jim Sargent
Nelson Polytechnic

Dear Professor Phillips,

Today I have discovered a copy of your opinion paper about the above topics on a message board in our institute. Maybe someone pinned it as a "tacepao" secretly. Unfortunately I did not have the opportunity to read the original one, which appeared in *The Dominion* recently, I was told.

I would like to express my honour to you for your opinion. At last you had the courage and expressed what others are afraid to say about the official science policy of the New Zealand Government(s).

I am a biologist and came here 10 years ago from Hungary, where the situation was the same in science as it was in USSR, especially in the fifties and early sixties. In those times genetics was declared as an evil capitalist science and rice and orange were forced to grow on the Great Hungarian Plain.

Since I came to New Zealand, I always wondered why politicians here do not study the history of the former Eastern European block to conclude what they should not do to ruin the intellectual force of this country. Why politicians never ever learn from history and why scientists of New Zealand have to suffer in the same way as they did in the former communist block.

I would like to pinpoint that the history of science in the former communist block indicates that a country's science is nothing without a very strong knowledge-based basic science. The forced preference of applied research versus basic research degraded those country's science to the level of the third world.

Fortunately, in the seventies some very respected scientists and bureaucrats could influence the politics in Hungary in a positive way and, for example, the Biological Research Center of the Hungarian Academy of Sciences was established in Szeged to conduct purely basic research in five main areas of modern biology. That center is still one of the best institutes in Europe despite the recent cutbacks in science budgets in Hungary (the governments do not learn there either). The activities and the achievements of that center also showed that their basic research produced many fantastic applications, indicating that only very strong basic science can produce that accumulated knowledge that can result in applications.

I hope that such enlightened people also exist in New Zealand too, who will be able to reverse recent trends in science policy here and put back New Zealand's science into the deserved and appreciated situation.

Congratulations once more for your brave opinion.

Name and address withheld by request.

ROYAL SOCIETY AWARD APPLICATIONS INVITED

VISITS TO DEVELOPING COUNTRIES

The Society, through its International Committee, has established a scheme of awards to enable members of The Royal Society of Chemistry to visit chemical establishments in developing countries. The visits must clearly be of benefit to the country concerned and the visitor would be expected to give lectures and engage in other forms of information exchange or, for example, to explore the possibility for future collaboration in research. Support will not be given for attendance at conferences. The grants will complement, where appropriate, those for visits to Commonwealth countries available from the Corday-Morgan Memorial Fund.

The intention is to help applicants make stop-overs in or diversions to a developing country while travelling elsewhere for other purposes. Support for travel within a developing country may be given where appropriate. Applicants must be members of the Society and the funding would cover or contribute to the additional travel costs involved, together with appropriate subsistence, up to a maximum of £500.

Applications should be submitted on the official form and will normally be considered within one month of receipt.

Application forms are available from the International Committee Awards, c/o The International Affairs Officer, The Royal Society of Chemistry, Burlington House, Piccadilly, London W1V 0BN, United Kingdom.

THE CORDAY-MORGAN MEMORIAL FUND

The RSC Corday-Morgan Memorial Fund exists to assist members of any established Chemical Society/Institute in the Commonwealth to visit chemical establishments in another Commonwealth country. The intention is to help applicants to make stop-overs in or diversions to such countries while travelling elsewhere for other purposes. The visits must clearly be of benefit to the country concerned and the visitor would be expected to give lectures and engage in other forms of information exchange or, for example, to explore the possibility for future collaboration in research. Support will not be given for attendance at conferences.

The grants will complement, where appropriate, those for visits to developing countries available from the International Committee's fund, and funding would cover or contribute to the additional travel costs involved, together with appropriate subsistence.

The maximum award to any individual is normally £500 and persons eligible must be citizens of, and domiciled in, any Commonwealth country. Applicants must be travelling to another country (not necessarily in the Commonwealth) and would normally stop en route to visit the stop-over country, which must be in the Commonwealth.

Applications should be submitted on the official form and will normally be considered within one month of receipt.

An application form for support from the fund is available on request from the Corday-Morgan Memorial Fund, c/o The International Affairs Officer, The Royal Society of Chemistry, Burlington House, Piccadilly, London W1V 0BN, United Kingdom.

RESEARCH FUND

The Royal Society of Chemistry is greatly indebted to the generosity of John William Thomas Jones, whose benefaction in 1992 greatly increased the Society's ability to support research.

The RSC Research Fund exists to assist members in their research by the provision of grants up to £1000, for example for the purchase of chemicals, equipment or for running expenses of chemical eduction research.

If you work in a university, polytechnic, college or school anywhere in the world and your work is held up for lack of moderate funding, the Research Fund may be able to help you. Applications from members of The Royal Society of Chemistry will be considered on merit, but account will be taken of any other source of financial aid available to applicants.

Preference will be given to those working in less well-endowed institutions and to those supporting their own research. Applications from those working in well-established universities will normally only be considered in exceptional circumstances and evidence to support such proposals must be provided. Council is especially anxious to see inventive applications of a 'pump priming' nature and is prepared to consider applications from those working in chemical education as well as chemistry research.

Members in developing countries should note particularly that additional funds have been made available to provide grants for successful applicants from such countries. Preference will be given to those able to cite collaborative research projects with institutions in countries other than their own.

Applications are limited to one per department and must be submitted through the head of that department. Application forms, together with the regulations governing the Fund, may be obtained from Stanley S Langer, The Royal Society of Chemistry, Burlington House, Piccadilly, London W1V 0BN, United Kingdom.

The closing date for applications is 31 October 1999 but submissions sent well in advance of this date would be much appreciated.

NEW ZEALAND INSTITUTE OF CHEMISTRY

BRANCH NEWS

WAIKATO

The Waikato branch of the NZIC hosted Professor Bill Denny recently as the Royal Society Australasian chemistry lecturer for 1999. Bill gave a talk to a packed house of NZIC members, chemistry students and even a few rogue biologists from Waikato. Bill's talk was highly multi-disciplinary in nature as he wove a tale of biology along with large doses of chemistry to explain recent research conducted by his group into the production of less toxic drugs for cancer therapy. Bill gave an in-depth analysis of the research strategies employed, and pointed out that much traditional research has proven relatively unsuccessful in terms of cancer treatment. From Bill's talk it seems the recent advances in gene technology may well prove more successful. Bill described an approach in which drugs are specially designed to modulate the enzymes that comprise signalling pathways that control cell division. These enzymes are coded for by oncogenes and thus overproduce in tumour cells. Bill described several drugs developed to take advantage of these advances and he also provided a snapshot of the pros and cons of collaborating with commercial biotechnology companies in cancer research. Bill was full of optimism about the future; his advice to those interested in the future of drug research "watch this space".

Other Waikato Branch activities focused on the National Chemistry Week. Activities included a national flag competition (using natural dyes to design a New Zealand flag) and a school's mastermind competition (with the final to be held in Wellington during National Chemistry Week. The Waikato Regional Competition was organised by Associate Professor Derek Smith, and the winners going through to the final were from St Peter's School, Cambridge. Dr Bill Henderson is running the National Crystal Growing Competition, open to all New Zealand school students. Prizes (4 prizes each of $40 for primary, intermediate junior and senior levels) were donated by the NZIC. Other activities tied to National Chemistry Week include the annual ChemQuest quiz for 6th form students and school visits.

Richard Coll

MANAWATU

Professor David Katz (chemist, educator, science communicator and consultant) from Cabrini College, Philadelphia, USA, spoke at a joint meeting of the Branch and The Science Centre & Manawatu Museum on Thursday evening 15th July. His demonstration lecture "Chemistry in the Toyshop" was held at the Science Centre and was advertised as a public lecture because of its general interest. It attracted an audience of about 120 people, both adults and children. The lecture was very successful in changing the way one would now look around a toy store, and was an excellent example of how to pitch chemistry at the right level for public enjoyment and learning. Professor Katz demonstrated the fascinating chemistry behind a variety of toys from Stretch Armstrong and superballs, to Hollywood Hair Barbie and magic sand. The multitude of demonstrations made this lecture suitable for all ages. Prior to the evening meeting, Professor Katz ran an afternoon workshop for science teachers on Consumer Chemistry.

On Wednesday 28 July the Branch organised a lunchtime "Careers in Chemistry" meeting at Massey University aimed at undergraduate and graduate students taking chemistry. Professor Andrew Brodie, Institute of Fundamental Sciences - Chemistry, introduced three Palmerston North chemists who discussed their careers with an audience of about 40 students. The speakers were Margaret Burrell who teaches chemistry at Freyburg High School, Barry Scott from BDH, and Stephen van Eyk from NZ Pharmaceuticals. The speakers described what they did in the "real world" and showed that there was life for chemists after University. They all emphasised that a University degree was only the start of life long learning and that a chemistry degree was an excellent foundation for future development. At this meeting, Stephen van Eyk, the current chairman of the Manawatu Branch, presented the Branch NZIC prizes to Kylie M Keen for 300 level chemistry and Elisabeth J Shaw for 300 level biochemistry.

In a joint meeting with the Manawatu Branch of the Royal Society of New Zealand at the Science Centre & Manawatu Museum on Tuesday 17th August, Professor Tony Burrell and Associate Professor David Officer, Institute of Fundamental Sciences - Chemistry, Massey University, spoke on "Artificial Photosynthesis - An Energetic Double Act". They pointed out that sustainable economic growth for New Zealand requires renewable, environmentally-acceptable energy resources. The most attractive option for the future generation of electrical energy is via the direct conversion of sunlight. The utilisation of solar energy has significant advantages over most other sources of energy in that it is inexhaustible and not a producer of carbon dioxide or other pollutants. Conventional silicon-based photovoltaic technology is not cost effective. An economically viable alternative is to mimic the natural world's utilisation of sunlight. Photosynthetic organisms use porphyrin systems (chlorophyll) to collect light and convert it into energy. In their presentation, Tony and David discussed their attempts at Massey University to develop

artificial systems based on porphyrins and related molecules that are capable of mimicking photosynthesis.

The Manawatu Science Fair was held on Friday-Saturday 30-31 July in the Convention Centre in Palmerston North. NZIC Manawatu Branch prize winners (through the agency of the Manawatu Chemical Education Trust) were Casey Henare of Palmerston North Intermediate Normal School for "Making of Potato Water Yeast" (intermediate schools prize), and Navin Wewala of Palmerston North Boys High School for "Sugars in Bee Honey" (secondary schools prize, also known as The Alan Furness Memorial Prize). In addition to the NZIC prizes, a Massey University Chemistry Prize was awarded to Fristin Anthony of Freyberg High School for "Love Salty Chips".

Branch members Harry Percival, Landcare Research, and Roger Reeves, Institute of Fundamental Sciences - Chemistry, Massey University, attended the 5th International Conference on the Biogeochemistry of Trace Elements held at the Technical University of Vienna, in Vienna, Austria, 11-15 July. Harry presented an oral paper "Management of sewage sludge amended soils to alter heavy metal bioavailability", and chaired the Technical Session on Modelling and Prediction of the Fate of Trace Elements. Roger presented an oral paper "The genus *Thlaspi* as a source of plants for phytoremediation studies". The conference attracted about 450-500 registrants from about 50 countries, and the programme comprised 2 keynote lectures, 10 special symposia and 19 technical sessions. Vienna was a wonderful host city with its memorable historic architecture and culture, and possessing a modern, user-friendly underground transport system to get around quickly to the various sights. There were four field tours associated with the conference, a 1-day tour in Austria , and three 3-day tours to the Czech Republic, Hungary, and Slovenia. Harry went on the Hungary tour which he thoroughly enjoyed being a blend of sightseeing (the Lake Balaton region and the capital city Budapest were highlights) and visits to several research stations.

Harry Percival

WELLINGTON

In July, David Katz, a chemical education consultant from the United States, visited and gave a demonstration lecture entitled "Consumer Chemistry" in which he took a light-hearted chemical view of some common consumer products including powdered fruit drink, hand cream, disposable nappies, butter and cheese. The lecture attracted a big audience of young and old chemists and concluded with a tasting of some of the more edible of his products. Earlier in the day, David had presented a general interest lecture on the subject of "Chemistry in the Toy Shop", in which he told the chemical story behind some of the curious toys which have excited the interest of children in recent years. The audience was mainly university students (and a few lecturers), but their enthusiasm for David's subject indicated that few had lost their interest in toys.

The August meeting was an industrial plant visit held at Resene Paints in Upper Hutt, in association with the Australasian Corrosion Association, and the visit was hosted by the Production Manager, Andrew Henderson. The plant manufactures solvent-based paints and the tour of the facilities progressed from the reception and storage of raw materials, through the various stages of production to the finished product and included a view of the laboratory used for monitoring quality. The evening provided a revealing insight to a product which many of us have toiled with over long weekends.

At the end of August the Branch organised a Quiz Night for local secondary school students under the genial chairmanship of Rod Tilbury. There was very strong support for the event with teams coming from as far as the Wairarapa and the Kapiti Coast to compete, making a total of 24 four-person teams. With the postgraduate helpers and a good turn out from teachers the atmosphere in the Kelburn overbridge lounge was electric as the teams competed for the honour of being the top regional chemical quiz team. There were also spot prizes of cinema tickets kindly provided by Hoyts cinemas, which added to the excitement. In the end it was a Wellington College team which won, with Hutt Valley High School and St Patrick's College, Kilbirnie closely behind.

In September, Victoria Stevens, a member of the local branch committee and an Advisor of Hazardous Substances at the Environmental Risk Management Authority (ERMA) New Zealand, gave a talk entitled "Hazardous Substances and the HSNO Act". This was an important and timely talk as the act is due to take effect for hazardous substances later this year, and from that time no new hazardous substances may be developed or brought into the country without the approval of ERMA, unless it is covered by the exemption relating to "small-scale chemistry".

July was an important month for chemistry at Victoria University, with the official opening by Professor Michael Kelly FRS FREng, of the new chemical laboratories in the School of Chemical and Physical Sciences, Victoria University. This was an important event for Victoria University in its Centennial year and the new laboratories provide attractive modern facilities for teaching and research in chemistry.

The last day of August was also the first day of the 1999 NIWA Science and Technology Fair which was held in the School of Chemical and Physical Sciences. The foyer, laboratories and corridors of the Laby Building were packed with an amazing array of exhibits, which demonstrated the great enthusiasm for science amongst intermediate and secondary school students in the region. Inevitably the judges had difficulty in selecting winners from so many excellent and diverse contributions.

John Spencer

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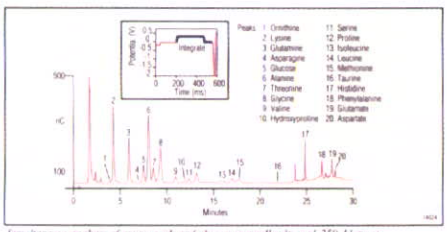

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