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NZIC Chemistry IN NEW ZEALAND

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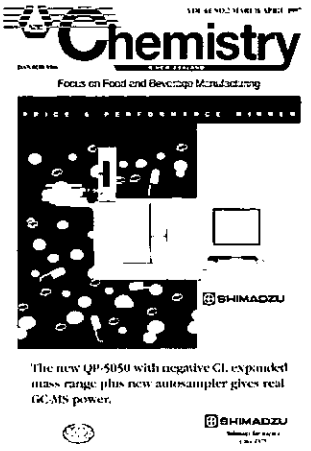
UP FRONT ...

NEW SHIMADZU QP-5050 GAS CHROMATOGRAPH MASS SPECTROMETER

Building on the success of the QP-5000 Shimadzu Scientific Instruments Inc. announces the next step in laboratory GC/MS productivity with the release of the Shimadzu QP-5050.



For further details see the cover story article on page 2

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IN THIS ISSUE ...

COMING UP ...

May 1997 - Plastics, Resins, Coatings, Paints, Inks

July 1997 - Nutrition, Pharmaceuticals, Cosmetics

Deadline for material:
5th of the month of publication

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COVER STORY

GCMS QP-5050 Simplicity and Versatility for Higher Productivity

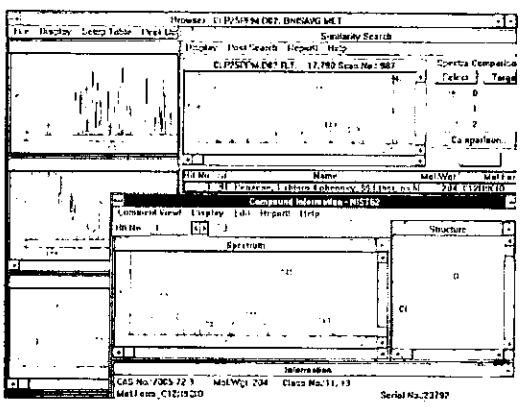
The new GCMS-QP5050 from Shimadzu Scientific Instruments builds on the success of the QP5000 to provide the next step in laboratory GC/MS productivity. By integrating a unique ion source design with the widest available range of injection techniques the QP5050 performs tasks never before achievable by a benchtop system.

Extended Mass Range up to 900 amu

The GCMS-QP5050 has a mass range of up to 900 Daltons allowing analysis of the highest-boiling point compounds amenable to GC/MS. With the new wider scan range, EI, CI, pyrolysis and solid probe options the GCMS-QP5050 maximises the range of compounds that can be analysed by GC/MS.

Multi-Component Analysis Capability

Enhanced sensitivity and the ultimate in scanning speed allow more components to be analysed per run. The new high energy conversion dynode improves the sensitivity attainable by a benchtop quadrupole GC/MS to unparalleled levels. In SIM (Selected Ion Monitoring) mode samples which previously required two analytical runs can now be analysed in one. Up to 32 channels of 32 ions may be monitored simultaneously providing the highest selectivity and sensitivity in quantitative analysis.



DI (Direct Inlet) Option

The direct inlet option allows less volatile or thermally labile samples to be directly introduced into the mass spectrometer. The applications include cross checking of GC/MS analysis results and analysis of collected HPLC fractions. Mixtures of compounds which have different boiling points can be positively identified by programming the DI probe temperature.

CI (Chemical Ionisation) Ion Source Option

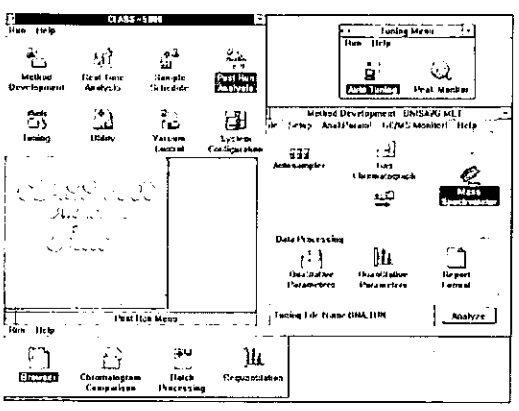
The Standard Setup contains an EI (electron impact) ion source, which provides mass spectra that are amenable to library search using NIST/EPA/NIH Library. Electron impact ionisation gives a great many fragment ions useful for qualitative analysis, but in some cases it cannot give molecular ions useful for qualitative determination using the library. Chemical ionisation, by contrast, is more likely to give molecular ions in such cases. Data obtained in the EI and CI modes may be combined, resulting in highly reliable qualitative analyses.

Easy Maintenance

The New GCMS-QP5050 is designed to ensure easy maintenance and minimal down time. In order for any analytical instruments to perform at an optimal level for an extended time, periodic maintenance is required. The Quickvac program automates the Start/stop operations related with column exchange and system maintenance. The ion source chamber is conveniently located inside the front door, simplifying user access. A turbomolecular pumping system provides superior pump down times and ceramic bearings used in the turbo molecular pump guarantee oil-free and trouble-free operation.

Simple Operation

CLASS 5000 (Chemical Laboratory Analysis System and Software) allows even a beginner to operate the QP-5050 instrument. Intuitive control software has now been improved to further simplify operation. CLASS 5000 software provides complete control of the gas chromatograph, mass spectrometer, and autosampler from a PC in the Windows environment with minimum training required. The menu system provides for selection of all operations from 8 control icons. These icons select the operations from which all data is generated, processed and reported. Full automated acquisition and processing maximises productivity.



For more details on the new Shimadzu GC/MS system contact:

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Shimadzu New Zealand
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Ph: 0800 735725 or (09) 8367750, Fax: (09) 8367757
Email: clareh@shimadzu.co.nz

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LOCAL NEWS

A.i. SCIENTIFIC, THE NEW DISTRIBUTOR FOR DIONEX IN NEW ZEALAND

A.i. Scientific is proud to announce it's appointment as the new distributor for Dionex in New Zealand. A.i. Scientific will be responsible for the sales and support of all Dionex products including the DX 500 HPLC System, the DX 120 Ion Chromatograph, the ASE Accelerated Solvent Extraction System and the CES-1 Capillary Electrophoresis System together with their respective consumables and spare parts.

HANCOCK MEDAL TO DENNIS HILLS

The Institute of Materials has awarded the 1996 Hancock Medal to Dennis Hills for outstanding service to the rubber industry. Dennis, a Christchurch consulting scientist, a Fellow of the NZIC, and a Fellow of the APRI, has become the sixth APRI member and only New Zealander to be awarded the Hancock Medal. The medal is named after rubber industry pioneer, Thomas Hancock, a co-discoverer of vulcanisation. The official presentation took place recently in London where Terry Hills, who was then working in the UK, accepted the medal on his father's behalf.

Dennis Hills joined Empire Rubber Mills on graduation and has been associated with the rubber industry for 38 years. He has been the only New Zealand rubber technologist to publish extensively – his first book was published in 1971. His years of experience in polymer degradation led him to publish in 1992, *Plastics and Rubber – How They May Fail.* He was instrumental in forming the New Zealand Branch of the Institution of the Rubber Industry in 1967 and was its first Chairman. As part of the Australasian Section, Dennis represented New Zealand on the Australasian Council.

Since joining the DSIR in 1974, Dennis has been regarded as New Zealand's foremost independent rubber specialist, mainly as a researcher and consultant for the DSIR. When his section of the DSIR was closed down in 1992, he became part of a consultancy to prevent the loss of services to South Island industry. He has recently established his own business, Materials & Quality Consultancy Ltd. His major area of research since 1965 has related to rubber pipe joint rings, when it was discovered that they were prone to microbial degradation. Rings produced since the 1970s are regarded as immune to such attack. Dennis is currently developing a method to modify rings laid prior to that time, to delay the need for replacement.

INDUSTRIAL, LABORATORY AND WATERCARE ACTIVITIES OF EVANS DEAKIN INDUSTRIES CHEMICAL DIVISION SOLD

Evans Deakin Industries Limited has today entered into a contract with Asia Pacific Specialty Chemicals Limited for the sale of the Industrial, Laboratory and Watercare businesses in Australia and New Zealand for a total consideration of $21 million. These businesses represent the largest remaining component of the Chemical Division following the sale of the Wolseley Castle business in December 1996, and include Ajax Chemicals New Zealand.

Evans Deakin acquired the chemical operations as a consequence of the takeover of Clyde Industries Limited last year and announced at that time that it was unrelated to their core engineering business and would be sold.

Ron Paul, the Chairman of Evans Deakin said that "this sale will bring the total consideration of the sale of the Chemicals operations to $47 million and will mean the greatest part of the assets invested in the Chemicals business will have been sold".

Negotiations for the sale of the smaller specialty chemical operation are proceeding with interested parties.

VARIAN NOW REPRESENTED BY A.i. SCIENTIFIC

A.i. Scientific is proud to announce it's appointment as the official distributor of Varian in New Zealand. A.i. Scientific will be responsible for the sales and support of all Varian spectroscopy and separation products in New Zealand which includes AA, AA-Zeeman, ICP-ES, ICP-MS, GC, GC-MS, HPLC and UV-VIS instrumentation together with their respective consumables and spare parts. A.i. Scientific aim to provide a new level of commitment to Varian products in New Zealand and have access to the full resources of Varian Australia to provide the highest level of support.

For more information please contact:
Kevin Moloney, A.i. Scientific New Zealand
Ph (09) 4781351, Fax (09) 478 1360

GBC'S NEW CHROMATOGRAPHY SALES DIVISION

Effective 24 March 1997, David Pegman will be managing the new Chromatography division of GBC Scientific (N.Z.). With nearly 20 years experience of the New Zealand chromatography market, and over 10 years hands-on co-operation with SGE International of Melbourne, considerable local knowledge, plus a wealth of technical expertise in the supply of syringes, capillary and HPLC columns, fittings, etc. is available.

David will be responsible for SGE activities in New Zealand, as well as HPLC fittings from Upchurch Scientific; autosampler vials and syringe filters from National Scientific; HPLC columns from Keystone Scientific; gas chromatographs from SRI Instruments; GPC columns from Polymer Labs, plus other chromatography related products available through GBC Scientific.

NEW STAFF AT A.i. SCIENTIFIC

Mark Albertson has been appointed to the position of Separation Products Business Manager. Mark is well known for his extensive experience in the field of scientific instrumentation, particularly with Dionex products. His responsibilities cover the co-ordination of sales and support activities for Dionex products and Varian chromatography products in New Zealand.

Martin Littte will take up the position of Separation Products Sates/Support Engineer. Martin will be responsible for the service and support of Dionex products and Varian chromatography products in New Zealand.

Melissa Parker has been appointed Office Administrator. Melissa will be responsible for the order processing for all Varian, Dionex, CEM, Kipp & Zonen and A.i. Scientific products in New Zealand.

JUST TAKE TWO ASPIRIN

'Just playing around' with the properties of common, everyday aspirin could result in startling new technological breakthroughs for local pharmaceutical manufacturer, Douglas Pharmaceuticals - and a work-related PhD for the young pharmacist.

The company is investigating the controlled release properties of drugs, and has chosen aspirin as the test compound. University of Otago student, Craig Rundle, is a recipient of the Foundation for Research, Science and Technology's *Graduate Research in Industry* Fellowship, and passionate about the project which focuses on the use of computer neural networks and fuzzy logic to characterise and predict the requirements of controlled release formulation.

Developing new products and processes is crucial and Dr Andrew McLeod, of Douglas Pharmaceuticals admits that the company had a huge gap in experience with controlled release drugs.

"At first we saw it as testing the waters, but now, a year into the project, we're really excited about the progress we've made," he said. "It is an area that we needed to boost our expertise in quite quickly, but we were constrained because it was just too risky to divert attention from our main business focus".

Inclusion of a graduate student on staff to work solely on development, whilst completing a PhD is also a first for the company and has been a win-win for both parties. For the company, it has meant the ability to carry out R & D in a potential new product area without diverting staff from their own tasks, and for Craig, it provides practical work experience.

"I could never have had ready access to machinery of this quality in a university, or the raw materials, and this project gives me a good balance between university education and commercial reality," said Craig. "The information technology we are developing will enable the computer to 'learn' the characteristics of formulation".

Douglas Pharmaceuticals expects to gain a high degree of confidence in the technology, which will allow them to use the techniques in other products, as well the project will assist them to make informed choices about the company's future machinery needs.

1996/1997 FELLOWSHIP AND FUNDING PROGRAMMES

A number of the ISAT Linkages Programmes for the 1996/1997 year and the Japanese Fellowship Programmes administered by the Ministry have now closed.

Applications for funding under the Bilateral Research Activities Programme (BRAP), the Profiles Programme, Academies and Societies Programme and the Japanese Fellowship Programmes, the JSPS Post-Doctoral Fellowship Programme, STA Long-Term Fellowship Programme and the NZ/USA Cooperative Science Programme (CSP) and the NZ/FRG Science and Technology Cooperation (STC) Agreement Programme have now closed for the 1996/1997 year.

Applications continue to be accepted on an *ad hoc* basis for the Technical Participation Programme (TPP) and the NZ/UK/ Australia Global Environment Research Programme (GERP) up until 30 June 1997, for activities commencing prior to 30 August 1997.

Guidelines for Applicants for 1997/1998 STA Short-Term Fellowship Programme have now been released, and applications will be processed on an *ad hoc* basis until the closing date of 31 December 1997.

Details of all of these fellowship and funding programmes have been provided to Application Coordinators of all New Zealand's research institutions and tertiary education institutions. Further details can also be obtained from Elizabeth Beale, Applications Administrator, C/- Ministry of Research, Science and Technology, P O Box 5336, Wellington, Ph: (04) 4726400, Fax: (04) 4711284, Email: Bealee@morst.govt.nz

THE COALITION AGREEMENT - WHAT DOES IT MEAN FOR RESEARCH, SCIENCE AND TECHNOLOGY?

The National New Zealand first Coalition Agreement outlines general directions and key initiatives in a wide range of policy areas, generally by portfolio area. There is no specific reference to policy for research, science and technology. However, there are various initiatives that are relevant.

Under Agriculture, a commitment is made to ensure that a "value-chain" approach to food research, considering issues from the soil to the supermarket, is properly considered within priorities for the Public Good Science Fund. This initiative cites organic farming research as a particular area for consideration in this context.

Also under Agriculture, there is an initiative to establish a national pest management strategy for the control of Bovine Tb and associated possum control research. This initiative calls for research into possum control to be increased by $3 .75 million. Under Commerce, a proposal is presented to create a technology transfer agency and increase funding to expand operations, at a cost of $2 million.

Under Education, a comprehensive review of all aspects of the tertiary sector is proposed. While not explicitly stated, such a review is likely to include assessment of funding for research within the tertiary sector.

Under Women's Issues, a survey of unpaid work/time-use is proposed. Various other initiatives may also overlap with research, science and technology interests.

The Coalition Agreement's "silence" on research, science and technology policy implies that current policy, particularly that established in *RS&T:2010*, continues. The Coalition Agreement also states, in general terms, that all policies and processes in place at the time of the election shall be supported unless amended by subsequent policy agreements.

LETTER FROM AUSTRALIA

As the new academic year begins, Australia's universities are experiencing a further fall in chemistry enrolments. Students continue to turn away from science except for a handful of niche-marketed courses, and it is small comfort to us to know that physics is even worse affected than chemistry.

Everybody has a pet theory to explain why the students of today are not like us. The first to be blamed are schools and teachers, with state authorities (who determine curriculum) not far behind. There is a particular focus on the qualifications of science teachers in junior secondary school, many of whom have specialist knowledge in one or other of the traditional science disciplines but who can be suspected of teaching badly or shying away from the areas in which they did not specialise at university.

The curriculum comes in for its share of the blame, too. There has been a tendency in recent years for the school curriculum to become disconnected from that of university studies or, to put it in another way, to ensure that school offers a balanced curriculum and not simply preparation for tertiary study. Universities have had to make some adjustments to their first-year teaching, but lecturers still complain that beginning students are less well prepared than those of yesteryear. Although my hypothesis has not been rigorously tested, I believe that my colleagues' responses are based on the absence from our science classes of a cohort of the best students entering university. One dean of science told me recently that plotting numbers of students entering the faculty against their tertiary entrance scores this year gave pretty much a normal distribution; in the past, it had been skewed towards the top end.

So, where are the top students, and why? Law and medicine are as popular as ever, and while numbers of medical entrants have actually been forced down by a parsimonious government, it seems that nothing can stop the growth in number and size of our law schools. Qualifications in medicine and law confer high status and promise high income for successful graduates, and few science courses can hope to match their attractiveness. However, business and management courses are also getting an increased share of top students, which leads us to think that money might be a powerful surrogate for social standing.

Nobody talks about sheer greed, of course, but it is politically correct to speak of the ease with which graduates in different fields find suitable employment. The available figures are always a year or so out of date, but for what they are worth, they show that graduates in mining, engineering, medicine, nursing, dentistry and law had the best job prospects, while those in mathematics, chemistry, physics, social sciences and arts fared worst. Such messages are rapidly transmitted to students in secondary schools and are likely to be prime causes of the decline in science enrolments.

A number of established scientists have argued that if we don't educate more scientists then Australia will be unable to continue to develop as a technologically advanced nation. When faced with the fact that we are evidently producing all the science graduates the country is prepared to employ - in other words, there is no shortage of available graduates, rather the reverse, - the commentators shift their ground and argue that government or private industry should heed their forecasts of imminent doom, and create more positions in R&D.

However, government has just made the going even tougher for science students by increasing the tuition fees on their courses. Under Australia's Higher Education Contribution Scheme (HECS), students have had to meet about 20% of the cost of providing university courses. The Scheme has been running since 1990, and indexation has taken the annual HECS charge to about $2500 a year, which can be paid up-front (thus attracting a discount) or carried as a debt to be paid back as a surcharge on income tax once the graduate is earning above a certain level. Until now, there has been a flat charge for all university courses, but beginning in 1997 the charge for law and medicine has shot up to $5500 because both lead to high-earning professions, although law courses are much cheaper to mount than those in medicine. Science subjects fall into the middle of three brackets, with annual HECS of $4700, while humanities subjects cost only $3300 a year.

Australia's Minister for Science and Technology, Peter McGauran, has responded to the declining enrolments and the expressed concerns of our senior scientists by declaring 1997 the Year of Youth in Science and by committing $12 million over three years to sell courses in science to presently reluctant students.

McGauran's counterpart in education, Amanda Vanstone, has promised to review the HECS charges if it can be shown that they are hurting science enrolments, but it would be a brave bureaucrat who focussed blame on just one of the many factors thought to be at work. We need to be especially wary of 'local' factors, since declining science enrolments are being reported in several other countries, and lurid stories about the likely closure of physics and chemistry departments in Australia are echoed by similar remarks about their British counterparts. In Britain, however, the global decline (or lack of growth) in the number of students at the same time that new university departments are being created, reinforces pressures placed on universities by tighter research funding under the fiercely competitive Research Assessment Exercise.

In another interesting parallel, Vanstone has set up a national inquiry into university financing and organisation, something like the Dearing Committee of Inquiry which is currently operating Britain. Our inquiry is chaired by a classicist who for many years headed an elite boys school, but his committee does include among its members a number of university 'heavies' and a (the only woman) chemist, Doreen Clarke, who runs her own business and was recently President of the Royal Australian Chemical Institute (RACI).

In the state of Victoria, the Minister for Tertiary Education, Phil Honeywood, has set up an inquiry into demand by students for education in science and technology. The inquiry is chaired by Alan Seale, a chemical engineer from ICI Australia and includes in its membership the Deputy Vice-Chancellor (Research) at Melbourne University. Frank Larkins who, like Doreen Clarke, is a Fellow of RACI.

It will be later this year before we receive the advice of these inquirers, by which time we will also be able to assess the actions taken by chemistry departments to trim their sails to the prevailing winds of student choice.

Professor Ian D Rae, Deputy Vice Chancellor
Victoria University of Technology, Melbourne.

International News

THERMO INSTRUMENT SYSTEMS TAKES #1 SPOT AS US STRENGTHENS GRIP ON LAB MARKET

Thermo Instrument Systems Inc. (Sunnyvale, CA), formed just over a decade ago, has taken the leading position in the global analytical instrument market with the 5th March announcement that it had 85% control of UK-based Life Sciences International, a $350 million-a-year international laboratory supplier.

With this deal, Thermo - the most acquisitive company in the history of the instrument industry - will end the first quarter of 1997 with annualised revenues of around $1.5 billion. This puts it well ahead of Perkin-Elmer, according to Dr Gordon Wilkinson, editor of *Analytical Instrument Industry Report*, the well known newsletter covering this industry sector.

As against five years ago, when the top five instrument makers accounted for just over 20% of the $8.5 billion business, in 1996 they held a third of the estimated $11billion to $11.5 billion market. Wilkinson provides this analysis in the 'Industry Scoreboard' edition of *AII Report* which ranks over 600 companies serving analytical laboratories in terms of their 1996 dollar revenues. He comments, "in the past decade or so, Thermo has engineered over 40 acquisitions, engulfing more than 70 operating units in the process... the company is one of the few to have demonstrated that analytical instrument and laboratory equipment businesses can be profitable and generate funds for new product development."

Thermo's expansion, explains Wilkinson, has come in an environment of slowing market growth, intensified global competition and the closure of some of the industry's longest-established companies. Consolidation was a key feature of the landscape with M & A transaction value exceeding $2 billion in 1996. At year-end, well-known companies such as Amicon, ElectroScan, Fisons Instruments, Gatan, Mettler-Toledo, Sievers, Suprex, TA Instruments and Zymark were among those under new ownership.

"Not only have Thermo's acquisitions transformed the fundamentals of the manufacturing sector, but consolidation in the laboratory distribution sector has meant that this business is now largely in the hands of Merck, VWR (of which Merck owns 49%) and Fisher Scientific - firms with combined revenues of almost $4.5 billion" concludes Wilkinson.

Kjeldahl versus Dumas
- which gives the "right" answer?

David Granger, SGS Food and Environment Laboratories, P O Box 13518, Onehunga, Auckland

The Kjeldahl process and the Dumas process are both current methods used for the determination of the protein content of stock foods, animal byproducts (fishmeal or meat and bone meal) and food products. The difficulties associated with the Dumas process meant that until more recently the Kjeldahl process was the method of choice for most laboratories. More recently however companies such as Leco have produced equipment that is simple to use and cheap to run, although strictly speaking the Leco process(and that of other automated analysers) is not the same as Dumas; the Leco system measures the volume of evolved N_2 differently from the Dumas method (see later in this article for details). For the rest of this article, the phrase Leco will be used to describe any automated analyser that uses a similar methodology.

Data produced from Kjeldahl nitrogen by laboratories throughout the world has been used to develop stock feeds that produce the correct growth characteristics in animals fed with them.

Leco protein results are now becoming more commonly used and some stock feed ingredients give different (usually higher) values. Why is this? Firstly, to try and answer this question let us look in more detail at the techniques:

The Kjeldahl method consists of sulfuric acid digestion in the presence of a catalyst and a salt to control the boiling temperature of the acid. The catalyst itself can determine the level of protein determined. Some can give higher recoveries of some types of nitrogen compounds (use of salicylic acid and thiosulfate can ensure the inclusion of nitrate nitrogen). Mercury catalysts are reported to give better recoveries than copper for instance.

The sample is destroyed by the boiling sulfuric acid/salt solution, and the various protein and nitrogenous compounds converted to ammonium sulfate. Once the digestion is considered complete the acid is cooled and water added to solubilise the salts. The mixture is further cooled and a strong caustic solution added, the ammonia is then steam distilled from the mix collected in a boric acid solution, and titrated with standardised acid. The resulting nitrogen determined is converted to protein by a factor (6.25 typically).

The Leco procedure is considerably simpler and faster. The sample is weighed into a combustion vessel and introduced into a furnace purged with pure oxygen. The latest Leco system uses a ceramic boat pushed into a horizontal furnace tube. Older designs employed a tinfoil encapsulated sample dropped into a vertical tube. The resulting combustion gases are collected in a glass ballast tank. An aliquot of gases is drawn off over a heated copper catalyst. CO_2 and H_2O are absorbed and the remaining nitrogen quantified by a thermal conductivity detector (the Dumas process measured evolved N_2 by volume over CO_2 absorbing KOH). The process takes less than five minutes per sample without the environmentally hazardous waste chemicals produced by the Kjeldahl procedure.

Now back to the differences in results. It is known that the Leco system determines nitrates much better than the Kjeldahl system (Sweeney, *J. Assoc. Anal. Chem.*, **72**, 5 (1989)) hence is of more use for total nitrogen studies such as plant tissues or fertilisers. For nutritional studies however the nitrates and other compounds not determined by Kjeldahl are not of significance when compared to the protein content. But since the Leco process does determine them, by conversion to protein (by multiplication by 6.25) the non-protein content can be significant (e.g. 0.5% nitrogen becomes 3.1% protein, a possibly very large difference). The latest study comparing Dumas and Kjeldahl results by Sachen and Thiex (*J. AOAC Intl.*, **80**, 1 (1977)) provides an interesting insight into this potential discrepancy. They found that nitrate levels in hay and corn silage samples were negative (<50 ppm NO_3-N), even though those samples gave higher levels of protein with the Leco system versus Kjeldahl. They also noted that if these differences were due to nitrates then the samples would be "very highly toxic to animals". Further investigation of the discrepancy by the above authors showed that the low density high fibre samples were entraining air when placed in vertical furnace Leco analysers. The resulting contribution by atmospheric nitrogen gave a significant error to these low density samples. Such errors can be removed by pelletising the material prior to analysis. Use of the horizontal furnace Leco FP2000 system also reduces or removes the atmospheric error because the design gives a more efficient pre-analysis purge and a much larger sample nitrogen peak size relative to the atmospheric nitrogen peak. Atmospheric blank values on the FP-2000 are usually zero.

So in the end what is the correct answer? Well, as the saying goes, that depends:

- For samples with negligible non-protein nitrogen levels, Leco and Kjeldahl analysis should yield statistically identical results provided the techniques used are validated properly. This includes checking the catalyst efficiency in Kjeldahl, and correcting (or pelletising) for low density samples in Leco systems, particularly vertical furnace arrangements.

- For samples with significant nitrate or other non-protein nitrogen compounds, the values produced by Kjeldahl will be lower than those by Leco (except in the special case of nitrates analysed by the salicylic acid-modified Kjeldahl system). Which set of results to use depends on what the information is being used for: e.g. if the material is a stock feed (not likely given the toxicity of nitrate) then non-protein nitrogen values should not be used to estimate the value of the material if that stock feed will ultimately be fed to organisms that cannot utilise those non-protein compounds (e.g. chickens). On the other hand, the total nitrogen figure is applicable to materials used as plant fertilisers, because of their ability to metabolise nitrates and other non-protein nitrogen species.

- The overall conclusion is that there is no substitute for good laboratory practice: you must know what your analytical results are being used for, and validate your analysis method accordingly.

Please feel free to contact the author on 09-6342593 or Email to dgranger@sgs-labs.co.nz for further information or to discuss your own experiences in nitrogen/protein analysis.

Patent Proze

by Jane Calvert and Greg Lynch

THE PROCEDURE FOR OBTAINING A NEW ZEALAND PATENT

Obtaining a patent in New Zealand requires a number of key steps and adherence to several deadlines. We provide an outline of the typical procedure and timescale for obtaining a New Zealand Patent. A schematic representation of the procedure is also provided below.

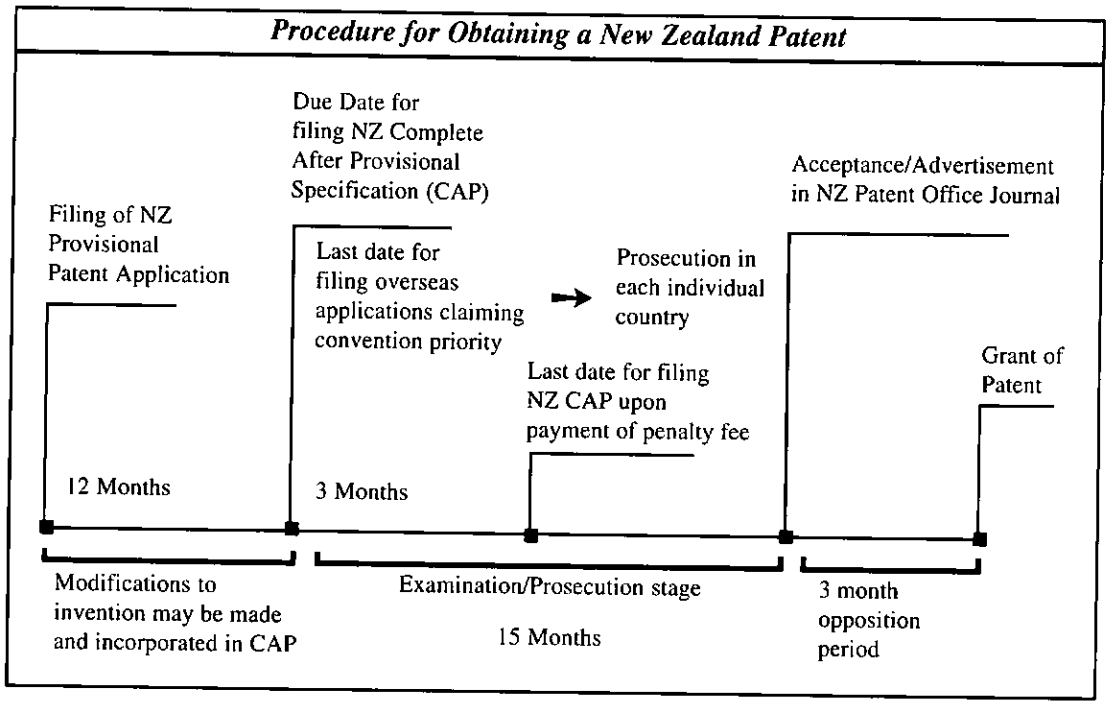
A New Zealand patent application would normally be accompanied, in the first instance, by a provisional specification. A provisional specification is a broad statement of the invention and attempts to cover possible future improvements or modifications to the invention. A provisional specification incorporates a technical description of the invention together with any drawings or reaction schemes. The filing of that application establishes an important date known as the "priority date".

Once a provisional application has been filed, the applicant has 12 months to file a "Complete After Provisional" (CAP) specification. This complete specification is a more detailed description of the invention, and includes a set of "claims". The claims define the scope of the invention for which the applicant is seeking patent protection.

Any modifications or improvements over the 12 month period from the priority date may also be incorporated. It is essential that any such improvement or modifications have not been publicly disclosed prior to filing the complete specification.

Before the end of the 12 month period, corresponding overseas patent applications also need to be filed. Overseas applications take the New Zealand provisional filing date as the priority date. It is for this reason that overseas marketing can proceed even though an applicant has only filed a provisional patent application in New Zealand. More on filing applications overseas in a later Patent Proze.

Once a complete specification has been filed, the patent application awaits its turn for examination at the New Zealand Patent Office. Recent changes in Patent Office practice have meant that examination occurs within two or three weeks of filing the complete specification.



Jane Calvert

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

Greg Lynch

In most cases, examination results in the issuance of a report identifying objections the examiner has to the patent application or specification. A statutory period of 15 months is provided to overcome the objections. This 15 month period is known as the "Prosecution Stage."

Once any objections raised by the examiner have been overcome, an official notice of acceptance is issued. Shortly after, the *New Zealand Patent Office Journal* features an abridgement or abstract of the complete specification, together with basic particulars of the patent application. The *New Zealand Patent Office Journal* is held in the public library of most main centres throughout New Zealand.

A three month period follows from the date of issue of the Patent Office Journal, during which a third party may file a notice of opposition to the grant of a patent. If no opposition is filed, then a final sealing fee is paid and the Deed of Letters Patent is granted.

It is at this point that a patent application finally becomes a patent. The procedure to date typically takes 18 to 24 months. However, this procedure can be shortened if an applicant chooses to file a complete specification in the first instance.

The New Zealand patent is dated from the date of filing of the complete specification. It can be kept in force for a full 20-year term, provided renewal fees are paid after the fourth, seventh, tenth and thirteenth anniversaries.

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

Patent Proze, Baldwin, Son & Carey, P O Box 852, Wellington (Email@bscwig.baldwins.co.nz)

HP COLUMNS AND SUPPLIES ON THE WORLD WIDE WEB

Medtec Products Limited has introduced the new Hewlett Packard Web Catalogue. Since January 1997 CAG customers have been able to view valuable information about columns and supplies directly on the World Wide Web.

The new C&S Web Catalogue offers many features to help customers quickly find the product information they need.

- Complete product information found in hardcopy catalogue
- User-friendly searches by keyword or part number
- Customer registration and feedback forms
- GC column quick-select guide
- Personalised catalogue
- Order form with e-mail/fax capability

In the coming months, customers will hear about us via the Chemical Analysis Home page and through advertisements placed in LC/GC, Lab Equipment News, and American Laboratory magazines. On-line bridge advertisements from other popular web sites will link customers to our web site. The HP Chemical Analysis Web URL will also appear in all communications pieces to customers.

Check us out for yourself via the following address on your favourite web browser: http://www.hp.com/go/chemsupplies

Contact: Wayne Sprosen, Medtec Products Ltd
P O Box 38543, Petone, Wellington
Ph: (04) 5670011, Fax: (04) 5672821
circle number 21 on the reader reply card

HP INTRODUCES BREAKTHROUGH ELECTRON CAPTURE DETECTOR FOR THE HP 6890 SERIES GAS CHROMATOGRAPH

First Major ECD Design Change in Two Decades Yields New Levels of Performance

Hewlett Packard Company has introduced a completely redesigned Electron Capture Detector (ECD) for the HP 6890 Series Gas Chromatograph (GC) system. The new HP 6890 Micro-ECD is more sensitive, linear and rugged than any comparable ECD on the market. It also has been optimised for fast chromatography. As a result, customers can realise the following:

- lower detection limits over a wider linear range;
- shorter startup times and longer uptime; and
- faster sample turnaround time.

Sensitivity Ensures Trace Detection
As technology advances and public awareness and concern about pollution grow, regulations specify ever-lower minimum detection limits for trace-level pollutants. To meet these specifications, the HP 6890 Micro-ECD offers unsurpassed sensitivity of 8 femtograms per second of lindane. It has been demonstrated that the new detector is capable of measuring as little as 10 femtograms of lindane in a 2 µL injection.

Linearity Broadens Quantitation Range
Unknown environmental samples could have pollutant concentrations from femtograms to nanograms per microlitre. Confident, accurate quantitation demands a detector that is linear over this broad concentration range. The HP 6890 Micro-ECD has a linear dynamic range of more than four orders of magnitude for lindane, with better than 20 percent relative standard deviation.

Ruggedness Improves Instrument Uptime
The HP 6890 Micro-ECD was designed for maximum uptime.

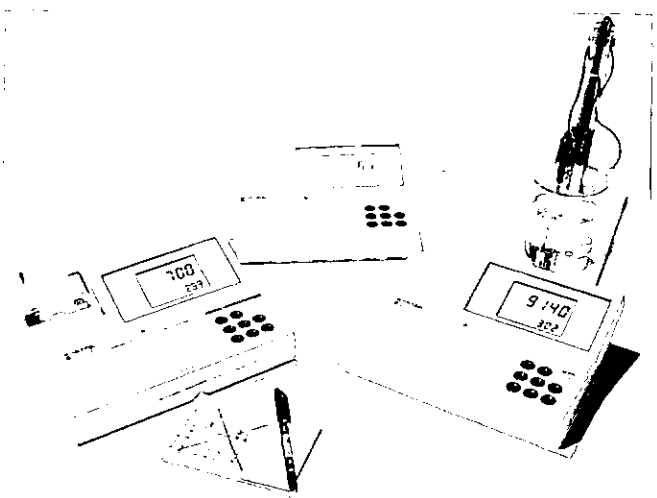
- it can be operational within one hour from power-on.
- The small detection-zone volume reduces the detector's susceptibility to contamination. Installation of capillary columns is made easier by a mechanical stop in the detector.
- Recalibration is less frequent; peak heights remain constant.

Fast GC Reduces Sample Turnaround Time
The ability of the HP 6890 Series GC System with the micro-ECD to perform fast gas chromatography can reduce sample turnaround time. The 150 microlitre cell volume and electronic sampling rates up to 50 Hz allow operators to speed up their analyses by a factor of three or more over current methods. For example, using a 1.4 m x 0.05 mm capillary column, it took 1.2 minutes to separate a mixture of 11 common chlorinated pesticides. It took more than 21 minutes to separate the pesticides using a standard capillary column.

Information about HP chemical analysis products and services can be found on the World Wide Webb at http://www.hp.com/go/chem

Contact: Wayne Sprosen, Medtec Products Ltd
P O Box 38543, Petone, Wellington
Ph: (04) 5670011, Fax: (04) 5672821
circle number 22 on the reader reply card

pH 301 BENCH-TOP pH/mV/ION/°C METER NEW FROM HANNA



The pH 301 from Hanna Instruments' new premium series of pH meters is manufactured according to CSA, UL and CE standards. It features simplicity of use together with state-of-the-art engineering to measure pH, mV, ORP and temperature.

Graphic Symbols and messages appear on the LCD to guide the user step-by-step through the calibration procedure, which can be performed at 1 or 2 points by choosing among 3 memorised buffers (pH 4.01, 7.01 and 10.01).

A 'CFM' message blinks on the LCD until stability is reached, and only then calibration can be performed. This guarantees that only optimal calibrations are carried out.

The calibration date (month, day and year) and data (offset and slope values) are stored into non-volatile memory, and can be easily recalled by the operator. Erroneous and incaccurate measurements due to a non-calibrated system can be avoided with the pH 301 last calibration data recall function, which warns the user in the case of an overdue calibration. With these features the pH 301 meets the requirements of Good Laboratory Practice (GLP).

In addition, the resolution of the pH range has been extended to 0.001 pH and, for routine operations, the operator can also choose to use the 0.01 pH resolution. The pH calibration can be performed at 1, 2 or 3 points with 6 memorised pH values (pH 1.68, 4.01, 6.86, 7.01, 9.18 and 10.01). In the ISE mode, the user can choose between readings in mV or direct concentration in ppm. Calibration can be performed at 1 or 2 points with 5 memorised concentration values (0.1, 1, 10, 100 and 1000 ppm). During pH and ISE calibration the time (hours and minutes) is stored in the non-volatile memory together with the date and data. The ISE calibration time, date and data can be recalled, to meet GLP requirements.

The opto-isolated RS 232 is bidirectional, which means the user can operate the meter from the computer keyboard. The pH 301 logging function can be used in the pH, mV and ISE modes. The logging interval is user-selectable (1, 15 or 30 seconds and 1, 5, 30, 60, 120 and 180 minutes). The memory is capable of retaining up to 99 different lots, each containing a maximum of 8000 samples.

The pH 301 is supplied ready-to-use, complete with glass body combination pH electrode, 12 V DC adaptor, pH 4.01 and 7.01 calibration solutions (30 mL each) and instruction manual.

Contact: Hanna Instruments Pty Ltd
P O Box 740, Noble Park, VIC 3174, Austalia
Ph: (+61-3)-97690666, Fax: (+61-3)-97690699
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NOW 0.25 MM ID CAPILLARY COLUMNS FROM SGE

To comply with US market standards, SGE have now added 0.25 mm ID capillary columns to their range. These columns compliment their existing range of 0.22 mm ID columns. Columns with a 0.25 mm ID are available in BPX5, BPX35, BPX70, BP1 and BP5 in lengths of 15, 30 and 60 metres.

Contact: Alltech Associates Inc
P O Box 100-352 North Shore Mail Centre, Auckland
Ph (09) 4443230: Fax (09) 4442399
Freephone 0800 ALLTECH
Email: alltech@alltech.co.nz
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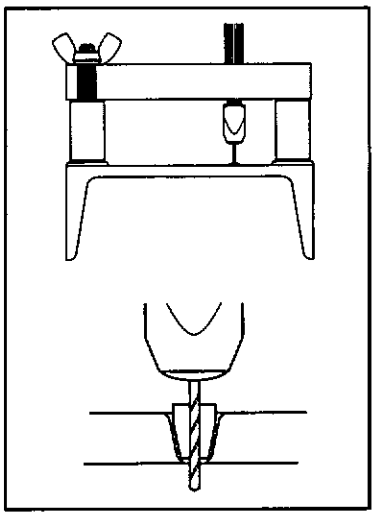
QUICKLY CONVERT UNUSED FERRULES



Drawers cluttered with unused ferrules? Capillary columns and tubing come in a wide variety of outside diameters, generally ranging from 0.32 - 1.6 mm. Now you can stock the smallest size or No-Hole ferrules only and use Alltech's Ferrule Drilling Rig to drill out the ferrules to fit a variety of sizes. A ferrule is inserted into the platform hole and a selected drill bit is placed in the pin vice. A few easy twists completes the job, giving a perfectly drilled ferrule. The Alltech Ferrule Drilling Rig comes complete with platform, pin vice, a package of 1/16" Vespel No-Hole ferrules and a 0.9 mm drill bit. Other drill bits and ferrule types are available. Request Data Sheet D8186 from our Chromatography Help Desk.

Contact: Alltech Associates Inc
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SUPERIOR DETECTION OF VOC'S IN ENVIRONMENTAL AND INDUSTRIAL HYGIENE APPLICATIONS

PE Photovac's innovative 2020 miniature photoionisation monitor weighs less than 1 kg and is intrinsically safe and easy to use. The 2020 PID is ideal for the fast detection of VOC's under harsh field conditions. The 2020 displays the level of contamination of air, groundwater and soil on its large back-lit display. Use the 2020 to 'scope' hazardous waste sites, test for fugitive emissions, survey real estate for buried chemical waste or provide rapid response testing for hazardous solvent leaks and spills. The 2020 is an excellent tool for monitoring toxic gases in workplace environments too. With its high sensitivity it can easily detect benzene at the OSHA Threshold Limit Value of 1 ppm. Refineries, chemical manufacturers, paint spray operations, plastic manufacturers and arson solvent accelerant investigators will all find the 2020 a boon. Left to operate automatically, the 2020 will run for a minimum of 10 hours. Both audible and visual warnings are activated when

pre-set levels are exceeded. The internal data logger will retain a complete record of the day's activity, allowing a tabular or graphical presentation of the concentration versus time.

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SOLVENT SAFETY CABINETS FROM ALLTECH

What are you looking for in a safety cabinet? Consider these important factors when comparing safety cabinets ... Protectoseal Safety Storage Cabinets are built to the highest quality control codes and the most exacting specifications in the industry. All of these laboratory tested cabinets meet or exceed NFPA and OSHA criteria, select models have been tested and approved by the US Navy for shipboard use, providing safe storage of up to 250 litres of flammable liquids in convenient locations close to the job. Six sizes are available. Also available are acid storage versions which comply with the latest edition of Australian standard AS3780.

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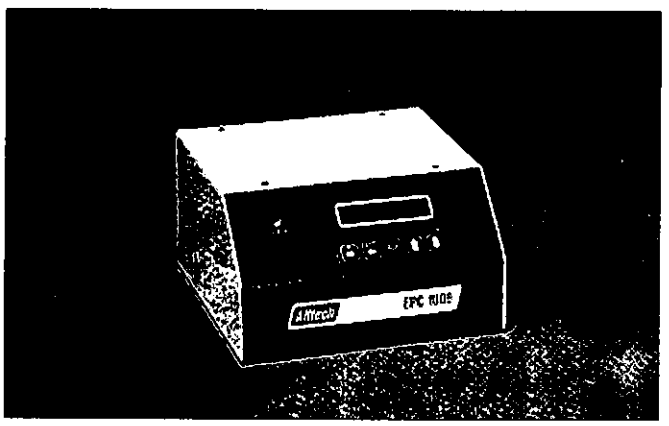
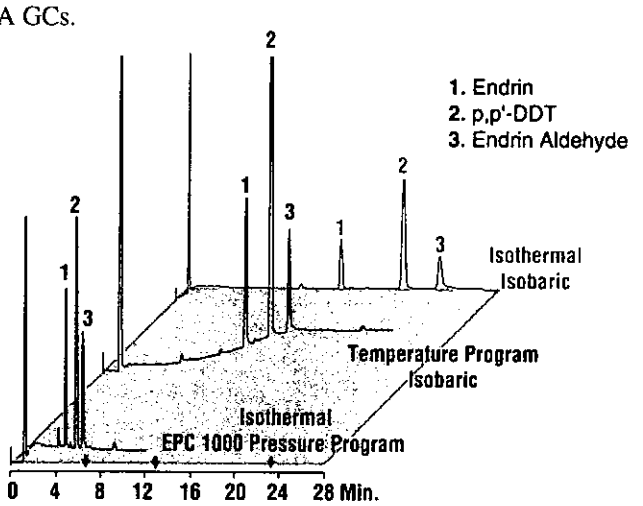
NEW! EPC SOFTWARE FOR YOUR GC



Alltech has developed a software control program that allows the user to interface the EPC 1000 to their PC. The software further enhances the abilities of the EPC unit and provides them with additional capabilities. The EPC 1000 can store and recall up to four pressure programs. The EPC 1000 Software Control program allows the user to save, recall and edit numerous pressure programs limited only by the free storage space on your PC's hard drive. This allows multiple users of one GC to save a variety of programs and not have to re-enter them when they need to use the GC. Software Control provides the ability to run the EPC 1000 in a constant flow mode without doing complicated manual calculations. The software program automatically calculates the appropriate pressure program to maintain a constant column flow rate throughout the analysis by simply entering the temperature program, column parameters and the flow the user wants to maintain. The software is provided with every new EPC 1000 unit and is also available at no charge to current EPC 1000 owners. Installation instructions for the EPC 1000 are available for: HP 5890 Series I and II GCs, Varian GCs equipped with 1077 injectors, Shimadzu 14A, 14B, and 9A GCs.



Column: AT™ - Pesticide, 20 m x 0.53 mm x 0.6 µm
Sample Size: 0.6 µL
Detector: 260 °C ECD

EPC Pressure Program:
Initial Pressure: 3.0 psig
Initial Hold Time: 0 min
Pressure Ramp: 4 psig/22 min
Final Pressure: 16 psig

Contact: Alltech Associates Inc
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Email: alltech@alltech.co.nz
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SAFETY EYE WASH

Tired of replenishing your eye wash bottles every week? Spending a fortune on eye saline? Can your existing eyewash provide at least 15 minutes washing capacity? Solve all these problems forever with a Lab Safety Supply Eye/Face Wash Unit. Simply screw the unit on to most existing taps, no special tools or skill required, use the 13/16" or 15/16" adaptors supplied! Allows normal use of taps.

For a soft aerated stream of water in a wide flow to the eyes and face choose either YB-8253 for standard taps or YB-8270 for gooseneck taps. Model YB-8252 gives a concentrated flow to the eyes only. A minimum of 15 psi flow holds the eye wash only unit on, the eye/face wash unit requires 30 psi. On mixer tap systems we recommend reverse threads on the hot water or a protective cover on the hot water handle.

Contact: Alltech Associates Inc
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varian

A.i. Scientific

MAJOR ANNOUNCEMENT

Varian Australia is proud to announce the appointment of A.i. Scientific as the new distributor in New Zealand for their award winning spectroscopy and chromatography products.

Varian/A.i. Scientific will be conducting seminars throughout New Zealand in the near future to coincide with the introduction of several new exciting products.

If you are a user of Varian products or interested in finding out more about any of Varian's existing product range, we want to know who you are!

Please contact Kevin Moloney at A.i. Scientific on (09) 478-1351 or complete and fax back the response form below. All respondents before 31st May will receive a small gift and are eligible to enter a draw for 2 separate prizes of $500-00 credit for purchases of any Varian product!

A.i. Scientific, P.O. Box 35579, Browns Bay, Auckland - Kevin Moloney
FAX: (09) 478 1360

NAME:

ADDRESS:

FAX:

PHONE:

EQUIPMENT IN LABS:

INTERESTED IN:

- ☐ AA
- ☐ ICP-ES
- ☐ ICP-MS
- ☐ UV-Vis
- ☐ GC
- ☐ HPLC
- ☐ GC-MS
- ☐ Sample Preparation
- ☐ Seminar Series

GOW-MAC GAS LEAK DETECTORS

Model 21-050 and Model 21-250 Gas Leak Detectors

The Gow-Mac Gas Leak Detectors easily and quickly pinpoint gas leaks emitting from pressurised systems. Utilising a thermal conductivity detector with signal amplification, the instruments are zeroed in ambient air and respond to any gas mixture with a thermal conductivity different from that of air. The detectors are highly sensitive, having an intrinsically high signal-to-noise ratio, amplification provides maximum usable sensitivity. Helium leaks of 1 x 10^5 cc/sec. are easily detected as are refrigerant leaks of 1.1 x 10^4 cc/sec. The model 21-050 or model 21-250 Gas Leak Detector can be operated with little or no training. Turn it on, zero and probe for leaks. As the instrument probe passes over the leak, a sample is drawn into the thermal

conductivity cell. When a leak is discovered a signal is registered on the meter. The larger Model 21-250 will emit an audible signal as well. No messy soap solutions, no system contamination. The probe is designed to reach difficult and confined locations. In close areas where several connections are grouped together the probe is small enough to pinpoint the exact problem location. Both units incorporate a high/low sensitivity switch. Caution: both models are NOT designed to be used to determine leaks of combustible gases. They use air as their reference gas and are designed to determine low level leaks of any gas having a thermal conductivity different from that of air, therefore they are not specific to any gas or vapour. A combustible gas detector should be used for the determination of combustible gas leaks in possible hazardous conditions.

Contact: Alltech Associates Inc
P O Box 100-352 North Shore Mail Centre, Auckland Ph (09) 4443230 Fax (09) 4442399
Freephone 0800 ALLTECH
Email: alltech@alltech.co.nz
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SGE 6 AND 10 SYRINGE MULTIPACKS

SGE have selected a range of their most popular syringes which can be purchased in economical six and ten packs. These will offer substantial benefits for you; peace-of-mind replacements are always on hand, and then there's the cost savings.

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P O Box 100-352 North Shore Mail Centre, Auckland
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Email: alltech@alltech.co.nz
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ALLTECH NITROGEN GENERATORS

Alltech Nitrogen Generators NG 7-1 and NG 14-1 produce pure nitrogen continuously 24 hours a day. They are safe, reliable and completely automatic. Air from the built-in compressor passes through an initial filter removing dirt and water droplets, then through a unique carbon molecular sieve filter which removes oxygen, water, CO_2 and hydrocarbons, which are then backflushed out of the system These machines are low maintenance and are ISO 9000 certified. You can generate as much or as little nitrogen as you need at the purity your application requires at a fraction of the cost of high pressure gas cylinders. The generators are low pressure, have an ambient temperature system that does not require manual handling, and provide a permanent uninterrupted nitrogen supply at the point of use. They will generate nitrogen with a purity range of 98% to 99.999%. Request data sheet # PS500911 and brochure # L70001.

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Email: alltech@alltech.co.nz
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ALLTECH PRE-SAT SILICA SATURATION COLUMN

* Use columns from pH 7 to 12
* Protects analytical column from harsh mobile phases
* Retards void formation
* Replaceable cartridges

Water, chloroform and certain buffers have been shown to dissolve silica based columns. As the silica dissolves, column retention and efficiency drop, back pressure may increase and finally, a void or channel may form in the column. The rate of solvation may vary but is generally accelerated by ion pair reagents and buffers of ionic strength at a pH near or above 7. The nature of the buffer may also accelerate solvation. Ammonium salts and dibasic organic acid salts are particularly troublesome. This problem may be minimised by saturating the mobile phase with silica before it reaches the analytical column. This may be done using a silica saturation column. A 250 mm x 4.6 mm column is installed between the pump and the injector. The column is filled with 50 micron, totally porous silica. As mobile phase passes through the Pre-Sat column, it becomes saturated with silica. The capacity to dissolve silica is diminished and the packed bed remains intact. The Pre-Sat silica saturation columns are available in a convenient cartridge or in the traditional stainless steel column format.

Contact: Alltech Associates Inc
P O Box 100-352 North Shore Mail Centre, Auckland
Ph (09) 4443230 Fax (09) 4442399
Freephone 0800 ALLTECH
Email: alltech@alltech.co.nz
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ALLTECH GAS SPECIFIC PURIFIERS FOR GC

* Decrease baseline noise and increase GC/MS sensitivity.
* Reduce gas impurities from high ppm to low ppb levels.
* The ultimate gas purification technology.

Gas Specific Purifier modules are designed to be placed in-line with the GC carrier gas supply or the GC detector gas supply. There are three groups of contaminants that impact gas chromatography; moisture, hydrocarbons and oxygen. The Gas Specific Purifiers remove the three contaminant groups from the analytical gases prior to entering the GC. Proprietary absorptive materials capture and retain contaminants for the operating life of the purifier. The new Gas Specific Purifier modules offer dramatic reductions in most contaminant levels (from many parts per million to levels that are below the lower limit of analytical detection), and absorb a larger number and variety of contaminants than other competitive products. The performance is optimised by incorporating a multiple bed format so that each successive bed functions at a lower contaminant concentration. The result is a series of contaminant concentration gradients across the length of the purifier module. When these advanced materials and design features are combined with a known gas contaminant concentration, the performance can be guaranteed. All-Pure Gas Modules are available with either 1/8" or 1/4" end fittings for the following: helium, hydrogen, nitrogen and air . All-Pure Gas Trap Modules

have the same selection of end fittings and are available as a Moisture Trap, Hydrocarbon Trap or Oxygen Trap.

Contact: Alltech Associates Inc
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ALLTECH SAMPLE LOOPS

Changing sample loops on Rheodyne injection valves is easy with Alltech Sample Loops. Our loops incorporate a knurled stainless steel long male nut, a PEEK ferrule and a Rheodyne sample loop. The long male nut extends beyond the other connecting fittings located on the back of the Rheodyne valve. This permits easy access to the fittings when changing loops. In addition, the nut and ferrule may be tightened in place without spanners. Finger tightening is leak-proof to 5000 psig. Change sample loops in just seconds without spanners. Alltech sample loops automatically adjust to the variations in port dimensions from one port to another and from one valve to another. This feature eliminates the need to dedicate a particular sample loop to particular valve as required when using sample loops with conventional stainless steel fittings. Use a single loop on any valve without introducing dead volume. Alltech sample loops are available both with and without fittings. Use the loop without fittings as a replacement for a worn, clogged or bent loop. The nuts and ferrules do not bind permanently to the loop the way stainless steel fittings do. Replace the loop tubing only, while reusing the nuts and ferrules again and again.

Contact: Alltech Associates Inc
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Email: alltech@alltech.co.nz
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SGE PRODUCT DATA AND APPLICATION SHEETS FOR THE FOOD INDUSTRY

SGE have a wide range of brochures, application and product data sheets designed specifically to assist you. Below is a listing of some of the publications available to the food industry.

BP21- Bonded Phase for the Analysis of Acidic Compounds. This gives GC users a bonded phase capillary column for the analysis of underivatised organic acids, free fatty acids and alcohols. It is ideal for environmental consulting laboratories, water treatment plants, water boards, hospital laboratories (biochemistry detection of post-operative anaerobic infection). Request part # PD-0031-C.

FAME (Fatty Acid Methyl Ester) Analysis - Peak Identification using ECL Numbers. Use this to make FAME peak identification easier and faster with the availability of ECL numbers. Ideal for the food industry, agricultural departments or anyone involved in the analysis of grain, cereals, animal and fish products. Request part # AP-0044-C.

BPX70 - Monosaccharide Application, for the food and flavours industry, brewing, softdrink manufactures and plant research institutes. Request part # AP-0001-C.

BPX70 - Fatty Acid in Edible Oil, for the food industry, especially manufacturers and processors of edible oils. Request part # AP-0035-C.

BPX5 - Triglycerides, for the food industry including dairy and manufacturers of edible oils. Request part # AP-0036-C.

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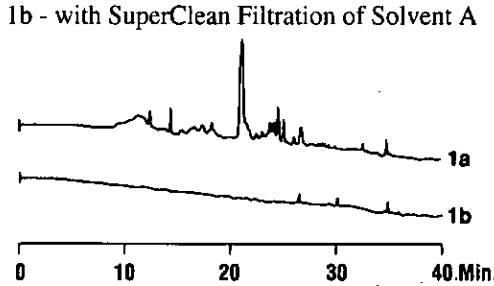
SUPERCLEAN AQUEOUS MOBILE-PHASE PURIFICATION FILTERS

SUPERCLEAN IMPROVES BASELINE STABILITY

1a - without SuperClean Filtration
1b - with SuperClean Filtration of Solvent A



Column: Econosphere C18, 5 µm, 150 x 4.6 mm
Mobile Phase: A: 0.05 M Potassium Phosphate, pH 7.8, (adjusted with phosphoric acid)
B: Acetonitrile
Equilibration: 100 Å for 45 min
Gradient:

Time:	0	43
%B:	5	95

Detector: UV at 220 nm

Alltech SuperClean Aqueous Mobile-Phase Purification Filters simultaneously filter and purify aqueous HPLC mobile phases, removing both dissolved hydrophobic chemical and solid particulate contaminants. Each 47 mm SuperClean Filter contains high-purity activated carbon enmeshed in an ultrapure PTFE (Teflon) fibre matrix. When aqueous mobile phase passes through a SuperClean Filter, the activated carbon traps hydrophobic chemical impurities while the PTFE matrix traps particles. Note: Use SuperClean Filters with aqueous solvents only. Do not use organic solvents. Request Data Sheet U2990.

Contact: Alltech Associates Inc
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BALSTON/WHATMAN TOC GENERATORS

Alltech have added the Balston/Whatman Model 78-40 TOC Gas Generators to our gas generator product line. The unit generates carrier and combustion gas from compressed air for TOC instruments eliminating the need for expensive, inconvenient high pressure cylinders of oxygen. It uses catalytic oxidation and pressure swing technologies to remove hydrocarbons to 0.1 ppm (measured as methane), CO_2 to 1 ppm and water vapour to 1 ppm. The model 78-40 is a complete system with carefully matched components engineered for easy installation, operation, and long term reliability. Installation consists of connecting a standard compressed air line to the inlet and connecting the outlet to the TOC gas supply line. Plug the generator into a standard electrical wall outlet and high purity carrier and combustion gas is supplied in minutes.

Contact: Alltech Associates Inc
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Email: alltech@alltech.co.nz
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FINNIGAN MASSLAB ANNOUNCE THE ARRIVAL OF THE VOYAGER

Representing the absolute latest in GCMS quadrupole technology development, the Voyager increases performance to levels that no other benchtop GCMS quadrupole can match.

The Voyager comes standard with EI, CI+ and CI- ionisation modes with performance in EI and CI mode being 5-fold better in sensitivity than the previous performance leaders in GCMS, the MD range from Masslab.

All the advantages of the MD range are enhanced and incorporated into the new Voyager, making the new Voyager stand out with it's ease of use, reliability, robustness, flexibility and sensitivity with spectral integrity.

Contact: Stuart Tyler, Alphatech Systems,
P O Box 37583, Parnell, Auckland
Ph (09) 3770392 Fax (09) 3098514
Email: sales@alphatech.co.nz
circle number 39 on reader reply card

ALDRICH FLAVOURS AND FRAGRANCES TURNS 10 CARE TO CELEBRATE WITH US?

Ten years ago Aldrich Flavours and Fragrances mailed its first catalogue. As we welcome you to our 1997 catalogue, we would like to thank you, our valued customers, for your continued support and product suggestions. In the catalogue you will find over 1,100 aroma raw materials, including many new products. If there is a product you are interested in that is not listed, please call us at the numbers listed below. With the global support of the Sigma-Aldrich Corporation, including state-of-the-art production facilities, we are pleased to offer you high-quality products at competitive prices. As we begin our second decade, we look forward to working with all of our customers worldwide. We at Aldrich Flavours & Fragrances dedicate all our efforts toward providing you with excellent service.

A few of our features for 1997 include:

- Over 1,100 aroma chemicals.
- More than 550 products certified as kosher (please inquire; status on all products is subject to change).
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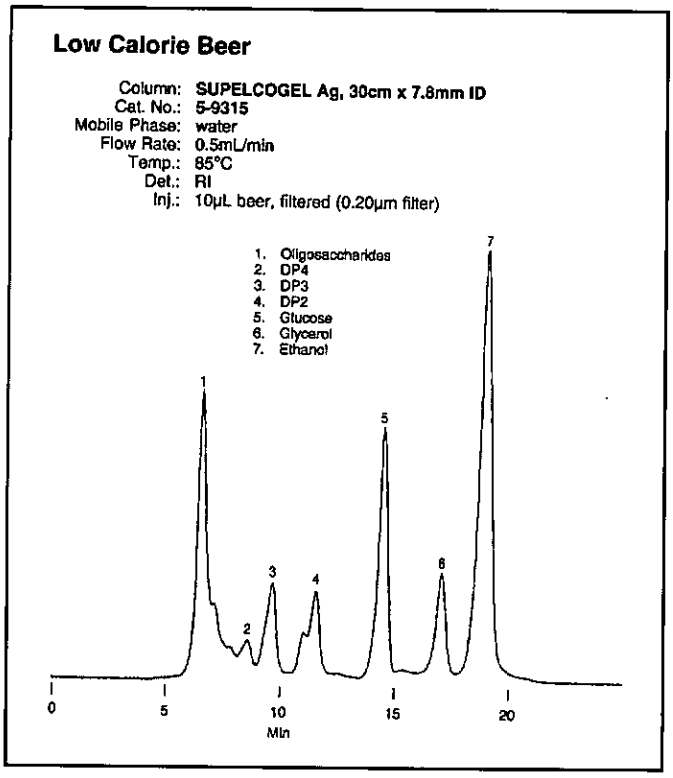

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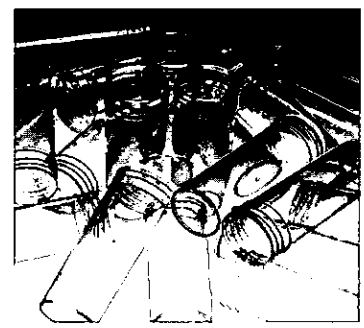

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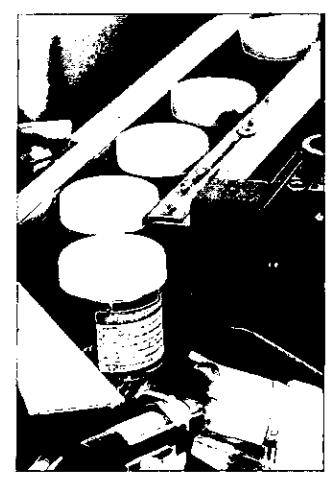

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New Zealand Red Wine Phenolic Content and Heart Disease

Heather Charlton†, Mark Duxbury+, Norman Sharpe+ and Charles Small†
†Department of Applied Science, Auckland Institute of Technology, Private Bag 92006, Auckland
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Introduction

Heart disease is a major cause of death internationally. A number of well known risk factors are associated with higher rates of heart disease, including smoking and consumption of saturated fats such as dairy products which raise cholesterol levels. It is evident from Figure 1 that there is a strong relationship between the saturated fat intake and heart disease mortality of Western European populations, yet paradoxically, France, a country with a high saturated fat intake from dairy products has one of the lowest heart disease rates in the western world. This so called "French Paradox" has been attributed to the protective effect of drinking red wine (1).

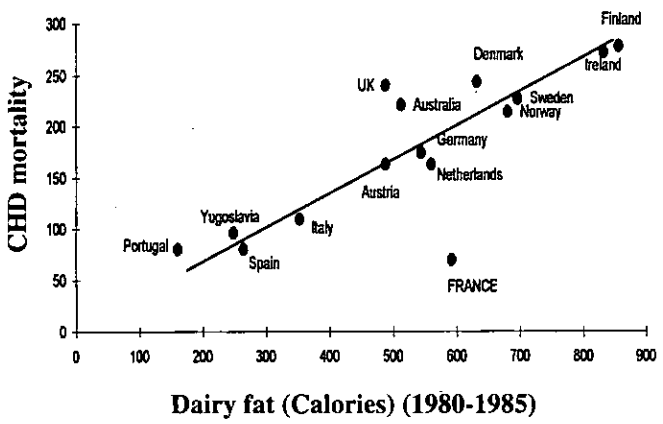


Figure 1: Relation between age-standardised death rate from coronary heart disease (mean for men and women per 100000 in 1987) and consumption of dairy fat.

Atherosclerosis, Phenolic Antioxidants and Red Wine

Atherosclerosis is a form of heart disease in which the coronary arteries carrying blood to the heart progressively narrow, ultimately cutting off the blood supply to the heart muscle with catastrophic effect. The early stages of atherosclerosis are now believed to involve oxidation by free radicals of the particles that transport fats in the blood stream - the lipoproteins (2). Lipoprotein particles consist of a hydrophilic outer coat of phospholipids, free cholesterol and protein and a hydrophobic interior containing triglycerides and cholesterol esters. Free radicals initially oxidise the unsaturated fatty acids within the particle, initiating a chain reaction that ultimately leads to severe oxidative damage to the entire lipoprotein particle (Figure 2). There are a variety of natural and environmental sources for the free radical initiators including cigarette smoke, each puff of which contains a billion billion free radicals. The oxidatively damaged lipoproteins are absorbed by circulating white blood cells (macrophages) that form part of the body's natural defence mechanism. Macrophages have specific receptors on their cell surface for oxidised lipoproteins. Once the macrophage begins accumulating oxidised lipoprotein it ceases to circulate and instead sits within the artery wall as a large , lipid rich cell - a "foam cell". It is these foam cells that comprise the so called "fatty streak", the first visible stage of atherosclerosis within a coronary artery (3). Over the lifetime of an individual the coronary artery becomes progressively more occluded as the fatty streak enlarges, ultimately leading to catastrophic cut-off of blood flow to the heart muscle.

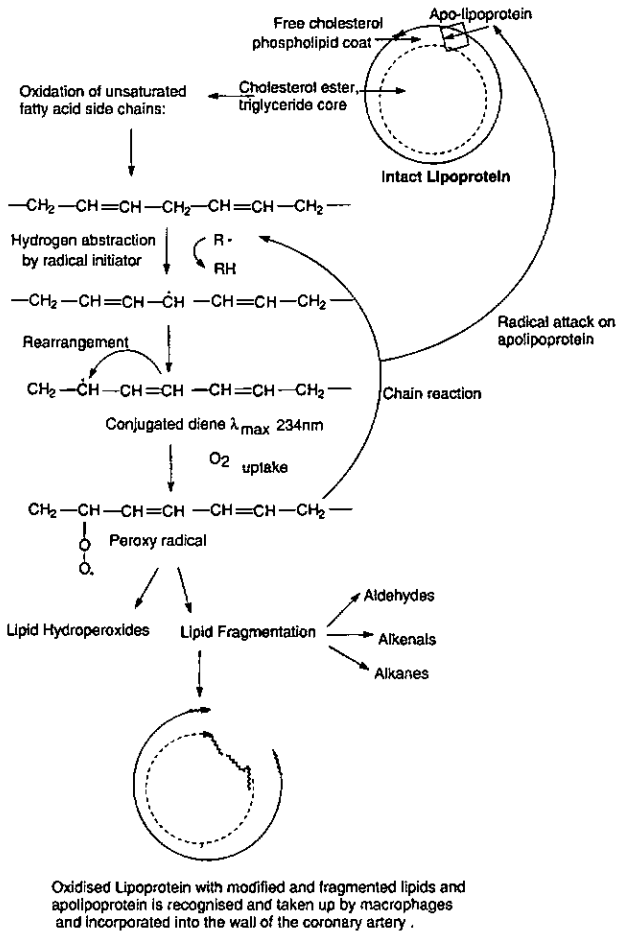
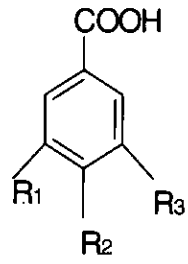


Figure 2: Radical-Induced Oxidative Damage to Lipid and Protein Components of Lipoprotein.

If radical-induced oxidation of lipoprotein is responsible for atherosclerosis then antioxidant compounds that can prevent or inhibit lipoprotein oxidation should prevent heart disease. There is now a considerable body of evidence that supports this postulate (4,5). Phenolic compounds are particularly effective as antioxidants, and two naturally occurring phenolic compounds occur within lipoprotein particles, Vitamin E (tocopherol) and Ubiquinol. The Vitamin E content of an individual's lipoprotein is strongly dependent on the Vitamin E content in their diet, vegetable oils in particular being rich sources of Vitamin E. A number of studies have shown that heart disease mortality is decreased as Vitamin E consumption increases (6-8).

Benzoic Acid Derivatives



Gallic acid R1=R2=R3=OH

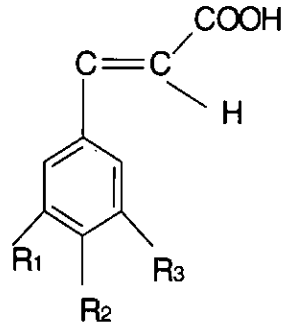
Protocatechuic acid R1=R2=OH , R3=H

p-Hydroxybenzoic acid R1=R3=H , R2=OH

Vanillic acid R1=OMe , R2=OH ,R3=OH

Syringic acid R1=R3=OMe , R2=OH

Cinnamic Acid Derivatives



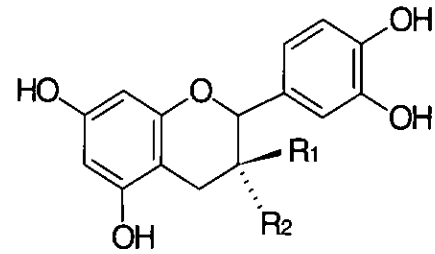
Caffeic acid R1=R2=OH, R3=H

p-Coumaric acid, R1=R3=H, R2=OH

Ferulic acid R1=OMe, R2=OH, R3=H

Sinapic acid R1=R2=OMe, R3 =OH

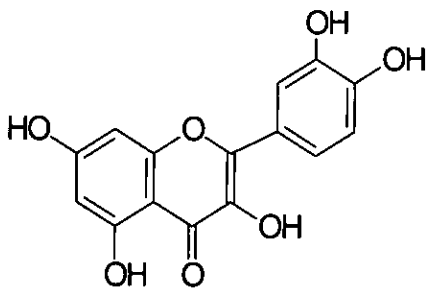
Flavanols



Catechin R1=H, R2 =OH

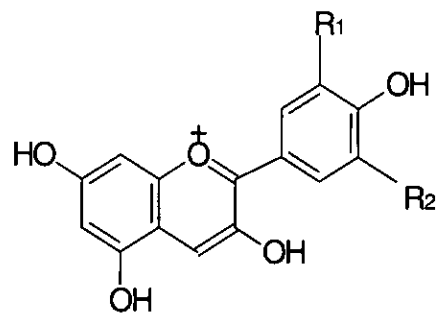
Epicatechin R1=OH, R2=H

Flavonol



Quercetin

Anthocyanidin



Delphinidin	R1=R2=OH
Petunidin	R1=OMe , R2=OH
Malvidin	R1=R2=OMe
Cyanidin	R1=OH ,R2=H
Peonidin	R1=OMe, R2=H

Figure 3: *Phenolic constituents in Vitus vinifera, the common wine grape. The hydroxycinnamates are present as tartrate and tartrate-glucose esters in grapes and wines, also as free acids and ethyl esters in wine; hydroxy benzoates as free acids and esters in wines; flavonols as 3-glucosides in red grapes; anthocyanidins as 3-glucosides (anthocyanins). The anthocyanins give red wine its colour. Oligomers of these compounds form as wine ages and oxidises leading eventually to the formation of polymeric or condensed tannins of largely indeterminate structure. The tannis gives red wine its characteristic astringent taste.*

Vitamin E is however only one of many naturally occurring phenolic compounds derived from plants that may prevent heart disease (9-11). Red wine in particular is a rich source of phenolic compounds. The phenolics of red wine consist of simple compounds such as gallic and cinnamic acids, polyphenolics such as flavonoids and complex polymeric compounds such as tannins (Figure 3).

Red wine phenolics are potent inhibitors of lipoprotein oxidation in *in vitro* models of heart disease (12-15). Figure 4 shows an example of such an inhibition model with a New Zealand red wine. Human low-density lipoprotein isolated from a volunteer's plasma is incubated in a spectrophotometer cuvette at 37° C in the presence of Cu^{2+} ions which initiate oxidation. As oxidation occurs conjugated dienes are formed from the lipoproteins fatty acids leading to an increase in absorbance at 234 nm. The solid line shows a control lipoprotein oxidation. Initially oxidation is inhibited for approximately 2 hours as the endogenous antioxidants such as Vitamin E in the lipoprotein protect the particle either by direct reaction with the initiating radical or by breaking the chain reaction once it has begun - this is the so called "lag phase". Eventually the endogenous antioxidants are consumed and the oxidation proceeds rapidly giving a steep change in absorbance. The dashed upper curve is the same lipoprotein sample with red wine added at a final dilution of 1/ 10000. The presence of the wine phenolics extend the protective lag phase to approximately 4 hours i.e. 100 % longer inhibition versus the control. Several studies using this or similar techniques have shown that the inhibition of oxidation is proportional to the phenolic content of the wine sample used. There is also clinical evidence that red wine phenolics are absorbed and act as antioxidants *in vivo* (16,17).

The New Zealand Perspective

The phenolic content of a red wine depends on a number of factors, including the grape variety from which the wine is made, the wine making process itself and the soil and climate in which the grapes are grown. New Zealand has only a relatively short history of wine production by international standards and new growing areas with varying climatic conditions are constantly being developed, some of which may be only marginally suited to red wine production. New Zealand as a whole has a unique cool maritime climate with considerable geographic differences in temperatures from North to South (18). It seemed possible that the unique climate and geography of New Zealand might affect the phenolic concentration of its red wine which in turn might affect its ability to inhibit heart disease. A study was therefore undertaken to quantify the phenolic content of New Zealand red wine and assess its ability to inhibit lipoprotein oxidation in an *in vitro* model of heart disease.

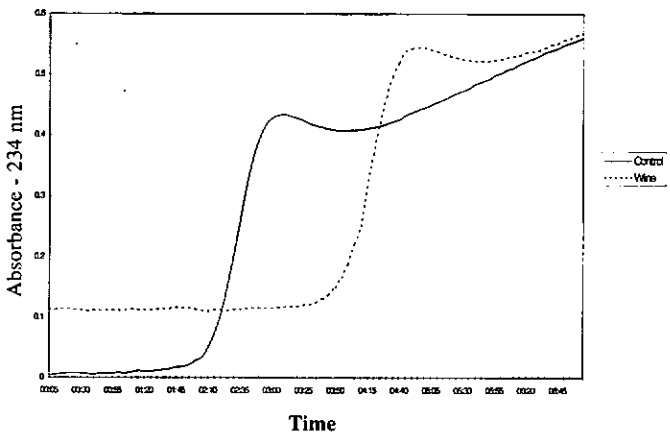


Figure 4: Lipoprotein Oxidation by Copper Ions.

Methods and Results

A total of 100 red wine samples were analysed for phenolic content across 7 vintages - 16 from 1996, 35 from 1995, 32 from 1994, 6 from 1993 , 4 from 1992 and 1 each from 1991 and 1990. Five of the wines were from an unspecified vintage. Figure 5 shows the geographic distribution of the wines. Two independent methods were used to determine the total phenolic content. The Folin Ciocalteu method (19) is based on oxidation of phenolic hydroxy groups and is reported in Gallic acid equivalents whereas the Somers method (20) is based on absorption of ultraviolet light at 280 nm by the phenolic ring and is reported in Absorbance units. The high degree of correlation (r^2=0.884) found between the two independent methods for the 100 New Zealand red wines gives confidence that the values reported are reliable (Figure 6).

There was a 13-fold variation in phenolic content of the New Zealand red wines, ranging from 307 mg/L for a Rose to 4070 mg/L for a Pinot Noir. Table 1 compares the phenolic content of New Zealand red wines with those found in similar studies overseas. The wines were further subdivided into groups based on the grape variety stated on the label. Table 2 shows that there is a significant difference between varieties, with Cabernet Sauvignon and Cabernet Sauvignon/Merlot blends having an approximately 20 % higher average phenolic content than Pinot Noir and Merlot. Pinot Noir is a red grape variety more suited to cooler climates and is therefore grown extensively in the lower North Island and South Island. Merlot is a red grape variety with low astringency and is frequently used to "smooth" the higher phenolic content Cabernet Sauvignon.

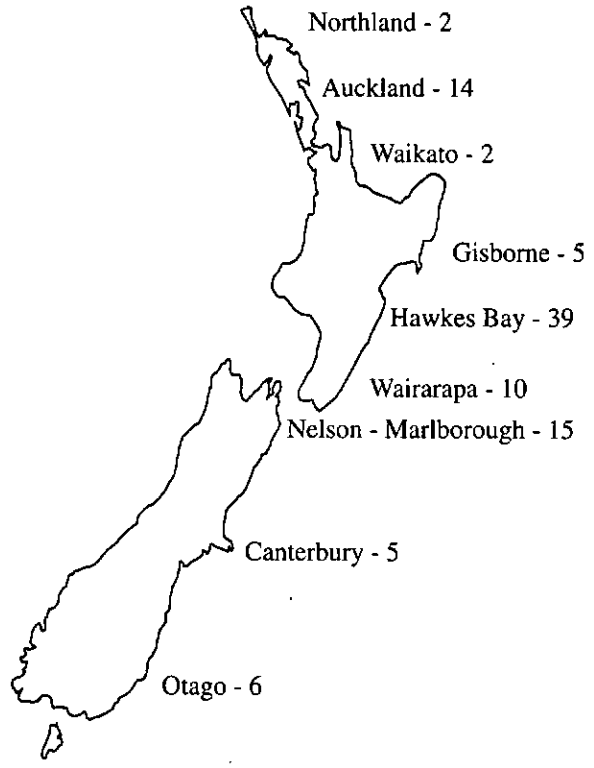


Figure 5: The Geographic Distribution of the Red Wines.

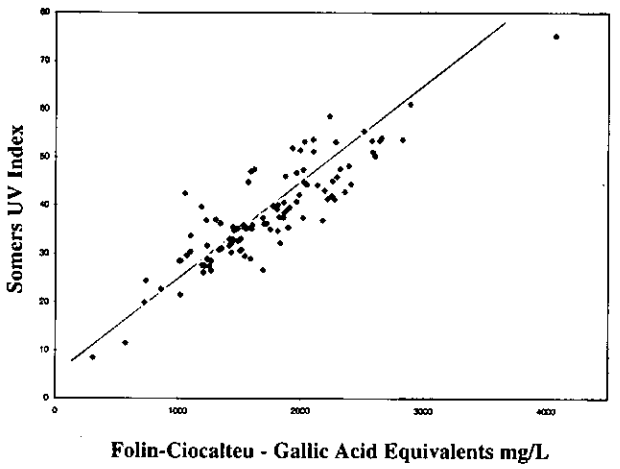


Figure 6: Total Phenols in 100 New Zealand Red Wines.

Inhibition of Lipoprotein Oxidation

Human low-density lipoprotein was prepared from the blood plasma of volunteers by isolation on a heparin-agarose column (14). Cu^{2+} catalysed oxidation of the lipoprotein (27,28) was carried out in the presence of twenty different wine samples selected from a range of varieties with differing phenolic contents. The percentage increase in the lag phase was measured relative to a control lipoprotein sample with all the wines diluted to the same extent - 1/10000. Figure 7 demonstrates that there was a reasonable correlation (r^2 = 0.79) between the total phenolic content of the New Zealand wine samples and their ability to inhibit lipoprotein oxidation in this *in vitro* model of heart disease.

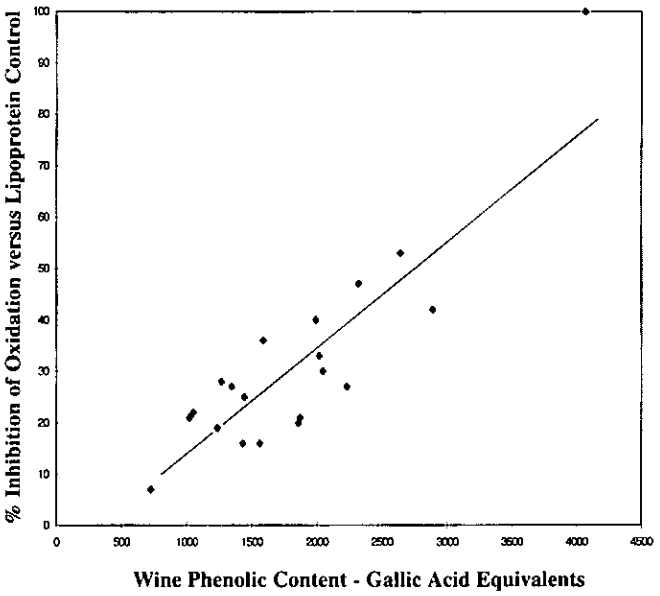


Figure 7: Wine Phenolic Content Versus %Inhibition of Lipoprotein Oxidation.

Conclusion

This study indicates that New Zealand red wines as a group have a similar range of total phenolic contents to those of overseas red wines and that like overseas red wines their ability to inhibit lipoprotein oxidation *in vitro* is proportional to that phenolic content. Pinot Noirs and Merlots as a group have a lower average phenolic content than Cabernet Sauvignons and Cabernet Sauvignon/Merlot blends. However, the high variation in phenolic content within each grape variety group means that it is not possible to say that any individual New Zealand red wine variety is more effective as an antioxidant than any other, e.g. some individual Pinot Noirs had very high phenolic contents.

Acknowledgements

This work was funded by the Auckland Institute of Technology Contestable Research Fund. We thank Dr Mike Rush and Kathleen McMahon of ESR, Mt Albert, and the many winemakers from throughout New Zealand who provided wine samples. We also thank Wilma Cooper, John Robertson and Barbara Gregory for providing blood samples.

Table 1: Total Phenolic Content of International Red Wines [a]

Country	Number of Wines	Mean Phenolic Content (Gallic Acid Equivalents - mg/L)	Range	Reference
New Zealand	100	1730	307-4070	
Australia [b]	400	1685	889-3160	21
California	14	2567	1800-4059	15
France [b]				
- Angers	10	1891	N/A	22
- Bordeaux	18	2068	N/A	
- Narbonne	40	2865	N/A	
Italy	9	1646	1040-3560	23
Sicily	33	2388	1225-4280	24
International			800-4000	25

(N/A - Not available)

Notes:

a - This table gives only an indication of total phenolic levels in international red wines. Even within a country the levels may vary 2-3 fold depending on the climate of the vintage year, regional microclimates, wine variety and processing methods. For example the three values given for France are for young red wines from the 1983 vintage, the differences being due in part to regional subclimates, Narbonne being warmer than Bordeaux which in turn is warmer than Angers. In addition each of these regions uses different wine processing methods and favours different grape varieties. As the wines mature the phenolic content would decrease. For a full discussion see (23). The international range at the bottom of the table probably gives the best indication of red wine phenolic content.

b - Values originally given in absorbance units and converted to gallic acid equivalents using the equation of Bakker *et al.* (26).

Table 2: Total Phenolic Content of Major New Zealand Red Wine Varieties

a) By the Folin Ciocalteu Method (19) reported in Gallic Acid Equivalents (GAE)-mg/L

Variety	n	Mean	SD
Cabernet Sauvignon	16	1840.3	515.2
Cabernet Sauvignon/Merlot	30	1891.1	379.6
Pinot Noir	23	1592.9	458.1
Merlot	9	1533.5	464.8

b) By the Somers UV method (20) and converted to Gallic Acid Equivalents (GAE) in mg/L using the linear regression GAE = 48.5x + 68.6 where x is the UV total phenolic index E280-4 (20).

Variety	n	Mean	SD
Cabernet Sauvignon	16	1895.4	496.4
Cabernet Sauvignon/Merlot	30	1852.4	340.2
Pinot Noir	23	1585.0	420.8
Merlot	9	1566.1	460.8

* A one-way analysis of variance (ANOVA) gave a significant difference ($p<0.05$) between the means for the four varieties by both methods.

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* * * * *

Professor Michael Hartshorn Retires

The year was 1960; a tall thin young man arrived at the University of Canterbury. One could be forgiven for thinking this was a younger Sir Ewart Jones. Michael Hartshorn had just completed an Oxford D.Phil with Professor Jones, after his honours degree at Imperial College of Science and Technology, London.

Michael's research at Oxford was concerned with the bromination of ketones, as part of Sir Ewart Jones' interest in synthesising analogues of steroid hormones. This research became the substance of a paper published in the *Journal of the Chemical Society*: Hartshorn, M P, and Jones, E R H, Part LXXIV, some tricyclic analogues of steroid sex hormones, *J. Chem. Soc.*, **1962**, 1312-1323. I think Michael was the last appointment to the Chemistry Department at the University of Canterbury without postdoctoral experience!

Michael joined the Chemistry Department at Canterbury as it was evolving into a modern department, towards the end of Professor Jack Packer's era. Under the strong influence of the late Sir Karl Popper, Canterbury University College, of the University of New Zealand, was changing from a teaching institution to a university embracing research. Jack Vaughan, an enthusiastic charismatic figure, with colleagues, Fred Fischer (later Professor at Victoria University, Canada), Ron Topsom (later Professor at La Trobe University), and also Graeme Wright were prominent among Michael's organic chemistry colleagues.

At Canterbury, Michael's first student was Adrian Wallis who continued with Michael's interest in bromination, and extended the chemistry to studies of New Zealand turpentine. Nuclear magnetic resonance spectroscopy (NMR) was a new tool and spectra were run by Dr Ian McDonald at DSIR Wellington, then a leading and well-funded scientific laboratory.

Shortly thereafter, two events were to happen which strongly influenced the direction of chemistry at Canterbury. The late David Kirk, previously a chemist with the research laboratories at British Drug Houses (BDH), joined the faculty (1962) and the Department acquired its own NMR instrument. David stayed in Canterbury for only three years, but his influence on research direction and work ethic was profound. He later became Professor of Chemistry at Westfield College, and then at Queen Mary College of the University of London. He brought to Canterbury an interest in steroid rearrangements and epoxide chemistry and the collaboration of Kirk and Hartshorn resulted in a partnership on these topics and culminated in the publication of Kirk, D N, and Hartshorn, M P, 'Steroid Reaction Mechanisms', Elsevier Publishing Co., Amsterdam, 1968, pp 476.

At this stage John Blunt and I joined Michael and David Kirk as graduate students and worked on steroid rearrangements. After completing my PhD and a postdoctoral year in England, I returned to Canterbury as a lecturer and collaborated with Michael for several years. John Blunt, a chemist with magic skills in the laboratory, went on to undertake postdoctoral work with Professor de Luca in the States, and then with Sir Ewart Jones at Oxford, later also returning as a lecturer.

Michael's first sabbatical was spent at Cornell University and resulted in the publication: Meinwald, J, Erickson, K, Hartshorn, M P, Meinwald, Y C, and Eisner, T, An allenic sesquiterpenoid from the grasshopper *Romalea Microptera*, *Tetrahedron Lett.*, **1968**, 2959-2962.

One of the notable features of Michael's career has been joint research with colleagues. He published with Kirk then with Coxon a substantial number of research papers reflecting the efforts of a number of talented research students. These collaborations were followed by work with Blunt and Munro. In turn this was followed by work with Vaughan, Richards and Wright, studying aromatic nitration, a long standing interest of Jack Vaughan and the subject of many of his publications. Michael co-authored the third edition of what had been Topsom and Vaughan, and became Happer, D A R, Hartshorn, M P, and Vaughan, J, 'Reactions of organic functional groups', Whitcombe and Tombs, Christchurch, 1972, pp. 203, a book used for teaching stage one organic chemistry at the University of Canterbury for many years.

With the retirements of Vaughan and Wright, Michael spent his only other full sabbatical leave with Professor Lennart Eberson of Lund University, Sweden. From then on they collaborated and published some 55 papers concerning nitration of benzene type molecules.

In a remarkable University career at Canterbury, Michael was involved in the supervision of 31 PhD students, and a comparable number of masters and honours students. His research students, particularly in latter years, will remember his close attention to their chemistry. He was in early each day and would visit several times throughout the day with specific suggestions as to what they should do next. Michael's abiding interest is in undertaking reactions, meticulously examining, isolating and identifying products; the more products the happier he seems to be! He is always on the look out for the unusual, exhibiting an uncanny ability to bring these studies to publication. He records among his most notable successes the backbone rearrangement of steroids, the chemistry or pinanes, *ipso* nitration in simple

aromatic compounds, his studies in chlorination of phenols and amines, and photochemical reactions of the charge transfer complexes of aromatic molecules with tetranitromethane.

His teaching career started in 1960; he became a senior lecturer in 1967 and two years later was promoted to reader. He was appointed to a Chair in Chemistry in 1972. In 1969 he was made a Fellow of the New Zealand Institute of Chemistry, and the following year became a Fellow of the Royal Society of New Zealand.

He took his turn as Chairman of the Canterbury Branch of the New Zealand Institute of Chemistry. In 1991 he was the Royal Society of Edinburgh's Furth Visiting Felllow and last year was Wilsmore Fellow at the University of Melbourne.

My first impression of his teaching was to remain an abiding assessment. He was a particularly effective communicator; an outstanding lecturer, meticulous, careful and dedicated. His lecture notes were at all time available for younger colleagues and he was always helpful to those learning the trade. He writes with great clarity and assurance. Michael is colourful. He folds forth socially on any topic, from the politics of Sweden to rugby, and always with authority. He knows what is wrong, who is wrong, and what needs to be done.

The University of Canterbury *Chronicle* in marking his retirement, records: "He was a member of the University's Centennial Executive Committee and deputy to the chairman, the late Professor Harry Hopkins (Civil Engineering)". When the work was divided, Professor Hartshorn landed the mammoth task of organising the Centennial Banquet for around 1000 guests. "Harry Hopkins gave us the jobs to do and left us to it. With the banquet the problem was always going to be the size of the attendance. I started off looking at using the (Christchurch Town Hall's) Limes Room with a closed-circuit TV link to extra guests sitting upstairs and downstairs, but then heard that a very large dinner had been held successfully in Cowles Stadium and used that instead. Getting the place done up from a gymnasium to a venue suitable for a centennial banquet was a huge task. But the catering, the decroating and the sound system professionals did us proud."

"Professor Hartshorn is a strong supporter of the old system which saw the University of Canterbury represented on Christchurch secondary school boards of governors. Between 1970 and 1982 he was a member of the Linwood High School Board of Governors and from 1983 to 1989 he was on the Christchurch Boy's High School Board, stints which included spells as chairman of both. "Those representitives did a great deal of good. Having people from outside school areas meant they could often speak their mind more freely about the issues which arose."

Michael has had an outstanding career. He has brought his considerable organisational skills to bear on numerous research problems and been an outstanding lecturer. His research and teaching are stamped with integrity. It is fitting that the University of Canterbury Council have granted him the status of Emeritus Professor.

J M Coxon
Professor of Chemistry, University of Canterbury

LETTER TO THE EDITOR

From: Ron Durham - Internet rdurham@mmm.com
3M New Zealand Phone (3M) 64-9-443-9074
Fax (3M) 64-9-443-2231

To R B Lyon (Editor - "Chemistry in New Zealand").

Dear Mr Lyon,

Reference : Vol. 61, No. 1, January/February 1997, page 7

It would be interesting to relate the statistics on R & D investment in various business sectors with (medium/long term) growth in sales and/or profits in those sectors.

You report:-

i R&D in paper, paper products and chemical products industries at one tenth of that in reference countries;
ii food and beverage industries comparable with reference countries;
iii textile industries well above reference countries.

It would be valuable to the science\engineering professions to
be able to convince boards of directors that profits in (iii) were
distinctly superior to (i), above. I'm assuming that R & D gives enhanced profits!

Reference: page 5 (same edition)
"Putting Science into New Zealand's Boardrooms ..."

Similarly, is there any data relating proportion of scientists on
New Zealand boards with sales/profits?

Regards,
Ron Durham
(Senior Production Chemist) (T.M. & Patent Co-ordn.).

If any of our readers have information on the above points or have comments to make please contact either Ron Durham or myself - *Ed.*

ERRATA

In the article 'Methyl Mercury in Rainbow Trout and the Trout Food Web in Lakes Okareka, Okara, Tarawera, Rotorua and Rotomahana, New Zealand' that appeared in the last issue of *Chemistry in New Zealand* (**61**,1, January/February, 1997) the units for methyl Hg in trout, smelts, bullies, koura and zooplankton should be micrograms Hg per g and not mg per gram as it reads, our apologies to the author.

CONFERENCES & SEMINARS

1-5 April 1997

4th International Symposium on 'Responses of Plant Metabolism to Air Pollution and Climate Change'

Venue: Egmond aan Zee, The Netherlands

Contact: Symposium Secretariat
Department of Plant Biology
University of Groningen
P O Box 14
9750 AA haren, The Netherlands
Fax: (+31-503)-632273
Email: g.stulen@biol.rug.nl

10 April 1997

Science and Public Policy Conference

Venue: Wellington Plaza Hotel, Wellington

This year's conference, Science and Public Policy, will field speakers drawing on both the New Zealand and British experience, and consider how New Zealand can best obtain and provide expert advice to inform public policy development. It will examine how Government departments can best access and make use of New Zealand's scientific and technical expertise in the develpment of public policy, given that much of this expertise now resides outside of central Government in Crown Research Institutes, universities and research associations.

Government policy advisers and scientists will examine central issues in the linking of science and policy development. Among the topics to be considered are agriculture and trade, environment, engineering, health, and social issues.

The Ministry considers that the conference will be of value to senior research managers and scientists, science funders, policy makers from the Government departments, private sector R&D managers, and others with an interest in ensuring that the development of public policy is informed by high quality scientific and technical advise.
Numbers for the conference are limited. For further information and registration forms:

Contact: Ministry of Research, Science and Technology
Tel: (+64-4)-4726400
Fax: (+64-4)-4711284
Email: editor@morst.govt.nz

9-11 April 1997

Annual Conference of the New Zealand Biotechnology Association

Venue: Waipuna International Hotel and Conference Centre, Auckland

Contact: Professor Ian Maddox
Department of Process and Environmental Technology
Massey University
Palmerston North
Tel: (+64-6)-3505548
Fax: (+64-6)-3505654
Email: I.S.Maddox@massey.ac.nz

17-18 April 1997

Fifth International Nature Genetics Conference on 'Functional Genomics: From Gene to Drugs'

Venue: Washington DC, USA

Contact: Cambridge Symposia
1037 Chestnut Street
Newton Upper Falls
MA 02164, USA
Tel: (+1-617)-6301399
Fax: (+1-617)-6301395
Email: symposia@cambridge.org

21-24 April 1997

International Symposium on Environmental Biotechnology

Venue: Oostende, Belgium

Contact: ISEB 1997, c/o R Peys
Desguinlei 214
B-2019 Antwerpen, Belgium

21-25 April 1997

Seventh International Symposium on Biological and Environmental Reference Materials (BERM-7)

Venue: Antwerp, Belgium

Contact: Dr J Pauwels
IRMM, Retiesweg
B-2440 Geel, Belgium

15 May 1997

Sweet Dreams: New Strategies for Oligosaccharide Assembly (Royal Society Discussion Meeting)

Venue: London, England, UK

Contact: The Science Promotion Section
The Royal Society
6 Carlton House Terrace
London SW1Y 5AG, England, UK
Tel: (+44-171)-8395561
Fax: (+44-171)-9302170

16-20 May 1997

Seventh Asian Chemical Congress

Venue: International Conference Centre Hiroshima
Hiroshima, Japan

Contact: Mr A Nakanishi
Head, Administration Office of 7ACC'97
Chemical Society of Japan
1-5, Kanda-Surugadai
Chiyoda-ku, Tokyo 101, Japan
Tel: (+81-3)-32926161
Fax: (+81-3)-32926318
Email: 7acc97@chemistry.or.jp
www: http://www.t.soka.ac.jp/chem/csj/7ACC.html

20-22 May 1997

Laboratory '97 Exhibition

Venue: Earl's Court, London, England, UK

Contact: L McBain
Reed Exhibition Companies
Tel: (+44-181)-9107837

CONFERENCES & SEMINARS

26-29 May 1997

VIIIth International Symposium on 'Luminescence Spectrometry in Biomedical and Environmental Analysis - Detection Techniques and Applications in Chromatography and Capillary Electrophoresis'

Venue: Las Palmas de Gran Canaria, Canary Islands

Contact: J J Santana Rodrígues
University of Las Palmas de GC
Department of Chemistry
Faculty of Marine Science
35017, Las Palmas de Gran Canaria
Canary Islands, Spain
Tel: (+34-928)-452915
Fax: (+34-928)-452922
Email: josejuan.santana@quimica.ulpgc.es

1-7 June 1997

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

Venue: Gmunden, Austria

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

5-9 June 1997

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

Venue: Gdansk, Poland

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

9-14 June 1997

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

Venue: Frankfurt am Main, Germany

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

28 June - 2 July 1997

6th International Symposium on Perspectives on Protein Engineering

Venue: Norwich, England, UK

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

7-10 July 1997

Chem Ed '97 Putting the Elements Together

Venue: Massey University, Palmerston North

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

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

14-18 July 1997

Advanced Methods for Protein Analysis

Venue: University of Hertfordshire, England, UK

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

20-24 July 1997

4th International Conference on Essential Fatty Acids and Eicosanoids

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

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

20-25 July 1997

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

Venue: Boston, USA

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

27-30 July 1997

6th International Symposium on 'The Maillard Reaction'

Venue: London, England, UK

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

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CONFERENCES & SEMINARS

18-22 August 1997

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

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

25-29 August 1997

5th International Conference on Amino Acids

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

28 August - 2 September 1997

Structure and Mechanism of Oxidases and Related Systems

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

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

7-9 September 1997

NSW Southern Highlands Conference on Heterocyclic Chemistry

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

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

21-26 September 1997

XXX Colloquium Spectroscopicum Internationale

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

29 September - 3 October 1997

International Symposium on Biotechnology of Tropical and Subtropical Species

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

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

15-17 October 1997

7th New Zealand Coal Conference

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

21-23 October 1997

BioTechnica: International Trade Fair for Biotechnology

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

26-30 October 1997

5th Pacific Polymer Conference

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

9-12 November 1997

Corrosion and Prevention 97

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

CONFERENCES & SEMINARS

23-25 November 1997

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

Venue: Dunedin, New Zealand

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

25-28 November 1997

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

Venue: Auckland, New Zealand

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

2-5 December 1997

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

Venue: Quezon City, Philippines

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

6-8 April 1998

Conference on Production and Uses of Starch

Venue: Edinburgh, Scotland, UK

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

13-17 July 1998

MACRO 98 AUSTRALIA

37th IUPAC International Symposium on Macromolecules

Venue: Gold Coast, Queensland, Australia

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

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

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

2-7 August 1998

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

Venue: The Hong Kong Convention and Exhibition Centre

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

6-11 February 2000

RACI 11th National Convention

Venue: Canberra, ACT, Australia

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

14-19 December 2000

Pacifichem 2000

Venue: Waikiki, Honolulu, Hawaii

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

IUPAC-SPONSORED SYMPOSIA IN 1997-1998

19-23 May 1997
9th International Conference on High Temperature Materials Chemistry
Venue: Pennsylvania, USA

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

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

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

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

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

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

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

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

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

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

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

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

PACIFIC OILS 2000

An International Conference on Plant Oils and Marine Lipids

25-28 November 1997

Venue:
The Conference Centre, University of Auckland, Auckland

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

Plenary and Keynote Speakers include:

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

Contact:

Con Cambie
Conference Chairman
Chemistry Department
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Conference Secretary
Oils and Fats Specialist Group
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"Gas Traps and Liquid Solutions" - GC Column Bleed

Brought to you by Alltech's Chromatography Help Desk

Adapted from Troubleshooting: GC "Low Bleed" Columns - Fact or Fiction? By Professor Walt Jennings, J& W Scientific.

Bleed is an increase in the background signal (Figure 1) with increasing temperature resulting from the disintegration of bonds and subsequent cyclisation of lengths of the polysiloxane backbone into a range of molecules (Figure 2) which are then swept along with the carrier gas, resulting in an increase in the baseline signal level. Several manufacturers offer "low bleed" columns . In some cases, these are merely selected from the standard production process, but in other cases, the columns are actually synthesised for low bleed. In recent years, it has been established that where functional groups (i.e. phenyl) are inserted into the polysiloxane chain as aryl inclusions (Figure 3), as opposed to being attached to the chain as pendant groups, the resultant phase possesses increased thermal and oxidative resistance. Columns coated with such phases emit lower levels of bleed signal and are capable of going to higher temperatures. The increased thermal resistance is apparent only at temperatures above 300 °C for non-polar phases. While some users can reap the benefits of these developments, others find little or no improvement - their bleed signals are still too high.

True column bleed, of course, comes only from the column. What the user perceives as bleed is usually the total signal reaching the detector, which is the summation of the signal from the column plus the septum (this gives a typical silicone mass spectrum), the injector and the detector, all of which are usually blamed on the column.

It is good procedure to first check the detector. Disconnect and remove the column, and place an undrilled cap on the column attachment fitting. Activate the detector, and note the signal at 50 °C. Increase the oven temperature to 320 °C, and again note the signal. On a pristine detector, the FID signal will increase by one to two pico-amps. If the increase exceeds this level, attention should be directed to cleaning the detector, make-up gas and hydrogen gas lines. Once the detector signal falls to an acceptable level at 320 °C, attention should be directed to the injector. If the injector liner is visibly soiled, the injector should be cooled, disassembled and the interior cavities scrubbed with solvent and natural bristle brushes or cotton swabs. After assembling the injector, a "jumper tube" (one to three meters of uncoated fused silica or steel tubing) is then used to connect the injector directly to the detector. The injector heater should be energised, and the oven set at 320 °C. Any increase in "bleed" signal over that observed with the detector alone must come from the front end of the instrument, and it may originate with the septum, carrier gas line, in-line regulators, valves, or flow controllers.

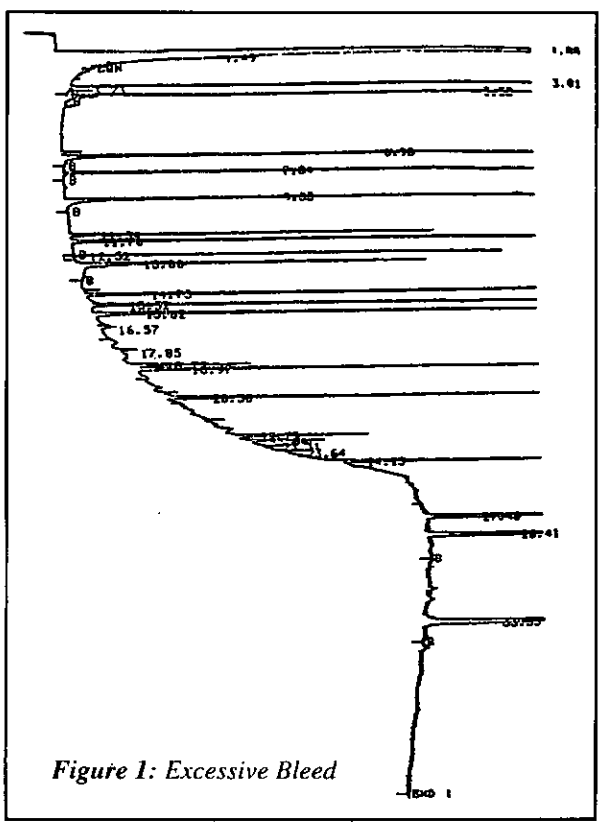


Figure 1: Excessive Bleed

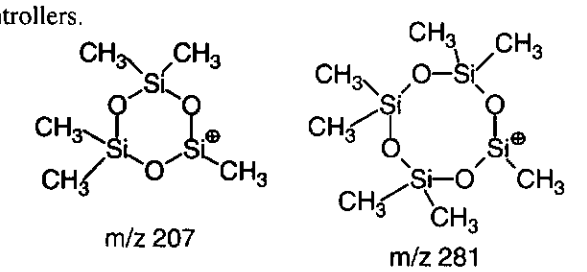


Figure 2: Typical Cyclic Siloxane Degradation Products

Wrap a new septum in aluminium foil, ensuring that one face is smooth, and install this, smooth side down. If the signal emanating from the jumper tube is decreased, it indicates a need for better quality septa. If the signal is still high, materials entrained in the carrier gas may have deposited in lines, valves, or regulators, which should be disassembled and cleaned or replaced.

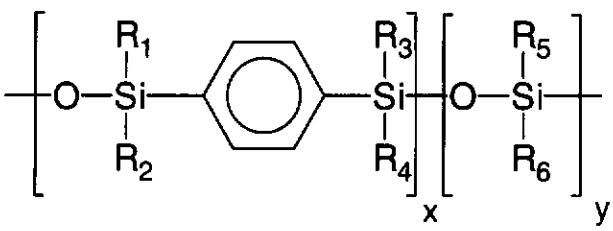


Figure 3: Silphenylene-Siloxane Copolymer (R_1... R_6 substiuent may vary dependent on polarity of phase

When the combined signal from the injector and detector falls to an acceptable level (one to two pico-amps at 320 °C on an FID), the user is ready to install and reap the benefits of a true low bleed column. The bleed rate of conventional columns is normally high enough to mask signals from the injector and detector unless these are heavily contaminated. With low bleed columns, the signals from the injector and detector assume increased importance. These spurious signals are not infrequently limiting and are usually (and incorrectly) perceived as "column bleed."

NEW ZEALAND INSTITUTE OF CHEMISTRY

NZIC COUNCIL NEWS

THE NEW PRESIDENT

Dr Rob Whitney has a BSc Tech from the University of Wales and a PhD in polymer chemistry from the University of Essex. He became Director of the Coal Research Association of New Zealand Inc. (CRANZ) in 1988 and is the founding General Manager of CRL Energy Research and Testing, a new venture set up in 1995 based on the operations of CRANZ

Rob is a fellow of the New Zealand Institute of Chemistry, and a former Wellington Branch Chairman and Council delegate. He is Convener of the Research Association's Co-ordinating Committee, and a member of the Ministerial Advisory Group for Research Science and Technology. He is a member of the APEC Clean Coal Technologies Experts Group, the International Committee for Coal Research, and the Energy Federation of New Zealand.

Rob worked at BRANZ from 1972 to 1988 as a Materials Scientist and then Assistant Director. Prior to that he held a Royal Society European Fellowship at the University of Freiburg in Germany. As a sandwich student he worked at the British Iron and Steel Research Association, Midland Silicones Ltd. and Dunlop Research Laboratories in the UK.

Since joining Coal Research Rob has taken a keen interest in the efficient and environmentally sustainable use of coal. He has been a strong promoter of Voluntary Agreements by energy users to reduce carbon dioxide emissions. CRANZ has signed a Facilitating Agreement with Government to promote emission reductions from the coal sector. It is the first and only industry to sign such an agreement. Rob has also recently formed a New Zealand consortium to join the IEA Greenhouse Gas R & D programme. This programme is looking at technical options for reducing greenhouse gas emissions. These options include coal fired power generation with no atmospheric carbon dioxide emissions.

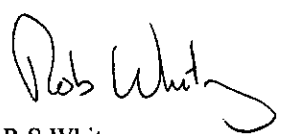
MESSAGE FROM THE PRESIDENT

You, the members, are the New Zealand Institute of Chemistry. Whether you are involved with your branch or a volunteer you will have lots of other demands on your time. For this reason the key function of Council and the Executive must be to provide you with support, resources and direction. We want to make sure we are working effectively towards the goals of promoting the chemical sciences and supporting all chemists. For this reason a number of the aims in our business plan relate to membership. We want:

- to increase the active membership of the Institute,
- to broaden the membership base of the Institute,
- to reduce subscriptions while improving services, and
- to encourage members' involvement in Institute activities.

It was a momentous occasion when Council decided at its December 1996 meeting to implement immediately the results of the membership referendum. The referendum and subsequent Council resolution was the culmination of two or more years of soul searching by Council. It demonstrates an intention to open the Institute to all chemists, to modernise it, and to make sure it focuses its services on helping its members achieve the goals of the Institute.

The decision to open up full membership of the Institute to everyone who has an interest in chemistry is just the start. We need to turn around the decline in membership numbers and to grow the Institute. We intend to reduce our fees to make membership fees under $100. We will take the opportunity of a change in the financial year to the calendar year to introduce the new reduced fees immediately for two 10-month subscription terms. This means we will have two years to increase our membership. The more members we have the lower our subscription needs to be to provide any particular level of service. We will need help, everyone's help, if we are to meet our targets for membership growth.



R S Whitney
President, NZIC

NZIC CHEMICAL EDUCATION TRUST

The Trustees wish to distribute approximately $5000 in grants in 1997. The initial intent is to make up to 10 grants of approximately $500 each. However, this should not deter proposals for amounts greater or less than $500.

The terms of reference of the Trust are flexible with funds to be spent on projects and/or equipment aimed at promoting interest and activity in chemistry, particularly at the secondary school level.

Proposals will be received up to 30 April 1997 and should be addressed to:
NZIC
Chemical Education Trust
P O Box12-347
Wellington

Successful applicants will be notified by June 15 1997

NZIC BRANCH NEWS

WAIKATO

Lea Bonnington has recently returned from a period of study in Japan to enrol in a DPhil degree at the University of Waikato where she will undertake a research project in collaboration with the Forest Research Institute (FRI) on the electrospray mass spectrometry of surfactants which will be supervised by Dr Bill Henderson.

The University of Waikato Chemistry Department has awarded the J E Allan Memorial Prize for 1996 to Louise McCaffrey for the outstanding results she achieved in her second year undergraduate papers.

Dr Bill Henderson will be going to Japan for 6 weeks in order to carry out research involving the use of scanning tunnelling microscopy at the National Institute for Materials and Chemical Research, Tsukuba.

For those Physical Chemistry Group Specialist Members who have not already received a copy, the first issue of the NZ-PCNL or *New Zealand Physical Chemistry Newsletter* was launched in December 1996. This will be a twice yearly newsletter which deals with events concerned with physical chemistry in New Zealand universities. Contributions however are welcome from all scientists involved in the practice of physical chemistry or chemical technology in New Zealand from both the public and private sector. Overseas contributions are also welcome. The NZIC has generously agreed to copy and distribute the NZ-PCNL in the interim and so, if you are interested in receiving a copy, please contact Allan Turner, NZIC, P O Box 12-347, Wellington. The NZ-PCNL has also been uploaded onto the University of Waikato Webserver and can be accessed via the Chemistry Home Page. The URL for the Waikato University Webpage is: http://www.waikato.ac.nz. Once you are in, make your way to the School of Science and Technology Webpage and then the Chemistry Webpage. The next issue of the NZ-PCNL will be out in July 1997 and so I will be requiring contributions in June 1997. A commercial sponsor is also being sought for the newsletter Any contributions, queries or comments can be sent to Dr Michael Mucalo, Chemistry Department, University of Waikato, Private Bag 3105, Hamilton; email: m.mucalo@waikato.ac.nz.

GRIF DPhil Fellowship Available

A GRIF (Graduate Research in Industry Fellowship) is still available for research toward a DPhil degree in Chemistry at the University of Waikato.

The topic is: CALCIUM PHOSPHATE PRECIPITATION FROM WHEY PERMEATES IN THE DAIRY INDUSTRY

Research will be carried out in the Chemistry Department at the University of Waikato as well as at Kiwi Co-operative Dairy Company in Hawera (Taranaki). In addition, there will be open access to facilities at the Dairy Research Institute (DRI) in Palmerston North.

Supervisors for the project will be Dr Michael Mucalo and Professor Brian Nicholson at the University of Waikato and Dr Richard Archer at DRI in Palmerston North. There will also be a nominated supervisor at Kiwi Co-operative Dairy Company in Hawera.

The value of the GRIF stipend will be $21,641.00 p.a. (tax free) and will be available for three years from the date research towards the DPhil degree officially starts.

Candidates should have an MSc or MSc(Tech) in Chemistry with at minimum, second class honours, first division.

Under the terms of the GRIF fellowship, the applicants should be New Zealand citizens or permanent residents of New Zealand.

If you are interested in this position, contact Dr Michael Mucalo as soon as possible on (07) 8384404 or write to: Chemistry Department, University of Waikato, Private Bag 3105, Hamilton for further information. A curriculum vitae with a transcript of your academic record should accompany any letter of application.

Michael Mucalo

WELLINGTON

The Wellington Branch programme for 1997 began in February with a joint meeting with the Australasian Corrosion Association that comprised a site visit to the Tranz Rail workshops at Gracefield where the repairs and refurbishment of locomotives and rolling stock is carried out. For itself the Branch had a lecture entitled "Killing Possums" by Dr Charles Eason of Landcare Research (Lincoln) that attracted a good-sized audience.

Victoria University News

Dr Rod Tilbury has been promoted to Senior Lecturer with effect from the beginning of 1997. The number of postgraduate student numbers has taken a turn for the better this year with several new candidates at the MSc and Diploma levels. From March 1 the Department was formally disestablished becoming a section within a School with Physics. However, the actual name of the School (School of Physical Sciences or School of Chemical And Physical Sciences) has yet to be settled. While the staff favour a name that reflect the two disciplines, the University administration much prefers not to have such recognition!

News from Branz

The Concrete Section of BRANZ has been examining the effect of pozzolanic inclusions in New Zealand -manufactured cement on concrete durability. One of the ways of lessening CO_2 emission in concrete manufacture is to blend these pozzolanic materials in, and it is certainly possible to make good concrete with these cements. But we are measuring the effects on chloride permeation and the general concrete durability (people think of concrete as having almost an eternal service life). High chloride permeation would be likely to promote reinforcing steel corrosion, but earlier studies show the permeation is likely to be lessened by the pozzolanic-modified cements. The results of this study will be reported at the CANMET/ACI conference on concrete durability in Sydney later this year.

The BRANZ Concrete Section has also been looking at the use of waste polystyrene insulation material in concrete, and the use of recycled demolition concrete as an aggregate for new

concrete. The Energy and Environment Section has a project on measuring waste generation on construction sites with a view to finding how it can be reduced. Construction waste is a significant contributor to landfills with the result that appropriate landfill sites are becoming increasingly scarce. These projects are aimed at reducing such need.

BRANZ Durability scientists have been struggling to find a sensible source for the disposal of a quantity of "used" mercury and other similarly "noxious" chemicals, and have not been able to do so except at a cost of $100 per kilogram for embedment in epoxy resin. Surely we are not the only ones facing such issues - are there any ideas out there? - or is this an instance where the Resource Management Act is imposing major costs which were unintended on businesses?

MANAWATU

The NZIC Prize for 300 level Chemistry in 1996 at Massey University has been awarded to Mr Simon P H Mee. The corresponding prize for 300 level Biochemistry in 1996 has been awarded to Ms Fiona J Miller.

The Branch Committee congratulates one of its members, Mrs Kath Fletcher, Central Hawkes Bay College, for winning the 1996 NZIC Chemical Education Award. Kath is Convenor of the Organising Committee for the Chem Ed Conference to be held in July 1997 at Massey University. David Harding, Immediate past chairman on the Branch Committee, is the Treasurer on the Organising Committee. He reports that plans for the Conference are going well. Registrations are already coming in and the international speakers in the programme have been confirmed.

Associate Professor John Ayers, Department of Chemistry, Massey University, along with David Elgar from the same Department and Mark Pritchard from the New Zealand Dairy Research Institute, have recently received a Carter Holt Harvey Food Award for Innovation and Excellence in New Zealand food product development. The Award was given for the development of the whey-protein product, ALACEN 895, resulting from years of collaboration between Massey University and the New Zealand Dairy Research Institute on the chemistry needed to isolate different proteins from whey, a by-product of cheese production. Whey isolate is used in the protein fortification of sports drinks for athletes as well as other food products. Using ion-exchange technology, the award winners were able to separate the protein from whey in a pure form so it could be used in food products such as drinks without causing the liquid to cloud. These whey protein isolates are the first to be pure enough for that purpose. It is likely that other new products using ion-exchange technology will be developed over the next few years, continuing the successful collaboration between Massey University and the New Zealand Dairy Industry.

In February, Dr Gill Norris and Dr Mark Patchett, Department of Biochemistry, Massey University attended the 22nd Annual Lorne Protein Structure and Function Conference, Receptor Signalling, in Lorne (near Melbourne), Australia. There was a specialist protein workshop prior to the Conference which covered topics such as MS sequencing and identification of proteins, characterisation of post-translational modifications (especially glycoproteins), and 2-D gel electrophoresis (2DE). The conference proper began with a session on kinases, followed by a welcome BBQ and the Leach lecture given by Nick Hoogenraad of La Trobe University on molecular chaperones. Over the next 3 days the attendees were treated to an exhausting but stimulating regime of early morning workshops (7 am!), talks, lunch time workshops, more talks, posters (about 250 of them), and evening lectures finishing around 9.45 pm. Post-translational modifications and signal transduction emerged as major underlying themes of the conference. There were no concurrent sessions and Gill and Mark did their best to cover everything. Session topics included Protease Structure and Function, Protein Folding, Protein and Peptide Analysis (including a description of APAF - the Australian Proteome Analysis Facility), Ion Channels, RNA/Protein Interactions, and Apotosis. A highlight was a talk on cell/MHC/peptide interactions. On the way home Gill and Mark visited laboratories in and around Melbourne. These included the Ludwig Institute for Cancer Research, the CSIRO Division of Bimolecular Engineering, the Bimolecular Research Institute, the Austin Research Institute and La Trobe University. Gill and Mark came away feeling both inspired and a little daunted at the pace of the development of new analytical techniques.

Harry Percival

AUCKLAND

The new committee has begun planning the branch activities for the year, after a somewhat late start, partly caused by the fact that I have only recently returned from a period of study leave in Chemistry Institutes in Munich and Durham. While in Germany and England, I attended several functions organised by local branches of the German Chemical Society and the Royal Institute of Chemistry. I found that these organisations still provide excellent opportunities for chemists with a wide range of backgrounds and interests to meet on a regular basis and I hope that we can provide similar opportunities here. One thing which impressed me particularly during my visit to Europe last year was the high level of interest and involvement of the younger generation of chemists in the local chemical society activities, and one of the things we hope to achieve this year is to attract more student members and to involve them in the activities of the Institute. As an extra incentive for students to join as student members, we plan to hold a Student Membership Raffle at our first meeting. Please bring this to the notice of any prospective student members with whom you are in contact.

For our first meeting this year we have chosen a topic which should be of wide appeal. Our speaker, Professor Laurie Melton, has recently joined the University of Auckland, and is engaged in the development of a new programme of teaching and research in Food Science. Food is vital to us all and to the New Zealand economy but how much do we really know about its constituents and their properties? News headlines in recent times show that these matters cannot always be taken for granted, and this talk will describe the scientific approach towards a better understanding of this important topic. The talk promises to be both interesting and entertaining.

The remainder of the year's programme will be finalised shortly, but we would also like to hear from you, the local branch members, about your wishes and preferences in this matter. In particular, we hope to organise a number of works and/or

laboratory visits, and it would be good if this could be done in liaison with branch members working in the organisations concerned. Therefore, if you are interested in hosting such a visit, please let a member of the committee know as soon as possible.

The 1997 Auckland Branch Committee is as follows:

Chair: Associate Professor Graham A Bowmaker, Department of Chemistry, University of Auckland
Secretary: Dr Gordon M Miskelly, Department of Chemistry, University of Auckland
Treasurer: Dr Michael Fitzpatrick, Department of Chemistry, University of Auckland
Committee: Dr Bruce Graham, Works Consultancy Services, Auckland (Council Delegate)
Michael Hodgson, Department of Chemistry, University of Auckland (Student Representitive)
Alan Grout, Department of Chemistry, University of Auckland
Dr John Robertson, Department of Chemistry, Auckland Institute of Technology
David Wilkins, Department of Chemistry, Auckland Institute of Technology

You'll note that this year's committee has a decidedly central-city academic flavour. This is great for organising committee meetings but not so great for representing the interests of Auckland chemists in general. Please help us counter this by providing suggestions for activities!

Graham Bowmaker
Branch Chairman

My Vision in a nutshell

COMMENT FROM MAURICE WILLIAMSON, MINISTER OF RESEARCH, SCIENCE AND TECHNOLOGY

It is a most interesting exercise to be a Cabinet Minister and to be appointed to a portfolio. You have a vision of where you want New Zealand to be in a few years (or you shouldn't be in the job) and you have an idea of what needs to be done to get us there.

But above the theory sit the people who make the portfolio work. These are those who deliver the goods, be it Education, Fisheries or Research, Science and Technology.

Each individual in this particular sphere, of course, has his or her own idea of the best way of delivering services or goods to achieve a particular outcome.

Here's why it is most interesting to be a Cabinet Minister. I get to implement my vision.

In a nutshell, here it is; where I want New Zealand to be in a few years in the disciplines encompassed by the portfolio of Research, Science and Technology. I restrict myself to a few years for specific goals because no one can predict how we will fare in this fast changing world even a decade out.

So, let's settle for some immediate goals. We are entering an information age that will bring change, the likes of which no one has experienced for centuries. All that we produce, all that we earn and all that we do will be changed by this age. United States Vice President Al Gore says 80% of new jobs will be knowledge-based. And this information age takes no heed of distance. That is, sheep carcasses wrapped in cheesecloths have supported New Zealand for a hundred and twenty five years. Granted, we have added value to them in many ways in recent times, but we must now grasp the knowledge and skills that will carry us through the next hundred and twenty five years.

My vision, if you like, is to see that this country prepares itself educationally, commercially and socially for this change. The world is divided into haves and have nots already. There are many countries that will happily see us cross ranks to the latter if we pause or stray from what must become a single-minded effort to grasp this change and use it to our advantage.

I see research, science and a healthy dose of technology as tools to aid us in this task. I see opportunities for knowledge-based industry to flow from New Zealand and find its place in the markets of the world which are, after all, just a keyboard away. No cheesecloths are needed, no blast freezers and no seasonal labour.

Let's make an analogy of seasonal labour. I have heard trade unionist, Ken Douglas, decry people who say that meat workers lack the necessary skills to find work in modern times. Meatworkers, he says, are extremely skilled. It's just that those skills are no longer in the demand they once were. He is perfectly correct. We risk the same irrelevance of skills as a nation if we do not grasp every opportunity we can to stay ahead of the tide. This is a world of knowledge and we must foot it with our competitors. In the past, I believe there has been too much emphasis on the R and the S of Research, Science and Technology. To achieve my vision, or at least, even to begin to work towards it, the T will need to be prodded to the front.

Some areas of research seem to me to have captured the public dollar. I will work to free some of those dollars.

My task, as I see it, is to provide a momentum and bias towards research into this information age; to allow New Zealand commerce to catch up because, through first hand experience, I know that it is lagging at present.

I meet and mingle frequently with company boards and partners in some of the biggest accountancy and law firms. From many presentations I have made to them of what this information age may mean I am met with disbelief and, sometimes, a shocked realisation that a revolution has sneaked up on them without their realising it. I have been to schools and shown what the new age holds to boards of trustees and parents. Where the

pressure once came to spend available funds on a gymnasium or a new rugby paddock, surprised parents are demanding to know why they knew nothing of the extent of changes that computers and instant communication promise. I am determined that the one chance we have will not slip by.

I know that as an agricultural nation we have priorities in research in agriculture related topics. But I also know that if we do not turn the thrust of our effort towards the information society, we will be betraying the generation that is just entering primary school.

Rewards in a fast changing society go to those who recognise opportunities and exploit them. Bigger rewards accrue to those who can cast aside older ways of doing things and grasp new opportunities, only to discard them when better ways of doing things are discovered, in other words, never relax. Reinvent yourself as the world changes. Never sit back and take a breather. That is the challenge I see facing us.

I want to see a thrust in research into the tools that will drive the information age. I don't see that at present. I see a gradual dawning in some people's minds but in other countries (the USA and Singapore, in particular) it's already mid-morning and they are up and running.

There's the thrust of my ambitions as Minister. To evangelise the need to adapt to the coming changes and to master them and throw them back at competitors. To achieve a climate in New Zealand where business is aware of and works with this knowledge in mind.

As to the mechanics, I like the purchaser/provider model we have. I have never been one to let Government departments tread where private enterprise rightfully belongs. Governments do not make good innovators and we need innovation as much as anything at present. There is risk and reward in this field. I welcome entrepreneurs who relish risk. I wish you luck in reaping your rewards. That is not a Government job; it is the realm of people who share a vision that New Zealand stands to benefit hugely.

We also stand to lose a lot if we miss this opportunity. My energies will be directed to ensuring we do not.

MoRST's Role in the Development of Public Policy

The Ministry of Research, Science and Technology, through the office of the Chief Scientist (OCS), has a responsibility to provide or arrange for the provision of specialist advice on public science issues, and science input to public policy in general, including:

- the monitoring of policy activity to identify areas where specialist science and technology input is appropriate and is absent, deficient or unbalanced; and

- the organisation of specialist input from wherever in the science and technology community it can be sourced for the most effective result.

Most of New Zealand's scientific and technological information and expertise lies outside of Government in Crown Research Institutes, universities, research associations, museums, professional or commercial organisations and individuals. The store of scientific and technological expertise within Government departments has been reduced as departmental activities have become more sharply focused on their core policy advice outputs.

As in-house scientific capability and expertise diminishes there is a weakening of linkages between departments and the expertise of the science community. Departments may tap a more limited range of scientific and technical information and expertise. The internal scientific resources of departments may be inadequate to interpret in a balanced and impartial way the scientific and technical information that is available. There is also a greatly increasing store of knowledge which, although potentially more accessible, also needs to be assessed as to quality and relevance.

Examples of scientific and technological input to the development of public policy

Issues and topics with which the OCS has been involved, to a greater or lesser extent, include:

- Climate change
- Biological diversity
- United Nations Convention on the Law of the Sea
- Convention on Biological Weapons
- Convention on Chemical Warfare
- Border control and quarantine issues and topics, e.g. Asian Tiger Mosquito, Asian Gypsy Moth
- Volcanic hazards: Mt Ruapehu, White Island
- 1080
- Leaded and unleaded petrol
- Rabbit calicivirus disease
- Sustainable land management
- Phytoestrogens in soy products
- Hormonal growth promotants in beef
- Environmental impacts of French nuclear testing
- Marine biotoxins
- Ballast water
- *Hieracium*
- Importation of sheep semen
- BSE
- Tussock Moth

Mechanisms for acquiring and providing scientific and technical information and advise

Liaison with the science community and other Government departments is important for building and maintaining networks of contacts. Liaison with other departments is important for

maintaining open communication and facilitating transfer of information and advice for incorporation into policy development. Staff of the OCS participate in a range of formally established and *ad hoc* Officials Committees.

OCS staff endeavour to keep abreast of current literature as far as possible. Computer literature searches are made on some topics, and the Internet is increasingly important.

The OCS places a high premium on external and internal peer review of information and advice received and strives to deliver high quality, balanced and considered advice. This often involves acquiring information and advice from more than one source, e.g. universities, CRIs.

Workshops, conferences, *ad hoc* advisory groups and panels are a most effective way of getting balanced advice. These have been used for advice on a number of topics, including marine toxins, ballast water, rabbit calicivirus disease, environmental impacts of French nuclear tests, 1080, climate change and volcanic hazards. A number of these have been set up in conjunction with the Royal Society; frequently other departments have also been involved.

Cabinet established the Bovine Spongiform Encephalopathy (BSE) Expert Science Panel to provide an independent stream of advice on BSE and CJD. The Panel reports to the Ministers of Agriculture, and Research, Science and Technology. It has proved effective and credible and its recommendations formed the basis for Government decisions following reports from Britain of a possible link between BSE and CJD.

Following on the success of the BSE Expert Science Panel, the Ministers of Forestry and Research, Science and Technology jointly established a Tussock Moth Science Panel to give independent advice on the Tussock Moth eradication programme.

Usually the Government is required to make decisions on the basis of incomplete information. The task of scientific advisers is to present information that is available in a balanced manner, highlighting the significance of gaps in knowledge, uncertainties and consequences of alternative courses of action. The OCS has an important role in providing independent assessment of the balance of evidence where there are contrasting or conflicting scientific opinions.

Advice coming from departments may be selective and tailored to fit broader policy objectives or operational responsibilities. The credibility of advice from the OCS is enhanced by its independence from government operations and direct responsibility for policy implementation.

The Foundation for Research Science md Technology (FRST) purchases strategic science through the Public Good Science Fund (PGSF) and expects Government departments to purchase from their own Votes operational research and monitoring to support their policy development and implementation. There are difficulties for funding at the boundary between public good and operational research and risks that policy development and implementation is inadequately supported by research. The OCS is an important interface between science and policy and is probably more aware of the nature and extent of these tensions and gaps than other agencies. However resolution of these problems resides with funders. The OCS does not purchase research largely for policy development.

Lessons for future directions

The credibility of and effectiveness of the provision of advice by the OCS of scientific and technical information, analysis and advice for the development of public policy depends on:

- independence of the OCS from detailed policy development and operations;
- the breadth and range of the scientific and technical expertise and experience of the staff of the office;
- a good understanding by the OCS staff of policy development process; and
- effective interaction and liaison with the science community, and with Government departments and Ministers.

The approach of setting up expert technical panels to consider key issues has proved successful. It has the advantages of clearly demarcating the independent scientific and technical advisory role from that of direct responsibility for policy development and implementation. There is also merit in having panels report directly to other Ministers.

The two panels that have been set up (BSE and Tussock Moth) are essentially reactive to situations that have developed. Consideration needs to be given to setting up pro-active panels, to identify and to examine key emerging technical issues This would complement existing mechanisms of securing scientific and technical advice, such as the commissioning of reports and the convening of workshops.

Science and Government decision making

The Government requires scientific and technical expertise to assist public policy making and provide for effective delivery of services. Scientific research can assist policy makers to address issues by providing:

- Factual insights to help identify and frame problems and to understand the situation;
- Knowledge to allow assessment and evaluation of the likely consequences of each policy;
- Arguments, associations and contextual knowledge to help policy makers reflect on their situation and to improve and sharpen their judgements; and

• Procedural knowledge to help design and implement procedures for conflict resolution and rational decision making.

To address these functions within the context of New Zealand's current public sector, an analysis of past and more recent reforms in the state sector provides an insight into the background and influences that have led to the current situation on the provision of science for public policy development.

New Zealand science for public policy before the science reforms

Prior to the formation of Crown Research Institutes (CRIs) in 1992, the provision of scientific and technical advice to Government was largely provided through the DSIR, its multidisciplinary specialist science and technology capability providing scientific coverage of the large number of physical and biological areas in which the Government had policy interests. The most important omissions were in the areas of social and medical science. The expertise in these two areas was largely held in the universities.

In some areas of science, the DSIR either had a competing interest, or little or no expertise. These included forestry, meteorological services and agriculture and fisheries. The Ministry of Forestry received its science and technology advice through the Forest Research Institute. The Meteorological Service received much of its science and technology advice through a specialist science division of its own. The Ministry of Agriculture and Fisheries also received its science and technological advice through its own science division during the later stages called MAFTech. However, DSIR also had strong capabilities in this area and could, and often did, provide alternative advice.

The role of the DSIR in informing the public policy debate
The DSIR was one of a number of organisations in the world with a large multidisciplinary structure. Other recognised institutions included the CSIRO in Australia and the CSIR in South Africa.

This philosophy lead to a strong departmental science organisation that was able to provide scientific and technological advice over a wide range of topics. Other Government departments had limited scientific and technological capability in their own right or lacked the necessary funds to contract for such activity externally. This is in contrast to many other developed countries, such as the UK, Canada or the USA, where individual government departments have significant scientific and research capability in their own right.

Current science provision capability within Government departments
Very few current Government departments have significant in-house scientific research capability. Some employ specialists and experts, and fund scientific research carried out by external organisations. Most rely on the synthesis of existing New Zealand and overseas scientific and technological information. In-house expert knowledge is often required to ensure that the best is gained from external experts, including scientists. When commissioning research it is important to have in-house, individuals that understand the science infrastructure and the dynamics of scientific research. For example, some problems are not immediately soluble through research, as a crucial breakthrough may not yet have been made.

Departmental restructuring and landing at departments
The process of restructuring of the public sector has lead to the loss of large sectors that were once Government owned; for example energy through Electricorp, and telecommunications through Telecom.

This has also meant a loss of scientific and technical expertise that would have been available to the Government in these areas.

Public investment in science and the needs of departments
The Government's major science investment, the Public Good Science Fund (PGSF), purchases science outputs that address agreed socio-economic priorities. Such science outputs are unlikely to meet all the science needs of departments for underpinning policy development.

Where departments can capture benefit themselves from science activities, they should normally assume responsibility for the investment. Where benefits are more general, the PGSF may be the appropriate source of funding for the science.

Some long-term science activities may also be critical for underpinning policy development. For example, some key environmental and social monitoring activities, collections and databases may have intrinsic and long-term value but may not address current socio-economic priorities. New and better ways of developing strategies for such issues may be required.

International models of science advice for public policy
Internationally, a number of structural models are used to provide scientific and technical advice to inform public policy. These include:

A Personal or Chief Science Adviser usually responsible directly to the President/Prime Minister or to the Minister of Science. This model is widely used throughout OECD countries, e.g. USA and the UK. The adviser may or may not have backup support facilities.

A National Science and Technology Advisory Committee often chaired by the Prime Minister or Science Minister, and advising senior Ministers and senior private sector participants directly, i.e. the science equivalent of the New Zealand Enterprise Council. This model is evident in a number of OECD countries. A variation on this model is the formation of independent Scientific and Technical Advisory Committees on specific topics, as represented by the Bovine Spongiform Encephalopathy (BSE) and Tussock Moth committees. These may be at a national level directly responsible to Ministers or at a departmental level. Many of these committees have mixed private/public sector membership.

A Chief Scientist heading a research capability within a government department is the norm for many OECD countries where individual government departments have significant R & D capability in their own right. This model is being modified with departments separating off their research capability and contracting research either from their own researchers or increasingly from external research providers.

A variation of this model is evident in Australia, which has stand alone research organisations specifically established to provide research for policy development. These include the Bureau of

Resource Science (BRS). While usually attached to a department, they are increasingly providing researched advice to a wide range of external departments.

In some departments, external scientific and technical advisory boards advise departmental heads on the scientific and technical competence and direction of the organisation or science strategy, e.g. the US Environmental Protection Agency.

NGO Scientific and Technical Advisory Committees, such as Royal Societies or Professional and Academic bodies, have established committees that seek to identify, discuss and promote key scientific and technical issues. In some countries, studies commissioned by the Government or Parliament on specific public policy issues are carried out. For example, in the USA, studies are often carried out by the National Research Council, a subsidiary body of the National Academy of Science. This advice is usually widely distributed. In many OECD countries "think tanks" and private sector sponsored foundations formulate advice on scientific and technical issues. Many are influential and high profile.

Scientific and technical advice direct to Parliament has traditionally been evident in countries such as the USA, where it is conducted through the Office of Technology Assessment (OTA). There is evidence of increasing use of statutory organisations responsible directly to Parliament for scientific and technical advice. The OTA was directed by Congress to provide reports on specific areas/issues as required. However, the OTA has recently been disestablished. Under MMP it might be expected that select committees and Parliament might have a greater requirement for independent scientific and technological advice.

Science Ombudsman. Increasingly, the public perception of science and public confidence in its conduct is being called into question, e.g. BSE. This has led to the call for independent assessment of science issues and practices. In the USA, the office of Research Integrity has been established to advise the National Institute of Health on science fraud issues. The equivalent in other areas includes the Ombudsman and Parliamentary Commissioner for the Environment.

Attributes of successful scientific advisory mechanisms

Several key features appear relevant for the successful design and functioning of scientific advisory committees. These include:

Independence: It is important to be able to speak "truth to power." Many countries do not have a history of permitting, much less encouraging, independent scientific review of public programmed plans and issues.

Openness to new ideas: Processes that assure a fair hearing for new and dissident views are critical. It is often difficult for groups to simply converge to the mean or to repeat conventional wisdom. Assuring a balance of age and gender distribution is one strategy that is often helpful in preventing ossification.

Authority to help define the task: Although the agenda of a committee carrying out the task and the selection of issues and topics should be strongly influenced by the funders and clients, a committee needs professional norms to ensure consideration of the merits of the issues requested and approval of only those issues that address pressing concerns. It is important to decide if the question is one that can be answered, whether there are sufficient data to allow analyses or assessment of issues, and whether expertise can be recruited to accomplish the study.

Relationship to clients: How arrangements are designed with clients needs to be are fully considered. Experimental learning processes may be required.

Access to information and networks: For advisory functions, access to information and networks is more important than laboratories and equipment. Committees fulfilling the advisory function need not themselves be engaged in original research. Efforts may need to rely largely on the existing scientific base. When information is lacking, it is sometimes necessary to conduct surveys and assemble new databases. More often, part of the function of a committee is to identify research needed for clearer understanding of the problem.

Ability to harness talent: The fundamental strength of a science advisory mechanism must be its ability to recruit the best engineers and scientists to work on the topic. This ability will be a function of the group's perceived independence, its record of developing high quality reports/advice and evidence that reports/advice receive serious consideration at high levels. The group must also have adequate staff to fulfill administrative functions, coordinate technical aspects of studies, provide data gathering and editing and in some cases contribute to the technical work.

Policies and procedure for carrying out studies: The conduct of advisory bodies will benefit from well defined and well understood policies and procedures designed to ensure that reports produced and advice given is timely, objective and technically sound.

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