

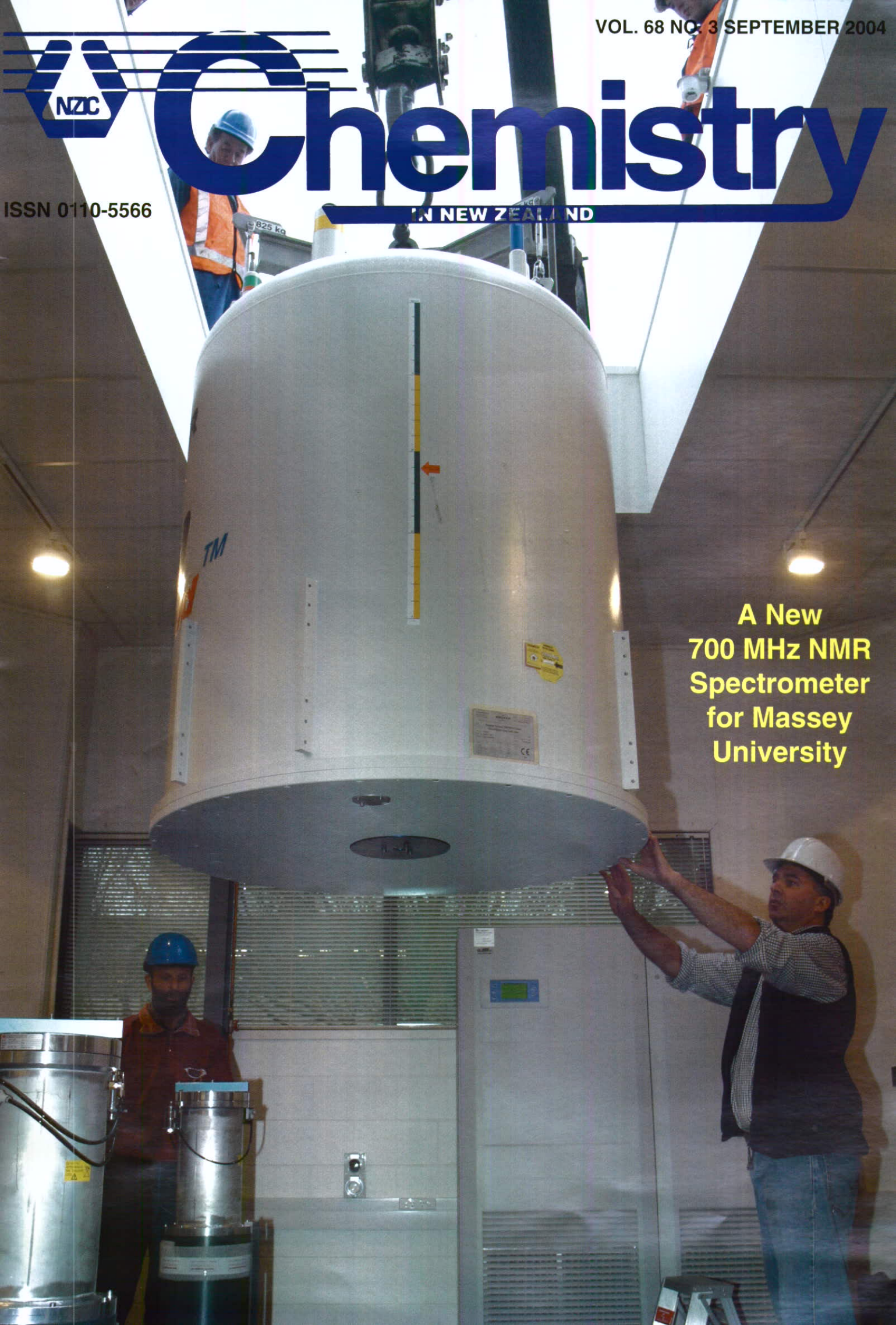


Chemistry

ISSN 0110-5566

IN NEW ZEALAND

**A New
700 MHz NMR
Spectrometer
for Massey
University**



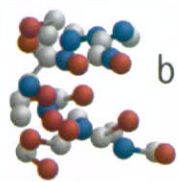


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MERCK REALIGNS DISTRIBUTION IN NEW ZEALAND

*Statement made by Selwyn Love,
Managing Director, Merck Limited,
New Zealand*

Merck Limited, the New Zealand operation of Merck KGaA, one of the world's largest pharmaceutical, laboratory consumables and specialized chemical multinational manufacturers and suppliers, has terminated its agency agreement with Biolab Limited in New Zealand, and has appointed Bio-Strategy Distribution Limited as one of its two distributors in New Zealand in addition to Global Science & Technology Limited.

The decision to realign our distributorship in New Zealand with Bio-Strategy is based on its ability to give greater focus to our product range, and its more marketing inclined approach to the principal/distributorship arrangement. Bio-Strategy combines leadership in the biotech consulting field with an all round appreciation of marketing, making it an ideal distributor of our more than 120,000 specialist laboratory products, consumables and apparatus.

Also, we have found Global Science to be a competent and comprehensive supplier, with a committed approach to marketing based on deep understanding of their customers' and suppliers' requirements, with a strong focus to relationships and quality.

Merck, with a turnover in excess of \$8 million in New Zealand, already has a significant share of the life science market, and we anticipate being able to consolidate this in association with Bio-Strategy and Global Science. We also market direct to key clients.

Merck has a major commitment to the New Zealand market, with its own operations here since 1949. We hold the country's largest depository of laboratory reagents, laboratory consumables/equipment and specialty chemicals, offering next day delivery on more than 2000 items.

In addition we weekly air freight into New Zealand the reagents, test kits, microbiology materials, chromatography supplies and life science products so necessary for New Zealand's research and science sectors.

Distributorships are an important link in the distribution chain. They provide focused, one-on-one attention, are a source of information and advice, and offer a range of other services and products.

The distributorship with Bio-Strategy starts on 1 October, 2004.

AGRESEARCH APPOINTS MANAGERS

AgResearch has appointed three Science and Technology General Managers to spearhead future science development in the company.

They are Dr Jimmy Suttie, Mark Ward, and Peter Benfell.

The three form part of an executive management team working with AgResearch Chief Executive Dr Andy West to manage the company's 1000 strong science teams.

Dr Jimmy Suttie will take up the appointment of General Manager Science and Technology, Applied Biotechnologies, based at AgResearch Invermay near Dunedin. Jimmy, already well known within the New Zealand deer industry, joined MAF based at Invermay in 1981 on a post-doctoral fellowship, after PhD studies at the University of Aberdeen on

physiological studies of growth nutrition and reproduction in red deer stags. He progressed from science to management, successfully managing AgResearch's Food Science platform. He will formally take up his new role on August 30.

Mark Ward has been successful in gaining the position of General Manager Science and Technology, Food and Health, based at Ruakura in Hamilton. Mark was Science Leader of AgResearch's Food Systems and Technologies platform. Prior to that he had worked in the dairy industry, initially at Lactose NZ, followed by the NZ Dairy Research Institute, and has been involved in both patent management and business development at Glaxo NZ.

Peter Benfell has been appointed to General Manager Science and Technology, Agriculture and Environment. Peter, currently the Foundation for Research, Science and Technology (FRST) Group Manager for Investment Operations, takes up his role in September and will be based at AgResearch's Grasslands campus at Palmerston North. Peter, who has spent his career in the field of research and development, has also been a General Manager in Science and Technology at the Institute of Geological and Nuclear Sciences.

BUSINESS AND SCIENCE LEADER JOINS VICTORIA COUNCIL

Former chief executive of the Foundation for Research, Science and Technology, Gowan Pickering, has been appointed to the Victoria University of Wellington Council.

Mr Pickering, who has a Bachelor of Science degree from the University of Canterbury, has held senior executive positions and directorships in private and public sector organisations. He

was chairman and managing director of IBM New Zealand from 1991 to 1998 and has latterly been chief executive of the Foundation for Research, Science and Technology.

Mr Pickering retired in March 2004. He is chairman of the Wellington Free Ambulance and a Fellow of the New Zealand Institute of Management.

HELP FOR STAFFING IN SCHOOLS

Schools are to get more help with staffing at the start of the school year as a result of a change to teacher staffing entitlements, Education Minister Trevor Mallard announced. From 2005 schools will be able to carry over their under-used or over-used staffing entitlements for the year until 31 March of the following year. This change gives schools an opportunity to employ teachers in the early part of the year from the previous year's staffing entitlement.

"Banking Staffing" provides a way for boards to maximise their staffing entitlement. The policy was introduced in 2001 and means that boards of trustees can manage their staffing in a more flexible manner. Previously, boards at centrally resourced schools were not able to staff over their allocated staffing entitlement. With banking staffing, schools in any one year can choose to:

- ◆ Anticipate up to 10 per cent of their staffing entitlement - using it in advance or going into overdraft;
- ◆ Save up a staffing entitlement to use later in the year - i.e. "banking" the entitlement;
- ◆ Use the staffing entitlement on a full year basis - so there is no saving and no overdraft.

It means that when entitlement staffing is un-used because of unplanned circumstances, the un-used staffing is credited to the school staffing bank, so the school can use it later in the year.

FEWER LEAVING WITHOUT QUALIFICATIONS

The proportion of students leaving school with no qualifications has hit

the lowest level in ten years, Education Minister Trevor Mallard said.

The latest Ministry of Education statistics show the percentage of students leaving school with no qualifications has dropped from 18 per cent of all leavers in 2002 to 15 per cent of 53,425 school leavers in 2003.

Fewer Maori and Pasifika students are leaving without qualifications, with the numbers also at their lowest in ten years. The numbers of students across the board leaving with a qualification higher than NCEA level 1 is also on the increase.

The government will continue to focus efforts on lifting underachievement across the board.

The other statistics are:

In 2003, 67 per cent of school leavers left with qualifications higher than NCEA level 1, compared to 63 per cent in 2002 and 64 per cent in 2001. These include Sixth Form Certificate, NCEA level 2, Higher School Certificate, Entrance Qualification and University Bursary. The proportion of Maori and Pasifika school leavers with qualifications higher than NCEA level 1 grew markedly, from 39 per cent and 54 per cent respectively in 2002 to 45 per cent and 59 per cent in 2003.

Trevor Mallard said he was pleased to see that the proportion of students staying on at school until year 13 was also on the increase, from 58.2 per cent in 2001 to 60.1 per cent in 2004.

INTERNATIONAL EDUCATION INITIATIVES

Education Minister Trevor Mallard released further detail about international study exchanges, awards and other government initiatives designed to lift New Zealand's overseas profile and strengthen the international education sector.

A second offshore education counsellor will be established in Washington from 1 July 2005, on top of the already announced position in Beijing. This position will focus on building New Zealand's profile and

reputation in the United States and in facilitating links between institutions.

In 2005 the focus for the scholarships programme will be on post-graduate students. Countries targeted in this first year, for both the overseas student scholarships and for New Zealanders to study abroad, will be China, Korea and ASEAN countries, and three Latin American countries which have with good prospects for growth in postgraduate student numbers: Chile, Mexico, and Brazil.

The undergraduate component of the scholarships package will start in the 2006 academic year. In 2006 the focus for the scholarships and study abroad awards will expand to include Japan, North America, Europe and the Middle East. See Trevor Mallard's full speech to the conference on <<http://www.beehive.govt.nz/mallard>>.

AMPERE PRIZE AWARDED TO NEW ZEALANDER

One of the world's esteemed scientific prizes has been awarded to Victoria University of Wellington's Professor Paul Callaghan FRS FRSNZ.

The Ampere Prize is awarded by the Ampere Group, a European association of scientists active in the fields of magnetic resonance, optics, dielectrics, magnetic resonance imaging, as well as in the development of the related methodologies and technologies. The prize is awarded every two years to a scientist who makes notable strides forward in magnetic resonance, and was presented recently to Professor Callaghan at the Ampere Congress in L'ille, France. He is the first scientist from outside of Europe to win the prize since it was established in 1990.

Professor Callaghan, who is Victoria's Alan MacDiarmid Professor of Physical Sciences and Director of the MacDiarmid Institute for Advanced Materials and Nanotechnology, a government-funded centre of research excellence, won the prize for his research into using nuclear magnetic resonance (NMR) methods to study complex fluids.

Professor Callaghan has led a number of advances in the use of magnetic resonance methods, including the development of NMR microscopy, new 'diffraction' methods for studying the structure of fluids inside porous materials, and new ways of analysing the motion of molecules over distances and times that hadn't previously been available. His methods have found widespread international use in the science of materials such as plastics, liquid crystals, detergents and even food products, as well as strongly influencing developments in medical magnetic resonance imaging.

2004 MARSDEN FUND RECIPIENTS ANNOUNCED

The Marsden Fund has announced 69 new research grants, totalling \$33.3M. 24 of these are Fast-Start grants for new and emerging researchers. The Marsden grants are funded by government and administered by the Royal Society of New Zealand.

The awards span the social sciences and humanities as well as the physical, biological and earth sciences, and mathematics.

A list of the new projects may be viewed at http://www.rsnz.org/funding/marsden_fund/

2004 SCIENCE & TECHNOLOGY MEDAL RECIPIENTS

The Royal Society of New Zealand's Science & Technology Medals Committee recently awarded New Zealand Science & Technology Bronze Medals to the following recipients:

Associate Professor Miles Barker University of Waikato. For his significant contribution to science and environmental education in New Zealand for over 40 years as a teacher educator, researcher, and national and international consultant on curriculum, teaching and learning.

Dr Jan Giffney IHOD Science, St Cuthbert's College, Auckland. For her significant contribution to science education, particularly through her

contribution to the New Zealand Chemistry Olympiad team.

Carol Pound Consultant, Pahiatua. For her significant contribution to the CREST-New Zealand award scheme.

Glenys Ross Kerikeri High School. For her significant promotion of science and technology to New Zealand secondary students and teachers.

Bruce Warburton Landcare Research Ltd, Lincoln. For his significant contribution to animal welfare research, through national and international involvement in the development of humane traps and trap testing guidelines.

These medals will be presented at relevant local functions around the country within the next 6 months.

SUPERCONDUCTOR RESEARCHER AWARDED INAUGURAL TECHNOLOGY MEDAL

The Royal Society of New Zealand has this year awarded the prestigious new technology honour, the Pickering Medal, to Dr Robert G. Buckley FRSNZ of Industrial Research Ltd, Lower Hutt.

Dr Buckley FRSNZ is a Distinguished Scientist and Superconductivity Platform Manager at Industrial Research Limited (IRL). Over the past 15 years, he has managed the commercialisation of high temperature superconductors, and has been a leading researcher in the synthesis and discovery of high-temperature superconductor materials and in investigating their properties.

Dr Buckley studied Physics and Chemistry at Massey University, before completing his PhD at Victoria University of Wellington in 1979. In 1981, Dr Buckley joined what was then DSIR Physical Sciences in Lower Hutt (now IRL), where he is still located. Among his other achievements, Dr Buckley is a co-inventor of a material known as Bi-2223, which is the only material used

for making high-temperature superconductor wires. The discovery of Bi-2223 was published in the leading scientific journal *Nature* in 1988, and today, the material provides the basis for a major part of the high-temperature superconductor industry world-wide.

Over the years, Bi-2223 wires have been used in a variety of technologies, from power cables, transformers, and powerful magnets, to motors and generators. This machinery is now being globally commercialised, and will form the basis of a revolutionary technology that will impact on many different sectors, from energy and transport, to science and medicine.

Dr Buckley played a key role in developing New Zealand's strategy for capturing the benefits of its high-temperature superconductor discoveries. IRL has undertaken research and development contracts, developed instrumentation and processes for manufacturing plants, and now purchases high-temperature superconductor wire for the manufacture in New Zealand of components for high-temperature superconductor products. Dr Buckley has managed this process.

In April 2004, these endeavours culminated in the establishment of the company HTS-110 which manufactures advanced products for the world market using high-temperature superconductor wire. Dr Buckley has been at the helm of this venture since its inception. In addition, he has managed the Materials Technology Group at Industrial Research over the past 3 years.

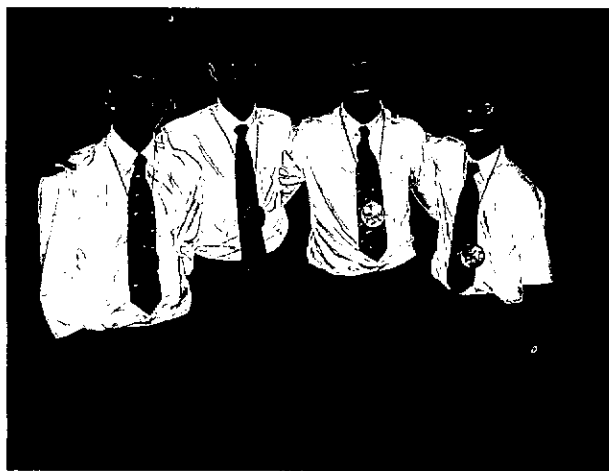
Dr Buckley is also a Board Member of the MacDiarmid Institute and is author of 93 refereed publications and 9 patents. He was elected a Fellow of the Royal Society of New Zealand in 2001.

The Pickering Medal was established by the Royal Society of New Zealand in 2003 to recognise excellence and innovation in the practical applications of technology. The medal is named in honour of distinguished New Zealand engineer, scientist, and administrator Dr William Pickering Hon FRSNZ.

The 36th International Chemistry Olympiad

The 2004 Chemistry Olympiad was held in Kiel, Germany, in July. The New Zealand team comprised of three Auckland students, Yun Huang (Westlake Boys' High), Tony Chui and Aritra Ray (Mount Roskill Grammar), and Reed Roberts (Scots College, Wellington). The boys were selected from a training squad of 17 who attended a camp in Auckland in April. Here they were introduced to chemistry principles and ideas well beyond those explored at school. The team selection was based on the results of both written and practical examinations held at the end of the camp. During term two the team had a raft of problems to work through to ensure their understanding of chemistry met the Olympiad syllabus. They also had some further practical experience.

The team, accompanied by mentors Drs. Sheila Woodgate (The University of Auckland) and Suzanne Boniface (Queen Margaret College, Wellington), arrived in Kiel on 17 July. After one day to acclimatise, teams from 61 other countries joined them. The competition was held at the University of Kiel and began with a formal opening ceremony where the competitors from each participating country were presented. The gathering was then addressed by Professor Henning Hopf (President, German Chemical Society) who outlined the successful history of the Chemistry Olympiad but expressed his concern at the under representation of the African states. A percussion ensemble from the Studienseminar in



Above: The New Zealand Chemical Olympiad Team with their medals.

Kiel provided exciting background music for this event.

The students had the opportunity to explore the city of Kiel and to participate in an excursion to the North Sea before facing a 5-hour practical examination carrying 40% of their final grade. This involved a two-step organic synthesis, and the qualitative and quantitative determination of a superconductor. Most competitors found this particularly challenging and many struggled to finish in the allotted time. With one day's respite before the theory examination, excursions were offered to a range of chemical industry sites and research facilities. Our students enjoyed a visit to the Bernhard-Noch Institute for Tropical Medicine. The theory examination, also a 5-hour event, certainly challenged the competitors and had a high focus on physical chemistry, each question reflecting the research interests of the examiners who were from a number of different German Universities.

Once the hard work of the exams was behind them the team were able to relax and enjoy the local area. They had the opportunity to visit a Lubricant Factory, shop in the Kiel city centre, sail on the Kiel harbour, and spend a half day visit to the city of Hamburg. The students enjoyed the opportunity to meet people from all over the world and made many new friends. They were great ambassadors for New Zealand, the country of *The Lord of the Rings*, and were one of the few teams to feature in the daily Olympiad news, the *Catalyzer*. At the closing ceremony in Hamburg we were delighted to receive four medals, a silver medal to Reed Roberts, and bronze medals for each of the other three members, making this one of the most successful teams in the 11-years of New Zealand involvement.

The Olympiad Trust is grateful for sponsorship for 2004 from: The Science Faculty, The University of Auckland, the MacDiarmid Institute (Victoria University), the Auckland, Wellington and Canterbury Branches of NZIC, Unilever, Douglas Pharmaceuticals Ltd, Pacific Pharmaceuticals Ltd, Crescendo Enterprises, and ABA Books. The students received funding from the Royal Society of New Zealand.

NZIC Annual General Meeting

The 2004 Annual General Meeting of the New Zealand Institute of Chemistry will be held in late November in Palmerston North at a meeting of the Manawatu branch. Further details of the meeting will be advised to branches and posted on the web site (www.nzic.org.nz) as they become available.

Nominations for Offices

Nominations are called for the offices of President, First Vice-President, Second Vice-President, Honorary General Secretary, and Honorary Treasurer. Nominations can be made by Branches, or by any six members and should reach the Honorary Secretary by 12 November 2004.

The address for nominations is:
Email: Secretary@nzic.org.nz or

FREEPOST 96
New Zealand Institute of Chemistry
P O Box 39283 Howick
Auckland 1730
NEW ZEALAND

The First Vice-President is automatically nominated for the position of President. The Second Vice-President is automatically nominated for the position of First Vice-President

G Boston
Honorary General Secretary



CHEMISTRY AT THE CROSSROADS: DOES THE NZIC HAVE A FUTURE?

Andrew Brodie, NZIC President 2004

Massey University, Palmerston North
(e-mail: A.Brodie@massey.ac.nz)

Introduction^{1,2}



If you attended the NZIC Conference in Nelson last December you would have gained the impression that the *New Zealand Institute of Chemistry* is alive and well. Around 400 delegates attended, with a strong contingent of younger researchers from the universities and other organisations. The interdisciplinary themes

(as highlighted by the plenary lectures), the enthusiastic presentation of posters by students, and a great conference dinner, all added up to a vibrancy and excitement in our discipline. The big question is: "how do we capture the energy of our conferences into our *Institute* as a whole?"

The NZIC is not vibrant. The AGM at Nelson did not raise a quorum! How many, apart from the Branch Committee, attended the last Branch meeting? Did you? If we continue in our present form, the demise of the NZIC is highly probable. You think I exaggerate. Let's look at some of the issues:

- *An aging and declining membership* - ~50% of members are over 50 years of age.
- *Few student members stay on as full members* - only 2 of the 52 students joining in 1998 are now members.
- *Membership skewed towards the professional chemist* - ~50% has a PhD.
- *Industry is not well represented in the organisational structure* - few FNZICs are from industry.
- *Expenditure is greater than subscription income* - we have survived financially because other activities (Conferences and CHEMNZ) made a profit.
- *We no longer have the time* - changing organisational structures in the work place mean that chemical scientists do not feel they have the time or support to assist with NZIC administration, either at Branch or National levels.

- *Communication within NZIC poor* - everyone blames someone else, e.g. Branches blame the ANCAT office or Council, ANCAT cannot answer questions because they have not been supplied with relevant information, etc., etc.

The 2004 NZIC AGM directed Council to discuss various strategies for the future of the *Institute*. As part of that process, First Vice-President, Graham Bowmaker and I visited our administrative office at ANCAT in Auckland in December last year.

Our immediate past-President, David Bibby, said during his Branch visits last year that chemical science has been a victim of its own success. Chemistry is still an important core scientific discipline, but emerging areas are using its concepts and techniques. Materials science is built on the traditions of inorganic and physical chemistry. Chemical biology is a merging of chemical and biological science. Scientists seem to prefer to join more specialised societies rather than a broad-brush one representing all the chemical sciences. To a large extent, the American Chemical Society is successful because its size allows it to cater for a wide range of interests.

Stephen Mann³ said "We need a collective *Viagra-like* remedy rather than a life-science support machine, to restimulate the imagination ..." in referring to University chemistry in the UK. It applies to the NZIC. In considering the future of NZIC it is worthwhile examining other comparable New Zealand science societies.

The data of Table I suggest that we are being more ambitious than other comparable societies with what we think we can provide for our members.

This article makes **THREE RECOMMENDATIONS** for NZIC members to consider. As I visit the Branches I will discuss these with you, and SEEK feedback on them. If you did not attend the Branch Meeting please forward your comments to me as soon as possible so that Council can decide appropriately on the action to be taken (in October) and any rule changes will then be put to a ballot later in the year.

The Name - *New Zealand Institute of Chemistry* - has it passed its use-by-date?

The answer is yes! The word *chemistry* no longer generates the excitement it used to. Can you imagine people queuing in the streets to hear a public lecture on chemistry today? Yet they did in the 19th century for Humphrey Davy who "*became the most famous and influential lecturer in England. ... There was an extraordinary appetite for science, especially chemistry, in these early, palmy days of the Industrial Revolution. It seemed a new and powerful (and not irreverent) way not only of understanding the world but of moving it to a better state*".⁴ Today chemistry generates a negative reaction in the mind of the public. How often do you find that when you tell someone you are a chemist they respond with *I could never understand that subject at school*, or some such or *where is your shop*? Often the view is that the actions of chemists and the products of chemistry are responsible for problems such

as pollution and global warming. And yet, “*Chemical science has never been more central to society. From materials to medicines, from nanotechnology to sustainable development, and genetic crop modification to climate research, the contribution of chemists makes the world go around, something that we need to be proud of, and non-chemists need to be encouraged to appreciate*”.⁵

Increasingly the term *chemical science* is used to embrace the wide range of activities that chemically trained scientists are now involved in. The chemical sciences cover chemical biology, structural biology, and protein chemistry, through to materials and nanotechnology, and the industrial applications of all of these. Think of the wide range of activities carried out by chemical scientists in industries such as NZ Pharmaceuticals and the dairy industry’s Fonterra, as well as in all the CRIs in New Zealand.

The second point is that the word *Institute* implies *NZIC* to be a professional organisation, like IPENZ. This is no longer the case; it is a society of people involved to a larger or lesser extent in the chemical sciences.

Recommendation 1. The *NZIC* be known as: *Chemical Sciences New Zealand*.

A name change would give a strong signal that the chemists of New Zealand and *NZIC* have moved into the 21st century. However, Council recognises that the designation *NZIC* has a tradition of many years among chemical scientists especially as used to indicate the election of a member to the Fellowship, *viz.* FNZIC. Thus it is proposed that the new name be the *brand name* by which the *Institute* is known and used on letterheads and publications, *etc.*, but terms such as FNZIC and MNZIC would be retained.

Council – has it fossilised?

As President, I am familiar with the workings of Council – as an *NZIC* member I was not. I suspect many members are in a similar position and could be forgiven for thinking that Council was still in the dinosaur age. Some of the problems are:

- Many minuted resolutions of Council have not been actioned.
- ANCAT seem unaware of important Council decisions and who the Council members are.
- A lack of continuity of Council members is not helped by the President holding office for 1 year only and Council meeting only twice a year.⁶
- The April Council meeting is too late to make strategic planning decisions for the year.
- Workplace demands on many *NZIC* members have increased; they cannot make a long term commitment to the important positions of Hon. General Secretary and Treasurer as was the case previously.
- University academic staff dominate Council.
- Council needs some younger members.

To have a Council that is more in tune with the membership and can operate more effectively and efficiently the following recommendations are made:

Recommendation 2.

- (i) Council Delegates be elected for a 3-year term and be eligible for re-election.
- (ii) The Hon. Gen. Sec. and Treasurer be elected for a 3-year term and be eligible for re-election.
- (iii) Full Council continue to meet twice a year⁷ but the Executive manage the day-to-day affairs and hold telephone conferences 3 times a year in months when Council does not meet.
- (iv) Council meetings be held in early February and September, the first meeting to involve strategic planning for the year and the allocation of *portfolios* to delegates.
- (v) Minutes of these meetings (with explanations of decisions) be made available to all Council members and the membership via the *Institute* web site.
- (vi) Council co-opt up to 2 members to redress any imbalance in representation.
- (vii) The role of each member of the Executive (President, Vice President, Hon. General Secretary and Treasurer) be defined.
- (viii) The role of each ordinary member of Council be defined in terms of a *portfolio*, (specialist groups, prizes, conferences, fellowships, publications, web site, Chemical Education Trust, *etc.*) with written reports provided for Council meetings.

Were the President to be elected for a two-year term then:

- (i) The 1st Vice-President should be elected for a two-year term.
- (ii) The position of 2nd Vice-President should be abolished so that 4-years is the total time spent on Council by a President.

Members and Fellows – a dying breed?

When chemical scientists are asked why they are not members of the *NZIC* the answer invariably is *Why should I join?* or *What’s in it for me.* Many students join only to get a conference travel grant and see no need to retain membership once they graduate.

It has been said that we need to do a better job of looking after the interests of the members we already have and this can be done in a number of ways, *e.g.*

- An examination of the existing specialist groups. Discard those no longer active and assess demand for new cross traditional ones, *e.g.* a group for those involved in patenting has been suggested.
- Run broad-themed national conferences every second year as at present, but alternate these with more specialised single theme conferences (possibly in collaboration with other societies including the *RACI*).⁸
- Stress the importance of networking with other chemical scientists, especially for student members.
- Better meet the needs and interests of Members at the Branch level (see below).
- Ensure that those who donate to the Chemical Education Trust received an accompanying letter of thanks and not just a tax receipt.

A national coordinated effort to recruit new members needs to be made with emphasis on targeting poorly represented areas in *NZIC*. To do this we must stress member benefits.

Some of these are:

- Networking
- Receiving *Chemistry in New Zealand*
- Travel grants for graduate students
- Prestige from election to *FNZIC* often improving promotion prospects
- Prestige from gaining an award or prize such as the HortResearch Prize and the Nufarm Prize for Industrial and Applied Chemistry
- Prestige for younger chemists from being awarded the Easterfield Medal
- The National Conference (often held with another society)
- Discounted registration fees to overseas conferences, e.g. RACI and ACS conferences
- Branch meetings in the main centres

Furthermore, the NZIC supports chemistry in high schools with activities such as:

- The publication *CHEMNZ* for chemistry teachers
- The award of the annual Chemical Education Prize
- The Chemical Education Trust which makes grants to schools
- *Chemistry* events for secondary school students organised in the Branches
- Support for Science Fairs through Branch prizes and judging.

A drive to elect more to *FNZIC*, especially from the non-educational sector is needed. Fellows can have wide-ranging backgrounds and Members can be invited to become Fellows without having to go through the normal procedures (See **Fellowship of the NZIC** on the website). *Fellows* have high status within and without the profession - some argue they should not need to pay a higher subscription.

The choices available are to increase our membership, including Fellows, or slim-down on what we offer to Members, e.g. for how much longer can we afford a *Journal*?

To increase membership, members must become more involved in the affairs of *NZIC*. One way to do this is to have each Branch responsible for certain areas of national activity with the Branch Delegate having linked portfolios on Council.

Membership of Specialist Groups can also increase the value of *NZIC* to members - again these could be based in different Branches and used as vehicles to increase membership and facilitate links with Australian chemists.

Branches and Specialist Groups – what is appropriate for the 21st century?

In the past the life and health of the *NZIC* depended very much on what happened at the Branch level. Most Branches, unlike our sister societies, have a defined programme, and cannot be expected to do more.⁹ However, they struggle to survive and get members involved on their committees or attend their meetings. Can they change direction?

Many suggestions have been made and these are reproduced below:

- Provide ample networking opportunities to meet with other chemists including industrial chemists, likely best achieved from fun stimulating social events rather than academic seminar meetings. Developing a sense of networking/community at the Branch level would make *NZIC* membership something worth paying for. This is especially important for student members.
 - Meetings could be held at a wider variety of venues than now, and possibly at times other than evenings, e.g. lunchtime meetings in workplaces with significant concentrations of chemists (but not Universities).
 - A programme containing about 50% non-academic social events with a chemistry theme, with more responsibility given to the younger members to plan and run events - after all, the *youngsters* will be taking over sooner rather than later!
 - Meetings advertised at the start of the year, including workshops, chemistry career information, insights into industry, etc., could be attractive to students considering a career in the chemical sciences. Most meetings should be relevant to a wide range of members, and include local professional seminar series covering topics such as safety in the workplace, chromatography, advances in the various spectroscopies, etc.
 - A prize draw at Branch meetings for *NZIC* members who are present.
 - A definite targeting of the new influx of university chemistry students each year.
 - A drive to have *all* chemistry academics as members would also promote membership to their students.
 - Branch support for students to attend conferences should be a priority.
 - Each Branch needs a list of its student members so that they can be tracked to find out why they stayed or left. Alternatively or additionally, student members could be surveyed to see what they want from the *NZIC* and what is needed to make them stay members; a prize draw could be the incentive to participate in the survey.
 - Branches must be informed as to the information and services available from the ANCAT office.
 - Solicit those no longer in the workforce to provide assistance at the Branch level when and where it is needed.
- Overall, the general view appears to be that Branches should aim for a broad range of events. Unless you have a lecturer with the skills and charisma of a "Humphrey Davy" the traditional lecture type meeting of the past is not attracting large attendances.

An alternative view is that we abandon Branches, concentrate on specialist groups, and operate only at the National level. Specialist groups could hold their own meetings when there is no National Conference and strengthen ties with *RACI* Divisions by holding joint conferences (this happens to a certain extent with the *Inorganic and Organometallic Specialist Group*). Council could take greater responsibility for specialist groups and their operation. The formation of new and activating old ones, such as *Chemical Education*, would be encouraged. Under this model Council Delegates would need to be elected by postal ballot and may or may not represent specialist groups.

Communication within the NZIC – do we still have a quill pen and sealing wax attitude?

Most Branches have commented that communication within the *NZIC* needs to be improved. For example, some Branch Secretaries do not know that they can get updated mailing lists with labels for Branches from ANCAT, or that they can put notices on the *NZIC* web site. Treasurers do not seem to know when to get their budgets and financial statements into the Council Treasurer. The list goes on.

Chemistry in New Zealand

There is no doubt that *Chemistry in New Zealand* has improved dramatically under the editorship of Brian Halton and this was commented on by some of the Branches. ANCAT has also received positive feedback. The fact that Branches take some responsibility for providing copy for a given issue has gone a long way to improving the quality and variety of articles. Branch News remains very popular. Some have suggested that the hard copy of the *Journal* should be replaced by an electronic version; Council considered this sometime ago but rejected it. However, the *Journal* does not come out frequently enough to be used as a vehicle for the transmission of information to members.

A decision will have to be made on what percentage of a member's subscription goes into the publication and see what we can get for that. \$12,000 has been budgeted this year but this may have to be reduced in future.

If we decide to retain the *Journal* as it is now, is the name appropriate for the 21st century? As mentioned above, *Chemistry in Britain* has changed its name and format. *ChemSciNZ* has been proposed.

CHEMNZ

A group from the Canterbury Branch produces this publication, aimed at the chemical education sector. This is where it started but it was located in the Manawatu Branch for a while. It is free to high school chemistry teachers, even if they are not members of *NZIC* and to all *NZIC* members if they wish to receive it. Copies are sold to the RSC and this generates a reasonable income stream at present. The future of *CHEMNZ* depends on being able to find suitable volunteers to keep it going.

The NZIC Website

Grant Boston and Stephen van Eyk (Manawatu) established this site and Rebecca Hurrell (Canterbury) has now updated it. She will continue to maintain it.

The website should be *the first place members go to get information*, but it needs to be accurate and current. A mechanism to ensure this is needed. Apart from containing the rules of the Institute, *etc.* It should contain:

- Branch newsletters and programmes put up by Branch Secretaries.
- Important *NZIC* announcements, news, and Council minutes.
- Dates of Council meetings.
- Contact information for *all* Council members.

- The *NZIC* Calendar with close off dates of when things have to be done.
- Conference information and/or links to a site where this can be found.
- Job advertisements confidential to members.
- Branch committee details and contacts.
- Information on the active specialist groups.

Email

Most Branches have an e-mail list of their members (not that it is always up-to-date) but we must remember that not all members have e-mail access. Should we have a confidential e-mail list of all members available for members and which can be used sparingly for transmitting important information?

Where to now?

Whatever we do, our core activities must be financed from our subscription income (\$NZ60,000-\$65,000) to remain viable. Other income, such as that earned from conferences, *CHEMNZ* and the Chemistry Year 12/13 Exam, should be used to support chemical education and special Branch or national projects. It should not be used to prop up the *NZIC*'s core activities as this is not a fiscally responsible way to run an organisation; none of these other income streams can be guaranteed in the future. Two models are put up for discussion:

Recommendation 3 – Option A

Retain the status quo

Although the 2004 budget showed an operating surplus, this was a result of estimated profits from the areas mentioned above. If we were to use only our subscription income of \$65,000¹ we would have an operating deficit of around \$1,000 (see below). However, Branch grants were down to \$1,500 per Branch – a very poor return on member subscriptions and Branches are understandably unhappy about this. We should aim to return at least 25% of income to Branches, *i.e.* about \$16,000.

Table 1: 2004 NZIC Budgeted Expenditure.

	\$
Administration (audit fees, ANCAT expenses, postage, printing etc.)	25,700
Production of Journal	12,000
Branch grants	10,000
Prizes (includes Easterfield travel)	3,750
Council meetings, President travel	6,200
Subscriptions	3,000
Donations	4,250
GST	1,300
Total	\$66,200

To maintain a fiscally viable *NZIC* we need to increase subscription income by about \$7,000 p.a. To do this we must recruit around 70 new full-fee paying members immediately. Breaking this down to Branch level means *each Branch* must gain 12 new members this year and replace any member who resigns. Can your Branch do this? What plans does it have? Do individual Branch members have the time and energy to do this? *Do you?* or ...

Recommendation 3 – Option B

Reorganise the NZIC to operate at a national level.

This model would operate only at National level by concentrating on specialist groups and organising national events such as conferences and New Zealand tours by selected international visitors. Grants for students to attend conferences would be made at the national rather than the local level. Branches would no longer exist.

A estimated budget is:

	\$
Administration (audit fees, ANCAT expenses, postage, printing etc.)	25,700
Production of Journal	12,000
Grants to specialist groups	5,000
Student travel	6,000
Prizes (includes Easterfield travel)	3,750
Council meetings, President travel	6,200
Subscriptions	3,000
Donations	2,000
GST	1,300
Total	\$64,950

Were this option adopted, Council delegates would need to be elected nationally by postal ballot.

We have the choice ...

- Do nothing and gradually die, or
- Decide on the important things the *NZIC* can offer to its members and revamp accordingly. Do these things well and stop banging our heads against a brick wall with the others.

Feedback is required from all *NZIC* members on:

- Changing the name *NZIC* is known by to *Chemical Sciences New Zealand* (**Recommendation 1**).
- Reorganising Council (as in **Recommendation 2**).
- Retaining the *status quo* with Branches or reorganise *NZIC* to operate only at National level (**Recommendation 3A/B**). The full implications for the future of *NZIC* of both these models must be considered fully.

References and Notes

1. Based on contributions from Council members, Branches, and conversations with a number of members.
2. See: *Chem. in NZ*, **2004**, 68(1), 42.
3. Mann, S., *Chem. in Brit.*, **2003**, 39, 3.
4. Sacks, O., *Uncle Tungsten: Memories of a Chemical Boyhood*, Pan Macmillan, London, 2002.
5. Abrahams, P., *Chem. World*, **2004**, 1, 2.
6. Reinstatement of Executive meetings should alleviate this. The rules do allow the President to hold office for a 2nd year.
7. A slimmed down *NZIC* would see an *annual* Council meeting and Executive meeting bimonthly.
8. The only specialist group running meetings regularly is *Inorganic and Organometallic Chemistry*.
9. The *NZSBMB* holds national conferences, supports students to attend conferences, and supplies copy for *NZ BioScience*.
10. Figures (GST inclusive) are based on the 2004 budget.



We record with sadness the passing on 4 August 2004 of **Sir Don Llewlyn**, Hon. FNZIC, twice a President of the Institute and inaugural Vice-Chancellor of Waikato University. A full obituary will appear in the November issue of this Journal. *Ed.*

Queen's Birthday Honours

Professor Robin Clark, FRS, Hon. FRSNZ, was appointed a Companion of the New Zealand Order of Merit (CNZM) in the Queen's Birthday Honours *for services to science and New Zealand interests in the United Kingdom*. Professor Clark is the Sir William Ramsey Professor and Head of the Department of Chemistry at University College London, and a former Dean of Science. His research expertise is in Inorganic Chemistry, and especially in applications of spectroscopy at the Arts/Science Frontiers. He is also an Honorary Fellow of the RSNZ, a Member of the Academia Europaea, and a Fellow of University College London. Her Majesty the Queen invested Professor Clark with the Honour at Buckingham Palace in August.

The following members have been nominated to represent NZ on IUPAC committees:

Division II (Inorganic): Associate Professor Lyall Hanton (Otago)

Division III (Organic & Biomolecular): Associate Professor Carol Taylor (Massey).

Division VII (Clinical and Human Health): Dr. Paul Fawcett (Otago).



BRANCH NEWS

CANTERBURY

The Canterbury Branch's third annual *Trivia and Truffles* evening held in May was a huge success. Quiz masters **Rebecca Hurrell** and **Michael Edmonds** did a superb job inventing questions, marking, and keeping the crowd under control. There was a great turnout with 15 teams of 3- or 4-participants and several spectators heckling from the sidelines. The Branch was particularly pleased by the involvement (and competitiveness!) of students, including third year students. Also of note was the support of our local sponsors – the College of Sciences, University Bookshop and Café 101 on campus, and the Christchurch Polytech. The winning team *Remarkably Dense* comprised of **Geoff Hurrell** and **Charles Wright** (Crop and Food) and **Kim van Berkel** and **Andrew Muscroft-Taylor** (University of Canterbury Chemistry Department).

Thanks to contributions of Branch members and the great coordinating efforts of **Michael Edmonds**, the 2004 *NZIC Canterbury Branch Cookbook* is now complete. With a clear bias toward chocoholics the book is available for only \$5 – contact the editor (edmondsm@cpit.ac.nz) if you would like a copy.

ESR

ESR Scientist **Nicola Turner** was the winner of the Environmental Sciences section and overall runner-up in the 2004 MacDiarmid Young Scientist of the Year awards (administered by FRST). Nicola works in ESR's Food Safety group based in Christchurch where she is also undertaking her studies.

Dr. Bill Swallow is retiring from ESR in August. Bill has been with ESR and its predecessor organisations for over 30 years, and was most recently General Manager of the Environmental Health group. Bill has received an ESR Chrysalis Fellowship to forge ties with, and new initiatives for, the University of Canterbury Chemistry Department to which he was recently appointed adjunct professor. Bill, a former PhD graduate of the Department, will take up the new post from early 2005. **Drs. Tom Speir** and **Jacqui Horswell** were invited to be members of the Ministry for the Environment's Biosolids Working Group, tasked with creating a National Environmental Standard for land application of biosolids.

Christchurch Polytechnic Institute of Technology

September 16 marked the Annual Year 11 chemistry competition held at Christchurch Polytechnic Institute of Technology. Teams from various schools around Christchurch competed in this test of practical and theoretical chemistry knowledge. In term 4 a year 10-science competition will also be held.

University of Canterbury Chemistry Department

The department has recently welcomed Dr. Maya Mitova who joined the Marine Natural Products Group as a postdoctoral fellow. Maya has an MSc in Biology and a PhD in Bioorganic Chemistry of Natural and Physiologically Active Compounds. She was awarded a Marie Curie Research Training Grant of the EC, a Fellowship of the Italian Ministry of Foreign Affairs, and has worked as a visiting researcher with teams in Italy, Germany, and Russia. Maya's research interests are in natural-products chemistry, bioactivity, plant and microbial metabolomics, and the isolation and cultivation of marine bacteria.

A new research student, **Chris McEntyre**, has joined **Dr. Alan Happer** to prepare derivatising reagents for measuring betaines by HPLC. He completed a BSc in chemistry and an MSc in marine science at the University of Otago. He moved to Christchurch in 2000 to work at Canterbury Health Laboratories doing mainly HPLC work.

The Department has recently farewelled **Professor Lew Mander** (Research School of Chemistry, ANU) after his six-week visit as an Erskine Fellow. Lew thanked the Department for an enjoyable and hospitable stay. Further Erskine Fellowships have recently been offered to **Professor Martin Banwell**, also from ANU, and **Professor John Brown** of Oxford University.

Two academic staff members have been awarded travelling Fellowships. **Professor Leon Phillips** takes his leave from June to August 2005, and **Dr. Jan Wikaira** (NZIC Canterbury Branch Chairperson), has recently departed to Toowoomba, Queensland on the start of her 3-month travelling fellowship.

University of Canterbury students won five of the eight subject categories in the Young Scientist of the Year awards. **Brett Davis** won the Agriculture, Forestry and Fishing category, for his work on applications of selected ion flow tube-mass spectrometry (SIFT-MS) technology to the measurement of trace amounts of volatile organic compounds from olive oil quality. Currently, taste tests are used to assess oil quality, which is very time-consuming and can lead to variable results. Brett's aim is to develop an accurate and convenient method for grading New Zealand oils and monitoring the quality of imported oils.

MANAWATU

The Manawatu Science Festival was held during the first week of July at Te Manawa. This involved a number of outreach programmes including Chemistry Day, during which **Eric Ainscough** enthralled 250 young people, and their parents in three separate sessions with a demonstration

and talk titled *Fun with Colours*. **Carol Taylor** and **Mark Waterland** also gave a talk titled *Chemistry through the looking glass*. **Paul Buckley**, as Chair of the Publicity Committee, took a leading role in the organisation of these events. This was followed in late July by the annual Branch *Careers in Chemistry* meeting for students. This year the speakers were **Dr. Daina Grant** (who has worked at Glaxo Pharmaceuticals, Fonterra and Crop & Food Research Ltd), **Quentin Harrison** (New Zealand Pharmaceuticals Ltd.), **Jason Stapp** (who has been a teacher and is now currently finishing a PG Dip BA (OSH) towards a Masters degree in Management) and **Dr. Paul Andrewes** (who has just started at Fonterra). All spoke enthusiastically about their jobs and the need for ongoing training.



Above: Chemical Magic with Eric Ainscough.

Fonterra

Charles (Charlie) Towler retired on 31 May after 34½ years of research and development work both as a chemist and dairy technologist with Fonterra (formerly New Zealand Dairy Research Institute (NZDRI)) in Palmerston North. Charlie was born and bred in Yorkshire and graduated from Edinburgh University with BSc (Hons.) in Chemistry in 1966. He emigrated to New Zealand at the beginning of 1967 to take up a position as a Science and Maths teacher at Manawatu College in Foxton. He then obtained a position as an applied protein chemist in the Chemistry Division at NZDRI at the end of 1969.

Following a subsequent reorganisation in NZDRI, he became a member of the *Casein and Related Products Section* and worked mainly on development of soluble forms of acid casein (caseinates) from laboratory to pilot-scale and then to commercial operation within the New Zealand dairy industry. This focus also included studies on protein functionality. During this period in the 1970s he made a significant and valuable contribution to the expansion of the caseinate sector of the New Zealand dairy industry.

In 1978, he was appointed Head of the Product Evaluation Section and held that position until 1990 when, in another reorganisation, he stepped down and took staff development leave to work with Anchor Foods (Swindon, UK), working mostly on development of aerosol products. He formulated an aerosol strawberry mousse that went into commercial production before he returned to New Zealand

in June 1991 to take up a position as a Principal Research Technologist.

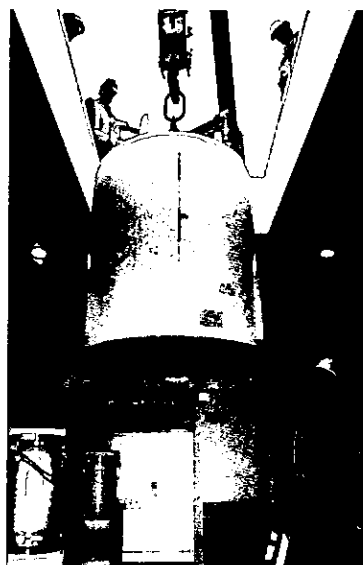
Since that time, he has worked mainly on product development in the area of liquid milk systems. This has included cultured and other acid milk drinks, yoghurt, fortified long-life milks, and long-life creams. Although Charlie has become a Food Technologist by default, he has maintained his interest in chemistry and built much expertise in the use of emulsifiers and gum stabilisers, particularly in relation to dairy foods systems.

Charlie has very much enjoyed the challenges and successes of a research career that has been both varied and exciting. While continuing with some part-time consulting, he is now happy to sit back and enjoy a more relaxed life-style.

Landcare Research

Benny Theng has accepted an invitation to give a keynote address at the 4th International Symposium on Mineral-Organic Component-Microorganism Interactions in Wuhan, China. During this all-expenses-paid symposium, Benny will be talking about *The use of clays and modified clays for pollution control and environmental protection*.

Massey University



Above: The 700 MHz magnet being installed at Massey University.

The refurbishment to house the new 700 MHz, 500 MHz, and relocated 400 MHz NMR instruments has been completed. Installation of 700 MHz is currently underway, along with its 500 MHz sibling. One of the main uses for the 700 MHz will be in the field of protein science. Characterisation of small molecules will make up the majority use for the 500 MHz and 400 MHz magnets. It is possible that the former *HortResearch* Wide Bore Horizontal Magnet, which has been gifted to *Massey*, will be re-commissioned and used for NMR imaging to non-destructively study such things such as the transport of water or sugars through plants or fruits, or in the research into the composition of milk. This is a unique situation for the *Institute of Fundamental Sciences (IFS)*, *Massey*, and New Zealand with four super-conducting magnets in

OTAGO

once dedicated suite. "July 16 is a momentous day for New Zealand science," said **Professor Robert Anderson** (Pro-Vice Chancellor, College of Sciences) as he witnessed the placement of the \$3 million 700 MHz NMR spectrometer into its new home in Science Tower C. Alongside Minister of Research Science and Technology **Pete Hodgson** and representatives from TEC, MoRST and the College of Sciences, the PVC of the College watched as the 3.5 tonne magnet was lowered into place.

Four new members have joined IFS. **Steve Kirk** is with the **Brodie-Ainscough** research team as a PhD student investigating novel and exciting developments in phosphazene chemistry. Steve's background includes working for Lotus Cars and BP Chemicals as well as a 3-year stint as a Senior Research Fellow at Warwick University (UK). He has an Honours Degree in Chemistry and Physics and a Masters Degree in Engineering.

Alex Le Blanc is a German exchange student from Eberhard-Karls University in Tübingen. He has joined the *Nanomaterials Research Centre* for a year of practical study after completing his intermediate exams in Germany. He is working on molecular orientation of light harvesting molecules such as modulated forms of chlorophyll from plants, and their potential to help develop solar cells.

Pavel Krist has begun a postdoctoral fellowship with **Bill Williams** on designing poly- and oligosaccharides. Pavel graduated from the Department of Applied Biochemistry and Microbiology in the Slovak Technical University and did his PhD on the preparation of novel glycoconjugates for NK-cell activation at Charles University in Prague.

Jim Salvador is another recent postdoctoral fellow to join IFS recently. He is working with **Geoff Jameson** on a Marsden-funded project on superoxide dismutases, where his experience with synchrotrons and neutron diffraction will prove invaluable. Jim has completed his PhD in solid-state inorganic chemistry at the University of Michigan. His publications include a 2003 *Nature* paper detailing the first material with a zero coefficient of thermal expansion.

David Harding spent 2 weeks in Egypt in July at the expense of the Egyptian government as part of a collaborative research programme with Mansoura University. Later this year a PhD student from Mansoura University will be joining David's group at Massey.

Congratulations go to **David Parry** on the award of the first *Massey University Research Medal* in recognition of his outstanding contribution as one of the world's leading authorities on fibrous proteins, including connective tissue, muscle and intermediate filaments from diverse sources, especially those present in hair. He will receive a research grant of \$20,000.

New Zealand Pharmaceuticals

Two Massey chemistry graduates, **Amanda King** and **Michelle Eccleshall** have joined NZP to work in product development. Prior to joining NZP Amanda was working for **Dave Harding** at Massey University and Michelle was with *Fonterra* in Timaru.

There is little to report from the Otago Branch. On July 28, we were fortunate to have **Dr. John Forrest** (founder and owner of Forrest Estate Wineries in Marlborough) conduct a wine-tasting. John is an Otago graduate and ex-flatmate of our current Branch Secretary, **Lyall Hanton**. He gave a fascinating account of how he got started in the wine business and just what it takes to run a winery - interspersed at regular intervals by samples of his excellent stable of wines. And yes, it is OK to drink screw-top white wine!

Professor Keith Hunter has been confirmed as the new Head of the Chemistry Department, taking over from **Professor Jim Simpson**, who steps down at the end of this year following a seven year stint. Keith is well known to chemists throughout the country as a world authority on marine chemistry and he has built up an impressive research record since his arrival at Otago in 1980. Keith obtained an MSc from Auckland and his PhD from the University of East Anglia. He is a fellow of NZIC and RSNZ, and was appointed full Professor in 1994. In addition to his academic duties, he is also the University Provost, and is particularly adept at assigning appropriate penalties for student transgressions. We wish Keith well in his challenging new role.

WAIKATO

The annual NZIC Waikato Branch Analytical Chemistry Competition was held in mid-June. Invitations were sent to schools in the Waikato/Bay of Plenty region to send teams of four students to the University for the day to carry out an analysis. A total of 20 teams entered this year, with students coming from around the regions. The task was to analyse nickel sulfate by a gravimetric procedure (for SO_4^{2-}) and a back-titration (for Ni^{2+}), and hence deduce n in the formula $\text{NiSO}_4 \cdot n\text{H}_2\text{O}$. This was demanding in the time available but some excellent results were achieved. The prize winners were:

1st - Tauranga Boys College (**James Culley, Shane Warner, John McLeish and Charles Wilson**)

2nd - St Johns College (**D. Jackman, L. Mourits, J. McDonald and Silas Dow**)

3rd - Church College (**Timothy Walmsley, Clenella Waetford, Holly Walmsley and Josephine Brown**)

4th - Hillcrest High School (**Hugo Barnard, Kwan Yeing Chiu, Alice Chung and Ruth Lin**)

5th - Hamilton's Fraser High School (**Charlene Ball, Ben Gibb, Mark Wang and Ray Lin**).

Numerous people contributed to the success of the occasion including **Annie Barker, Steve Cameron, Amu Upreti, Bill Henderson, Michael Mucalo, Michele Prinsep and Tavita Pasisi** from the Chemistry Department and **Tui Doak** from Bryant Hall. Financial support from Hill Laboratories, the NZIC Waikato Branch, and the Chemistry Department is gratefully acknowledged. Overall the competition enabled keen Year 13 chemists to spend a day in the University laboratories and mix with peers from other schools, and provided an opportunity for the teachers who

accompanied the students to meet each other and with University chemists.



Above: 1st prize winners - Tauranga Boys College.

Many members will have been saddened to learn of the death of **Sir Don Llewellyn** in August. Sir Don was the founding Vice-Chancellor at Waikato and the main impetus behind Fieldays. A large number attended the University's Memorial Service for Sir Don Llewellyn on Friday 20th August. The group heard moving tributes from past Vice-Chancellor's and the current Vice-Chancellor, from Fieldays representatives and some moving poems and musical renditions from Don's grandchildren. It was very plain what a tireless and enthusiastic man Don was. His contributions to the founding of the University and the Fieldays standing out, but mention also was made of his contributions to many volunteer organizations. A full obituary for Don will appear in the November issue of this Journal.

University of Waikato

Lyndsay Main recently attended the Reaction Mechanisms VII Conference at University College, Dublin, together with **Wade Mace** a recent Waikato graduate now doing postdoctoral work at Cork, and **Craig Butts**, a Canterbury graduate and lecturer at Exeter with research interests in ionic liquids. This was followed by a two-week visit to Paul Dyson's laboratory at Ecole Polytechnique Federale de Lausanne (EPFL) looking at applications of ionic liquids. New Zealand is represented in Dyson's laboratory by PhD student and Massey graduate, **Adrian Chaplin**.

Richard Coll has just returned from a period of sabbatical leave at Cambridge University working with Dr. Keith Taber at Homerton College. Richard and Keith co-authored a chapter in a recent book on the difficulties of teaching chemistry students models of chemical bonding. Richard called in to Vancouver to deliver a paper on religion and science at the annual meeting of the USA-based National Association for Research in Science Teaching, and on the way home called in to Trolhatten in Sweden to launch the *International Handbook for Cooperative Education* co-edited with **Dr. Chris Eames** from Waikato. This is the first Handbook on work-based learning, and involved some 52 contributors from a variety of work-based learning programmes worldwide. It has attracted worldwide interest and sales. Richard also recently went to Muscat in Oman

for recruitment of international students in science and science education.

Bill Henderson has just submitted a book manuscript for John Wiley on *Mass spectrometry of inorganic, coordination and organometallic compounds : Tools - techniques - tips* co-authored with Waikato graduate **Scott McIndoe** (now at University of Victoria, Canada).

NIWA

Bob Wilcock (Principal Scientist, Aquatic Chemistry) spent a 3-month sabbatical from mid-April to mid-July, at the Institute of Ecosystem Studies, Millbrook, New York. He worked with **Dr. Peter Groffman**, an acknowledged world leader on denitrification processes in terrestrial ecosystems, and visited the Baltimore Ecosystem Study sites on two occasions for field work and scientific meetings. Bob also worked with **Professor Steven Chapra**, Tufts University, MA, on diel changes in dissolved carbonate, Ca and Mg in macrophyte dominated streams.

Peter Robinson and **George Zabkiewicz** are running several chromatography courses under the umbrella of the NZIC chromatography group. These have been run since 1981 in conjunction with the NZ Chromatography Group and have now trained over 1200 scientists and technicians from throughout New Zealand. Details are as follows:

BASIC GAS CHROMATOGRAPHY - 23-26 November 2004

This course gives an introduction to the basics of GC, covering basic theory, columns, phases, detectors, qualitative identification, quantitation and integration, and troubleshooting. Emphasis is very much on hand-on operation and setup of GCs and all participants are expected to take part in installing and leak checking of gas lines and columns as well as operation of the instruments. A variety of instrumentation will be available, from basic GCs through to fully computer-controlled systems. Note that the former is usually the best for *learning the ropes*, as it is easier to see what is happening. Although different instruments will have columns with different phases, the emphasis is on packed or wide bore columns and only flame ionisation detectors are used for the practical work.

CAPILLARY GAS CHROMATOGRAPHY - 30 November – 3 December 2004

This more advanced course is suitable for those who have completed the basic course or who have had some experience with chromatographic theory and practice. It is assumed that those attending have some understanding about what is happening inside a GC column and know how to run a GC instrument. This course covers capillary columns and the various inlet systems in detail with extensive practical work on setting up an instrument to run correctly. Emphasis is on troubleshooting and practical work using different inlet systems. A variety of instrumentation will be available, but *no instrument specific* training is given in detail.

For further information about enrolment please contact: Maggie Masterson, Department of Science & Technology, Waikato Institute of Technology, Private Bag HN3036,

Hamilton 2020. Ph: +64-7-834-8800 Ext: 8303; Fax +64-7-834-8823; Email: <maggie.masterson@wintec.ac.nz>.

For information about course content contact Chromatography Group organisers:

Peter Robinson, Hill Laboratories, Hamilton
Ph: +64-7-858-2000; Fax: +64-7-858-2001; Email: <peter@hill-labs.co.nz>.

or George Zabkiewicz, Forest Research Institute, Rotorua
Ph: +64-7-347-5491; Fax: +64-7-347-5811; Email: <zabkiewj@fri.cri.nz>.

WELLINGTON

In June **Dr. Dave Lowe** (NIWA) spoke on *Atmospheric chemistry: An earth system perspective* to a wide-based audience. He told us that the earth's atmosphere, terrestrial biosphere and oceans are closely linked through a large number of natural cycles which transfer carbon, nitrogen and a host of other substances amongst them. The study of these processes and the way in which material is transferred between the atmosphere and the two other reservoirs, often called *Earth System Science*, has become one of the fastest growing disciplines in the natural sciences. To understand the changes involved one must move from the core scientific disciplines of chemistry, physics, and biology to an integrated interdisciplinary approach. In modern atmospheric chemistry tools are taken from all scientific disciplines and applied to problems - ozone depletion, global climate change and the transport of pollutants throughout the atmosphere. In the current political arena *global change* has become equated with *global warming*. Certainly rapid climate change and global warming are real possibilities but one must note that atmospheric gases trapped in ice cores show the chemical composition of the atmosphere to have changed dramatically over the last 10,000 years.

The July meeting took the form of a mid-winter dinner with members of the Australasian Corrosion Association in the Big Thumb restaurant in Wellington's entertainment district. The cool weather did deter some but the 35 or so attendees had a most enjoyable social evening. Thanks go to our student representative on the Branch Committee **John Ryan** for arranging the very successful evening. The August meeting was the first from the sequence of Presidential addresses to the Branches. **Professor Andrew Brodie** spoke about the future of NZIC and the contents of this paper appear elsewhere in this issue.

The NIWA Wellington Science & Technology Fair was held at Victoria University in the last week of August. Although there were about 380 entries it remains a concern that few of year 12 and 13 seniors now participate. The Branch sponsored the Fair with Junior and Senior prizes. Judges **Dr. David Weatherburn** and **Mr. Alan Turner** awarded the prizes as per:

Junior Section: Jointly awarded to **Tobias Gunn** *Alkalinity and pH levels* (Muriti School, Eastbourne), and Olivia Winn-Ricketts and Sanna-Rose Fourt-Wells *Rusty* (Kelburn Normal School).

Senior Section: Jointly awarded to **Janie Chen** *Calcium*

in Eggs (Queen Margaret College), and **Anna Garcia**, **Kacey Campbell**, and **Katherine Robbins** *Experiment a Little - Calcium Drinks* (Upper Hutt College).

Victoria University

Professor John Spencer has been appointed Head, School of Chemical & Physical Sciences in succession to **Professor Jim Johnston** from an international field of candidates. His term of 3-years is from November 1. Jim moves to become the inaugural Head of a new *Centre for Applied Chemistry & Technology Development* within the School. **Dr. Brendan Burkett** has been appointed to a lectureship in chemistry and becomes the third organic chemist on staff and in succession to **Professor Brian Halton**. Brendan gained his PhD from ANU under the guidance of **Dr. Christina Chai**, a former VUW staff member; currently he is in Hong Kong on a postdoctoral appointment and expects to be in Wellington in November.

Dr. Kate McGrath attended a Gordon conference on *Biom mineralisation* in New London (New Hampshire) in mid-August. She gave a paper entitled *Carboxylic acids as crystal modifiers: the role of the hydrophobic chain* from work by Graham Henderson (Otago) and Ben Murray (VUW). The broad ranging conference highlighted the large number of systems in which biom mineralisation occurs from humans, *e.g.* teeth, bones and abnormal calcifications, and urinary stones, through to diatoms, the most abundant plant life in the marine ecosystem. The conference also spanned the evolution of the species through to fundamental solid-state chemistry, with considerable biochemistry, protein sequencing, and gene mapping thrown in for good measure. A number of different techniques used to investigate the mechanisms of crystal nucleation and growth were presented and, of particular interest to Kate was the use of the atomic force microscope as applied to calcium carbonate deposition. Kate gratefully acknowledges support from VUW to attend the conference.

A new arrival to Kate's research group is **Pascale Savigny** (using the atomic force microscope to follow cell processes in real time and, in particular, the release of luteinizing hormone from pituitary cells as the trigger of ovulation for PhD study). Pascale picks up where **Jocelyn Collie** left off; Jocelyn completed her MSc last year. **Kasper Hansen**, a temporary addition from Denmark, is investigating the flow properties of milk, dark and white chocolate as a function of pre-solidification treatment and any variation that arises in the solid macrostructure of the chocolate. He will be with the group until December. Meanwhile ... the group has 30 kg of chocolate that smells awfully good once it is melted! Congratulations to **Dr. Steven Dickinson** of the group who successfully defended his PhD thesis; he now works for Clariant (Auckland) focusing on colour pigmentation of plastics.

John Ryan (a final year PhD student in the Northcote Marine group) attended the 11th International Symposium on Marine Natural Products *XI MaNaPro* in Sorrento (Italy) in early September. John's poster presentation was *Novel Compounds Isolated from the Marine Sponge Dendrilla rosea collected from New Zealand Coastal Waters*.

WATER DIMER IN THE ATMOSPHERE

Henrik G. Kjaergaard and Timothy W. Robinson

Department of Chemistry, University of Otago, P O Box 56, Dunedin

The recent observation of the water dimer ($\text{H}_2\text{O}\cdot\text{H}_2\text{O}$) has verified the presence of a new class of compounds in our atmosphere known as hydrated complexes.¹ These complexes consist of a water molecule weakly bound to another molecule.

Complexes, or clusters as they are sometimes called, are small assemblies of atoms or molecules held together by the weak van der Waals interactions. A simple example of a complex is the weakly bound He dimer ($\text{He}\cdot\text{He}$). The binding energy between the He atoms arises from dispersion (or London) forces and is extremely small, $\sim 10^{-6}$ kJ/mol. This dimer (and larger He complexes) is formed in a jet expansion of He gas into a vacuum. The expansion cooling makes formation of the complex more favourable than otherwise. In recent years larger He complexes (liquid helium nanodroplets) have been used as a medium for spectroscopy. The droplets provide a unique environment that is ideally suited to the spectroscopic study of biomolecules, metal complexes, radical complexes, hydrogen bonded clusters, and ions, as the He droplet imparts only a minimal influence on the species embedded inside it.² Currently, this spectroscopic technique is not available in New Zealand.

Research on complexes has recently experienced an explosive growth and many examples involving not only various molecules and atoms, but also radicals and ions, have been observed in laboratories.³ An early example was that of an Ar atom weakly bound to the p-electron cloud of an aromatic ring (Fig. 1). The vibrational frequency of the *trampoline vibration* of the Ar atom has been measured and used to determine the binding energy. This type of interaction is typically very weak with binding energies $\sim 2\text{--}4$ kJ/mol. More recently, an interesting class of complexes has been studied that involve functionalised alkanes binding to p-electrons, as shown by the chloroform-

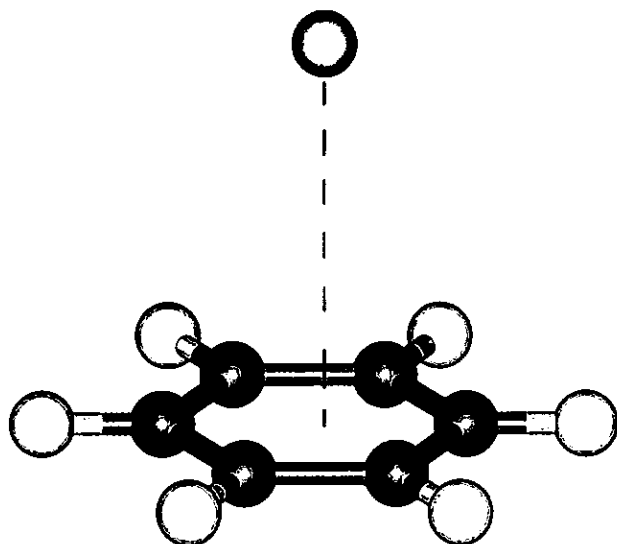


Figure 1. The benzene-argon van der Waals complex.

benzene complex, $\text{CHCl}_3\cdot\text{C}_6\text{H}_6$.⁴ Complexes that involve dipole-dipole interactions, such as traditional hydrogen bonds, are much stronger. The phenol dimer (Fig. 2) is one example. Binding energies in these types of complexes are typically about 20 kJ/mol. The atoms involved in hydrogen bonding ($\text{O}\cdots\text{H}-\text{O}$) prefer to align in a near-linear arrangement, with an inter-oxygen distance of about 3 Å.

Complexes between water and an acid are usually even stronger. In addition to one strong hydrogen bond, a second partial hydrogen bond is often formed. The partial hydrogen bond is characterised by a non-linear arrangement and a longer inter-oxygen distance. One example is the water-sulfuric acid complex, $\text{H}_2\text{O}\cdot\text{H}_2\text{SO}_4$, (Fig. 3) and binding energies of these water-acid complexes are about 40 kJ/mol.^{5,6} Some of the strongest complexes are cyclic, such as the formic acid dimer shown in Fig. 4. In these complexes there are two equivalent and cooperative strong hydrogen bonds and the total binding energy is as high as 60 kJ/mol.

In general, the formation of complexes can significantly change the physical and chemical properties of the individual parent molecules. Hydrogen bonding significantly alters the frequency of the infrared (IR) fundamental vibrational transitions of the OH bond involved.⁷ It typically leads to a lower frequency (red-shift) and a higher intensity of the fundamental OH-stretch of the hydrogen donor.

Recently, examples have been found in which a frequency shift to blue occurs upon complexation. The fundamental CH-stretching vibration in the chloroform-benzene complex is shifted about 15 cm^{-1} higher than the CH-stretching transition in free CHCl_3 .⁴ This blue shift is small in comparison to the dramatic red-shift (500 cm^{-1}) found for the OH-stretching vibration in nitric acid upon formation of the strong hydrogen bonded water-nitric acid complex, $\text{H}_2\text{O}\cdot\text{HNO}_3$.^{5,8} The blue shift observed in the chloroform-benzene complex resulted in the interaction being labelled an *anti-hydrogen bond*.⁴

The formation of complexes also has the ability to significantly change reaction rates, as was demonstrated a decade ago for the hydration of sulfur trioxide.⁹ Calculation showed the reaction to be second order with respect to water pressure, and involved the formation of a water-sulfur trioxide, $\text{H}_2\text{O}\cdot\text{SO}_3$, complex, in qualitative agreement with the experimental rates.¹⁰

These examples suggest that hydrated complexes in our atmosphere can impact on the spectroscopy and chemistry. Complexes can change the ability of parent molecules to absorb both solar and terrestrial emissions. In addition they can provide access to completely new ways by which reactions occur, which could have a significant effect on

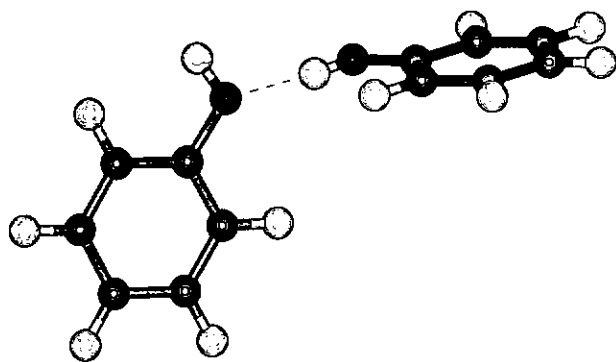


Figure 2. The hydrogen bonded phenol dimer.

atmospheric chemistry. A better understanding of these complexes would facilitate an improved modelling of weak interactions that are important in many areas of chemistry. The focus of this article is the spectroscopy of the water dimer, its detection in the atmosphere, and the effect that it has on the atmospheric absorption of solar radiation.

The water dimer: structure, spectroscopy, and atmospheric detection

The structure of the water dimer was determined by microwave spectroscopy using isotopic substitution effects, the Stark effect, and measurements of the hyperfine structure.¹¹ The equilibrium structure of the water dimer has C_s symmetry and is shown in Fig. 5. The complex consists of an acceptor unit (H_aOH_a) and a donor unit (H_bOH_f) with a binding energy of 20 kJ/mol.¹² The structure is consistent with a near-linear hydrogen bond with an experimentally determined inter-oxygen distance of 2.98 Å. The structure deduced from the measurements is in excellent agreement with that predicted by *ab initio* calculations.^{13,14} The OH bond involved in hydrogen bonding (OH_b) is about 4 mÅ longer than the OH bonds in the water monomer. The OH bonds of the acceptor unit (OH_a) are close in length to those of the water monomer, and slightly longer (1 mÅ) than the free OH bond on the donor unit (OH_f). Based upon the structural parameters we would expect the vibration associated with the longer OH_b bond to be significantly red-shifted.¹⁵

It is a challenging task to observe these complexes experimentally because of predominantly low concentrations in water vapor and the strong absorbance by the water monomer that limits studies to fundamental

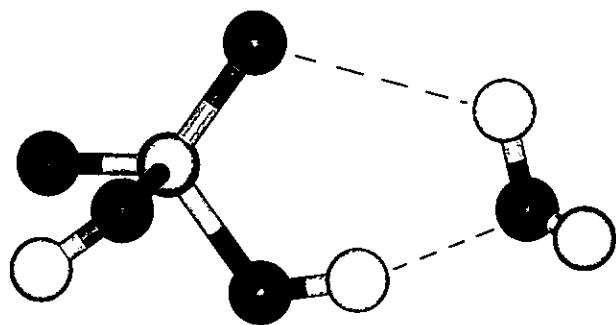


Figure 3. The hydrogen bonded sulfuric acid-water complex.

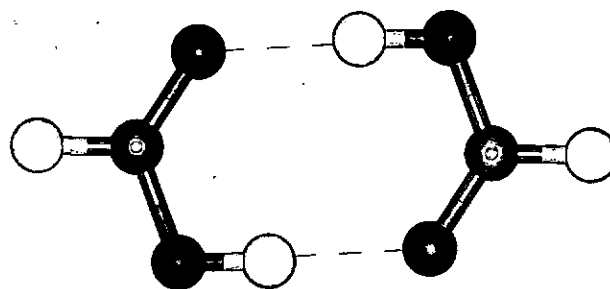


Figure 4. The hydrogen bonded formic acid dimer.

vibrational transitions in the IR region. Most experiments have relied upon supersonic expansion techniques to provide a reasonable abundance of complex. The jet expansion technique generates not only the dimer but also larger water complexes in ratios that depend on the particular jet conditions; the spectra of the different complexes are difficult to separate. Huisken *et al.*¹⁶ used crossed molecular beams to record spectra of size-selected water complexes and found two transitions in the IR spectrum of the dimer that correspond to the fundamental OH-stretching transitions of the bonded OH_b and free OH_f oscillators. Previously, rotationally resolved spectra of the asymmetric OH-stretch of the acceptor unit had been reported.¹⁷ Recently,¹⁸ matrix isolation techniques have been used to record the vibrational spectrum of the water dimer up to 7300 cm^{-1} and provided valuable information on the fundamental and first overtone OH-stretching transitions, whereas vapour phase spectroscopy of the dimer has so far been limited to fundamental transitions. However, an inherent problem with matrix isolation spectroscopy is perturbation from the matrix, which usually gives rise to frequency and intensity shifts relative to vapour phase spectra.

To determine the effect of the water dimer on absorption of solar radiation, the frequencies, intensities, and line widths of its vibrational overtone transitions in the near infrared (NIR) and visible (vis) regions must be known. We have developed a unique theoretical model that has allowed us to calculate the vibrational spectra of complexes from first principles. The NIR/vis spectra of molecules that contain OH bonds are dominated by transitions involving OH-stretching overtones. These overtone transitions are described well by the local mode model of molecular vibration,^{15,19} and we use the harmonically coupled anharmonic oscillator (HCAO) local mode model²⁰ to describe the OH-stretching vibrations in the water

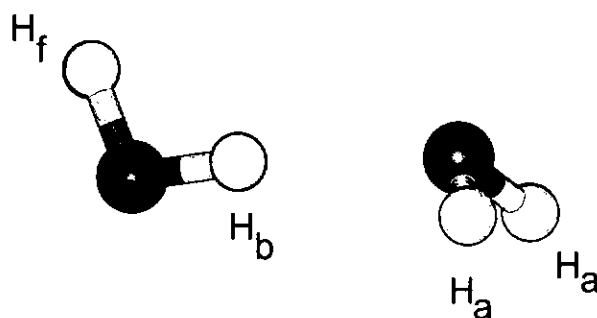


Figure 5. The hydrogen bonded water dimer - donor unit at left.

dimer.¹⁴ Each water unit in the dimer is modelled as two harmonically coupled anharmonic (Morse) OH-stretching oscillators. We have extended this HCAO local mode model to include the HOH-bending modes.²¹ The other vibrational modes in the water dimer have vibrational frequencies of the order of 100 cm⁻¹ and contribute very little to the overtone intensities.

Solution of the Schrödinger equation associated with the HCAO local mode model Hamiltonian leads to vibrational energies and wavefunctions. In the hydrogen acceptor unit the two OH bonds are equivalent and the vibrational states are labelled as the symmetrized $|v_0\rangle_{\pm}$. For the fundamental vibrations ($v=1$) these two states would be similar to the well known symmetric (v_1) and antisymmetric (v_3) vibrations in the water molecule. In the donor unit the two OH-stretching oscillators are non-equivalent and the vibrational states are labelled $|v\rangle_b|0\rangle_f$ or $|0\rangle_b|v\rangle_f$ corresponding to having the vibrational energy in one of the two bonds.¹⁴

Our calculated spectrum of the fundamental OH-stretching transitions in the water dimer is shown in Fig. 6,²² where it is compared with the three transitions observed in the molecular beam experiments.^{16,17} The calculation predicts the lowest energy peak, associated with the hydrogen bonded OH_b $|1\rangle_b|0\rangle_f$, to be the most intense transition in the fundamental region. The symmetric stretch of the acceptor unit is calculated to be the weakest transitions, and is not observed in the molecular beam experiments. The calculated frequencies are within 10 cm⁻¹ of the experimental values for each of the three observed transitions. In matrix isolation experiments, the interactions between the matrix and the water dimer cause frequency shifts of up to 50 cm⁻¹ for a nitrogen₂ matrix and up to 25 cm⁻¹ for an argon matrix.⁵

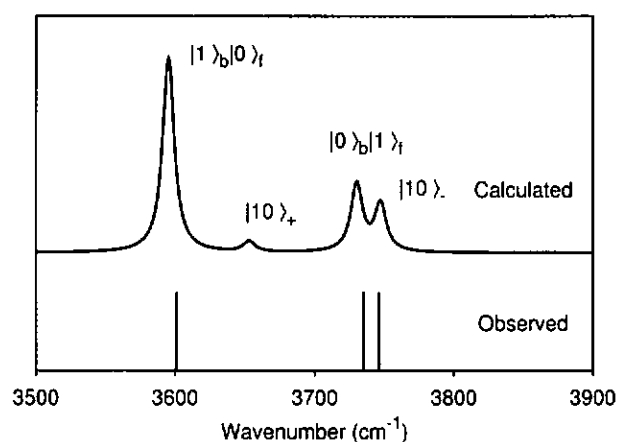


Figure 6. HCAO-calculated OH-stretching fundamental spectrum of the water dimer and observed vapour phase frequencies.

The molecular beam experiments do not provide intensity information and thus we use matrix isolation results to verify our calculated intensities. Fig. 7 shows the calculated intensities of the four fundamental OH-stretching

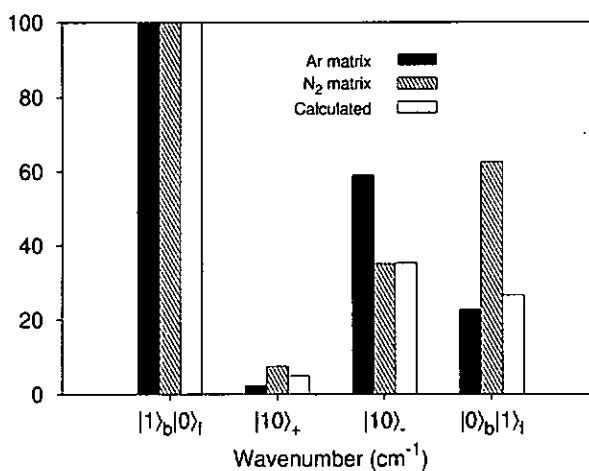


Figure 7. HCAO-calculated and matrix isolation observed intensities for OH-stretching fundamental transitions in the water dimer.

transitions in the water dimer compared to relative intensities obtained from N₂ and Ar matrix isolation experiments.¹⁸ Not surprisingly, the intensity of the strong $|1\rangle_b|0\rangle_f$ transition has been set to 100 to facilitate comparison. The intensity pattern in the acceptor unit is, very similar to that of water monomer, with the asymmetric transition $|10\rangle_-$ significantly stronger than the symmetric transition $|10\rangle_+$. In the donor unit the hydrogen bonded transition $|1\rangle_b|0\rangle_f$ is stronger than the free OH-stretching transition $|0\rangle_b|1\rangle_f$, as is commonly observed for hydrogen bonds.⁷

Fig. 8 shows a similar comparison for the four pure local mode transitions in the first OH-stretching overtone. The two transitions from the acceptor unit, $|20\rangle_-$ and $|20\rangle_+$, have similar relative intensities to those in the fundamental region, and in terms of absolute intensity show the typical order of magnitude decrease. The intensity of the free OH-

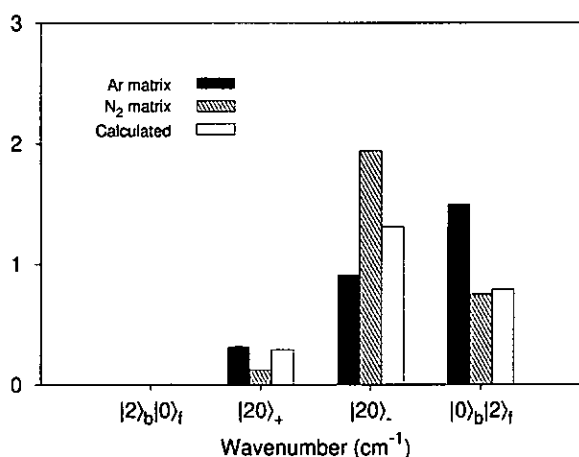


Figure 8. HCAO-calculated and matrix isolation observed intensities for the pure OH-stretching first overtone transitions in the water dimer.

stretching transition in the donor unit $|0\rangle_b |2\rangle_f$ also shows this order of magnitude decrease. In contrast, the hydrogen bonded transition $|2\rangle_b |0\rangle_f$ shows a remarkable four orders of magnitude drop in intensity, and matrix isolation experiments have so far failed to observe this transition. This unexpected intensity decrease can be explained by cancellation of terms in the expansion of the dipole moment function, as detailed elsewhere.²²

The comparison of our calculated spectra with those from molecular beam and matrix isolation clearly illustrates that the calculations are sufficiently accurate to be useful as a guide to further laboratory studies, as well as to facilitating atmospheric detection of the water dimer. The main difficulty with atmospheric detection is overlap with water monomer bands, which have broad rotational envelopes. Fig. 9 shows the calculated spectrum of the water dimer in the third OH-stretching overtone region compared with the rotationally resolved water monomer spectrum.²¹ The hydrogen bonded OH-stretching transition $|4\rangle_b |0\rangle_f$ is sufficiently red-shifted from the water monomer lines and is predicted to have sufficient intensity to allow its detection.

Last year this water dimer overtone transition was measured by atmospheric long-path (18.34 km) differential optical absorption measurements in the air above the North-Sea; it was the first observation of the water dimer in the Earth's atmosphere.¹ Guided by our calculations, a 19.4 cm⁻¹-wide Lorentzian-shaped band was detected at 749.5 nm (13,340 cm⁻¹) as predicted by us at 13,400 ± 100 cm⁻¹. Prior to our calculations, experimentalists were focusing on different spectral regions.²³ The intensity of the observed band showed a dependence on [H₂O]² as expected for a water dimer transition. The atmospheric abundance of the water dimer was estimated by comparison of our calculated oscillator strength and the measured intensity of this transition.²⁴ The abundance depends on temperature and water concentration but is about one water dimer per 1000 water molecules.²⁴

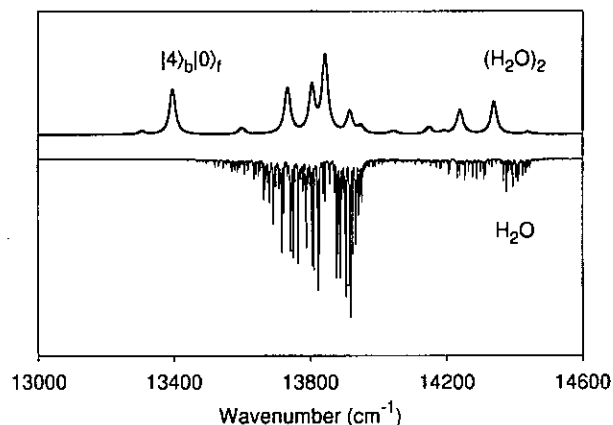


Figure 9. HCAO-calculated spectrum of the water dimer and observed rotationally resolved water monomer transitions in the OH-stretching third overtone region.

Our calculated spectrum of the water dimer has allowed an evaluation of its impact on the absorption of solar radiation in the atmosphere. The water monomer absorbs radiation in sharp rotationally resolved lines whereas the water dimer bands are broader and often frequency shifted. Line-by-line radiative transfer simulations of absorption of solar radiation have found that the contribution from the water dimer depends significantly on the line shape of the transitions, but is ~1% of the total absorption of solar radiation.^{25,26} The importance of the line-shape on these simulations demonstrates the need for further laboratory spectra of the water dimer in atmospherically relevant conditions.

We have found that the water dimer is likely to constitute a large fraction of the empirical continuum currently used to explain discrepancies between observed and modelled radiative transfer.^{25,27,28} It is also likely that other hydrated complexes, such as H₂O•N₂ and H₂O•O₂, play an important role in radiative transfer.²⁶ These hydrated complexes could also affect the absorption of terrestrial emission and hence have an impact on global warming.²⁷

Acknowledgements

We are grateful to Professors Bryan R. Henry (University of Guelph) and Veronica Vaida (University of Colorado, Boulder), and Drs. John Daniel (NOAA, Boulder) and Klaus Pfeilsticker (University of Heidelberg), as well as Dr. Geoffrey R. Low, Daryl L. Howard and Daniel P. Schofield (past and present members of the Viking Research group at the University of Otago) who all have contributed to this research.

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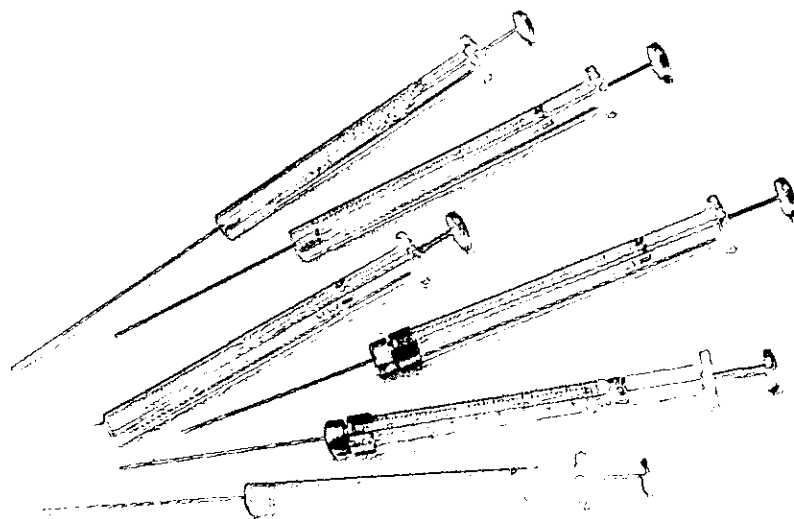
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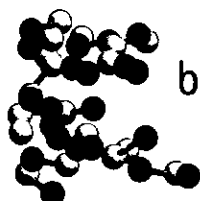
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PHENOMENEX HONOURED AS THIS YEAR'S RECIPIENT OF THE INTERNATIONAL SPIRIT AT WORK AWARD

Phenomenex (Milford, New Zealand; Torrance, CA, USA; Macclesfield, UK; Aschaffenburg, Germany; and Lane Cove, Australia, with Distributors in 60 countries - www.phenomenex.com), a global market leader for innovative chromatography products with more than 350 employees, has been honoured to receive this year's International Spirit at Work Award. According to Cindy Wigglesworth, Selection Committee Chairperson of the International Spirit at Work Award, "The award honours the recipients for their spiritual policies, programs or practices that explicitly nurture spirituality in their organizations. Their leadership strives to engage the gifts of their employees. Their cultures strive for integrity, discipline, creativity, and effective growth. They honour all religious traditions. This dedication to wholeness and health creates a financially sound and dynamic organization."

The Phenomenex mission statement commits the company to the well being of all stakeholders: customers, employees and humanity. Philanthropy and community service is strongly encouraged and has been embedded and practiced at all levels since its start in 1982. Nourishing spiritual values at work is considered a founding principle without which the organization cannot survive or thrive. Mr. Fasha Mahjoor, President and founder of Phenomenex, remarked that this principle "has not only proven itself again and again to be a powerful business catalyst, but has also brought to life an essential humanitarian vision within the organization. By building an institution that shows itself both progressive and enlightened, and by setting new standards in serving our employees and customers, we can transform our world in many good and worthwhile ways."

The 2004 International Spirit at Work Awards will be presented at the annual Spirit in Business Conference, held this year in Zurich, Switzerland, on October 1-2, 2004. (www.spiritinbusiness.org). For further information on Phenomenex or any aspect of this award, please feel free to contact Tom Cleveland (TomC@Phenomenex.com) or president and founder of the company, Mr. Fasha Mahjoor (FashaM@Phenomenex.com).

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HEAD OF DOLLY LAB DIES

The head of the science laboratory which created Dolly the sheep has been found dead in his holiday home. 53-year-old Professor John Clark, who was believed to have been suffering from depression, had only recently returned to work. Professor Clark led the Roslin Institute in Midlothian, one of the world's leading animal biotechnology research centres. He played a crucial role in creating the transgenic sheep that earned the Institute worldwide fame. Professor Clark became a head of department at Roslin in 1993 and group leader at the Institute in 1985. He pioneered the development of transgenic livestock and oversaw the establishment of the Institute's research programme on human embryonic stem cells.

Professor Clark also founded three spin-out firms from Roslin - PPL Therapeutics, Rosgen and Roslin BioMed. He replaced Professor Grahame Bulfield - who has become vice-principal and head of the College of Science and Engineering at Edinburgh University - as head of the Roslin Institute.

PPL was forced into voluntary liquidation last year after its value fell from £500 million to £5m. The Roslin building in which PPL Therapeutics was based, where Dolly the Sheep was cloned, was put up for sale for £1.24m in December last year. The decision to sell was taken by PPL as it struggled to balance the books for its shareholders. The firm was put up for sale in November after abandoning its one remaining interest - a wound sealant called Fibrin-1.

The sale of the Roslin building was another body blow for a company which has made its mark on history. In 1997, it made headlines worldwide after unveiling Dolly as the first cloned animal. It was thought that the firm's genetically-cloned sheep would revolutionise the biotechnology sector, while its modified pig organs would be transplanted into humans, providing a solution to the donor crisis. But after 16 years of pure research, the group's 150 employees across Scotland and New Zealand dwindled to a skeleton.

This article is sourced from:
<<http://edinburghnews.scotsman.com/index.cfm?id=948042004>>.

Company. Work for the Company was charged for by LWR, albeit at very modest rates.

The assays and testing of materials from H. F. Stevens Ltd were ever present and would occupy evenings and weekends in the laboratory. Occasionally urgent results, which might delay work in the Manufacturing Department,² would necessitate a dash home to obtain them. Because of the chemicals use and the supply role of the Company quite a lot of inquiries from the public turned up on their doorstep and *Mr Ruddle would be called for* to deal with these at the front counter. Samples provided for analysis would be taken home with the results available a few days later. No great report writing was involved. A verbal explanation or figure on small piece of paper was provided and a modest fee changed hands at the counter, *e.g.* 15 Shillings or 15 Bob as they said (in today's money \$~1.50 - \$10 per week was a substantial wage in the WW II years!). Despite the simplicity of these *transactions* all analyses, with essential details, were given a number and recorded in a large prescription book. Three of these identical books, indexed separately for work description and client name, cover the period commencing from the 1st July 1922 until the 3rd. March 1955 (entry number 14227), which was prior to his retirement in 1959. Presumably after March 1955 the records were kept otherwise and also other staff were involved by then.

Some of the firms for which Ruddle provided regular analytical services eventually grew to a size where they established their own laboratory and employed a graduate chemist. At that stage he would help them set up by providing any specialized equipment or materials that he might thereafter have a lesser need for. Where graduates were straight from University, instruction time would be spent with LWR at his home laboratory to provide familiarization with the practical details for the techniques and methods they would subsequently have responsibility for.

Except to mention that he had been in WWI and that his health had needed years to recover from the experience he never discussed it. His commonest concern in conversation was escalation of cost for imported materials in the immediate post WWII years, and where it would all end up. I presumed he was involved in this for the Company for the indented supplies for manufacturing and for his laboratory.

The Stapletons Road laboratory was at the rear of a deep section, which backed onto Petrie Park with the Richmond Bowling Club at the south end of it. The latch windows, which opened upwards, were set high in the building and the interior was not visible when standing outside. Whether this was for security (not generally a concern then) or ventilation purposes (there were no fume cupboards) or other reasons is not known. It allowed manipulation of apparatus on benches without risk of breakage of windows immediately behind. At the south end of the laboratory a room contained a number of large (50 L) earthenware crocks, supported on wooden stands, and used for storage of sodium hypochlorite solution (sold as Nados[®])³ for cleaning and sterilizing recently adopted stainless steel

pipes used in dairy milk production. The crocks had been especially made to LWR's requirements by McSkimmings, from down South. This part of the lab was generally commercially sensitive and not open to visitors; I only saw in there a couple of times from numerous visits as a boy *in short pants* who had gained the friendship and interest of Les Ruddle. In the main laboratory area, near the Nados[®] Room and close to the workbench, a vertical steel rod set in the concrete floor extended to the roof, where it was attached. This *retort stand* would have been useful for apparatus requiring unusual height, commencing from the floor if necessary, although I never saw it in use. All facilities were of a high quality and purchased from Scientific Equipment Suppliers; improvisation was not evident. Much of the equipment had specifications indicating its suitability for the intended role, especially for analytical chemistry, *e.g.* pipettes, burettes; volumetric flasks were A-grade with accompanying certificates. Mandated apparatus faithfully met descriptions for Standard Procedures [British Pharmacopœia (BP), USP, AOAC, Foods & Drugs Act, *etc.*], were all held in his Library] and was more evident than in any other of the many laboratories I later visited in New Zealand and even overseas. This was important where legal issue arose and it was disclosed that some departure, even minor, had been involved for the results presented. The correct equipment discounted the possibility of evidence being ruled out on such a technicality or arbitrary basis. Ground glass jointed apparatus, expensive and rarely available at the time, was present for all procedures where it would be desirable for the best results. There was also an abundance of platinum ware, crucibles with lids and evaporating basins. The only compromises to self-provision were: (i) a wooden stand to hold an assembly of four or five pear-shaped separating funnels employed in Alkaloid Assays - a very frequent task; and (ii) a Mercury Manometer. Both of these were of tidy appearance.

On entering through the outer door (Fig. 1) there was apparatus on both sides of the passage. A large steel analysis furnace (with 24 Bunsens) to the right and ovens (electric, water-jacketed, air, and a water-jacketed vacuum with mechanical pump) to the left, and a grand array of clamps, rings, plates, retort stands, gas burners (Fishtail, Rose, Méker, *etc.*). A room of set-up assemblies followed for Kjeldahl nitrogen determinations (a macro 5-hole digestion rack, distillation rack to match), Soxhlet extraction apparatus (set of 5), a 5-hole water bath, and 3-matching baths on a stand, each with concentric rings. Most of the metal parts were of copper on iron stands. A mechanical cork borer was set up in a corner of this room near a two-bucket hand operated centrifuge.

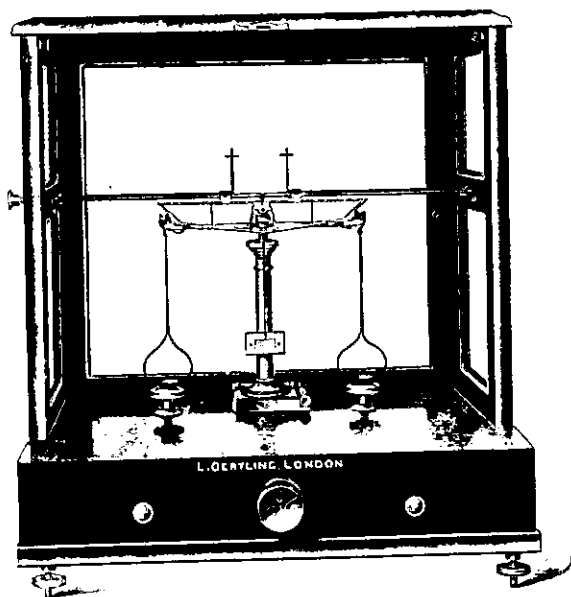
A right turn led into the main laboratory area with benches around the walls and a sink in the corner. Below the benches, on shelves, were abundant supplies of glassware, *e.g.* beakers, flasks, evaporating dishes *etc.* All internal walls were lined with shelves holding a vast collection of chemicals, reagents, indicator solutions *etc.*, in glass-stoppered bottles. An island-bench, with drawers, had an Abbé refractometer set up for use, the aforementioned assembly of separating funnels for alkaloid assays, and several stands with burettes ready for use with good natural

light from the exterior windows. Another permanently set up apparatus was a retort stand with double holder for a gas burette and a reservoir each linked at the bottom with a rubber tube - Lunge Nitrometer (or Lunge's gas volumeter); spirits of Nitrous Ether BP was assayed by this method.

The office, which housed the library, was off this main laboratory room (Fig. 1). Two walls of the office had adjoining benches on which there was a collection of five balances (including Westphal Density, Gold Assay and Bunge Air Damped Analytical) on one and specialized apparatus (spectroscope and polarimeter, *etc.*) set up on the other. A barometer hung on the wall as did framed membership certificates, including that for his FNZIC. There were at least two desiccators evident, one on the Office bench and another in the lab. Also there was a large bundle of assorted glass tubing under one of the benches. In those days, the ability (almost mandatory) to do elementary glass blowing and manipulation was always

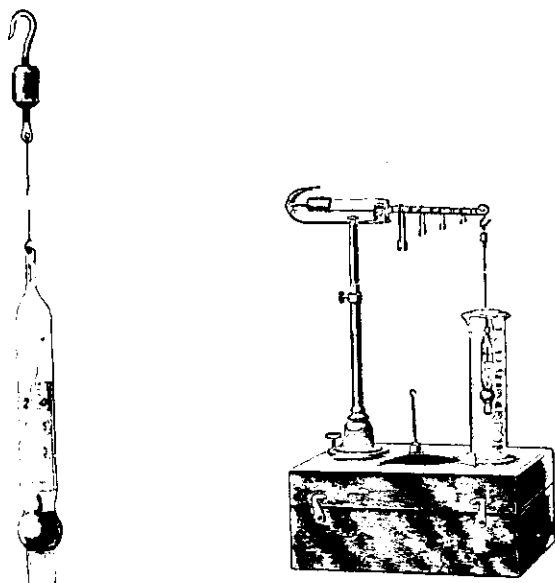
likely to be called on. Close by were shelves holding a plentiful supply of boxed filter papers, the cellophane wrapped special number grades standing out as a mark of a professional user (previously I had seen only the common Whatman No. 1 filter papers). On each side, next to the desk, there was a large lounge chair for important visitors. The library occupied all one wall from floor to ceiling as well as a large bookcase behind the office desk. It was reputed to be the best collection in analytical chemistry outside the Dominion Laboratory and it ranked highly as a private library for the Southern Hemisphere according to visitors in a position to comment on such matters.⁴ Moreover, it was more widely based than analytical chemistry with the best authoritative monographs for other areas: foods, drugs, alkaloids, beverages, oils and waxes, essential oils, soaps, cosmetics, soils, agricultural chemistry, milk, cheese, other dairy products, margarine, metals, gasworks products, chemistry of dyes, *etc.*, were all there. Series such as the latest editions of *Allen's Commercial Organic Analysis* (10 vols.), *Thorpe's Dictionary of Applied Chemistry* (12 vols.) and the Lunge and Keane, *Technical Methods of Analysis* (4 vols.) were very impressive. On the bookshelves, behind the desk, the *AOAC, BP, Organic Synthesis, Quantitative Clinical Chemistry* (Vol. 1: *Interpretations*; Vol. 2: *Methods*) by Peters and Van Slyke, *Spot Tests* by Fiegel, and a large collection of other very important and new books made a glittering array within easy reach for immediate consultation while working at the desk. In addition, organic chemistry coverage included practical synthesis, the *Organic Synthesis* annual monograph series (Vols. 1-27 to date), the well-known, and then very authoritative, *Organic Chemistry Volumes* by Whitmore, Richter (3 or 4 Vols.) and Cohen including his *Practical Organic Chemistry*; Hickingbottom, *Reactions of Organic Compounds, etc.* There were volumes on spectroscopy, a full set of J. Newton Friend *Text-Book of Inorganic Chemistry* (Vols. I-XI Part III), *etc.* There were long runs of bound journals, including *The Analyst* from 1925, *The Quarterly Journal of Pharmacy & Pharmacology* - later *The Journal of Pharmacy & Pharmacology* (from Vol. 1 (1928)), *JCS, JSCI, Industrial Chemist, British Abstracts (A, B & C), etc.* The first two of these journals included abstract sections, which covered foreign language journals, the translations providing sufficient detail to follow an analytical procedure at the bench, with all contents comprehensively indexed to provide a huge coverage of methods. This was particularly so for *The Analyst* for which, in addition, cumulative indexes were available. Abstracting was discontinued in *The Analyst* after 1949 and replaced by separately provided journal issues (1950-1953, *British Abstracts, Section C, Analysis and Apparatus*; 1954 onwards, *Analytical Abstracts*).

The book collection implied earlier interests which perhaps never came to fruition as the demand for analytical results took control, and were paid for, over intellectual adventures for which an economic outcome was unlikely (organic synthesis or spectroscopy). The laboratory's chemical collection included many reagents in small packs for which uses were unlikely outside organic synthesis thus lending further support to this supposition. The absence of fume cupboards would not have been an immediate barrier to



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Above: Gold Assay Balance.



Above: Westphal Density Balance.

synthetic or similar work at that time. Makeshift arrangements, such as opening all windows and doors and moving outside once the essential steps were completed, were then considered sufficient if the need for special precautions arose, *cf.* the preparation of gold solutions involved the use of cyanides.

Moreover, there was a closed storeroom with no windows, devoted to chemicals (Fig. 1) including larger packs of solvents (2.5 L) and other substances that I saw on a number of occasions. It wasn't until many years later, as an MSc (Hons.) research student, when the laboratory steward (George Green) took me into the Canterbury University Chemicals Store, that I again beheld such a large collection and it brought back a wave of nostalgia for the LWR laboratory. LWR once spoke about the vast amount of chemicals which had passed through this store, especially in the 1930s and early 1940s, which I took to refer to solvents (chloroform and ether in particular) employed in alkaloid assays when the use of Galenicals were at their height. Framed certificates for scholastic excellence in science awarded to Les Ruddle as a student at Christchurch Boys' High School hung over the door of the aforementioned Storeroom. A list of chemicals obtained from LWR by the author appears as Appendix I.

The room shown with the Ultraviolet Cabinet (curtained to allow indirect viewing) (Fig. 1) was used to stack journals awaiting binding. Glass cases, which lined the walls, contained specialized glassware, *e.g.* ground glass-jointed apparatus, iodine flasks, Schrötter bottles *etc.* There were drawers containing similarly more specialized apparatus, *e.g.* Dean and Stark receivers, Soxhlet extractors, specific gravity bottles, viscometers, hydrometers, thermometers, Y- and T-tubes, various stop-cocks, *etc.*

Present in various corners of the laboratory, in wooden cases, were a microscope, a flash point apparatus, colour

comparators, a comprehensive supply of test papers, *etc.* There was no sign of facilities for microbiological work in the laboratory with all activities confined to chemical analysis as far as I could see. This is mentioned as demand for microbiological facilities were obviously importantly needed in the other two laboratories to be described, namely those of Roy Gardner and Gilbert A. Lawrence, where there was a visible record of significant activity.

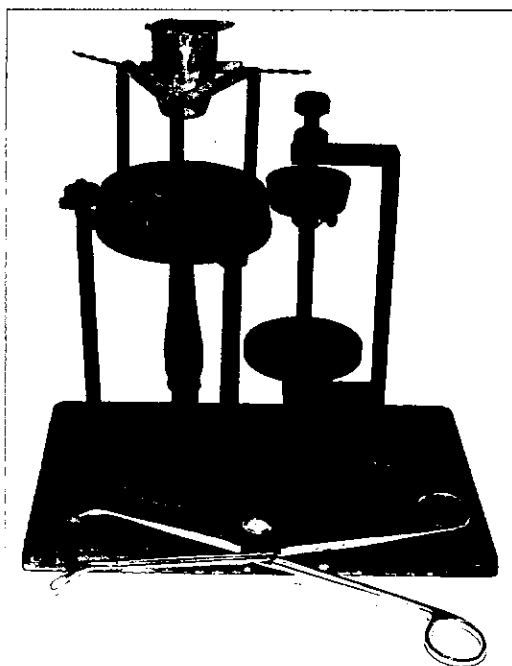
The abundance of reserve supplies of glassware, general apparatus, chemicals, *etc.*, was impressive for a time where many only had bare essentials needed for their immediate operation. This is referred to below, and will be obvious from other parts of this account. The work of the laboratory is illustrated by the following three examples.

The determination of iron in ink

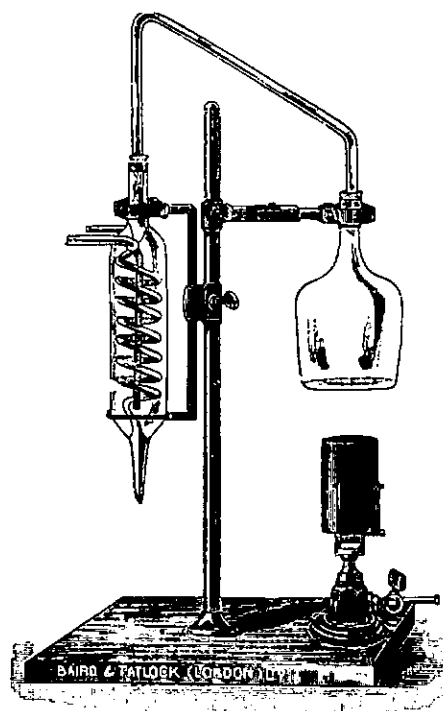
The determination of iron in ink involved ignition of a sample in a platinum crucible and weighing the residual Fe_2O_3 from which the percentage iron was calculated. Initially, the ink was heated gently (to remove the water) and the residue so formed heated more strongly. The crucible was rotated in a metal frame by a hand driven wheel during the early stages. On another occasion Fe_2O_3 was precipitated with ammonia, recovered by filtration, and the filter paper and residue ignited in a platinum crucible. I recall asking about the allowance for ash content from the filter paper to be told that special Analytical Grade filter papers with an average ash weight per circle were used.

The determination of alcohol (ethanol) content of Cider (Rochdale label, Nelson)

About 100 mL of Cider was accurately measured and diluted with distilled water (~50 mL), which was used to wash it from the measure into the *Beer Flask* for the *Thorpe Inland Revenue Distillation Apparatus*. The flask was heated on a sand tray and ~90 mL of distillate from the



Above: Determination of iron in ink - platinum crucible on rotating Baird & Tatlock holder with Pt-shoed tongs in foreground.



Above: Thorpe Inland Revenue Apparatus (Alcohol Determination).

spiral condenser was collected in a 100 mL volumetric flask; this was then made up to the mark with distilled water. A sample was then transferred to a specific gravity (SG) bottle, which contained a thermometer, inserted through a ground glass joint, and a capillary spout with a ground cap at the outlet. The specific gravity of the distillate allowed the alcohol content to be obtained from standard tables of ethanol/water mixtures. Initially the SG bottle was allowed to stand for a period to allow small air bubbles to escape from the liquid and walls. Attention to temperature control was necessary at all stages, especially for the SG determination as the Table was for 20°C. To achieve this LWR would hold the SG bottle in a filter paper and allow the warmth of his hand raise the temperature to the exact value needed while carefully wiping the capillary outlet with a piece of filter paper to absorb the excess alcohol solution, and then transfer it to the balance case for weighing; subsequent contraction⁵ of volume thereafter was unimportant. Prior calibration of the SG bottle with water alone was probably only done once or at infrequent intervals. An alcohol determination took place most Saturday mornings.

The Assay of Tinctures of Belladonna (Deadly Night Shade), Hyoscyamus (Henbane) and Stramonium (Datura) for Solanaceous alkaloids

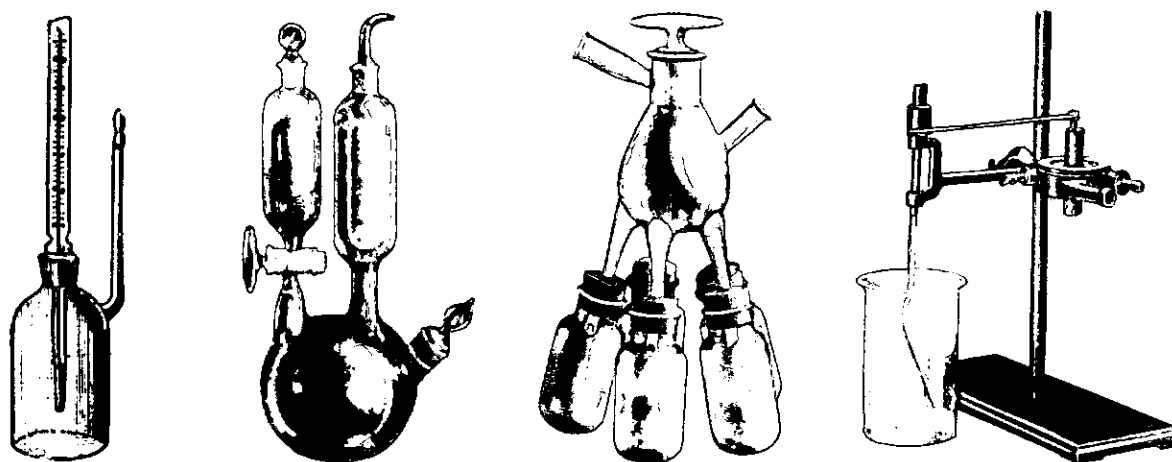
These analyses were in constant demand. A sample of the tincture was heated on a water bath to remove alcohol until a sticky residue, rich in chlorophyll, remained. This was taken up in dilute HCl, extracted with CHCl₃ (to remove colouring matter) and the acid solution (containing the alkaloid as the salt) was then made basic with ammonia solution to liberate the free base; this was then extracted into CHCl₃. Pear-shaped separating funnels were used for this solvent extraction. The free alkaloids were estimated by titration with standard HCl or H₂SO₄ after removal of the CHCl₃ on a water bath. Total alkaloids for each were calculated as hyoscyamine.

Analysis of a Tannery Leather Treatment 'Product'

The commercial product⁶ was of sufficient interest to the tannery for them to want to know more about it. Exact details of the analysis are unknown but it took at least three months of collaborative work in the evenings and weekends by Les Ruddle and Ces Mason. Cecil G.W. Mason⁷ was a

very enterprising and skilful industrial chemist who must have contributed very significantly to the outcome. Fractional vacuum distillations (much as currently with a Claisen head distillation flask, Liebig condenser, cow receiver with vacuum outlet coupled to a mercury manometer) were involved but the apparatus was huge by comparison with current Quickfit[®] standards. The large receiver had five adapters, each of which had a capacity of ~50 mL. Corks were used for every part of the apparatus. The considerable resources of the laboratory were used to the full, much exclusively dedicated for the duration of the project. Nonetheless, the regular quality control work for H. F. Stevens and other dependent clients would have continued during this period on the tannery project. Finally, a product was formulated, based on the analysis, which matched the sample provided at the outset. When an account for £150 was presented to the tannery the response was that *"they didn't know that it would be worth that much to them!"* The tannery forming a small company to market the product finally resolved the matter. The hard working, skilful, professional pair received their fees from sales made over the following three years. Things did not come easily in those days - especially financial rewards. It seems a very modest fee bearing in mind the capital value and overheads of such a comprehensive laboratory. The resources to accommodate the project, in addition to the considerable regular work and other demands, says much for the grandness of the laboratory's facilities. The work was probably done between 1935 and 1942 and when this story was related at the 1991 NZIC Christchurch Conference in the *History and Development of the NZIC Symposium*⁸ Ernie Hullett, a retired Wheat Research Institute Director and one of the older chemists of that era, remarked how pleased he was to have heard it with younger chemists present; "They would realize how easy things had been in their time by contrast" he said. My own abiding memory of student days even in the 1950s is the frugality of everything at the University. Research provoked the greatest demands and a way of doing things could usually be found but it was never extravagant and always involved the bare essentials for the task.

With the founding of the NZIC in 1930/31 one of the first tasks involved bringing all those seriously involved in chemistry together. Getting to know each other followed



Above: Left to Right: Specific Gravity Bottle (with thermometer and capped outlet), Schroetter Bottle, Cow Receiver, Water Driven Stirrer.

at the Branch meetings and afterwards Mrs Ruddle would prepare grand suppers at the Stapletons Road Laboratory including beer out of beakers; saveloys, cheese and biscuits out of evaporating dishes, and many other treats as well as tea and coffee. Members would enjoy an after meeting party and no doubt take in the laboratory, which was always of interest. At NZIC conferences in Christchurch, small affairs then, there would always be visits to the lab and few chemists could resist the opportunity to see such splendid facilities and chat with the owner. The laboratory and Les Ruddle were quite widely known and visitors, national and international, were not uncommon.

The inevitable shortages of the war years (1939-45) resulted in many requests for hard-to-obtain equipment and chemicals and LWR could usually oblige. Analytical reagents of all kinds were on hand, *e.g. delicate reagents* (capable of detection at very low levels), and *spot-tests* were very fashionable and in great favour. Some tried to replace the classical qualitative analysis schemes for metal identifications with spot tests, only to discover they were so sensitive that metals were frequently found where there was none of significance! The samples, of shelf chemicals, for identification sometimes contained trace impurities that showed up just as boldly as the principal components and caused much confusion, especially for the more usual mixtures; the initial *avant garde* enthusiasm for spot tests waned after this was realized.

The 1932 British Pharmacopœia, 18 years after its 1914 predecessor, was the first with comprehensive provision for analytical standards. Each monograph included identifications, assays, adulterant tests, *etc.*, in addition to the more subjective descriptions as well as information about source, preparation details, and active principles, *etc.*, for the substance or product described. Prior to that (1922-1932) LWR would have had to decide whatever provisions he deemed necessary for the Stevens Manufacturing and Marketing operations and been prepared to stand by them if challenged. A 7-year revisionary period was expected for BP but with WWII it was 1948 before a new edition appeared, although a number of *Addenda* were published to update more urgent and important issues. Thus LWR was always working from the 1932 BP during my visits and it was in frequent use.

Other recollections are that at the Stevens warehouse LWR was always dressed in a business suit, with waistcoat, and was regarded as part of the management, that he always wore boots laced to the ankles, and that I never saw him drive a car. Early in his career, before the Analytical Practice built up, he used to do after-hours relieving work in pharmacies always travelling by bus or tram with one of his library books to read; the tickets were used as place markers and can still be found in them. All of LWR's calculations were done by long division and multiplication, as there were no calculators in those days. An incongruent object of frivolity that sat on the bench in his office was an illustrated card titled *How to live on 30 Bob a week*. This gave a fairly lengthy list of expenditure with financial allocations to each item; the first 25 Bob went on a series of dissipations/extravagances like beer, tobacco, betting, or worse and then proceeded to detail, with minute

allocations, life-essential items including *the wife's allowance* all to a total of 5 Bob. Today such a card would be seriously regarded as *Not Politically Correct*, uncouth or worse.

One evening approaching Christmas Mr. Farr, from the well-known electroplating firm Armstrong Farr, called at the laboratory for urgently required gold solutions, which had been prepared by LWR. There was something of a hold up as the assay results were still being finished and it was quite late when all was completed. In view of the season, LWR shouted Mr. Farr a few beers, as well as yours truly, and it was about 1 a.m. before the five or six 2.5 litre *priceless* glass bottles (Winchesters) of gold solution had to be put in the boot of the visitor's car. He wanted to back the noisy car the considerable distance in from the street, past the house and down the back garden right to the laboratory door; LWR wouldn't hear of it as *it would wake everybody up, especially the neighbours*. There was concern there would be breakages and the very costly solutions (£100s) might be lost - and who would be responsible! In the end the bottles, packed with cardboard, were placed in a wheelbarrow and I was enlisted to provide a steadying hand during their transport to the street and awaiting car. There was also quite a business making sure the Winchesters were safely packed in the car. The next day at school, by afternoon, I realized that I had dozed off when an arm, supporting my chin, fell away and my head nearly struck the desk! Such lateness and celebrations had been no part of my world previously but maybe they marked the beginning!

A laboratory usually has a characteristic odour, all I have worked in have, and iodine was my impression for 124 Stapletons Road. It was frequently in use in the standard solutions used in titrimetry, which seemed to account for the perception. However, I suspect this was a long believed misconception and that low concentrations of chlorine released from (NaOCl solution) in the Nados® room was responsible for the odour; a faint fading of some book covers noted many years later could also be accounted for by bleaching from chlorine.

The range of work undertaken in the laboratory is too wide to relate here but the details are available in previously mentioned record books. However, LWR did mention the significant demands made on him at all hours of the day and night in the early days of the Christchurch City milk supply for milk testing.

There was much concern over raw milk production and distribution in the 1930s and earlier. It was a cottage industry with dairy farmers delivering from door to door from a tank from which milk was ladled into *billycans* left out by customers. Hygiene, milk borne diseases, the freshness of the product, and proper storage at all stages were major concerns. Initially, attempts were made to control these risks by testing samples (methylene blue reductase test) randomly and then more specifically where problems were suspected. Despite this, problems were never overcome until greater controls at all levels were introduced. Initially, this came in the form of the United Dairies, later the Christchurch Milk Company, and now

the Canterbury Dairy Farmers Milk Station (Blenheim Road) - and acceptance of accredited supplies from sources having responsibility for distribution of all milk after pasteurization.

Another demanding period involved the collection of Rose Hip Berries (from widely scattered sources around the South Island with the Stevens staff sometimes involved in the gathering) for the preparation of Rose Hip Syrup as a source of Vitamin C for infants. Obtaining a product with an adequate Vitamin C shelf life was difficult; preservation with sulfur dioxide (from bisulfite addition) added to the problems from anecdotal accounts. Dr. Muriel Bell (Otago University Medical School) was involved with the idea, which had some national support, especially during the WWII years. The difficulties were never entirely overcome such that production withered away after a few years effort. I never saw the Monier-Williams SO₂ determination apparatus at the Stapletons Road laboratory although Vitamin C determinations by titration with 2,6-dichlorophenolindophenol dye (by reduction to a colourless compound that is more specific than the use of iodine or potassium permanganate) seemed to be in use. However, when the laboratory was transferred to H. F. Stevens there could have been a modified SO₂ determination apparatus in use.

LWR [Assoc. NZIC (1933) and FNZIC (1941)] served a term as Chairman of the Canterbury Branch NZIC (1941)⁹ and gave two presentations *Alkaloids* and *Fixed Oils*.¹⁰ He may also have spoken on *Milk* at some stage. He attended NZIC Conferences in Dunedin and Christchurch and financed the annual NZIC Prize for Stage II Chemistry with stress on practical work¹¹ at Canterbury University, and also for *The Ruddle Prize* for science at Christchurch Boys' High School. Professor Hugh Parton told me that the NZIC Canterbury Branch nominated Ruddle for Fellowship because of his generosity in making his library available to other members. He held memberships in the UK based Chemical Society (now RSC) and Society for Analytical Chemistry.

From about 1945, when he had been working too much, Ruddle took up bowls at the nearby Richmond club. This became a passion for him and he served as Club President. A good time to visit was at dusk when he could be caught returning from bowls. His daughter Sue (1932-) told me years later that I was the most frequent and persistent of the lab visitors and perhaps this is why there is someone to tell the tale. Her impression was that the lab was at Stapletons Road from ca. 1928. An older son died shortly after birth and then, after Sue, there was a brother who died at an early age (3 or 4 yrs). However, it was his wife's early death in 1948 that caused much distress for all and hastened the transfer of the laboratory to Stevens in Worcester Street. He had mentioned several times earlier that it was his intention to move the lab to the Company or have it disposed of, as he didn't want his wife to be faced with that if anything happened to him. The transfer took place in November 1949 and the lab was at the set-up back-end of the top floor of the warehouse and suitably partitioned off. LWR told me that the contents, including the library that was such a splendid feature of his home

laboratory, had a value of £5000 at the time. His record keeping over the years had been meticulous and included regular stock-takes for which full inventories were available. These habits were gained from his earlier pharmacy training as anyone familiar with that profession would recognize and his orderly character had also been noted even on the S.S. Willochra where he was regarded *from the point of administration easily the best man we ever had on the ship as dispenser* by Captain T. L. Buxton.¹² When the laboratory was moved problems arose over the financial settlement as the Company adopted the view that they only wanted what strictly related to their Pharmaceutical and manufacturing operations. This affected matters at all levels as the library, in particular, represented a large single item of the total. They only saw the BPs, BPCs, etc., as being necessary for whereas LWR always imagined that a substantial Company would need a back-up library to meet developments and to field enquiries. He had been doing this free of charge for nearly 30 years and would continue to do so for almost a further decade. This sad and disappointing outcome after years of devoted service (at extremely cheap rates) caused significant disharmony. The Nados[®] operation had also been turned over to the Company and that was not straightforward either. However, the Manager (Leslie A. Holden MPS) was more sympathetic to LWR and was able to arrange a modest compromise in the form of a slightly improved superannuation. The immediate outcome was that LWR sold some of the unwanted items when enquiries provided an opportunity, e.g. books from the library. While I was quite surprised by this I took the opportunity to obtain some of the important, and then out of print, analytical monographs, e.g. Mulliken: *Identification of Pure Organic Compounds* (4 Vols). During one of these book-buying visits, LWR inquired "what was I doing these days?" and when informed that I was to do research for an MSc (Hons). I never saw him more pleased and even today it remains a happy recollection.

Prior to LWR's retirement in 1959, Richard (Dick) Schmidt joined the laboratory to continue the work but left and eventually joined DSIR. Austin Hunt replaced him in 1959 for a time but left to take over a consultancy based initially at the Perfection Ice Cream Company [subsequently General Foods (SI) Ltd.]. Marie Hunter then took over the laboratory work for a time before deciding to study medicine. However, in January 1961 Norman Hornby joined the company with responsibilities similar to those of LWR with the modernization of the facilities a condition of his acceptance. For the laboratory this involved moving to the instrumental age (IR, UV-vis spectrometers, gas chromatograph, Mettler Balances, etc.) and new equipment all around. Moreover, H. F. Stevens relocated their manufacturing as Stevens Chemicals Ltd., initially for three years to leased premises in Brisbane Street, and then (in 1965) to their own new factory at 81 Bickerton Street, Wainoni; the laboratory was transferred also. Only that part of the library considered currently relevant was taken. The old laboratory at Worcester Street was abandoned with the unwanted chemicals, apparatus, library, and the original LWR hand-written records. By chance, the author became aware of the impending disposal of the residual collection, with plans to convert the abandoned Worcester Street



Above: Water baths, vacuum drying oven with pump, etc. - from the LWR laboratory.

laboratory into a sales display room in May 1966. Through Hornby, arrangements were made for purchase of the collection and this has, in turn, provided material for parts of this LWR story; all of the surviving record books and files have remained in storage until now, when this account was written.

Following his retirement, LWR visited the laboratory to provide direction for some of the more difficult tasks, e.g. the alkaloid assays that taxed the skills of the new staff, but this had to be arranged around his bowls engagements. By the time Hornby joined the company, calls on LWR were over although he visited Worcester Street once or twice and preferred not to take much notice of the new equipment. The electronic equipment, increasingly becoming a feature of analytical methods, was no part of LWR's interests. Similarly, I recall earlier asking him about pH meters and the response was that *other methods could equally well do the job*. His world had been one of titrations, gravimetric determinations, colour comparators, tintometers, and the like. He was self-taught and lived in an era where this was not uncommon and not to be depreciated. In those days in the UK, many entered chemistry by ARIC examinations, both theoretical and practical, and were so very highly regarded that much more could be added to their credit. University wasn't the only way to become a chemist then. Daughter Sue told me that it was the advent of antibiotics that saw the end of her father's era. When Hornby visited him some two years later the Stapletons Road laboratory building was becoming somewhat derelict though it was still standing in 1992.



Above: Semi derelict Ruddle Laboratory (Nados® Room south end ca. 1992.

I saw Les Ruddle for the last time in May 1964 (just prior to taking up a lectureship for the newly formed Pharmacy Course at Otago University. He was living alone in retirement at Stapletons Road and we walked down to the deserted laboratory and had a look around while chatting about various matters. He seemed a little surprised to learn that I would be working with another eminent analyst, namely Dr. Roy Gardner. It was while working in the RSC Library, at Burlington House in London in 1971 that I learnt with sadness of the death of Les Ruddle from a note in this *Journal*.¹⁴



Above: The author in the RSC Library, Burlington House, London.

Some years later, when corresponding with Hugh Parton, I suggested LWR would have been appalled by the disposal of his library from Stevens when they shifted manufacturing from Worcester Street. His response was that *"he would be pleased to see that it had gone on to end up in my hands"*. *The Analyst* (1925-45) and *J. Pharm. & Pharmacol.* [Vol. 1 (1929-)] were purchased from Stevens for my own library and together with existing holdings and ongoing subscriptions these periodicals were kept up to date during my working life at Otago University such that the library grew in scope and to a size where visitors in a position to know, claimed it was the largest private collection in chemistry for New Zealand; it supported the undergraduate and postgraduate teaching and research in Pharmacy for nearly quarter of a century and, like LWR, I provided it free of charge!

Some of the more interesting lab items that came to me from LWR were the spectroscope, polarimeter, Gold Assay Balance, and water driven turbine stirrer. Historically, probably the most interesting possessions are the lab records (3 Vols.; 1922-55), notebooks, a card file in a wooden box, and stock inventory records, which John Pollard believed to be a valuable insight to the stock and trade of an Analyst for the era. Costing, charges, prices paid for items marked in catalogues, and record books, etc., were secretly coded by H. F. Stevens Ltd. Thus the word GLYCERITUM had each letter stand for 1,2,3,4,5,6,7,8,9,0, respectively. Hence £T/GM/R would be £8-10-6 (eight pounds, ten shillings and six pence). A similar ten-letter code was used nationally in Pharmacy, namely VINUM ALOES; older readers will probably recall auction rooms or farm sale yards with money signs (£ or \$) followed by alphabetical letters, marked on goods, and

now realize that commercial secret price codes were widely used.

A somewhat broader newspaper account *Who wants fairies at the bottom of the garden?* by Sue (née Ruddle) Taylor of her father and his laboratory has been written.¹⁵

Postscript: Stevens Chemicals Ltd. became the casualty of a financial takeover. The laboratory was containerized and shipped to Auckland removing all of the remaining LWR collection that had survived in their hands from the Christchurch scene.

References and Notes

1. The Government Analyst's Laboratory opened in Christchurch in 1927.
2. Denis J. Hogan had Christmas vacation employment (1948-49) in the Manufacturing Department of H. F. Stevens Ltd, Worcester Street. He recalls that first thing each morning LWR would arrive at 8 a.m. and proceed to enter the analytical results from the previous night or weekend in a book while standing at a high desk. The staff would then use these results for the work of the day.
3. Nados® (NaOCl): There were no chlorine cylinders, electrolysis, or other equipment for generating chlorine in the Nados Room. I suspect the solutions were probably prepared from bleaching powder as the starting material with some modifications, e.g. *Dakin's Solution* is prepared from bleaching powder and sodium carbonate solution.
4. Visitors varied from highly placed academics, Heads of Institutions, School Teachers, Company Managers, Clients, the curious, etc. I believe the much experienced and travelled 1953 NZIC President Dr. H. E. Annett was a visitor from remarks made by LWR who obviously enjoyed the occasion.
5. Jack Futter (H.W. Lawrence & Son, Chemical Services Laboratory, Johnsonville) achieved this needed cooling from the latent heat of evaporation with a precautionary squirt of acetone onto the SG bottle.
6. Tanning product (chrome?) - three months work at least in evening and weekends with Ces Mason: Surviving LWR laboratory records available to the author provide no information/details of this project.
7. Obituary: C.W.G. Mason (1905-77) by F. B. Shorland, *Chem. in NZ.*, **1978**, 42(1), 18.
8. McKeown, R. H. (Pharm Chem Research Laboratories Ltd, Dunedin). *Recollections of a Christchurch Analyst and His Private Laboratory in the 1940's—Leslie William Ruddle FNZIC, an Early Member of the New Zealand Institute of Chemistry*. 1991 NZIC Conference (Christchurch): Symposium - History and Development of the NZIC.
9. *J. NZIC*, **1941**, 5(2), 6 and 10.
10. *J. NZIC*, **1940**, 4(3), 9.
11. *J. NZIC*, **1942**, 6(4), 11.
12. The New Zealand Defence Force Archives for LWR are complete not only for his military service but also with copies of several letters attesting in detail to his Good Character and especially to his service when ordered aboard the S.S. Willochra to replace the Ship's permanent dispenser who was sent ashore ill. It was noted that without assistance he did all dispensing for the voyage, which

included 1000 Imperial soldiers and sailors (Plymouth to Alexandria), and 270 Australian and New Zealand wounded from Suez to their home countries. He was very economical and careful in preparing returns, and on disembarkation carried out most satisfactorily all orders relating to repacking balances of stores for Plymouth, Suez, and New Zealand. Finally, Captain T.L. Buxton made a strong recommendation for a higher rate of pay.

13. The consultancy laboratory based at the Perfection Ice Cream Company was originally established by Maurice Hunter, BSc., ANZIC, who on-sold it to Peter J. Radford BSc, ANZIC (when he took up a position with the Canterbury Dairy Farmers, Milk Powder, Factory, Kaiapoi. Later he moved again to MAF, Dairy Division, New Plymouth). Peter Radford moved to Canada after on-selling the laboratory to Austin Hunt.

14. *Chem. in NZ.*, **1971**, 35(1), 29.

15. Susan Taylor (née Ruddle), *The Press, Christchurch*, **1984**, 7th April, p.19.

Appendix I: Some of the Chemicals Obtained from LWR.

1. Arnold's Base
2. Benzidine.
3. Dithizone
4. Cacotheleine
5. *p*-(Dimethylamino)benzalrhodanine
6. Aurinetricarboxylic Acid
7. Rhodizonic Acid
8. Brucine
9. Dimethylglyoxime
10. Diphenylamine
11. Fluorescein
12. Phenol Red
13. Cresol Red
14. 2,4-Dinitrophenol
15. Chloroacetic Acid
16. Ammonium Molybdate AR
17. Phosphotungstic Acid
18. Platinum Chloride, 10% Solution
19. Beryllium Nitrate
20. Lanthanum Nitrate
21. Zirconium Nitrate
22. Thallium Sulfate
23. Thorium Nitrate
24. Sodium Vanadate
25. Zinc Uranyl Acetate
26. Selenium
27. Tellurium
28. Hyoscine Hydrobromide

About the author

Rob McKeown grew up in Christchurch starting his adventures with experimental chemistry in the home kitchen in the early 1940s. He came to know Les Ruddle as a schoolboy, acquired laboratory chemicals from him and supply houses, and set up his schoolboy laboratory ... about which we will hear more later. He gained MSc and PhD degrees from the University of New Zealand, is a qualified pharmacist, taught in Otago's School of Pharmacy for many years and is a long-standing Fellow of the New Zealand Institute of Chemistry.

Patent Proze

By John Landells and Helen Palmer

METHOD OF TREATMENT CLAIMS – THE FINAL CHAPTER?

In earlier issues of Patent Proze (January/February and July/August 1997, March/April 1999, January/February 2000 and November 2002) we have discussed New Zealand practice in relation to Swiss-style and method of treatment patent claims.

To recap, method of treatment claims provide patent protection for methods of medically treating humans or other animals. Treatment methods include administration of drugs, surgical methods and diagnostic methods. Such claims can give protection for a new medical treatment using a known compound – a classic example would be the use of aspirin for treating heart disease.

Swiss-style claims can also provide protection for the use of a (known) compound in the preparation of a medicine for treating a particular disease, and are allowed in some jurisdictions which do not allow method of treatment claims.

In this area of New Zealand patent law, the decisions in *Pharmaceutical Management Agency Limited v The Commissioner of Patents & Ors* [2000] 2 NZLR 529 (*Pharmac*), *Wellcome Foundation Ltd v Commissioner of Patents* [1983] NZLR 385 (*Wellcome*), and *Pfizer Inc v Commissioner of Patents (Pfizer)* CA 22/03 are particularly relevant.

The New Zealand Court of Appeal in *Wellcome* held that methods of medically treating humans were not an “invention” under New Zealand law and were therefore not patentable. The Court of Appeal in *Pharmac* re-assessed this issue, holding that it could no longer be said that methods of treating humans were not an “invention”. The *Pharmac* Court further held that Swiss-style claims are allowable in New Zealand.

In *Pfizer*, the High Court acknowledged that it was bound by the Court of Appeal’s earlier decisions, and that claims directed to methods of treatment of illness or disease in humans were still not allowable. *Pfizer* then appealed the High Court’s decision to the Court of Appeal.

The hearing took place in February 2004, and, eventually, on 28 June 2004 the Court of Appeal released its decision. Somewhat unsurprisingly, the Court once more unanimously held that in terms of the present law, methods of medical treatment of illness or disease in humans are not patentable. Interestingly, the Court of Appeal’s decision in *Pfizer* has moved away from its earlier decision in *Pharmac*, in holding that, although methods of treating humans are “inventions”, they are not patentable inventions.

In coming to its decision, the Court of Appeal considered the possible burdens that patent claims to methods of medically treating humans could place on medical practitioners. The existence of a valid method of treatment patent claim could, in theory, place a medical practitioner in danger of being sued for providing medical treatment for his or her patients. The Court also considered that because of the important social and economic implications, any reform in this area of the law should be undertaken by Parliament, which would allow for proper consultation with all interested parties.

The Court of Appeal’s decision maintains the status quo in New Zealand as far as claims to methods of treating illness or disease in humans are concerned. Thus, Swiss-style claims remain allowable and claims to methods of treating non-human animals are also allowable. Method of treatment claims are not allowable. This means that in New Zealand it is possible to protect a new use of a known compound for treating a particular disease (a Swiss-style claim), but it is not possible to obtain protection for a purely surgical method, such as a new method of laser eye surgery, for example.

From a patentee’s point of view, the *Pfizer* decision may appear harsh. However, it does mirror the situation in many other countries, where methods of medical treatment are also not allowable. For example, the European Patent Convention provides that methods of treatment of the human or animal body are not patentable. The TRIPS, treaty, adopted by most of the countries in the world, also allows countries to specifically exclude from patentability methods of treating humans and animals (TRIPS Art. 27).

The situation in Australia and the USA is different methods of medically treating humans are patentable. However, in



John Landells

Helen Palmer and John Landells of Baldwins specialise in chemistry and biotechnology patents. Helen joined Baldwins in 2000. She has a PhD in chemistry from The University of Auckland and postdoctoral research experience. John joined Baldwins in 2003. He has a PhD in chemistry from the University of Otago and is in the final stages of completing an LLB at Victoria University of Wellington.



Helen Palmer

the USA a specific statutory exception has been enacted, protecting medical practitioners from being sued for infringement of a method of treatment claim. This provision addresses the public concern that patents covering methods of treatment might restrict the medical treatment by doctors of their patients.

Finally, the New Zealand Patents Act is currently under review, and we are expecting a new Patents Bill to be introduced into Parliament shortly. It is likely that the Government will put in place legislation to specifically exclude from patentability inventions concerning diagnostic, therapeutic and surgical methods for the treatment of humans. Although this is not necessarily good news for patentees, it will at least provide more certainty in this area of New Zealand patent law.

TRACE ELEMENTS CONFERENCE

The Waikato Branch of NZIC is hosting a *Trace Elements Conference* on 17-18 February 2005 at RYDGES Le Grand, Hamilton for about 150 scientists from around New Zealand and the world, and will encompass all aspects of trace elements in various media. It will offer the best opportunity to present and discuss trace element results and issues to a broad audience from the trace element community. It will also serve as a forum to see the latest technology from a number of instrument manufactures.

The scientific programme will include but not be restricted to:

Trace elements in agriculture/horticulture;
Trace elements in the environment;
Trace elements as contaminants;
Trace elements in health and disease;
Modern analytical techniques for measuring trace elements.

Confirmed Plenary Speakers include:

Dr. Joe Brenner - Scientist Adviser and Consultant, Israel.

Dr. Bill Maher - Professor in Environmental Chemistry (University of Canberra).

Dr. Julian Lee - AgResearch, Palmerston North.

Dr. Richard Vanoort - ESR, Christchurch.

Conference details will be hosted on the Hill Laboratories website; see:
www.hill-labs.co.nz

For further details please contact:
peter.robinson@hill-labs.co.nz (Ph: +647-858-2806) or
m.ellwood@niwa.co.nz

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

Patent Proze
Baldwins
P O Box 852, Wellington
Email: email@baldwins.com

OBITUARY

Dr Bernard (Bernie) Eskil Swedlund

Dr Bernie Swedlund, formerly a Senior Lecturer in Chemistry at The University of Auckland, died peacefully at his home on 15 June 2004. He was 83.

Bernie grew up in Taihape, received his secondary education at Scots College in Wellington and then went on to Victoria University College, where he graduated BSc and MSc, working under the supervision of Professor P W Robertson before taking up a Junior Lectureship. He travelled to London in 1953 and enrolled for the PhD degree at University College, working with Professor E D Hughes on the reactivity of diphenylmethyl halides.

In 1958 he was appointed lecturer in chemistry at Auckland with the aim of strengthening research and teaching in physical organic chemistry, to balance the strong natural products work of Professor L H Briggs and his school. This Bernie did, undertaking research on the addition of halogens to $\alpha\beta$ -unsaturated carbonyl compounds and the rearrangement of N-halogenoamides. He was a popular lecturer and took a full part in departmental activities. He had three periods of study leave, which he spent at the University of East Anglia, the University of California, Santa Barbara and at Concordia University, Montreal exploring various facets of physical organic chemistry. He also spent a period at Khon Kaen University in Thailand, advising on the development of the Chemistry Department there. He took a full interest in the work of the Institute and was elected to the Fellowship. He attended branch meetings and conferences with great regularity.

He had a lifelong interest in music which he shared with his late wife, Anne and their four children, one of whom, Peter, has recently completed a PhD in chemistry at The University of Auckland. He was a keen climber and trumper, continuing to go out on walks with a group of Auckland friends until only weeks before he died.

Bernie will be missed by a wide circle of friends and colleagues.

IUPAC announces the 2004 winners of the IUPAC Prize for Young Chemists

The winners for the IUPAC Prize for Young Chemists have been announced! They are: Parag Acharya, Uppsala University, Sweden, Yu Huang, Harvard University, Cambridge, MA, USA, Zhipan Liu, Queen's University of Belfast, UK, and S. G. Srivatsan, Indian Institute of Technology, Kanpur, India. The winners will each receive a cash prize of US\$ 1000 and a free trip to the IUPAC Congress, 14-19 August 2005, in Beijing, China.

The award was established to encourage outstanding young research scientists at the beginning of their careers. The prize is given for the most outstanding PhD thesis in the general area of the chemical sciences, as described in a 1000-word essay. In addition to the cash prize and trip to Beijing, each prizewinner will also be invited to present a poster at the IUPAC Congress describing his/her award winning work and to submit a short critical review on aspects of their research topics to be published in *Pure and Applied Chemistry*. In view of the excellent quality of many applications, the Committee decided also to give four Honorable Mention awards to: Orlando Acevedo, Duquesne University, Pittsburgh, PA, USA, Neel Sarovar Bhavesh, Mumbai University, Mumbai, India, Anand Mahadeo Gole, University of Pune, India, and Jennifer J. Sokol, University of California, Berkeley, CA, USA. These winners will each receive a cash prize of US\$ 100 and a copy of the *Compendium of Chemical Technology*; the IUPAC "Gold Book". For more information see: <http://www.iupac.org/news/prize/2004_winners.htm>.

John F. Hartwig awarded the Thieme-IUPAC Prize 2004

John F. Hartwig is the recipient of the 2004 Thieme-IUPAC Prize in recognition of his outstanding achievements in the field of synthetic organic chemistry. His research focuses on the discovery, development, and understanding of new reactions catalyzed by transition metals and has had a direct and relevant impact on synthetic chemists worldwide. The scope of his research is extensive, covering areas such as amination of aryl

halides, *alpha*-arylation of carbonyl compounds, alkane functionalization, hydroamination of olefins, and enantioselective allylic amination and etherification. He was presented with the prize at the 15th International Conference on Organic Synthesis (ICOS-15) in Japan, on 3 August 2004.

The Thieme-IUPAC Prize is awarded every two years on the occasion of this IUPAC-sponsored conference to a scientist under 40 years of age, whose research has had a major impact on the field of synthetic organic chemistry. The Prize is sponsored jointly by Georg Thieme Verlag, IUPAC, and the editors of *Synthesis*, *Synlett*, *Science of Synthesis*, and *Houben-Weyl*. For more information: <http://www.iupac.org/news/archives/2004/thieme_prize.html>.

IUPAC Prize for Young Chemists - 2005 Solicitation

The 2004 IUPAC Prize for Young Chemists may have just been announced, but it's not too early to begin thinking about the 2005 IUPAC Prize for Young Chemists! Young chemists around the globe are urged to submit their PhD thesis. The prize aims to encourage research scientists at the beginning of their careers. The prize will be given for the most outstanding PhD thesis in the general area of the chemical sciences, as described in a 1000-word essay. The prize will consist of US\$ 1000 cash and travel expenses to the IUPAC Congress at Beijing as well as an opportunity to present a poster describing the award-winning work!

Deadline: February 1, 2005 - for entrants that receive their PhD (or equivalent) degree during the calendar year 2004. For more information: <<http://www.iupac.org/news/prize.html>>.

IUPAC Poster Prizes Established

IUPAC has established the IUPAC Poster Prizes to recognize outstanding poster presentations at IUPAC Congresses and Division-sponsored conferences where poster sessions are held. On request of a National Adhering Organization, they may also be awarded at a single chosen national conference each year. This program was approved at the Executive Committee Meeting in Bangalore, India in April 2004. Typically, two prizes will be awarded, although some conferences may award up to three prizes. The conference organizers will oversee the selection of the prizewinners. The winners of the IUPAC Poster Prizes will be given

a certificate signed by the IUPAC President, a copy of the *Compendium of Chemical Terminology*, and two years' subscription to *Chemistry International*. For guidelines and more information visit: <http://www.iupac.org/news/archives/2004/poster_prizes.html>.

Elections for 2006-2007 Terms

Every two years, IUPAC proceeds with the election of its officers and committee members. About 120 individuals are to be elected or reelected either as Titular Members, Associate Members, or National Representatives. Information concerning the voting process and the role of each kind of member is contained in the Union bylaws.

Any qualified individual who is interested in being nominated is invited to contact his/her National Adhering Organization (NAO) and/or the current committee officers. The next election will cover a two- or four-year term that will start in 2006. The following division committees and standing committees will all have vacancies: Physical and Biophysical Chemistry, Inorganic Chemistry, Organic and Biomolecular Chemistry, Macromolecular, Analytical Chemistry, Chemistry and the Environment, Chemistry and Human Health, Chemical Nomenclature and Structure Representation, CHEMRAWN, Chemistry and Industry, Chemistry Education, Interdivisional Committee on Terminology, Nomenclature and Symbols, and Committee on Printed and Electronic Publications.

As part of the nomination procedure, NAOs are invited to submit curriculum vitae for each nominee to the IUPAC Secretariat no later than 15 December 2004. Elections for each division committee will then take place during the first half of 2005. The 2006-2007 memberships for all committees will be finalized during the next General Assembly in August 2005. Individuals interested in becoming officers on the IUPAC Bureau should contact his/her NAO. Nominations for officers have a different timeline and can only be made by an NAO. Elections will take place at the Council Meeting during the next General Assembly.

Contact information for all NAOs and division and standing committee officers are available on the IUPAC Web site, or upon request at the IUPAC Secretariat (Email <secretariat@iupac.org>; Tel.: +1 919 485 8700; Fax: +1 919 485 8706).

Conferences & Seminars

17-22 October 2004

12th International Biotechnology Symposium

Santiago, Chile

Contact: Professor Juan A. Asenjo

Centre for Biochemical Engineering and Biotechnology
University of Chile, Beauchef 861, Santiago, Chile

Email: juasenjo@cec.uchile.cl or IBS2004@conicyt.cl

<http://www.conicyt.cl/IBS2004/>

18-19 October 2004

RNAi Europe

London, England, United Kingdom

<http://www.RNAiEurope.com>

18-22 October 2004

Vth International Congress on Chemistry and Chemical Engineering

Havana, Cuba

Contact: Professor Alberto J. Núñez Sellés

Center of Pharmaceutical Chemistry
Sociedad Cubana de Química, Ave 21 & 200, Rpto.
Atabey, Apdo. 16042 Havana, CP 11600, Cuba

Email: alberto@cgf.co.cu

http://www.geocities.com/scq_2004/

20 October 2004

Energy Modelling Workshop

Seminar Room, CO 249, Cotton Building

Victoria University of Wellington (VUW), Wellington

Contact: Robbie Morrison

Email: robbie@mcs.vuw.ac.nz

<http://www.mcs.vuw.ac.nz/events/EMW>

1-4 November 2004

The Scale-Up Of Chemical Processes

The Burlington Hotel, Dublin, Ireland

<http://www.scientificupdate.co.uk/conf/scaleup/scaleup.htm>

4 November 2004

Functional Foods Symposium

Auckland

Contact: l.ferguson@auckland.ac.nz

7-10 November 2004

AUSBIOTECH 2004 - Going Global

Brisbane, Queensland, Australia

<http://www.ausbiotech2004.com>

16-18 November 2004

Design Of Experiments And Optimisation In Organic Synthesis

Windsor, England, United Kingdom

16-18 November 2004

The 2nd International Conference on Chemical Education and Sustainable Development

Moscow, Russia

Contact: Professor P. D.Sarkisov

Mendeleev University of Chemical Technology
Miusskaya sq., 9, RU-125047 Moscow, Russia

Email: rector@muctr.edu.ru or tarasnp@muctr.edu.ru

22-26 November 2004

19th Annual DNA Technology Workshop

An introduction to the theory and practice of DNA technology. Early enrolment advised to secure a place in this popular course.

Massey University (Palmerston North Turitea Campus)

Contact Email: R.E.Bradshaw@massey.ac.nz

<http://imbs.massey.ac.nz/workshop.htm>

28 November 2004 - 1 December 2004

The 14th Annual Queenstown Molecular Biology Meeting

In conjunction with the New Zealand Society for Biochemistry and Molecular Biology

"Molecular Mechanisms in Cell Biology"

Rydges Hotel, Queenstown

Contact: Billie Masters, Conference Organiser

Email: billie@jsmasters.co.nz

<http://www.qmb.org.nz/>

30 November - 3 December 2004

Chemistry for Agriculture

Jesenik, Czech Republic

Contact: Dr. Adam Pawelczyk

Wroclaw University of Technology

Smoluchowskiego 25, 50-370 Wroclaw, Poland

Email: adam.pawelczyk@pwr.wroc.pl

<http://www.conference.republika.pl/>

6-8 December 2004

Fats, Oils and Oilseeds Analysis and Production

Tunis, Tunisia.

9 December 2004

Royal Society Council Meeting

Wellington

17-19 January 2005

Protein Crystallography in Drug Discovery

South San Francisco, California, USA

<http://www.ProtCrystConf.com>

14-16 February 2005

Screening Europe

Geneva, Switzerland

<http://www.ScreeningEurope.com>

10-14 July 2005

7th World Congress Of Chemical Engineering

Glasgow, Scotland, United Kingdom

<http://www.chemengcongress2005.com>

New Products

A UNIQUE DEVELOPMENT IN DISCRETE ANALYSIS

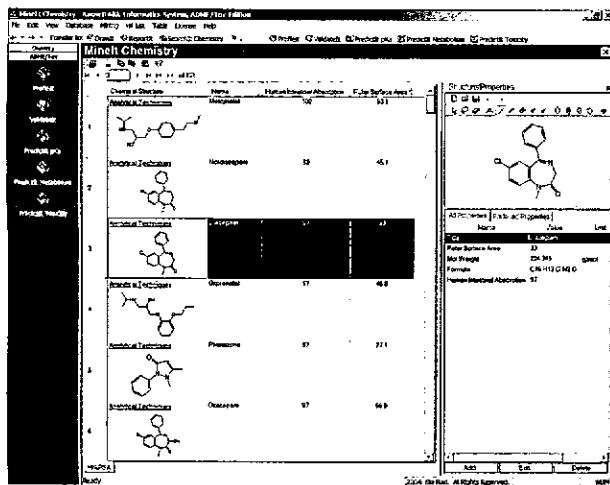
The growing popularity of discrete analysers in the fields of water, environmental and industrial analysis is set to leap ahead following a major breakthrough by SEAL. Supported by Ai Scientific, the Seal AQ2 Benchtop Analyser has become the first discrete system in the world to offer a fully automated, on-board cadmium reduction method for nitrate analysis. As analysts in the USA and many European countries use cadmium reduction as the method of choice, they can now combine all their routine analysis in one, compact benchtop analyser, thus bringing significant analytical and cost advantages to the laboratory. Another key application area for this development is that of nitrate in saline samples where the alternative method based on hydrazine reduction is unsuitable due to significant interference effects.

Contact: Ai Scientific
Email: aimail@aiscientific.com
Free Phone: 0800 95 10 10
Web: www.aiscientific.com

BIO-RAD RELEASES THIRTEEN NEW ADME/TOX DATABASES

Bio-Rad Laboratories, Inc. announced recently the release of thirteen databases that contain measured ADME/Tox properties for a broad range of chemical compounds and cover seven endpoints, including Blood Brain Barrier, Human Intestinal Absorption, log D, log P, Mutagenicity, Plasma-Protein Binding, and Water Solubility. These databases are the result of internal literature research and external collaboration with various scientific groups.

Michelle D'Souza, PhD, Medicinal Chemistry Software Product Manager, remarked, "These new ADME/Tox data collections are a valuable addition to our *in silico* ADME/Tox portfolio. Scientists, particularly those involved in drug discovery, can benchmark the results of their own



experiments against this data, validate the accuracy of predictive ADME/Tox models, or build new models by using this experimental data as a training set for their model."

About *In Silico* ADME/Tox

Within drug discovery, most failed compounds have problems associated with their Absorption, Distribution, Metabolism, Excretion, or Toxicity (ADME/Tox) profile. Virtual, or *in silico* ADME/Tox prediction is used to evaluate the ADME/Tox profile of a compound, even before it is synthesized, in order to eliminate poor drug candidates early on in the drug discovery cycle.

Contact: Deborah Kernan at Bio-Rad
Phone: +1-215-349-7366
Email: deborah_kernan@bio-rad.com

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contaminated samples like diesel fuel in lube oil or gasoline in diesel fuel and for biodiesel testing. Its continuously closed cup design and small sample volume of only 2 mL offers maximum safety, avoids offensive fumes in the testing area and reduces sample waste. The fast thermoelectric cooling at the end of a test and the fast and easy handling of the instrument save expensive labour time. Due to the true portability and rugged housing, the MINIFLASH is also the perfect solution for mobile labs and military applications.

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Ai Scientific is proud to announce its partnership with Environmental Express (USA). Environmental Express produce a range of laboratory apparatus to improve the efficiency and effectiveness of the lab. Throughout North America, Environmental Express is the first choice for application-based solutions for thousands of water treatment plants, industrial manufacturing, commercial labs and environmental testing. Ai Scientific is proud to supply and support Environmental Express' innovative tools in Australia and New Zealand.

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SCIMITAR FTIR SPECTROMETER FROM DIGILAB

Ai Scientific is proud to announce the introduction of the Digilab's Scimitar 800, 1000 and 2000 models in Australia and New Zealand. The new Scimitar family of FT-IR spectrometers includes a patent-pending high-energy Duraglow source that is the brightest, most stable and

longest lasting air-cooled source. Using patented technologies derived from Digilab's research spectrometers, the Scimitar family also offers a wide variety of upgrades including FTIR microscopy. These systems are designed with a simple USB computer interface, advanced diagnostics, and validation and certification protocols. With the new Resolutions spectral analysis software, new validation and diagnostics packages and Digilab's traditionally high throughput and S/N, the Scimitar family is easier than ever to use. All models feature a full size sample compartment, equipped with automatic accessory recognition, enabling all industry standard sampling accessories to be used. Because the Scimitar shares the Excalibur patented technology, its spectroscopic performance ensures that virtually all sampling techniques, such as attenuated total reflectance, specular reflectance, and diffuse reflectance can be performed without compromising the confidence of your results.

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CEM RECEIVES PATENT FOR SIMULTANEOUS COOLING TECHNOLOGY

Ai Scientific is proud to announce that CEM, a leading provider of microwave laboratory instrumentation, has received a US patent (6,744,024) for its PowerMAX technology. PowerMAX technology is utilized in the Discover line of microwave synthesis systems which is widely used in the pharmaceutical and biotech industries. PowerMAX provides an enhanced microwave synthesis process, which allows chemical reactions to be simultaneously cooled while being irradiated with microwave energy. This allows higher levels of microwave energy for a given temperature, which can result in higher product yields and new pathways.

"We are very pleased that PowerMAX has been granted a patent," said Michael J. Collins, President and CEO of CEM Corporation. "This unique technology represents a major advancement in the field of microwave synthesis. It creates an enhanced process, which has been shown to have major benefits for certain types of chemistries. It is already being used extensively in the pharmaceutical and biotech industries by many of our customers, and in some cases, they have achieved some extraordinary results. Several scientific papers have been published in the past year confirming the importance of this technology."

Ai Scientific is the exclusive distributor of CEM in Australia and New Zealand and has been servicing and supporting CEM users for over 9 years.

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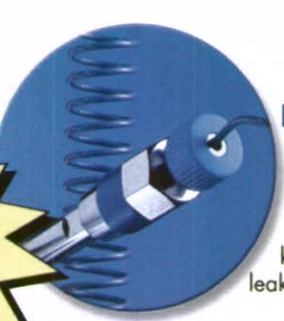
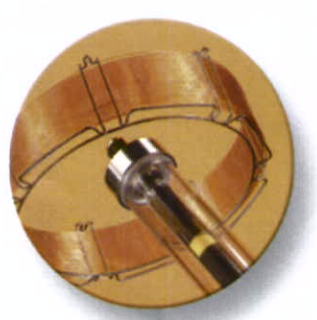


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