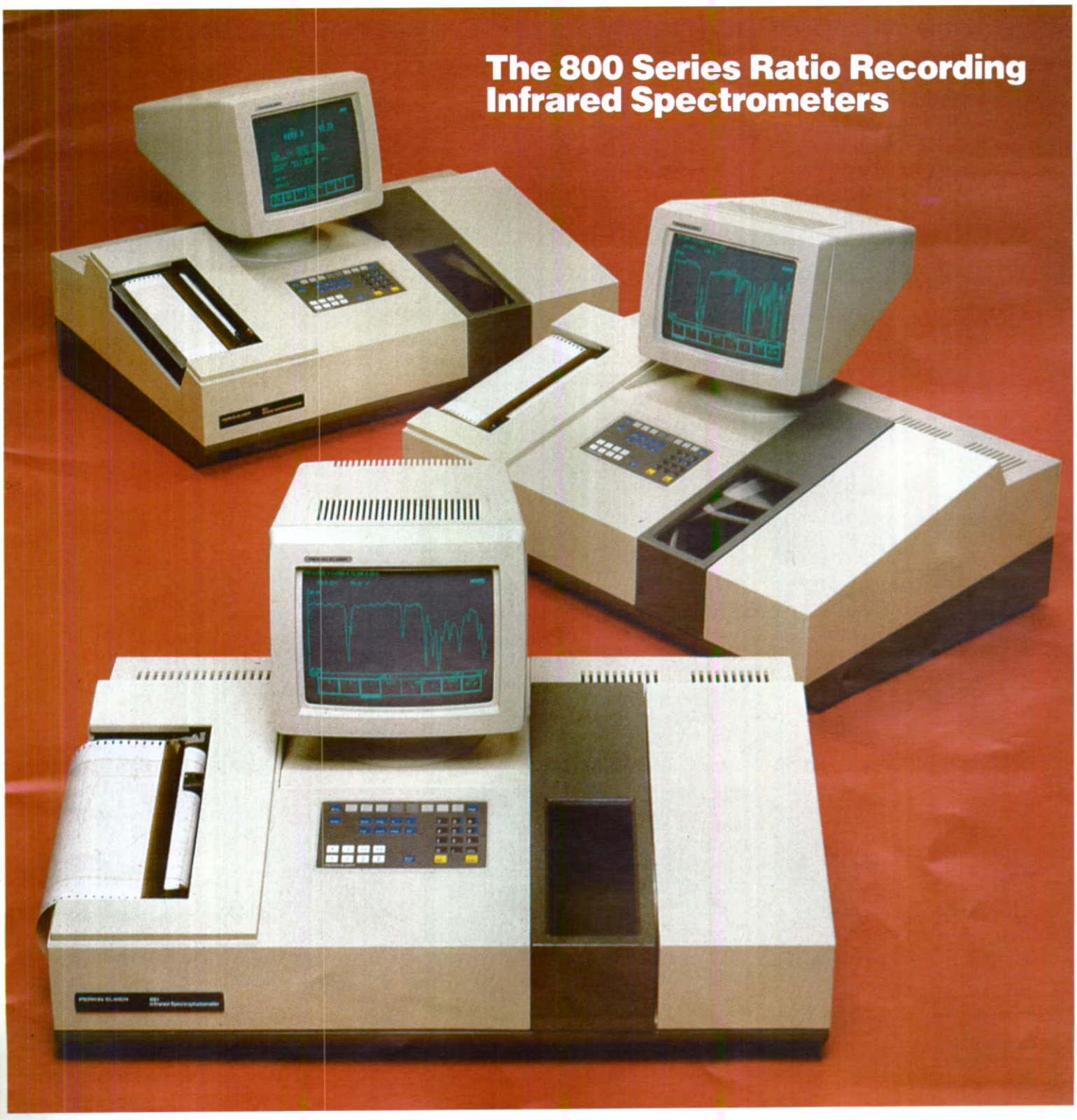
NZIC

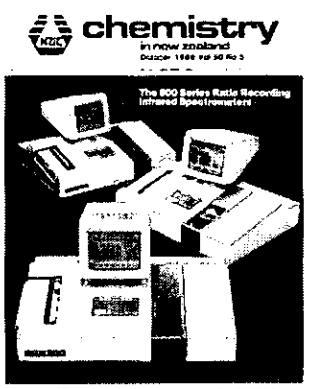
chemistry
in new zealand
October 1986 Vol 50 No 5



chemistry in new zealand

OCTOBER 1986 VOL. 50 NO. 5

Front Cover Story



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Published on behalf of the New Zealand Institute of Chemistry (Inc), P.O. Box 29183, Christchurch. President: Dr Brian Halton, Hon. Gen. Secretary Dr John Rogers, Registrar Denis Hogan.

Published by: CATHEDRAL PRESS LTD, P.O. Box 9072, Newmarket. Phone 775-533
Advertising Manager Carl Roze, Phone Auckland 547-244.

GUEST EDITORIAL

Recruitment

Council and Branches are having a drive for membership, a subject which has concerned me for some time, because it is obvious that we do not attract large numbers of chemists. I believe that our main recruitment efforts should be directed to chemists in industry and commerce, where there is a huge potential source of members, but there are some changes needed before we can get them.

Over the years since becoming a member in 1946, I have asked many chemists to join the Institute and generally the question they ask (not always so bluntly), is: "What's in it for me?" — so let's look at this question.

I have heard comments that Council and a high proportion of branch committees are made up — probably not surprisingly — of successful people, mostly with good experience in their professions, high status in their organisations, and often heavily oriented to university or government employment. If this is the case the problem is: — how do we attract the not yet successful, and the hard-working chemists who may never get to the top of their tree. Another problem is to persuade the above-mentioned officials that, especially in industry, a lot of excellent, diligent, highly contributing people may not be well-qualified academically. However, they are just as worthy of membership as a university graduate who spends a few unfruitful years in a laboratory and then decides to go out selling laboratory equipment, chemicals, or whatever.

To get to the heart of the question we must go back to the objectives of the Institute. We have our "objects," but I think we can ignore most of the high-sounding words about enhancing the interests of the profession, promoting the science and practice of chemistry and so on: THE REAL OBJECTIVE OF THE INSTITUTE IS TO ADVANCE THE INTERESTS OF ITS MEMBERS.

You can study the rules of almost any incorporated body whose members market their brains rather than their brawn and find them similar to our own, but study of the actions of thse bodies shows that their real achievements are the advancement of the interests of their members. I do not imply that Codes of Ethics, rules about qualifications, advertising, competition and so on are unnecessary but it often seems as though we worry too much about the details — (is that why we have SIX grades of membership?) and not enough about why we have an institute.

Some time ago I wrote a "Letter to the Editor" regarding possibilities for making the public more aware of what a chemist is and does, but not a lot seems to have happened. Is this because leaders do not see the need for such action? Other bodies are not so timid, even to the point of having various factions arguing in public with each other. Press, radio and T.V. can all be used if we have the skill and will to use them. We don't need an official point of view — any point of view will do as long as it is attributed to a member of the Institute of Chemistry.

Another handicap to our becoming an effective body is our outmoded management structure. When major decisions are to be made, a delegate (or an official appointed by Council), brings it before Council, Council refers it to the Branches, Branches try to get the views of their members, the Branch committee instructs its delegate, Council meets (not very often), and may or may not make a decision. The whole process can take years! This is hardly the place to suggest remedies but if we want more action we must take some action.

Have you been to a meeting where there has been futile discussion about whether we are a Learned Society or a Professional Body? You can imagine what relevance this has to a young chemist struggling with his or her factory manager about a low titre, a ship's mate over a flashpoint, or a sales manager about a deviation from an active ingredient content! These young chemists are the ones who should be members — they need our support, they need more status, they need good guidelines about salaries, hours of work, ethics and hosts of other matters. If we gave them these things there would be no doubt about the answer to the question: "What's in it for me?" and we would have no worries about our membership numbers.

Why can't we do it?

C. Lester, H. Stonyer

OBITUARY

Many readers will be saddened to learn of the sudden death on October 22 of Stan Brooker. Stan was President of the NZIC in 1964 and Journal Editor 1947-53, and again from 1978 to 1981. Stan is survived by his wife Nancy, three sons and a daughter, and numerous grandchildren, and to them we extend our deepest sympathies. A full obituary will be published in a later issue.

THE PRESIDENTIAL ADDRESS

G.B. Petersen
Department of Biochemistry, University of Otago

"User pays", and the funding of Science and Technology in New Zealand. What is the Institute doing, and what can you do? George Peterson has a challenge for us all.

The single most effective method of depressing the spirits of scientists that I detected as I moved around the country on my Presidential lecture tour is the relentless introduction of the "user pays" principle in the funding of Government science. More people seemed to want to talk about this topic than any other. Yet the real impact of the policy did not sink in until I visited the Waikato Branch and spoke to members of our Institute who are employed in the MAF laboratories at Ruakura. These scientists had just learned that their budget would be cut by some 40% over the next three years and that they would be expected to make up the deficit by recovery from users of their services. A member of the Head Office staff of the Ministry of Agriculture and Fisheries had visited the laboratory in the week before my visit and had told the staff that he could not see how the deficit could be recovered in this way and predicted that the only way that they could make ends meet would be by laying off staff. The logic of this conclusion is irrefutable when one remembers that in an organisation of that type perhaps 75-80% of the total budget goes into staff salaries. The seriousness of the situation, however, is appreciated when one learns that the prediction was that in five years' time as many as *one-half* of the scientists to whom he was speaking on that day would be no longer there.

Needless to say, the staff concerned were still in shock when I visited them the following week. I was asked what the Institute of Chemistry, as a professional body, could do about the situation. More accurately, I was asked what the Institute of Chemistry *would* do about the situation.

I do not for one moment minimise the importance of the personal effect on the staff concerned of the threat of redundancy, and I am in no doubt that the Institute must look after the professional interests of its members, but this is only one facet of a much more complex situation that faces science in this country — a situation that seems to be generated by the inability of those in charge of the public purse strings to see further ahead than saving the next dollar. No one would deny that in any organisation — whether it be a university, a business, a government department, or a whole country — it is necessary every now and again to take stock of the situation, to look to see where unnecessary extravagances have been allowed to creep in, to rationalise activities and to redeploy resources in more effective ways. It is inevitable that in any such activity, certain members of the organisation will be found not to be pulling their full weight and, painful though it might be, it is inevitable that a certain amount of "dead wood" will be cut out — though the most optimistic reformer would find it hard to support an argument that a large proportion of the staff of one of our most prestigious research institutes is "dead wood."

At the same time, the argument that says that in cases where an individual or a business employs a research organisation to undertake contract research towards an end that will result in *profit* for the client, the cost of that research should be paid for by the client and not by the taxpayer is perfectly reasonable. The danger is that it is possible to go too far. Constructive reform is all very well, but the urge to reform can sometimes run far ahead of common sense.

The 'user pays' principle is fine in theory and, at first sight, is hard to argue with. Government laboratories in New Zealand have always been willing to take on specific research projects for clients in the private sector and I am quite sure that, in the past, many of these consulting activities have not been charged for at the full rate and it is quite reasonable that users of this service should be expected to pay for it. But the principle can be extended to the point where an organisation funded from the public purse can be encouraged to go out and seek paying customers at the expense of activities that are not only a legitimate charge on the taxpayer, but are essential to the long-term interests of the country. The introduction of the principle presupposes that a user can be identified and it does not take too much imagination to see that much of the legitimate activities that the taxpayer can *expect* of a laboratory in the public sector simply can not be categorised in this way. Take, for example, the discovery, made in the late thirties, that bush sickness was due to cobalt deficiency. This was a discovery that could not be patented or licensed. It was one that was totally in the public domain and that made it possible for vast areas of non-productive country to be brought into full production. Of course individual farmers profited from the discovery, but their profit (for which they had to work very hard) was to the absolute economic advantage of the country as a whole, and surely the expenditure on that research was absolutely legitimate use of the taxpayer's money. I can recall being told in the early 1960's that the increased revenue from this one discovery had more than paid for all of the scientific research that had ever been done in New Zealand up to that time and, for all I know, that claim might still be true. This discovery was not one that came in a blinding flash of light, it was the culmination of decades of painstaking research by a large number of scientists in the public sector. This was 'mission-oriented' or 'strategic' research — a problem was recognised and a solution sought. There was no single customer, but it paid off in the end. And this, of course, is the point. Such research *does* pay for itself in the long run.

This is only one example. There are hundreds that could be given. Indeed, one of the best sources that anyone wishing to pursue this line of argument could consult is our own publication "Chemistry in a Young Country." For purely practical, if not traditional reasons, New Zealand has an economy that is largely based on our renewable resources of pasture, animals, forests, fisheries and horticulture and whether our future income continues to be derived from exploitation of the crude materials, or whether we move further into biotechnological industries that depend upon 'value added' characteristics, this broad basis for our economy is likely to remain. It follows that New Zealand scientists must continue to explore ways of improving productivity and efficiency, of extracting extra value, and it follows that many of these activities must essentially involve research that is fundamental or mission-oriented rather than applied to an end that is instantly revenue-producing. My point is, of course, that fundamental or long-term mission oriented research *must* continue to form a major part of the activities or our Government-funded laboratories.

If unreasonable weight is given to the "user pays" principle there will be a number of inevitable consequences.

1. It will encourage government laboratories to decrease their activity in fundamental or exploratory research.
2. It will tend to encorage such laboratories to concentrate on analytical services — services that will pay off in the short term and that can be performed to a defined budget. As an Institute, we should be concerned that in many cases this may well be at the expense of the analytical chemist in private practice.
3. It will deter government laboratories from taking on research projects that have a long lead time before "pay-off." Projects of this type include those in the general field of molecular biology and genetic manipulation — areas in which there are still major practical difficulties to be resolved and where experience so far has shown clearly that there is a lead time of at least 10 to 15 years, if not longer, before there can be any hope of pay-off. These are areas in which New Zealand is already well behind the rest of the world and that we neglect at our peril.
4. Most importantly, if Government laboratories are forced to trim their activities to meet unrealistic budgetary constraints and this trimming can be achieved in the short term only by laying off skilled staff, Government science will lose expertise in areas that are likely to be vital to the future of New Zealand science in the 21st century. The assumption that the laying off of staff will allow the cutting out of "dead wood" is an extremely dangerous one. Inevitably, once such a practice is instituted, the *best* scientists — the ones that we can least afford to lose — will voluntarily move rather than remain in a situation where they are unable to practice innovative science and where funding for exciting research is uncertain. Furthermore, this loss will not be confined to experienced scientists. There will be a flow-on effect on recruitment. The problem is that, once the decline sets in, it will be extremely difficult to reverse.
5. If skilled scientific staff are laid off, they will inevitably leave New Zealand for some other country where employers are less short sighted. This loss of manpower will thus have the additional effect of providing our competitors with skills that could have been used to our own advantage.

The indiscriminate insistence on the "user pays" principle is, of course, the result of pressure being brought by Treasury economists who are not scientists and who are neither concerned about nor aware of the long term consequences of these short term actions. A question that immediately comes to mind is "how have we got into a situation where issues that you and I can see so clearly as putting New Zealand on a disaster course are not seen with such clarity by the Government?" The answer, is not hard to find, nor is it the exclusive fault of the present government, or of its predecessor. The problem is that no New Zealand government in the past twenty years or so has recognised the true importance of scientific research to the New Zealand economy.

The sad and simple fact of the matter is that as long as the front row of the Treasury benches are occupied by ministers who have no interest in science and who cannot be persuaded that science provides a key factor in the long-term survival of New Zealand we are doomed to slip backwards. There are two points that are relevant to an understanding of the situation. The first is that, in reality, the Minister of Science's influence is limited to that of Minister of the DSIR. In this role he does, of course, have a say in the Government's share of the activities of the research associations but he has no direct influence over two of the major repositories of scientific skills in the public sector — the Ministry of Agriculture and Fisheries and the Universities. The second point is that, while successive Ministers of Science have not been slow to seek advice on science policy, and those advisers — whether they have been the NRAC, the Universities, the DSIR or special working parties or conferences set up to explore these problems — have tried hard to solve the sorts of problems that I have mentioned, almost invariably that Minister has had so little cabinet clout that the advice given has been unable to penetrate the walls that are created by Treasury policy: policy that, in general, does not appear to regard the financing and future of scientific research in any different light from any other factor in the economy of the country.

The NRAC have literally slaved over the production of a stream of reports and policy and planning documents that, at least from the viewpoint of those of us who are outside, are simply ignored. The DSIR must share the NRAC's feeling of helplessness when, after producing such excellent discussion papers as the Biotechnology review document and following it through with wide-ranging discussions it was thwarted at the eleventh hour by a change of Government, and with it the introduction of a different point of view with different priorities.

This is a disastrous situation. The effective use of science requires long-term planning. It requires that there be an effective means of gathering advice from the experienced scientists of the country, that there be effective methods of evaluating that advice, that there be an effective means of transmitting that advice to the very top echelons of the Government of the day, that those top echelons be pledged to listen to that advice and that each of these processes has an inbuilt continuity that transcends politics and political change.

Can this ideal be achieved? I believe that it can, through three changes to the present system. The first is through the creation of a position of Chief Scientific Adviser to the Government — a non-political appointment of a senior and respected member of the scientific community who is attached to the Prime Minister's Department and who is totally independent of any other Ministry. It follows, of course, that such a person must be able to report directly to the Prime Minister and thus to the Cabinet of the day. The second change would be to set up a science policy committee — a group of informed people who would maintain an overview of all research in the public sector and advise on those areas that should be strengthened, those that should be given lower priority and the overall distribution of resources for long-term and fundamental research. Such a committee, which, of course, may well be a revamped NRAC, would report through the Chief Science Adviser (who could be the Chairman of the committee) and would thus be assured of a receptive ear. The third change would be to give the Royal Society of New Zealand the role that its statute permits it to have — responsibility for the collection and evaluation of scientific advice for the Government, advice that it would transmit through the Policy Committee and the Chief Scientific Adviser. Thus, the Royal Society would act as the eyes and ears of the Scientific Adviser.

Why the Royal Society? Because its composition makes it ideal for this purpose for three reasons. In the first place, through the Fellowship, it has direct access to a group of scientists who have been elected because they have been effective in their science and who represent a very broad range of scientific expertise from all affiliations in the public sector. Secondly, because the structure of the Royal Society, with its member bodies, gives it direct access to scientific opinion at the grass roots. Through this structure it has access, for example, to the advice of the entire membership of the New Zealand Institute of Chemistry and we, in our turn, would have a route through to the top echelons of Government. Thirdly, through the local branches, the Society has direct access to interested public opinion. Properly exploited, these three arms of the Royal Society could provide a source of counsel that would meet the criteria that I have suggested as essential for the development and maintenance of an effective national science policy.

The second, important point, of course, is that the formulation of a long-term science policy is inextricably linked to the question of the funding of scientific research in this country. The future of science in New Zealand depends upon the intelligent exploitation of *all* of our intellectual resources, not simply those in the Government service. We have six universities and an agricultural college in New Zealand. Together they represent a formidable and exciting resource. Certainly, the universities are, on the whole, well-housed and reasonably well-equipped. The expansion during the heady days of the seventies saw an improvement of several orders of magnitude and continued provision of equipment through the University Grants Committee and Lottery funds and the replacement of ageing equipment through the Teaching Equipment Replacement Scheme, while by no means overgenerous, have allowed us, more or less, to keep up with the provision of modern plant. But active, productive research needs more than equipment — it needs pairs of hands and it needs running expenses. University teachers have to teach as well as to

do research and the broken time that the first requirement engenders can introduce an unsurmountable barrier to the second. University funding is tied to student numbers and to the teaching rather than the research function of the institution. Thus, the requirements for technical help are judged from the requirements for servicing the teaching laboratories rather than the research laboratories of the institution. Furthermore, the materials of modern research in chemistry and, perhaps even more so in biochemistry, are expensive and, almost invariably, have to be imported.

Some of us who work in the fundamental biomedical sciences have been able to secure some research funding through the Medical Research Council, but the MRC budget is far from adequate even for medical research requirements. At the same time, it must not be forgotten that there is a very thin dividing line between biomedical research and pure biochemistry and physiology and that much of the research funded by the Medical Research Council has a direct application to the biological sciences in general and to agriculture in particular. This is particularly true of the area of molecular biology and molecular genetics and I believe that I can say totally without fear of contradiction that if it were not for the fact that the Medical Research Council has been willing, over the years, to fund fundamental research in this area, New Zealand research in molecular biology would barely have got off the ground by today.

The fact that we still have no comparable way of funding basic research in the physical, biological and agricultural sciences in the universities is a situation that is little short of scandalous and the change in emphasis in government science towards applied projects will only serve to magnify the difficulty. For years, many of us have been trying to persuade successive governments and Ministers of Science that, if New Zealand is to continue to compete successfully on the world scene, it is essential that a research council for the funding of fundamental scientific research in universities be established. This view has been taken up in many reports — the Probine report was quite specific about this need — and I am sure that the New Zealand Institute of Chemistry will not be the only body that has included a plea for this in its submission to the Beattie committee, now sitting. The problem is, of course, that the creation of such a body will cost money, the funds already available for basic research in New Zealand are inadequate and it is not realistic to expect that this new body could be funded at the expense of existing science. A point that seems to have been totally ignored by those who have been involved in initiating the new cost-cutting excercise in the government science budget is that government science has been subject to a "sinking lid' policy for many years. Most of the 'fat' has already been cut out. The budget for the funding of university research will have to be found elsewhere. An interesting possibility, however, would be to give the research council that administers the university fund control over the funding of fundamental research in government institutions as well. If this new council has close liaison with the body that is to set research priorities, the exciting prospect of an overall science policy that can be put into effect through the efficient use of our full intellectual resources appears. The important consequences of such a scheme would be to make sure that the overall resources are used to the best possible advantage and that government laboratories and university laboratories do not compete with each other — indeed, are encouraged to collaborate and cooperate. In saying this, I must emphasise that I am not suggesting that *all* of the funding of government laboratories should be under this form of control. There are clear functions of government science (the "strategic" research that I have already mentioned, the monitoring of water quality, the maintaining of chemical, geological and physical data bases and the hundred and one other functions that have no single end user but are essential for the smooth running of the country) that must be maintained. This budget must, of course, remain under the control of the Director of the laboratory concerned.

I have talked at some length about matters that are probably obvious to most of you. As I have said, none of the ideas that I have proposed are new. But time is running out. New Zealand has already slipped too far behind. Somehow, someone has to convince Treasury that we are rapidly coming to a "crunch point" and that unless some pretty bold steps are taken we will simply not be able to compete with those countries — not too far away from us — that have already read the signs and taken appropriate steps to move into the twenty-first century. For those of you who are visitors from overseas, these words must carry some sense of deja-vu. Many of the problems that we face are essentially those that have already been faced by virtually every other advanced country. It is often remarked that in matters such as these, New Zealand lags behind the rest of the world. This delay in activity in New Zealand can be used to our advantage in the sense that we can, perhaps, profit from the mistakes of others. Our problem, and indeed our job as scientists and administrators is to convince those who make decisions on the allocation of financial and human resources to take note of what has been tried and rejected in other countries and to dissuade them from taking steps that seem attractive in the short term but that will in the not so long term result in total disaster. If I were in Treasury I would take a great deal of notice of the reports that have been made by the recent Biotechnology Mission to Japan. Data from that mission tell us that by the year 2000 (which is, remember, only 14 years away), Japan aims to have 11% of its GNP coming from *new* biotechnology. In dollar terms, this is NZ$63 billion. To put this into perspective, remember that the New Zealand GNP is $35-40 billion and that our *total* exports amount to only $8.5 billion. It is quite clear that the Japanese government understands the importance of biotechnology. And if that were not enough to make me nervous that I was on the wrong track, even a casual glance at what is happening in China — a country that has been held back for a decade and a half and that realises that it must now make up for that lost time or be doomed to remain a third world country — would be more than enough to convince me. Jasper Becker, the Beijing correspondent of the *New Scientist* quotes Prime Minister Zhao Ziyang: "Whether or not we can find effective solutions to many of the major problems of our economic development depends on whether or not we can make major breakthroughs in science and technology." Have we ever heard a New Zealand Prime Minister say anything like this? The warning signs are so clear that it is almost unbelievable that a government made up of intelligent men and women can not read them.

This brings me to my final point — the obvious question that we must ask: "Why is it that it has not been possible, with all the activities of the NRAC, the Probine Committee, the various thinktanks, and the numerous reports and discussions that have been held over the past five years or so, to convince the Treasury and the top ranks of Government that there is a problem out there? It seems to me that there are two answers to this, one subtle, one obvious. The subtle one, I believe, is related to the decline in the quality of the teaching of physical sciences in our secondary schools. I do not intend to dwell on this, the facts are well known to all of us and I am proud of the way that the Institute has responded to the challenge to improve the quality of chemical education in this country. But our concern that our schools are failing to provide an adequate preparation for the school children who are going to advance to science studies at tertiary level can obscure an equally poor performance in getting across a feeling for science as part of the general education of the student who is going to read History, or Classics, or Economics — and end up with a job in the Treasury.

The more obvious answer to this question is that we, the scientists of New Zealand, are simply failing to communicate properly. Either we are talking to the wrong people, or we are talking in the wrong way. It is probably a mixture of the two. Indeed, I am conscious that I am doing both of these things at this very moment. I should not be preaching to the converted, I should be talking to Mr Lange or Mr Douglas or Mr Palmer or to some other member of the handful of Ministers who seem to hold the balance of power in the Cabinet. We must take every opportunity to try to bring our concern to the attention of those whom we believe can do something about these problems. How many of you who are in Government or University research have actually invited a Minister or even a government backbencher to visit you in your workplace, have explained to them in simple terms what you are doing and why it is important? Or, even more subtly, how many of you have remembered that Cabinet Ministers have friends and have invited those friends to your work place? (It would be very interesting to know how many important political initiatives come not from the mind of a Minister, or an M.P., or a member of Treasury, but from a message passed on to a Minister

by a perceptive friend whose motives can not be suspected). Finally, we must not forget the power of the person in the street. The problem is not simply one of convincing the politicians. We must also persuade the public at large because it is through them that the momentum for the recognition of the importance of science on a long term basis is maintained.

We have to acknowledge that much of the blame for our present dilemma can be laid on our shoulders. We are simply not making effective use of the opportunities that are offered to us daily. We must seize every chance to educate the public, the politicians and, above all, Treasury. At its meeting in August, Council received a report of a discussion of "The Image of Chemistry" that took place at the meeting of World Presidents of Chemical Societies meeting in Lyon, France, last September. it drew attention to a paper on "The Public Understanding of Science," published by the Royal Society of London that emphasises that scientists, in our case chemists, must accept that they, as individuals as well as collectively, have a responsibility to interact with the public. The author of the report went on to quote from that document: "All scientists therefore need to learn about the media and their constraints, and to learn how to explain science simply, without jargon and without being condescending."

There is one ray of hope on the horizon. The Beattie Committee could not have been set up at a better time. We do not know what it will recommend. We do know that our Institute has not been the only body that has drawn its attention to some of the problems that I have outlined. And we know that, whatever the conclusions of the Working Party, we can be confident that they will be based on a wide range of informed comment and will represent a coherent overview of the situation.

We must not, however, be lulled into a sense of false security. Whatever the Beattie Committee recommends, and even if their recommendations are heeded in toto, the continuing and long-term security of scientific progress in New Zealand is very much in the hands of every member of the New Zealand Institute of Chemistry.

(Copies of the above address, and 'Chemistry in a Young Country" are to be sent to Sir David Beattie, the Prime Minister, and other appropriate members of Government — Ed.)

1986 NZIC SALARY SURVEY

Wendy Singers, Chemistry Divn, DSIR, Wellington

This report is based on responses to the questionnaire sent to members a few months ago, and follows a similar format to previous years.[1] The analyses were calculated using GENSTAT.[2]

There were 738 returns giving a response rate of 65.0%, slightly lower than for 1982. Of the 738 returns 11 were excluded, 4 retired, 2 unemployed seeking work, 2 part-time, 2 late and 1 incomplete. The quality of the returns was poor, most requiring some interpreting. The allowances section was often only marked as present on many forms and no effort was made to calculate a value. This was very common for a car and telephone. The insurance section also was of some concern. Several people entered values of over $10000. As I felt that these values were more likely to be the value of the cover rather than the premiums, to avoid biasing the survey they were set to missing values.

Histograms of salaries for the employment categories with sufficient numbers are presented in figure 1. For Central Government the labelled peaks correspond to the top of the various grades in the Science Occupational Class, the highest peaks now being at the top of Grades 104 and 105. Similarly the highest peak on the University histogram corresponds to the top of the Senior Lecturer scale. The later peaks correspond to the steps through the Associate Professor and Reader scale. These steps are on merit. The effect of the rigid bars at the top of the grades for Central Government is even more obvious than in the 1982 Salary Survey.[1]

I have included the salary+allowances histogram for the Industry group, excluding one value ($120800), which is well off the scale for this histogram. The shapes of the two industrial histograms are interesting with the salary+allowances histogram showing none of the peaks and hollows of the other groups.

Some of the differences in the histograms reflect the age distribution differences. The percentage age distribution in a condensed form, that highlights the differences is presented in Table A. Note the large percentage of university staff in the 41-50 age group, only 22% of this group are below 40 compared with 65% for industry. Table B gives the mean, median, minimum and maximum salaries for the various employment groups. To show that not all the differences can be accounted for by age, I have included Table C which gives mean salaries for the broader age groups. Those of you over 40 are sure to be rather green-eyed over the university and research association salaries.

In Table D the maximum allowance together with the number that claimed allowances is presented for each employment group. Empty fields signify that there were no allowances claimed in those categories. The figure in brackets is the number that signified that they had the allowance but didn't state a value.

References:

1. W.A. Singers, Chem. in NZ, **46,** 86 (1982).
2. GENSTAT program suite; contributors: N.G. Alvery et al, Statistics Department, Rothamsted Experimental Station, Harpenden, Herts, England.

Figure 1,

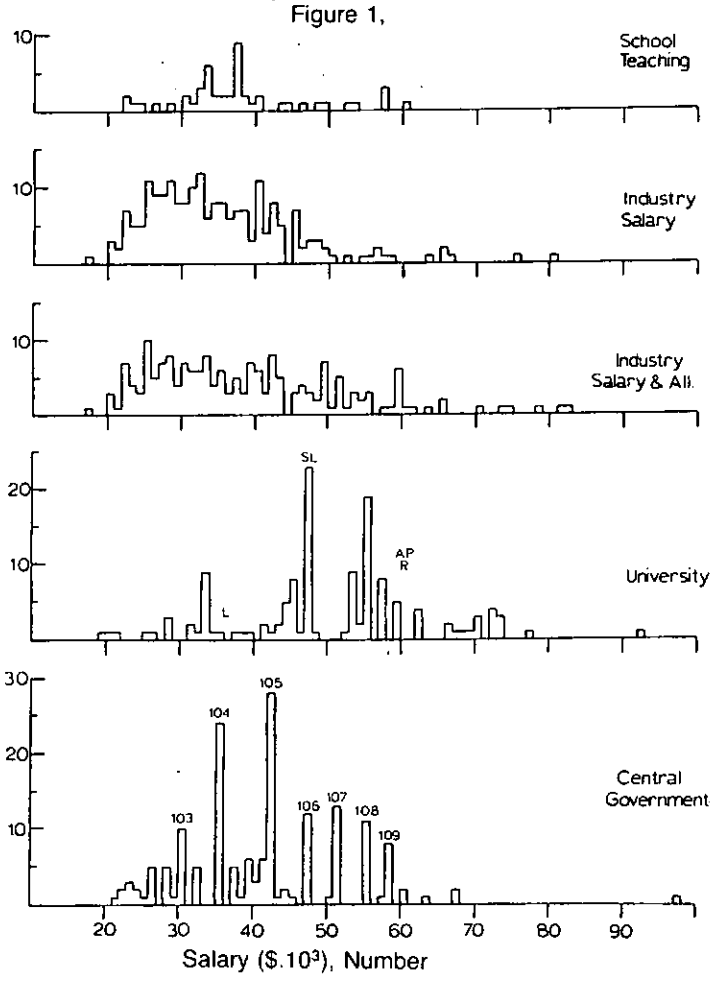

TABLE A: Percentage age distribution

	<32	32-40	41-50	>50
School Teaching	10	25	33	31
University	10	12	51	27
Industry	25	40	19	17
Central Government	16	34	37	14

TABLE B: Mean, Median, Minimum and Maximum Salaries

			Mean	Median	Minimum	Maximum	% with allowances
School Teaching	S	50(47)	38142	37000	22265	60000	*T 10
	S+A		38533	37028	22265	60000	*NT29
Teachers College	S	2(4)	39875	39875	36750	43000	T 0
	S+A		39875	39875	36750	43000	NT 0
University	S	133(137)	50007	47000	19000	92500	T 2
	S+A		50107	48900	19000	92500	NT 5
Technical Inst.	S	30(29)	37286	37836	3600	72500	T 3
	S+A		37504	37836	3600	76150	NT33
Industry	S	207(217)	35093	33000	17000	80000	T 25
	S+A		39002	37000	17000	120800	NT73
Central Govt.	S	165(185)	41716	42500	21800	97300	T 2
	S+A		41812	42500	21800	97800	NT 9
Local Government	S	20(13)	35345	35693	23025	47450	T 35
	S+A		36209	36693	23025	52450	NT50
Research Assn.	S	54(61)	40859	40350	17946	73750	T 4
	S+A		43047	41860	17996	138000	NT31
Self Employed	S	12(3)	37108	26000	10000	115493	T 17
	S+A		42836	37975	10500	125993	NT67
Hospital Serv.	S	8(12)	36632	35001	17458	47300	T 0
	S+A		36635	35011	17458	47300	NT12
Other	S	22(16)	35361	30300	9000	72536	T 23
	S+A		40031	35000	9000	76600	NT55

Note: Numbers in brackets are the 1982 figures.
* T, NT Taxable and Non-taxable

TABLE C. Mean Salaries by Agegroup

		<32		32-40		41-50		>50	
		No.	Mean	No.	Mean	No.	Mean	No.	Mean
School Teaching	S	5	25949	13	32995	17	40157	16	42416
	S+A		25949		33981		40501		42472
Teachers College	S					2	39875		
	S+A						39875		
University	S	13	28859	16	38601	68	51434	36	60017
	S+A		28874		38601		51528		60204
Technical Inst.	S	1	42000	11	33623	12	40466	6	36854
	S+A		42040		33690		40939		36871
Industry	S	51	27678	82	34939	39	40718	35	39989
	S+A		30731		38808		45653		44096
Central Govt.	S	26	28651	55	38681	60	45813	23	53058
	S+A		28902		38683		45841		53377
Local Government	S	7	29216	9	37274	2	40655	2	42800
	S+A		29261		38983		41355		42900
Research Assn.	S	16	24970	17	40023	11	46395	10	59412
	S+A		25048		41567		56314		59767
Self Employed	S	1	20000	5	25600	4	61373	2	25900
	S+A		28000		28129		71398		29900
Hospital Serv.	S			4	32115	1	35000	3	43200
	S+A				32115		35020		43200
Other	S	6	22850	6	31500	4	56134	5	36391
	S+A		24408		45327		56134		39543

TABLE D.
Numbers with allowances and the maximum value for each Employment Group.

		Car			Telephone			House		
		*Nx	Ny	Maximum	Nx	Ny	Maximum	Nx	Ny	Maximum
	School Teaching									
	University									
T	Technical Institute									
a	Industry	3	(3)	8000	2	(2)	240			
x	Central Government				2		90			
a	Local Government									
b	Research Association	1		1000	1		200			
l	Self Employed		(1)		1	(1)	250		(1)	
e	Hospital Services									
	Other	1		450	1		175	1		12000
	TOTAL	9			10			2		
	School Teaching	1	(1)	400	5		247		(1)	
N	University									
o	Technical Institute	2		3500	1		150			
n	Industry	85	(24)	26000	85	(4)	720	5	(1)	5000
t	Central Government				9		396			
a	Local Government	2	(2)	2000	3	(1)	250			
x	Research Association	5	(1)	8000	2		240			
a	Self Employed	6	(1)	8000	6	(1)	350	1	(1)	2000
b	Hospital Services	1	(2)	20						
l	Other	9		8000	5		600			
e										
	TOTAL	142			122			9		

		Life Insurance			Medical Insurance			Other Insurance		
		Nx	Ny	Maximum	Nx	Ny	Maximum	Nx	Ny	Maximum
	School Teaching		(1)							
	University							1		1360
T	Technical Institute									
a	Industry	1		200	3	(2)	250	1		2100
x	Central Government									
a	Local Government				1		67			
b	Research Association									
l	Self Employed		(1)		1	(1)	250			
e	Hospital Services									
	Other									
	TOTAL	3			8			2		
	School Teaching									
N	University	1		86				1		1200
o	Technical Institute									
n	Industry	18	(9)	3600	74	(15)	1000	10	(4)	4800
t	Central Government	1		350	2		150	1		1400
a	Local Government				1		100			
x	Research Association		(1)		7		450	1		5200
a	Self Employed	1		2000	5		200	1	(1)	2600
b	Hospital Services									
l	Other	1		500	2		240			
e										
	TOTAL	32			106			19		

		Bonuses			Allowances			Other		
		Nx	Ny	Maximum	Nx	Ny	Maximum	Nx	Ny	Maximum
	School Teaching				4		3239	1		1234
	University							1		3400
T	Technical Institute				2		1900			
a	Industry	30		12000	6		7000	5		750
x	Central Government				1		6500	2		180
a	Local Government	7		1080	3		1144	1		1135
b	Research Association				1		50			
l	Self Employed									
e	Hospital Services									
	Other	3		2000	2		750	1		5000
	TOTAL	40			19			11		
	School Teaching				9	(1)	500			
N	University				1	(1)	2000	6		2708
o	Technical Institute				9		240			
n	Industry	5		6000	49	(2)	25000	21	(1)	20000
t	Central Government				3		250	1		4000
a	Local Government				5		910	1		88
x	Research Association				5		600	3	(1)	250
a	Self Employed	1		5000				2		6000
b	Hospital Services									
l	Other	2		40000	3		4000			
e										
	TOTAL	8			88			37		

* Nx - Number that indicated that they had the allowance and returned a value.
Ny - Number that indicated that they had the allowance without specifying a value.

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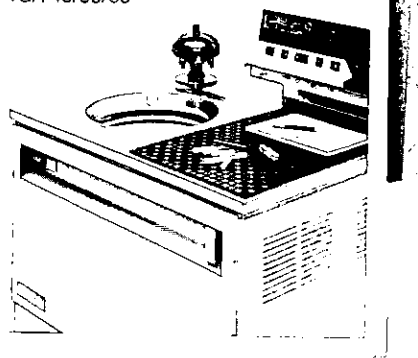

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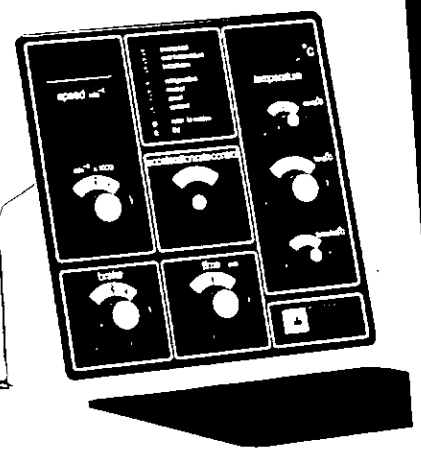

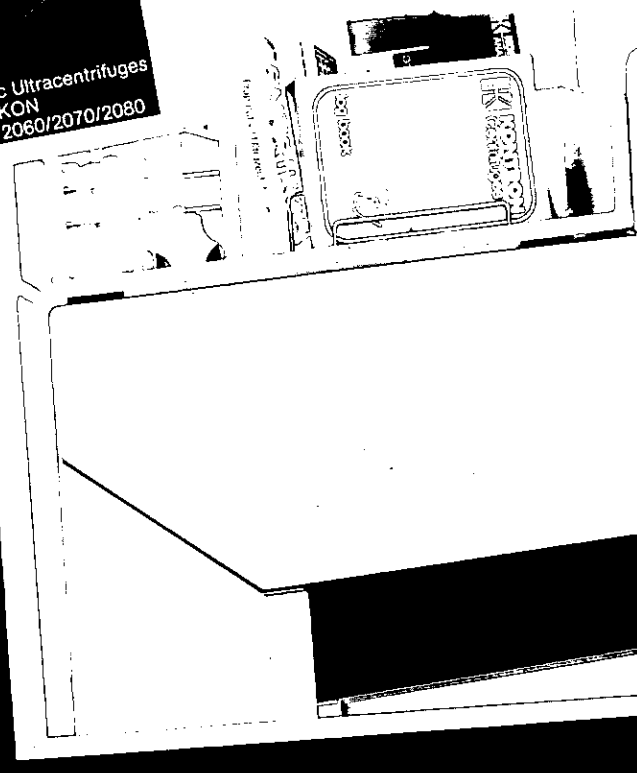

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THE ELECTROLYSIS OF WATER TO PRODUCE HYDROGEN AND OXYGEN

A.G. Williamson, Professor and Head of Department Chemical and Process Engineering, University of Canterbury

Sir,

Enclosed are some comments on a recent discussion which took place in the National Business Review. I was concerned that established scientists should be so quick to criticise without first doing some homework. I too was sceptical of the claims made by Mr Crosby, but then discovered when I did some calculations that my scepticism had to be moderated:

In two recent articles in the National Business Review (July 11, August 1) claims have been made by the designer of a welding gas generator that the gas is capable of producing more energy than the electricity used to produce it. The claims have been treated with great scepticism by established scientists and even described by one eminent chemist as "pure nonsense". This is a pity because it is possible at least in principle that the designer's claims could be correct. Mr Crosby says that under carefully controlled conditions the electrolysis uses less electrical energy than is produced by combustion of the gases generated, and that the extra energy is "drawn in from the air" because under these conditions the water being electrolysed cools down rather than heating up.

Let us examine the energetics of the dissociation of water in more detail. In the process

$$H_2O(\ell) \rightarrow H_2(g) + \tfrac{1}{2}O_2(g)$$

at T = 298K (25°C) and P = 1 atm pressure the Gibbs energy change ΔG° is 237 kJ/mole. That is, the minimum possible amount of *work* (mechanical or electrical) which is required to dissociate the water is 237,000 Joules for each 18 g of water. This represents the minimum amount of electrical energy required to generate the hydrogen under conditions listed above. The heat of combusion of the hydrogen on the other hand is — 285 kJ/mole (to the liquid). That is for the process

$$H_2(g) + \tfrac{1}{2}O_2(g) \rightarrow H_2O(\ell)$$

at 25°C and 1 atmosphere every 18 grams of water formed gives up 285 kJ of heat (or for the process

$$H_2 \quad + \tfrac{1}{2}O_2 \quad \rightarrow H_2O$$

each 18 grams of water formed gives up 242,000 Joules.)

The question of where the remaining energy comes from is answered (though to the scepticism of the establishment who ought to know better) by Mr Crosby. It is absorbed from the atmosphere. If we recall the thermodynamic equation

$$\Delta G = \Delta H - T\Delta S$$

we can rearrange this to

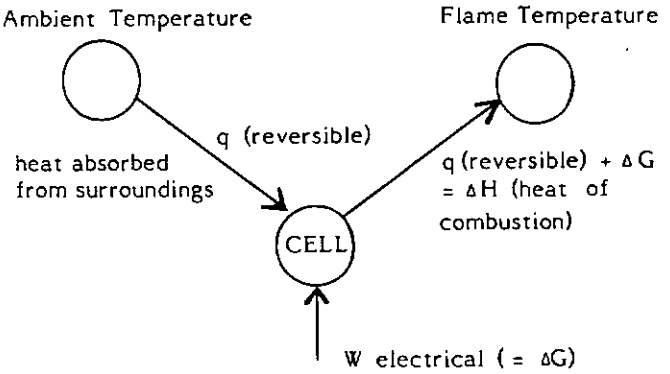
$$\Delta H = \Delta G + T\Delta S$$
$$= \Delta G + q \text{ (reversible)}$$

where q (reversible) is the heat exchanged between the system and the surroundings. In this case

q (reversible) = 48 kJ/mole.

That is, to maintain the temperature constant the system will absorb 48,000 J from the surroundings for every 18 grams of water electrolysed.

If we ignore the details of the process and treat it simply as the absorption of some heat at ambient temperature and its transport to a higher temperature we can picture the process as



In these terms Mr Crosby's device could be regarded as an electrochemical heat pump. In actual fact the ideal situation as described above needs to be modified in two ways. Firstly one has to allow for the fact that the gases are evolved at partial pressure less than atmospheric (total gas pressure = 1 atm). The Gibbs energy for the dissociation will be lower by about 1½ kJ/mole and the heat of combusion will be negligibly altered. The heat absorbed will be increased by 1½ kJ/mole of water electrolysed.

It will be noticed that the discussion to this point has not required any specific reference to electrolysis. The thermodynamic calculations are independent of the actual mechanism by which the dissociation of the water takes place. The ideal "reversible" voltage required to electrolyse water

$$\frac{\Delta G}{2F} = \frac{237000}{2 \times 96496}$$

is 1.23 V.

The second modification to the calculations has to allow for the fact that in a real cell a higher voltage is required to overcome the internal resistance of the cell and any overvoltage on the electrodes. The extra voltage will result in energy dissipation in the electrolysis cell and this will in turn appear as heat offsetting the energy (heat) absorption from the surroundings by the cell. The dissipation becomes equal to the reversible heat absorption q (reversible) when the excess voltage equals

$$\frac{q \text{ (reversible)}}{n\,F} = \frac{48000}{2 \times 96496}$$

or 0.25 V. That is when the total voltage is 1.48 V — Crosby's thermoneutral EMF.

The thing I find difficult to accept is that Mr Crosby has produced an electrolysis cell with the required output which is sufficiently "reversible" that the heat absorption from the surroundings (or a corresponding temperature drop) is actually observable. However that can surely be established by simple measurements and if he has indeed succeeded then there would be no denying it.

COUNCIL NEWS

Chemical Education & The Image of Chemistry

At the meeting of Council held recently in Dunedin, prior to the Annual Conference, a major item for discussion was the current state of chemical education in New Zealand schools. Problems cited included the lack of professionally qualified chemists as teachers and grossly inadequate funding for equipment. In addition the numbers of pupils with a real interest in the study of chemistry have shown an alarming decline over recent years. Council was also concerned to learn of an apparent lack of anyone with suitable qualifications in chemistry in that part of the Department of Education that determines course prescriptions in the subject.

While some of the above can be attributed in part to administrative difficulties, an underlying problem is also seen to be that of the current image of chemistry, in both the eyes of the public and those of prospective students. This situation is not unique to New Zealand, as illustrated in a report received from Professor R.D. Guthrie on the 1985 meeting of Presidents of Chemical Societies, which is summarised elsewhere in this issue.

These matters should be of concern to all members of the NZIC. To assure an adequate supply of future generations of chemists action is required now. Council has decided on the following initiatives.

Chemical Education Trust. A Chemical Education Trust fund is to be established to promote the study and teaching of chemistry in secondary schools. The fund will be used to support and increase activities in promoting chemistry in schools.

The target for the fund is a minimum of $100,000, with working funds provided by the interest earned on this amount. An initial "seed" of $20,000 will be provided from Institute reserves, with the remainder to be raised by an appeal for contributions from industry, and from corporate members of the Institute. Contributions to the fund will be allowable as tax deductions, if approved by the Minister of Finance.

Over the next few months a trust deed will be prepared, and Trustees appointed. Letters soliciting contributions will be circulated widely to those companies involved with chemistry and the chemical industry, and to members of the Institute. It is essential that this scheme receive the fullest support possible, and members are urged to do all that they can to see that it is a success.

National Chemistry Week. To promote awareness of chemistry in schools and also in the public at large, Council is to promote a National Chemistry Week. This approach has met with considerable success for the RACI in Australia, with activities such as a chemistry quiz, a chemical analysis competition, lectures to senior secondary students, visits by chemists to schools, and visits by students to chemistry laboratories. Most Branches of the NZIC are involved in organising some of these activities already. The aim is to coordinate these on a national basis, at the same time raising the public image of chemistry, and of the NZIC, by means of the national and local media.

Our first Vice-President, Terry Hitchings, will organise NCW for 1987, and it is envisaged that the task will fall annually to holders of that office. Initially the aim will be to simply coordinate Branch activities, before drawing them into a national system in future years. The date for National Chemistry Week 1987 is likely to be in the second half of the second term of the school year.

Other Activities. The above are the two major initiatives taken by Council. In addition appropriate representations will be made to the Department of Education with regard to chemical expertise in key areas of their organisation. Council has also resolved to apply for Associate Membership of the New Zealand Chemical Industry Council, which has similar concerns to NZIC with regard to improving the image of chemistry in the eyes of the public.

Review of Science And Technology.

The Public Affairs and Science Policy Committee has prepared a submission on behalf of the Institute to the Ministerial Working Party currently undertaking a review of science and technology in New Zealand. The full text is published elsewhere in this issue. Submissions were also made independently by the Waikato and Otago Branches.

A major feature of the Institute's submission is concern over the application of the "user pays" policy to Government funded science. This was also a key point in the Presidential Address given by Professor Petersen during the Dunedin Conference, and which is also published elsewhere in this issue.

Unemployment Aid. Council is aware that some members are currently unemployed. The recession in certain parts of the economy and/or restructuring of Goverment Departments and the introduction of the "user pays" policy is having its effect. The Honorary General Secretary has been asked to work with the Auckland Branch Committee in the production of a chemists support package, similar to that produced recently for members of the farming community. In addition it has been resolved that "situations wanted" advertisements should be provided at no charge in Chemistry in New Zealand, to members and potential members. Anyone wishing to take advantage of this offer should contact the Editor, with the assurance that all steps will be taken to ensure that confidentiality is maintained.

Grades of Membership. The Auckland Branch has asked that the debate on non-corporate grades of membership be reopened. The Branch is to circulate a discussion paper on its proposals to seek support for this.

The basis of the proposal is that the label Technician is seen as inappropriate by some holders of the NZCS, and presents a real barrier to recruitment at this level. It is proposed that the four grades of non-corporate membership (Student, Technician, Graduate, and Associate) be reduced to two, Student and Associate. The academic criteria for Associate membership would be a combination of those currently applied to Technician and Graduate.

No change in the criteria currently applied to eligibility for the corporate grades of membership is recommended. If the proposal is adopted the status of current Associates would be equated with that of current Technician and Graduate members, and any Associate member would be eligible to apply for full Member status on the basis of appropriate professional experience.

At the AGM of the Institute, held recently in Dunedin, members were urged by the President to participate in discussions on the proposal at branch level. It is essential that Branch Delegates come to the February meeting of Council with a clear view on the matter, so that this oft debated issue can be resolved once and for all.

Member Affairs. Following the receipt of a letter from concerned staff, the President and Vice-Presidents have written a letter to the Chairman of the Council of the Auckland Technical Institute, expressing concern at the conditions under which chemistry is taught at the Institute. The full support of NZIC was offered in any representations that might be made to appropriate government agencies.

Publications and Publicity. A memo on press releases has been circulated to Branches, Council Committees, and other Council representatives. Members are asked to bring newsworthy items regarding the Institute and its members to the attention of Branch Chairmen, so that they can be given full publicity through the local and/or national media.

Council has asked the Publications Committee to investigate the production of a set of new publicity leaflets, including a membership application on each form, to replace the somewhat dated one currently in use. The leaflets will be targeted at particu-

HONOURS AND AWARDS

Council is pleased to announce the following honours and awards:

Easterfield Award: Dr P.J. Steel, University of Canterbury.
ICI Prize: Dr W.A. Denny, Cancer Research Laboratory, University of Auckland.
Shell Industrial Chemistry Prize: N.D. Blazey, NZ Pharmaceuticals Ltd, Palmerston North.
1987 NZIC-RACI Visiting Speaker Award: Dr R.B. Bucat, University of Western Australia.
Chemical Education Award: A.G. Groves, Ellesmere College, Leeston.
Chemical Essay Prize: B. Whittington, University of Canterbury.
Student Paper Prize: A.M. Manning, University of Otago.
Honorary Fellowship: The following members have been elected Honorary Fellows of the Institute: I.R.C. McDonald, Dr J. Rogers, Dr H.P. Rothbaum, A.H. Wooff.

ELECTION OF OFFICERS

The following were elected unopposed and take office on 1 September, 1986:

President: Dr B. Halton.
First Vice-President: T.R. Hitchings.
Second Vice-President: Dr D.R. Llewellyn.
Honorary General Secretary: Dr J. Rogers.

COUNCIL NEWS

lar recruitment groups, such as students and newly qualified chemists, similar to those currently produced by the RACI.

Council were also pleased to learn that because of the current high rate of advertising support for Chemistry in New Zealand the publisher has advised that there will be no increase in journal costs to the Institute for at least the next twelve months. The Institute has also been given the opportunity to sell advertising on its own behalf, thereby off-setting journal costs from revenue earned in this way. The Editor will shortly be contacting Branches with further details as to what can be done in this regard.

International Chemistry. Dr Mary Good, 1986 President-elect of the American Chemical Society, is to speak at the 1987 ANZAAS conference which is being held in Palmerston North next January. Dr Good has made outstanding contributions to chemistry as a research scientist — in the area of inorganic chemistry related to materials science — as an effective teacher, a hard-working leader in professional societies, and currently as a chemical industry executive. She is President of Signal Research Centre Inc., a unit of Allied Signal in Des Plaines, Illinois.

Another notable visitor to ANZAAS will be Dr J.I.G. Cadogan, Director of Research for BP International and former President of the Royal Society of Chemistry, who will be remembered as an outstanding speaker at the NZIC Golden Jubilee Conference in 1981. Council is to sponsor a function in honour of both these visitors during their time in Palmerston North. Brian Halton our President will host the function.

The American Institute of Chemists has engaged in a programme to sponsor American chemists and chemical engineers to other nations. The first such group, under the aegis US Exchanges, visited New Zealand in September and made contact with the Honorary General Secretary in Auckland, and attended a meeting of the Otago Branch in Dunedin.

PAC CHEM '89 An invitation has been received from the Chemical Society of Japan, host society for the 1989 International Chemical Congress of Pacific Basin Societies, for NZIC to again be an Official Participating Organisation, as for the 1984 Congress. A delegate has been invited to attend a meeting, along with representatives of the ACS, CIC, Chinese Chemical Society, FACS and RACI, to be held in Tokyo, July 1987.

Members wishing to offer suggestions for symposia and possible organisers are asked to contact the President, Dr Halton.

Meetings. A telephone meeting of Standing Committee is planned for 7 November 1986, and Council will meet in Wellington 3/4 February, 1987. Papers for circulation to Council members prior to the February meeting must be with the Registrar by 5 December, 1986.

B W Graham, Editor
September, 1986

MEMBERSHIP CHANGES

25 August 1986

Honorary Fellows:

I R C McDonald — formerly Deputy, Director, Chemistry Division, DSIR.

J Rogers — formerly Director, N.Z. Fertiliser Research Assn and presently General Secretary, NZIC.

H P Rothbaum — formerly Deputy Director, Chemistry Division, DSIR.

A H Wooff — formerly Head of Science, Christchurch Boys High School.

Fellows:

Cooney, Ralph Paul, BSc(Hons) PhD(Q'land) FRACI, Chemistry Dept, University of Auckland (Professor).

Cutfield, John Franklin, MSc PhD(Auck) Dept of Biochemistry, University of Otago (Senior Lecturer).

Groom, Philip Stanley, BSc. Chemistry Division, DSIR, Auckland (Scientist).

Harvey, Colin Charles, MSc PhD(NZ), KRTA Ltd, Auckland (Senior Geochemist).

Lee, Donald, BSc(Hons) PhD(Edin) Dept of Surgery, University of Otago (Research Officer).

McKenzie-Parnell, Joan Margaret, MHSc PhD(Otago) Dept of Human Nutrition, University of Otago (Senior Lecturer).

O'Brien, John Patrick, MSc(Auck) MIMM, CEng, Applied Geology Associates, Auckland (Director).

Sharman, Lionel Edward, MSc(Well) Chemistry Division, DSIR, Gracefield (Section Leader, Forensic).

Weatherall, Ian Leslie, MSc(NZ) PhD(Cant) School of Home Science, University of Otago (Senior Lecturer).

Whyman, Derek, BSc(Hons) PhD(Lond) MRSC Chemistry Dept, University of Otago (Senior Lecturer).

Winter, Stanley, The Southland Co-op Phosphates Co Ltd, Invercargill (Technical Manager).

Member:

Boddy, Ian Kenneth, MSc PhD(Auck) University Chemistry Laboratory, Cambridge U.K. (Post-Doctoral Fellow).

Brimble, Margaret Anne, MSc(Auck) PhD(Sthmptn) Grad RSC Chemistry Dept, Massey University (Asst. Lecturer).

Calder, Philip Charles, BSc(Hons Massey) Dept of Biochemistry, Auckland University (Asst. Lecturer).

Freeman, Michael Conrad, BSc(Hons Warwick) PhD(Massey) North Canterbury Catchment Board, Christchurch (Scientist).

Jurlina, Jeffrey Louis, MSc PhD(Auck) ICI (NZ) Ltd, Lower Hutt (Biochemist).

Monk, Gary Neil, BSc(Hons Cantuar) Canterbury Frozen Meat Co Ltd, Belfast (Analytical Chemist).

O'Brien, Glenys Anne, MSc PhD(Auck) Allan Aspell and Associates Ltd, Auckland (Analytical Chemist).

Trounson, Mary Elizabeth, BSc(Hons) PhD(Otago) Wool Research Organisation, Christchurch (Scientist).

Member from Graduate:

Bennett, Tony Edwin, BSc NRM Feeds Ltd, Auckland (Quality Assurance Officer).

Hubbard, Michael James, BDS,PhD(Otago) National Institutes of Health, Bethesda Md, USA (Visiting Fellow).

Misuelly, Gordon Mark, BSc(Hons Otago) Chemistry Dept, University of Otago (PhD Student).

Siva, Umapathy, M.Appl.Sci(Madras) Chemistry Dept, University of Otago (Visiting Lecturer).

Thompson, Murray Bruce, BSc(Hons Otago) Logan Park High School, Dunedin (Teacher).

Member from Associate:

Patel, Dhiru Bhai, MSc(Jabalphur) ARA Water Laboratory, Auckland (Senior Technician).

Sidwell, David Ewart, NZCS Pacific Steel Ltd, Auckland (Works Chemist).

Associate Member:

Ashby, Kelvin Russell, NZCS Waitaki International Ltd, Timaru (Senior Chemist).

Cavanaugh, Mark Andrew, NZCS Defence Science Establishment, Auckland (Chemical Technician).

Associate from Technician:

Harper, Christine Joy, NZCS NZ Industrial Gases Ltd, Lower Hutt (Sales Supervisor).

Technician:

MacMillan, Verily Linda NZCS Ministry of Agriculture and Fisheries, Whangarei (Biochemist).

Graduate Members:

Arnold, Leslie John, BSc Chemistry Dept, University of Waikato (MSc Student).

Barton, Richard Hadlow, MSc(Auck) Chemistry Dept, University of Auckland (Research Technician).

Carroll, David Ronald, BSc Chemistry Dept, University of Auckland (Student).

Cleverley, Douglas Robert, BSc Chemistry Dept, University of Auckland (Student).

Deed, Terence Charles, BSc NZ Forest Products Ltd, Tokoroa (Chemist).

Demeke, Getaheen, BSc Chemistry Dept, University of Auckland (Student).

Goeth, Michelle Elizabeth, BSc Chemistry Dept, University of Auckland (Student).

Hayman, Alan Ross, BSc(Hons Otago) Chemistry Dept, University of Otago (PhD Student).

Hindmarsh, David Kevin, BSc Chemistry Dept, University of Auckland (Student).

Howe, Trudi Anne, BSc Chemistry Dept, University of Auckland (Student).

Janssen, Mrs Sally Joyce, MSc(Auck) Chemistry Dept, University of Auckland (Student).

Johnson, Martin Victor, BSc Chemistry Dept, University of Auckland (Student).

Johns, Jeffrey Roy, MSc(Auck) Chemistry Dept, University of Auckland (Asst Lecturer).

Lynch, Gregory Paul, BSc(Hons Otago) Chemistry Dept, University of Otago (PhD Student).

McDonald, Armando Gabriel, MSc(Otago) Forest Research Institute, Rotorua (Scientist).

Marsh, Nicholas Francis, MSc(Auck) Chemistry Dept, University of Auckland (Student).

Milne, Alan James, BSc Chemistry Dept, University of Otago (MSc Student).

Mitha, Amin Sadrudin Hasham, MSc(Auck) Dulux NZ Ltd, Auckland (Technical Officer).

Neilson, Judith Claire, BSc Pacific Pharmaceuticals Ltd, Auckland (Development Chemist).

Quartly, Murray John, BSc dip T'chng, Mintech NZ Ltd, Nelson (Technical Sales Rep).

Raine, Alan Robert, BSc BE Carter Holt Harvey Ltd, Manukau City (Building Products Cadet).

Reid, David John, NZCS BSc 3 Fearon Ave, Mt Roskill, Auckland.

Roscoe, Stephen Barrie, BSc Chemistry Dept, University of Auckland (Student).

Smith, Sean Campbell, BSc(Hons Cantuar) Chemistry Dept, University of Canterbury (PhD Student).

Stone, Martin Jeremy, BSc Chemistry Dept, University of Auckland (Student).

Continued on page 145

COUNCIL NEWS

NZIC PRESIDENT — 1986/87

The newly-elected President of the NZIC is Dr Brian Halton of the Chemistry Department, Victoria University, Wellington. Brian Halton was born in Lancashire, England. He gained his BSc (Hons) degree in chemistry in 1963 at the University of Southampton and PhD in organic chemistry in 1966 from the same institution. After a year of post-doctoral research at the University of Florida, he was appointed to the faculty as Assistant Professor. He transferred to Victoria University of Wellington in 1968 and has held the position of Reader in the Chemistry Department since 1977. He spent six months as a Visiting Lecturer at the University of New South Wales, took a study leave at the University of Reading, and more recently was Visiting Professor at the University of Utah whilst on sabbatical leave in 1981-82. Dr Halton has authored and co-authored over seventy scientific papers, was a contributor to the Chemical Society Specialist Periodical Report 'Alicylic Chemistry' and, with Dr J.M. Coxon of Canterbury University, has co-authored a text 'Organic Photochemistry' now in its second edition with Cambridge University Press. His research interests lie in the sphere of non-natural products with particular emphasis on the chemistry of highly strained organic molecules. He was awarded the Research Medal of the N.Z. Association of Scientists in 1974 and the ICI research medal by the Insitute in 1980. He was the recipient of a British Council travel award in 1974 and a Fulbright fellowship in 1981. He is a Fellow of the Institute, a Past-Chairman of its Wellington Branch and was a member of Council (1978 to 1981) before being elected 2nd Vice President in 1984. He is married and has two sons.

Submissions of the New Zealand Institute of Chemistry The Ministerial Working Party: Review of Science and Technology

The Institute of Chemistry welcomes this opportunity to offer opinion on Science and Technology (S&T) in New Zealand. Indeed, it is timely to review science policy because of the expectations society has in this technological era. The low level of expenditure on research and development (R&D) in NZ, the lack of taxation incentives to encourage industry to invest accordingly, and current suggestions that the 'user pays' principle should apply to such R&D programmes are all likely to cause further decline in the country's competitiveness for overseas markets. The absence of a representative organisation not only to advise Government, but also to coordinate S&T policy amongst the research facilities of the government and public sector laboratories, the universities, and industry is evident. New Zealand's size and the nature of its industries demand an approach to S&T policy that is a balance between unfettered basic research and 'user pays' R&D. The small science base must be efficient; wastage caused by competitiveness between government science organisations should be minimised. As New Zealand will always import its technology it is crucial that its scientists keep breast with international developments.

We now address our concerns by way of specific comments and recommendations.

1. **We perceive a distinct need for a national science policy** which encompasses the roles of S&T in government, in industry and in the universities. Presently there is no such policy nor any effective policy-making group in Government.

1a. Science is directly relevant to many Ministries; therefore we **recommend that an eminent scientist be appointed Chief Scientist in the Prime Minister's Department.** If given a suitable support system the Chief Scientist's office would compare well with equivalents in overseas countries.

1b. **We recommend that a Science Research Council be established.** This should be comprised of eminent scientists drawn from the public and private sectors and the universities, and it should advise Government of S&T options.

The Council should, through a research sub-committee(s), **fund and coordinate high quality research** at the fundamental basic and applied levels, particularly in the universities but also in the government laboratories. Such a Council would better represent science in NZ and its funding support (technical assistants, studentships, post-doctoral fellowships etc., c.f. Australian Research Grants Committee) would encourage active and acclaimed researchers with on-going programmes.

2. We recognise that government investment in S&T is considerable, but that industry investments are low. The multinational companies have research facilities overseas, whilst many indigenous organisations cannot justify the costs of sophisticated R&D laboratories. Hence **there is an essential link between industry and Government in New Zealand.** Application of **the 'user pays' principle will favour short term work only, encourage government science into a servicing role to the detriment of its research function, and compete with private analytical laboratories.**

3. We are of the view that **government research** should be mission oriented, but that it **must include basic research which may well have a long lead time before 'pay-off.'** Fundamental studies are best performed in the universities, but the staff may also effectively contribute to basic and applied programmes. The Research Associations clearly oriented to their relevant support base are very important in the New Zealand context.

Investment in science is an investment in the future. Government should fund on the basis of the expectations it has for the development of our society over the medium-to-long term.

4. We believe that encouragement of entrepreneurial skills in industry will aid economic development, but note that **there is an urgent need to provide appropriate incentives to industry for R&D programmes.** Joint investment and partnerships between the public and private sectors should be encouraged.

5. We recommend **a better interchange of scientists between government, university and industry,** so that there is a clearer understanding between the groups, a more efficient usage of talents, and a rationalisation of high cost equipment by co-joint ownership between the various users.

6. We are intensely aware that the NZ science of tomorrow depends upon the quality of education available today. The public image of science is poor. Chemistry is central to the basic sciences and the lack of qualified chemistry teachers in the secondary schools is of grave concern to us. We are strongly of the view that **every secondary school should have on its teaching staff a professionally qualified chemist.** At the university level it has been shown (U.K.) that quality undergraduate teaching is reflected from quality research. **The high student/staff ratio in the NZ universities decreases staff effectiveness and must be rectified** if quality science graduates are to be available for the high technology industries of tomorrow.

7. The Review Committee should consider the implications of C.E.R. to the NZ scientific effort and look to collaboration where possible; Australasian competitiveness in the Asia-Pacific region must be maintained.

Dr B. Halton
Public Affairs and Science Policy Committee

Membership Cont. from Pg 143

Sutton, Bridget Mary, BSc Chemistry Dept, University of Auckland (Student).
Walsh, Russell Stuart, BSc Chemistry Dept, University of Otago (MSc Student).
Watson, Paul Andrew, BSc Chemistry Dept, University of Auckland (Student).
Wong, She Tin, MSc(Auck) Chemistry Dept, University of Auckland (PhD Student).
Worth, Gillian Helen, BSc(Hons Otago) Chemistry Dept, University of Otago (PhD Student).

Life Members:
G A Nicholls (Auck) A D Shand (Canty) G O Osborne (Ov).

Resignations:
L W Fletcher, R A Hodge, V N Holmes, P R Leslie, A L Thompson, L S Thompson, P Walters, H K Wong (Auck). G A Abbott, K L Brown, A Denward, N R Towers (Waik). J K Alexander, S J Gardiner, G L Dick, P R Herrington, D G Howarth, D J Howell, M B Jameson, H A Poulsen, G R Sheeman, P C Tyler, S K Virtuia (Well). J D Morton, (Canty). C R Clark, P W Larking, G Wong (Otago). A Chittendon, L K Powell (Os).

Deaths:
S A Tse (Well), W Williams (Auck).

THE IMAGE OF CHEMISTRY

The following notes are from a report received from Professor R.D. Guthrie, President, The New South Wales Institute of Technology, Sydney, and formerly Secretary General of the Royal Society of Chemistry. In his former role Professor Guthrie chaired a session with the above title, at a meeting of Presidents of Chemical Societies, held in Lyon, France, September 1985. Some 26 countries were represented at the Presidents Meeting, and of these 16 participated in the session chaired by Professor Guthrie.

Two basic conclusions could be drawn from the session: all countries have a problem with the image of chemistry; and all societies felt that there was a need to do more than they were doing at the present.

A simple illustration shows the problem faced. A drawing competition organised by the Societé Française de chimie for young children showed a strong correlation between: chemistry and pollution; chemistry and explosions; and chemistry and nuclear hazards.

There was general agreement that the approach needed had to be two-fold: in the short term press and publicity — better external relations generally; in the long term general education of the public — in particular better awareness of science amongst schoolchildren.

An obvious conclusion from the presentations at the Meeting was that the level of activity varied with the size of society, though many of the smaller societies were surprisingly active.

Surveying the various written and verbal submissions several activities were ranked highly by a number of societies: the development of a resource base to assist the media to obtain correct information, particularly about hazards and accidents; the establishment of a press office with at least one full time member of staff; the production of publications, video or TV programmes (or interaction in their making); and parliamentary and government interaction.

Many societies liaised with industrial and other laboratories to have open days for the public. These were particularly successful in the Netherlands, Belgium and Sweden.

Exhibitions of the achievements of chemistry were felt by some societies to be important. In Japan, for example, the fair "Invitation to Chemical Wonderland" held in Sendai in 1983 had 100,000 visitors in three weeks. Another similar fair "Chemistry Tomorrow" took place in Nagoya this year.

A now regular event on a national scale is the Australian "National Chemistry Week" — an idea to be copied by the Royal Society of Chemistry. (and NZIC! — Ed.) On the educational front many societies had special lecture programmes aimed at schoolchildren.

In conclusion it is clear that the image of chemistry is a worldwide problem, that it is being tackled vigorously by most societies. It is hoped that the session held at the Presidents Meeting will help by transferring ideas from one society to another.

Before closing it may be of interest to draw readers attention to the recent report published by the Royal Society (not the Royal Society of Chemistry) called "The Public Understanding of Science." This is obtainable from the Royal Society, 6 Carlton House Terrace, London SWIY 5AG at a cost of £6.90. A shortened version called "Science is for Everybody" is available free. In this document it emphasises what I believe to be an important problem in the solution to the image of chemistry. That is that scientists, in our case, chemists, must accept that they, as individuals, as well as collectively have a responsibility to interact with the public. Let me quote from the document (p.3) :

"All scientists therefore need to learn about the media and their constraints, and to learn how to explain science simply, without jargon and without being condescending." The attitude that must be changed is that of so many chemists and typified by the response to our Society's Press Officer's request for summaries of papers to be presented at a conference (for the preparation of press releases). The reply read — "I regret that the talk that I shall give is too technical for a brief synopsis to convey anything of interest to a lay audience."

With friends like that who needs enemies!

R.D. Guthrie
November 1985

IUPAC NEWS

IUPAC and Chemical Education

Many chemistry teachers equate the International Union of Pure and Applied Chemistry (IUPAC) with chemical nomenclature, terminology, units, symbols, atomic weights and related topics. They may not be aware that IUPAC is also involved in a number of other activities — not least chemical education.

Some 1500 chemists from over 40 countries work on IUPAC's Committees and Commissions. One of these is the Committee on Teaching of Chemistry (CTC). The Committee arranges international conferences and workshops and is involved in the production of various publications.

• **Conferences.** IUPAC sponsors some 30 international conferences each year. These include the highly successful CHEMRAWN conferences: Chemical Research Applied to World Needs. CTC arranges international conferences on chemical education. These are held every two years. The most recent, entitled 'Widening the Scope of Chemistry for our New World' will be held in Sao Paulo, Brazil in July 1987.

• **Workshops.** CTC has been involved with a UNESCO-inspired initiative to encourage laboratory work in colleges and university courses. These have taken the form of regional workshops. The first was held in Seoul, Korea in 1975. Others have taken place in Bangladesh, Denmark, India and Jordan.

• **Publications:** IUPAC publishes conference proceedings and definitive volumes of chemical data and nomenclature. These include the famous 'colour' guides to chemical nomenclature, quantities, symbols and units. The Union also publishes the scientific journal **Pure and Applied Chemistry** and its own news magazine **Chemistry International.** CTC produces the **International Newsletter of Chemical Education** twice a year. Over 3000 copies are printed per issue and distributed free. CTC is also involved in the publication of various books on chemical education.

In January this year IUPAC launced an Affiliate Membership Scheme in order to maximize the participation of chemists throughout the world in its affairs and also to disseminate information about its activities to a much wider audience. In its first six months of operation over 5200 chemists from 26 countries became Affiliates. These included many chemistry teachers. Affiliates receive several benefits, including six copies per year of **Chemistry International.** They are entitled to reductions in registration fees at IUPAC-sponsored conferences and also reductions on the costs of most IUPAC publications. Above all, Affiliates become visible as potential recruits for the scientific work of the Union.

Further information about IUPAC, its activities and its publications may be obtained from Dr Michael Freemantle, IUPAC Secretariat, Bank Court Chambers, 2-3 Pound Way, Cowley Centre, Oxford OX4 3YF, UK (Telephone + 44 (865) 717744)

Affiliate Membership

The IUPAC Affiliate Membership scheme is administered in New Zealand by the NZIC. Application should be made through the Registrar, enclosing $(NZ)20 for subscription, preferrably before mid-December, 1986. The benefits of Affiliate Membership are as outlined in the above article.

IUPAC Documents

Comments are invited on the IUPAC documents listed below. Brief synopses of these are held by the Honorary General Secretary, NZIC. The closing date for comments is indicated in brackets alongside each entry. Details regarding the availability of the documents and the addresses to which comments should be sent are available from the General Secretary, Box 29-183, Christchurch.

Nomenclature, symbols, units in spectrochemical analysis: Part X,

Preparation of materials for analytical atomic spectroscopy. (Feb. 87)

Nomenclature, symbols, units in molecular absorption spectroscopy: UV and visible. (Jan.87)

(a) Names for hydrogen atoms, ions and groups, and for reactions involving them. (March 87)

Nomenclature of sampling in Chemistry. (March 87)

Nomenclature of inorganic chemistry (The Red Book): Revisions of 2nd Edition (1970)

(i) Chapter 1.1: General aims, functions and methods of nomenclature

(ii) Chapter 2-5: Names based on stoichiometry. (April 87)

Nomenclature for cyclic organic compounds with contiguous formal double bonds (the S-convention). (May 87)

Recommendations for the presentation of papers for publication in luminescence spectroscopy. (June 87)

THE BIOTECHNOLOGY MISSION TO JAPAN 1986

Experiences, Impressions and Thoughts for the Future.

John Robertson

Dr John Robertson is an Assistant Director within Applied Biochemistry Division, DSIR, Palmerston North. He was the organiser of the New Zealand Biotechnology Mission to Japan, working closely with staff of the International Section, DSIR, Head Office, and the New Zealand Embassy, Tokyo.

In the words of Mission Member Ian Forrester, Otago University, on the last Saturday in Tokyo —

"The New Zealand Biotechnology Mission has been privileged to experience a comprehensive insight into all facets of the Japanese bioindustries and bioresearch supporting structure. The era of electronic commodities is about to be replaced by a completely new 'revolution in living': the biological revolution. The Mission returns to New Zealand with a feeling of genuine urgency to try to tell New Zealanders what is just around the corner for society. The impact of the biological revolution will be staggering. New drugs to warn of cancer starting in our bodies, new drugs to combat cancer, drugs to reverse birth defects, new types of food and new devices based on various properties of biological molecules to sense the environment. Everyone knows how successful the Japanese nation has been over the last 30 years; we drive Japanese cars, use Japanese cameras, wear Japanese watches and add our grocery bills on Japanese calculators."

And now the Japanese are turning their attention to what they are calling the 'bioindustries revolution.' By the year 2000, the Japanese Ministry of International Trade and Industry (MITI) predicts the contribution of these industries to the gross national product will be around 11%. This revolution will be based to a large degree on expansion of traditional fermentation industries into new areas involving specially cultured or genetically manipulated plant, animal or bacterial cells. The Japanese are predicting high commercial returns from products derived from these systems in the pharmaceutical and food markets. To achieve such goals the Japanese are working systematically towards developing the scientific and technological skills, as well as the organisational structure, to ensure successful research and coordination with commerce. One such coordinating body visited by the Mission, was the Bioindustries Development Centre (BIDEC) which is funded both by Government and by industry and which is playing an important role in stimulating research and commercial development among a group of companies with interests predominantly in fermentation technology.

Can and should New Zealand participate in the bioindustries revolution? The feeling of Mission members was that we must. We must gear our biotechnology to a level which will allow participation. If we do not, we will be "left out in the cold" in terms of the full development of the economic potential of our biological resources. New Zealand has rich biological resources which are already sought after by the Japanese as one of our three top trading partners. Mission member Jim Turnbull, Gibco, expressed the view that there is potential for further development of these resources using biotechnology to produce value-added products or semirefined materials for use in Japanese bioindustries. Clearly entry into these markets will require careful research and determination but Elizabeth Lampen-Smith, Waitaki International, considered that where a New Zealand company had information, technology or a product which was wanted by the Japanese, they are willing to talk business.

Other comments taken from the reports from Mission members, which are presently being compiled in a major report on the Mission, include views expressed by Dick Bellamy, Auckland University.

"I found the most impressive aspect of biotechnology in Japan to be the close integration between the traditional fermentation companies (beer, yeast, food etc) and what we now view as modern biotechnology. Many of these companies are diversifying horizontally into products not traditionally associated with food production (e.g. erythropoietin: Kirin Breweries; enzyme production: Oriental Yeast Co; colony stimulating factor: Morihaga Milk and so on);

Bill Howie, A.J. Park and Son, commented; "It is my opinion that New Zealand ignores new bioindustry at its peril. If the industry needs to have a special environment established in Japan and the new industries need support than I cannot see how New Zealand can even keep abreast of international developments without providing the same sort of environmental support in New Zealand. Food processing and protein engineering must be seen as matters of vital importance to New Zealand's future." Michael Boland, DSIR, and John Christeller, DSIR, echoed these sentiments.

"The proposition that the technique of protein engineering will be fundamental to the optimal development of biotechology is well accepted in Japan. Practically every institute we visited had projects (fundamental or applied), utilising site-directed mutagenesis or other protein engineering techniques. . .Protein engineering is seen as the number one priority in biotechnology. New Zealand has little activity in this area and it should be vigorously promoted so that we too can benefit from this exciting field."

Ian Maddox, Massey University, reporting on opportunities for New Zealand in Japanese bioindustries raised the possibility that: "If we can provide a source of low-cost raw material for fermentation, it might be possible to produce and export to Japan bulk chemicals (joint ventures?)" and "If we can isolate microorganisms with novel activities or construct such strains, then New Zealand could possibly enter the "high value chemical market."

In the plant areas Tony Conner, DSIR, reported that:

"Overall I was disappointed with the extent of plant molecular biology research in Japan. Although there were some excellent research projects going on, I was expecting greater input. The level of expertise in New Zealand came as a surprise to some Japanese scientists. The Japanese are definitely interested in commercial biotechnology contacts with New Zealand.

By most accounts the New Zealand Biotechnology Mission to Japan led by John Troughton, DSIR, was highly successful and especially so in terms of rapport developed among members.

Clearly some Mission Members would have liked to have done other things in Japan. Julian Davies, DSIR, expressed the view that more commercial companies should have been visited. From an organisational view point, making arrangements to visit companies in Japan turned out to be by far the most sensitive aspect of the preparation for the mission. Several New Zealand organisations, already involved in the commercial sphere in Japan, expressed concern prior to the Mission leaving, that the Mission might complicate their activities. Furthermore the New Zealand Embassy in Japan, who along with the International Section of Head Office, DSIR, did magnificent work on the Mission, did not have the time to negotiate a large number of individual visits to commercial enterprises. Such visits, at least in the first instance, require much more effort than a simple phone call. However, most Mission members have now made sufficient contacts in the commercial sector in Japan to allow them to obtain an introduction to almost any company in the area of biotechnology, should that be necessary.

As for the future there are many possibilities and proposals for action. Future missions to Japan have been proposed of small numbers in targeted areas of science and commerce. Also it has been suggested that consideration be given to establishing a BIDEC type of organisation in New Zealand, and that learned societies in New Zealand could play a more active role in bridging the gap between research and commerce in the area of biotechnology.

The New Zealand Department of Foreign Affairs has recently offered to support the visit to New Zealand of two Japanese biotechnologists with whom the Mission had contact and invitations are presently being extended to Professor Isao Karube, Tokyo Insititue of Technology to visit in October, 1986 and Professor Koki Horikoshi, Riken Institute, to visit in February of 1987. Professor Kurube has an international reputation for his work on biosensors and Professor Horikoshi, who is Head of the Superbug Project, is known worldwide for his work on microorganisms from unusual environments. Such outstanding visitors will unboubtedly be required to encourage enthusiasm for developing biotechnology in New Zealand and also stimulate New Zealand's biotechnological industries to participate in the bioindustries revolution, so evidently underway in Japan.

NZIC Conference 1987

Theme: Commercialization of Chemistry

Auckland, New Zealand, 24–28 August 1987

Preliminary Notice & Provisional Application Form

The New Zealand
Institute of Chemistry

The New Zealand
Biochemical Society

THE THEME OF THE 1987 NZIC CONFERENCE IS 'COMMERCIALIZATION OF CHEMISTRY — THE BENEFITS TO NEW ZEALAND'

The intention is to acknowledge the expanding commercial role of chemists in both the Public and Private sector.

It is by recognising their potential, both individually and collectively, that capitalization of chemical resources (technology and materials) has resulted.

Examples of where this has occurred will serve to provide valuable insight into the enormous potential still to come.

Academia will provide the opportunity for industrial research to use dedicated, knowledgeable personnel operating complex, expensive equipment.

No longer will only the larger or multi-national companies have the benefits of involved research. It will be accessable by the smaller companies as well.

All chemists, no matter what their field, will find assistance and support for their endeavours. Academia will benefit from 'real world' experience with the resulting feed back in terms of funds, information and continuing relevance.

Ask yourself:

What are the problems that you face in your job?
Are they so different to those faced by other chemists?
How can a chemist explain the value of his work to accountancy, marketing and sales personnel?
Should communication and business skills be taught to chemists?
How is chemical technology transferred to industry?
How can research chemists identify industry's problems?
Does chemistry have a place in senior management?
Does the NZIC have a role in the commercialization of chemistry?

These topics will be addressed.

THE VENUES ...
Catering to a wider audience than previous conferences, the first day of the conference will be held at Aucklands' prestigious Sheraton Hotel. Able to seat 650 people in comfort, this venue is ideally suited to hosting our first day of activity.

We then move less than a kilometre down the road to the University of Auckland for the balance of the conference.

THE RELATED ACTIVITIES ...
Field trips to major industrial sites and research establishments will be offered as an alternative programme during the conference.

THE TRADE DISPLAY ...
The 1987 Chemical Industry Trade Fair (CITF '87) will take place 25–27 August on campus. This fair will cater to the needs of the chemist, both analytical and industrial, and to this extent will be a departure from previous displays being more substantial in its coverage.

THE CONFERENCE COMMITTEE ...

Chairman:	Peter Nelson
Secretary:	Paul Farr
Treasurer:	Neil Edmonds
Committee:	Geoff Brokenshire
	Stephen de Mora
	Bill Denny
	Bruce Graham
	Dennis Karl
	Alan Mackney
	Rodney Norris
	Ken Scott
	Dianne Webster

THE SOCIAL PROGRAMME ...
Two social programmes exist. For those not actively involved in the conference, sightseeing tours will be available for two days. Other activities including arts and crafts and cruises on Auckland's famous harbour are also offered while leaving time for shopping and family commitments.

The evening programme, which includes the conference dinner at the Sheraton, also features a trades dinner, a Great Debate and an open evening at the Auckland Institute Museum.

THE ACCOMMODATION ...
Hostel accommodation will be available. These facilities are located within easy walking distance of the University. While the 1987 room rate has yet to be struck it is estimated that the cost will be in the vicinity of $28.00 per day for full accommodation and meals. Additionally, a number of rooms are held at the Sheraton Hotel for conference delegates. In both instances an early indication of your requirements would be appreciated.

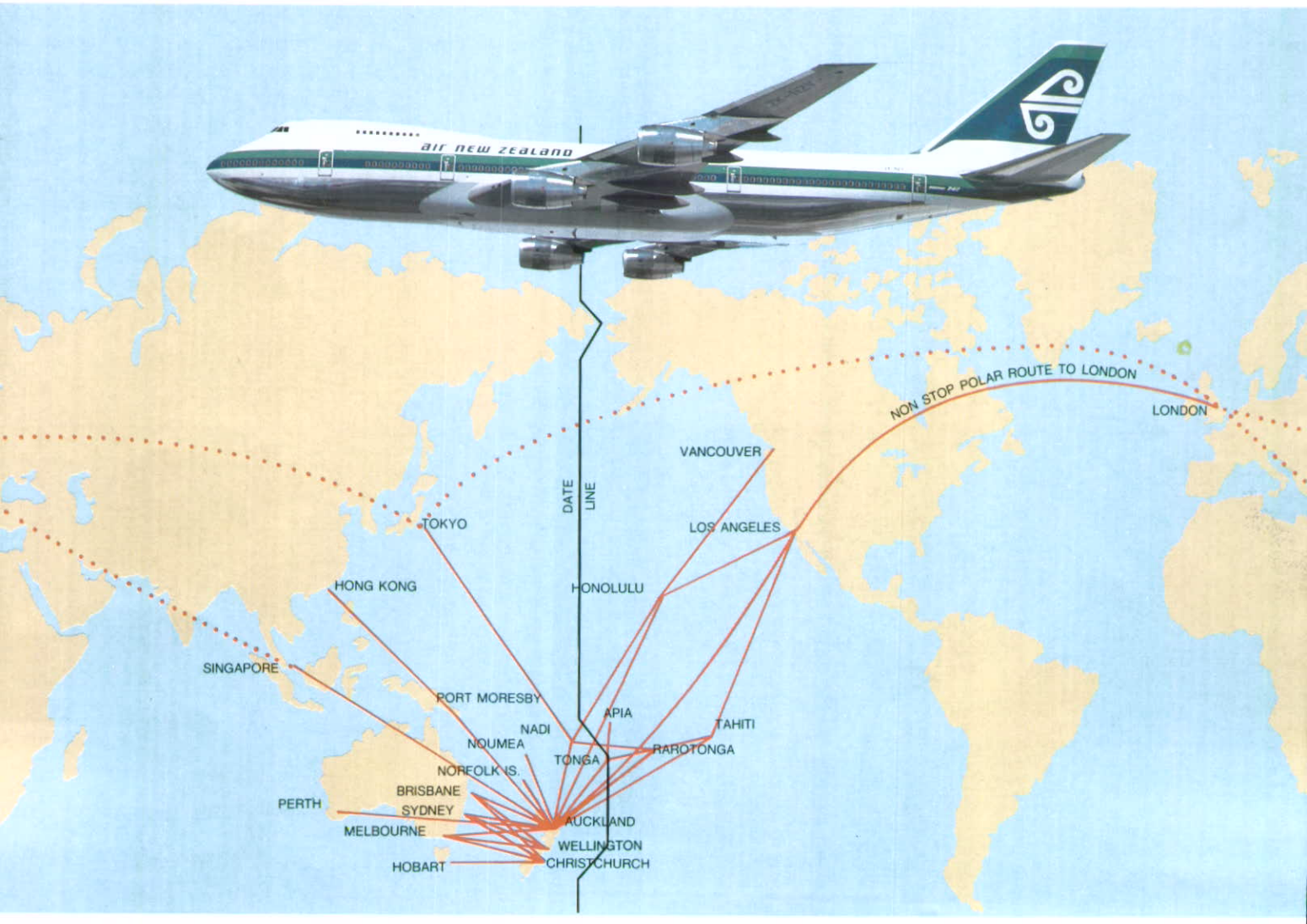
THE PROVISIONAL APPLICATION FORM ...
Accompanying this preliminary notice, there is a provisional application form that allows us to furnish you with more information as required. Additional forms are available on request.

For further information contact:

Brian Fairchild
Conference Organiser
Private Bag
Browns Bay, Auckland 10
Phone (09) 403-9109/404-6737
Telex NZ 60596 SECOSER

CONDITIONS: The transportation companies or firms concerned are not to be held responsible for any act, omission, or event during the time passengers are not on board their aircraft or conveyances. The passage contract in use by the carriers concerned when issued shall constitute the sole contract between the transportation companies or firms and the purchasers of these tours and/or passengers.

TOUR NZ13



AIR NEW ZEALAND OFFICES

NEW ZEALAND: All major cities; **AUSTRALIA:** Sydney, Melbourne, Brisbane, Adelaide, Perth; **FAR EAST:** Singapore, Hong Kong, Tokyo; **USA:** Los Angeles, San Francisco, San Diego, Detroit, Dallas, New York, Seattle, Portland, Phoenix, Tampa, Chicago, Denver, Washington, Houston, Honolulu; **CANADA:** Vancouver, Calgary, Toronto, Edmonton; **SOUTH AMERICA:** Caracas, Sao Paulo; **EUROPE:** London, Manchester, Frankfurt, Rome; **PACIFIC ISLANDS:** Nandi, Suva, Apia, Rarotonga, Papeete.

INDUSTRIAL NEWS

Dr David B. Rands, director and General Manager of Taubmans International NZ, has been appointed a director of parent company Taubmans Industries Ltd, of South Australia. He transfers to Sydney as General Manager of the Building Paints Division in Australia, with responsibility to direct this segment of the New Zealand company.

Dr Rands joined Taubmans as Production Manager in 1976. He rose to Marketing Director in 1982 and succeeded Mr Simpson as General Manager in 1983.

Neil Galloway has been appointed a director of Taubmans International NZ Ltd. A first class honours graduate from Victoria University, he joined the company as Works Chemist in 1979 and later attended a general management course at International Paints, in England. Mr Galloway is a graduate member of the NZ Institute of Chemistry and a member of the NZ Division of the Oil and Colour Chemists' Association.

Canterbury Frozen Meat Company

Gary Monk has joined the company in the position of Chemist, after resigning from G.L. Bowron & Co.

Shell

Mr A.A. Turner of Shell has been seconded to the Liquid Fuels Trust Board for two years. Alan is a member of the Institute's Public Affairs and Science Policy Committee.

A.C. Hatrick (NZ) Ltd has recently concluded a technical collaboration agreement with Dyno Industrier A.S. of Oslo, Norway.

A.C. Hatrick (NZ) Ltd is a leading manufacturer of formaldehyde based resins used by the wood processing industry in New Zealand. Dyno Industrier is a major manufacturer of these resins in many countries of the world including Norway, Finland, Sweden, Denmark, Singapore, Indonesia, Pakistan and shortly in Western Australia.

The Agreement with Dyno will thus provide Hatrick with access to the most up to date resin technology available. The strong research and development activities of Dyno and its many associates will ensure the continuing availability of modern technology to A.C. Hatrick and its customers.

Mr John Kenny has left his position as Chemist with the Southland Co-operative Phosphate Company to become Laboratory Manager with Travenol Laboratories, suppliers of intravenous solutions, prescription drugs and other hospital supplies, in Auckland. While in Invercargill, John has acted most ably as contact man for news for the Journal from the Southland area. John's wife, Frances, is also a chemist and will be leaving her post with N.Z. Aluminium Smelters for the move to Auckland. Although presently occupied with a young family, she intends now to broaden her horizons and train for secondary school teaching.

UNIVERSITY NEWS

Mr John Milligan of Auckland Technical Institute will be taking industrial refresher leave from 14th July to 22nd August. He will be visiting several companies in the Auckland area to familiarise himself with modern industrial techniques.

Waikato

We have been pleased to welcome two overseas visitors to the department. In May **Professor Cullen** from the University of British Columbia addressed a seminar on "Organic synthesis with the aid of Group VIII transition metals;" followed, in June, by **Professor D.E. Ryan,** the McLeod Professor of Chemistry at Dalhousie University in Halifax, who gave a talk on "Neutron Activation Analysis and the SLOWPOKE Reactor."

Arrivals and Departures: A new Raman instrument — a Spex Ramalog Spectrometer with a helium neon laser excitation source — has recently been purchased. At the end of June, **Dr Alistair Wilkins** left for a year's study leave at NAS, Canberra, and early in July **Mr Kevin Poschalk** from James Cook University (Townsville) arrived for a six month visit to the Science Education Research Unit — he will be working with LISP (Energy).

Massey

Professor Ben Freiser (Purdue University, West Lafayette, Indiana) described new developments in fourier-transform mass spectrometry at a Chemistry and Biochemistry Departmental Lecture on 22 August. Developments that he discussed included selected ion reaction monitoring, collision-induced dissociation, pulsed valve addition of gases and the gas phase chemistry of laser-generated metal ions. Despite the fact that the FTMS is a single region mass spectrometer Professor Freiser showed how ions of interest can now be prepared, isolated and then reacted with various molecules in the absence of the ions' parent gas.

The use of a four-sector mass spectrometer (VG, ZAB-4F) at the National Institutes of Environmental Health Sciences, Research Triangle Park, North Carolina, for collaborative research on the use of high resolution mass spectrometry together with collisional activation of ions was described by **Professor Maurice Bursey** (University of North Carolina, Chapel Hill) at a Departmental Lecture on 1 September. Applications of collisional activation to previously inaccessible ions (such as peptides in the 100-1500 molecular weight range) and studies of the unusual chemistry of collisional activation of polyethyleneglycols were discussed by Professor Bursey. Initial high resolution mass spectral separations were shown to be particularly useful for the removal of solvent ions in fast atom bombardment mass spectra.

Victoria

A "Careers Symposium" was held at Victoria University on 30th July, to which all chemistry and biochemistry students of third year level or above, were invited. **Dr Halton,** as Vice President, explained the role of the NZIC, and pointed out the advantages of membership. This has resulted in about 15 applications for student and graduate membership being received. Brief talks were also given by **Dr Gordon Leary, Dr Geoff Beresford,** and **Dr Joan Mattingley** on employment and career opportunities for graduates, in DSIR, private enterprise and hospital laboratories.

A UGC Post-doctoral Fellowship has been awarded to **Professor Leon Phillips** and **Dr Peter Harland** to investigate photon and electron impact of ionic and neutral clusters in a pulsed molecular beam. The Nicolet Instrument Company has made a gift of $10,000 worth of computing equipment to **Dr Ward Robinson** to assist research into optimising experimental procedures associated with x-ray crystal structure analysis. **Drs Murray Munro** and **John Blunt** received research funds of $187,500 from Harbor Branch Foundation Inc. to further their research into the isolation of antiviral and anti-tumour compounds from marine invertebrates.

Otago

Professor Mike Roberts has arrived recently to take up the Chair of Pharmacy. **Dr Dennis H. Robinson** has now left for a lectureship in the Department of Pharmaceutical Science at the University of Nebraska after 10 years on the staff at Otago.

The Department of Pharmacology was host in August to a 2 day meeting of the N.Z. Branch of the Australasian Society of Clinical and Experimental Pharmacology. Papers presented covered topics in drug kinetics and dynamics, drug metabolism and distribution, hypertension, respiratory, neuro — and psychopharmacology, and on computers in pharmacology. A joint symposium was held on one afternoon with the NZIC conference on "Current Problems in Clinical and Environmental Toxicology."

Dr Rosalind Gibson, from the Department of Applied Human Nutrition at the University of Guelph, Canada, has arrived to spend a year's sabbatical leave in the Nutrition Department. She will spend February in Papua New Guinea to further her studies on trace elements in human nutrition.

From the Chemistry Department, **Assoc. Prof Donald J. Brasch** and **Dr Derek Whyman** have now completed preparation of their book entitled "Problems in Fluid Flow." It was publishd by Edward Arnold (Publishers) Ltd of London in August, and is intended for use primarily by students of Chemical Engineering, Applied Chemistry, Mineral Technology and other Applied Sciences.

Siva Umapathy, who is working with **Drs A.J. McQuillan** and **B.M. Peake** to complete a PhD degree, will shortly move to the University of York to take up an SERC post-doctoral fellowship with **Professor R.E. Hestor.** Mr Umapathy will work on laser Raman spectroscopic studies of electron transfer reactions.

OBITUARY

John Hill Goodey
1910-1986
M.Sc, MNZIC M.Inst. F.

John Hill Goodey died in Auckland on March 2nd, 1986. Born in London in 1910 he was brought as an infant to New Zealand in 1912. The family settled in Wanganui where John attended Wanganui Technical College becoming Dux of the School. He gained both Junior and Senior Scholarships before proceeding to the University of Otago. At Otago, where he graduated B.Sc in 1931 he held successively the Beverley Scholarship in Pure and Applied Mathematics and the John Edmund Fellowship in Applied Science.

As Senior Scholar in chemistry under Prof. Inglis he first carried out research on ozone. Later for his Master's thesis he undertook some of the earliest research on the "Chemical & Technical Aspects of N.Z. Mineral Oils." In particular he studied the identification and estimation of the aromatic constituents of Taranaki Oils.

Following his marriage in 1936 and as a direct result of his research he left N.Z. to join the staff of the Shell Company of Australia initially as research chemist and ultimately became chemist in charge of their Australian Head Office laboratory based in Melbourne.

During this time with Shell, which included the critical period of the 1939-45 war, one is continually impressed with the versatility and breadth of John's interests. These included the manufacture and analysis of sulphonated fatty oils, the substitution of oils needed for the textile and leather industries, and an extremely detailed research programme into the composition and structure of emulsions. This later work was delivered as a full course of lectures at Melbourne University and published by the Australian Chemical Institute in 1949.

Of special interest during the war was his work on developing a suitable contaminant to render petrol supplies unusable by any advancing enemy. So successful was this work that a practical demonstration to the army totally imobilised a convoy of vehicles provided for the experiment.

On his return to NZ in 1952 John joined the Auckland Gas Company as Chief Chemist. As an industrial chemist he was responsible for work both inside and outside the works. Outside he was responsible for investigating and later installing a cathodic protection system for high pressure gas mains serving the North Shore. The publication of this work embraced actual field observations and the subsequent successful design and installation of the protection system. At the same time he was responsible for the setting up and supervision of the Tar and Ammonia Plants at the Works.

Concurrent with the above he carried out extensive trials on the suitability of N.Z. coals for gasification and developed a range of surfactants and detergents as by products for the works. Not content with this he was also responsible for experimental work on refractory materials for use in the plant.

Anticipating the arrival of natural gas in 1962 John joined Colmore Holdings as Chief Chemist. This firm included Consolidated Chemicals and Sonata Laboratories as part of its interests. John was closely involved with their early development of epoxy resins for a multiplicity of uses. In contrast he then turned to the development of marine anti fouling paints and returned to his earlier experiments on surfactants, foams, emulsifiers and cleaning compounds. With these he was actively involved until his retirement in 1975.

His working life as an industrial chemist not only confirmed his early research ability but also his innovation and versatility over a wide range of disciplines. He was an industrial "chemist" par excellence, using his theoretical ability to solve real and actual problems. He was highly respected by all who worked with him and was extremely generous with his assistance to those who turned to him for help.

Originally an Associate of the Institute in 1933, he transferred to the Royal Australian Institute during his stay in that country, rejoining NZIC in 1955. He was also a member of the Oil and Color Chemists which he joined in 1959. For many years a member of the Auckland Committee he played an important role in organising the 1968 conference.

John was an active member and elder of the Presbyterian Church. He is survived by his wife Dolly, a son Ronald and three daughters Ngaire, Marilyn and Bernice to whom our sympathy is expressed. To me as a close friend for over thirty years he is sadly missed.

Ken Seal

BRANCH NEWS

Auckland

Dr Arnis Kuksis of Charles H. Best Institute of the University of Toronto gave a talk to a lunchtime meeting of the Auckland branch in mid-August. The talk was entitled "Plasma Lipid Profiling in Health and Disease." The meeting was a joint one with the Fats and Oils Group and was attended by more than 80 people.

Also at the meeting the Auckland Chairman, **George Clark,** took the opportunity to make a presentation to **Stan Brooker** on the occasion of his 75th birthday.

Prior to the meeting Dr Kuksis visited the DSIR campus at Mt Albert, where he met **Dr Harry Young** and others and looked at the work being done on lipids and mass spectrometry.

Waikato

Professor George Petersen gave his Presidential Address on "DNA — Tackling the Megamolecule" when he visited the branch on 12 June. he also presented the J.E. Allan Memorial Prize to **Bridget Kerr**, who was judged to be the best second year chemistry student at Waikato University in 1985. Some branch members took the opportunity to express their concern about projected government cuts in research expenditure. The President agreed to investigate the situation and suggested that other scientific societies affected by this problem should also be contacted.

Dr Doug Watson, Chief Chemist, Motonui Synthetic Fuels Plant, presented an address entitled "Chemistry of the Motonui Process" on 16 July. School science students and staff were especially invited to attend this branch meeting.

Professor James McCloskey, Department of Medicinal Chemistry, University of Utah, Salt Lake City, talked about "Structural Elucidation by Mass Spectroscopy" at the branch meeting held on 3 September. He described recent developments in applications of mass spectroscopy to bio-medical research.

Manawatu

Dr Mike K. Andrews of the DSIR's Physics and Engineering Laboratory discussed the Department's silicon technology programme at a Branch meeting on 22 July. He described the development of integrated circuits, the structure of transistors and the materials used in their manufacture. The Laboratory's facility and its development programme were also discussed by Dr Andrews.

Two plenary lecturers from the 10th Conference of the Australian and New Zealand Society for Mass Spectrometry, held in Dunedin during 26-29 August, visited the Manawatu and addressed Branch Meetings of the Institute. **Professor Arnis Kuksis** (Banting and Best Institute, University of Toronto) discussed human blood plasma lipid profiles in health and disease at a meeting on 21 August. New methods of analysis of plasma lipid components were described by Professor Kuksis, together with their application to clinical analyses. Professor Kuksis also described gas chromatographic analyses of triglycerides on an especially purified methyl phenyl silicone liquid phase that is nonpolar at temperatures below 300°, but displays polar characteristics above 300°.

At a meeting on 1 September, **Professor James McCloskey** (Department of Medicinal Chemistry, University of Utah, Salt Lake City) described recent advances in the application of mass spectrometry to the microscale structural studies of organic compounds, in particular base-modified nucleosides. He discussed the advantages and disadvantages of thermospray liquid chromatography/mass spectrometry and tandem mass spectrometry (together with collisional activated dissociation) for the analysis of complex mixtures of compounds.

At the 1986 Manawatu School Science Fair held during 20-23 June in Palmerston North, the Branch prize in the intermediate category was awarded to **Robert Groat** and **Martin Vieregg** for their project "Carbide," in which

GOVT DEPTS & RESEARCH INSTITUTES

MAF, Ruakura Soil and Plant Research Station

Dr Denis Lauren returned at the end of June from 13 months with Agriculture Canada in Ottawa. While there he studied methods for the isolation, structural identification and analysis of trichothecene mycotoxins produced by *Fusarium* species. He now intends to commence a major programme of work studying the occurrence and implications of *Fusarium* mycotoxins in New Zealand cereals and pastures.

MAF, Invermay

At the Invermay Agricultural Research Centre, **Dr Keith Steele**, an agronomist from the Ruakura Research Centre, has now taken up his new position as Director of the Southern South Island Region. Dr Steele is renowned internationally for his work on plant nitrification. Following completion of the extensive building programme at Invermay, and the recent drastic cuts in Government funding, his task will now be to take stock of resources with a view to defining groups with an expertise of value to private industry and overseas concerns which will be able to pay for a service. Readily discernible at Invermay are groups with expertise in hormonal studies in deer and sheep, and in the study of scientific angles of high fecundity gene pools in sheep.

NZ Dairy Research Institute

Recently installed in the Flavour Section is the Shimadzu QP-1000 gas chromatograph/mass spectrometer system. This comprises the Shimadzu GC-9A outfitted for fused silica capillary columns, directly interfaced to the mass spectrometer. The system is complemented with library search facilities using a modified version of the NBS/NIH/EPA mass spectral data base. **Dr Owen Mills** is the Officer in Charge of the QP-1000, which will be used to identify flavour compounds in dairy products.

DSIR

Food Research & Development Centre, Singapore

On July 12, 1986 **Norman Lodge** attended and delivered a paper at the Inaugural Conference of the ASEAN-New Zealand Business Council held at Jakarta, Indonesia. His paper dealt with "Opportunities for Science & Technology Transfer: ASEAN/New Zealand."

The Conference was held under the joint auspices of the ASEAN Chamber of Commerce and Industry and the New Zealand Chapter of the ASEAN/New Zealand Business Council. Present were 70 participants from the ASEAN countries and 22 from New Zealand. Plenary Meetings of the ASEAN/New Zealand Business Council are planned to be held every two years.

Applied Biochemistry Division

Dr John Shaw is spending 12 months at the Food and Drug Administration, Washington, working on advanced applications of mass spectrometry on food research with **Dr James Sphon**. He is investigating the use of fourier-transform mass spectrometry, MS/MS and very high resolution gas chromatography/mass spectrometry (VG-ZAB) to problems in flavour biosynthesis, peptide sequencing and mapping, mixture analysis and natural product characterisation.

Professor Milton Bailey (Department of Food Science and Nutrition, University of Missouri-Columbia) visited the Division and the Animal Science Department, Massey University during 23-25 July to discuss results of a joint research contract with Drs' Cecil Johnson, John Birch and Roger Purchas. The contract (with the US Department of Agriculture's Office of International Co-operation and Development) involved studies of the flavour of cooked beef and lamb from animals fed different diets. Professor Bailey also addressed a seminar in which he discussed his investigations of the chemical sterilant Kastrin (zinc tannate) for bulls.

Chemistry Division, Gracefield

Messrs Sun and **Ma** from the Nanjing Forestry School have been working with **Yeap Foo** and **Lawrence Porter** on tannin chemistry during this year.

Those staff members who have travelled overseas recently included: **David Bibby,** to the 7th International Conf. on Zeolites in Japan, followed by a later visit to laboratories in Europe and USA; **Werner Giggenbach,** who attended a Geochemistry Conference in Florence in June; **Doug Crump** travelled to Canada and USA on work related to the possible commercialisation of animal pheromones for pest control; **Don Hannah** will attend a major conference in dioxins in Japan in September and later will visit laboratories in N. America and Europe; **Richard Furneaux** and **Peter Tyler** attended the 13th Int. Carbohydrate Symposium at Ithaca and later visited laboratories in USA and UK during August; the Director **Gordon Leary**, visited Australian Govt laboratories during May and attended Sir George Porter's retirement celebrations in London in July.

Dan Perera has been awarded an ICI NZ Award and will be on study leave at Newcastle for 18 months. **Rod Weston** was awarded a Prince and Princess of Wales Fellowship and will spend 3 months at the U. of Oklahoma: **Debbie Moynihan** was awarded a Churchill Fellowship and will study for MSc in Forensic Science at the U. of Strathclyde. **Roger Newman** will spend 12 months study leave from September at Oxford working with Ray Freeman's group. **Neil Milestone** returned in September from 15 months study leave at Brookhaven, NY. **Lawrence Porter** attended the RACI Organic Chemistry Symposium and **Sue Vintner** a workshop on isoelectric focussing; both events were in Adelaide in May.

The Dominion Analyst, **Craig Stevenson,** hosted a meeting of Australasian crime laboratory chiefs in August. New staff members are **Alistair Lennie** and **Jane Orange,** both in the Environmental Chemistry Section, and **Sarita Pillai,** Forensic Section.

Wheat Research Institute, DSIR

In keeping with the DSIR's new corporate image, the Wheat Research Institute is hoping to join the ranks of Michener, Ludlum & Co in the best sellers list with work having begun on a technicolor recipe book. All recipes will incorporate cereal products, and are being prepared and tested by WRI staff before being accepted for publication.

Branch News Cont. from Pg 150

they investigated the action of eight common household liquids (including kerosine, dishwashing detergent, soy sauce, vinegar and water) on calcium carbide. A second entry was also of particular merit — for his display, "Natural Pigments," which studied the dyeing of samples of wool with aqueous extracts from several different berries, **Gavin Snowsill** was highly commended.

Wellington Branch

Professor Neil Curtis gave the Mellor Lecture at Central Institute of Technology on 9 July, giving an account of the development of his interest and expertise in the chemistry of macrocyclic ligands. After discussing methods for the preparation of these compounds and how their ability to complex with various metal ions can be controlled by altering the size of the ring, Professor Curtis described how ligands such as the "crown" ethers can be used as phase transfer catalysts, and speculated on possible future applications of ligands in inorganic analysis. I am sure those members who attended the lecture would wish to join with me in thanking the speaker for an introduction to the chemistry of macrocyclic ligands in general, and a fascinating account of his own research in particular.

Otago

Professor George B. Petersen delivered the annual President's address to the Branch at a meeting in July. His talk, entitled "DNA: Tackling the Megamolecule," was an informative and entertaining account primarily of his work in sequencing of the amino acid residues in certain protein molecules. Also in July, and primarily at the request of student members of the Branch Committee, an employment seminar was held to highlight career opportunities in Chemistry and Biochemistry. First held in the afternoon, it was repeated in the evening, and in total, over 100 students from schools and the University attended. Speakers included **Mr Ron Hall** from N.Z. Forest Products, **Dr Peter Williams** from the DSIR, Chemistry Division, Wellington, and **Mr Neil Jacobsen** from Alliance Freezing Co., Invercargill. August saw the Annual Conference of the Institute, held this year in Dunedin and organised most efficiently by **Professor Arthur Campbell** and his team.

The Otago Science Fair for schools, run jointly by the Otago Science Teachers Association, the Otago Branch of the Royal Society and the Kiwanis, was held again during August, but again, there were few exhibits with a chemical theme. Exhibitors selected to represent Otago at the National Science Fair to be held in Hamilton later in the year included **Shane Sturgeon** and **Jeremy Baker** with an exhibit "The Candle," all of these students coming from Otago Boys High School.

The biennial science teachers conference, "Scicon," was also held in Dunedin in August this year, with approximately 120 participants attending.

CONFERENCES

Perspectives in Marine Natural Products, 1987

A one day symposium organised jointly by the Departments of Chemistry and Zoology, University of Auckland, and sponsored by the Auckland Branch and the Fats and Oils group of the NZIC.

This event, scheduled for Thursday 12th February in the Department of Chemistry of the University, is expected to create a great deal of interest among students, academics and industrial chemists.

Overseas speakers include Dr K.L. Rinehart, University of Illinois, Dr J. Coll, James Cook University, Townsville and possibly Dr W. Fenical, Scripps Institution, San Diego. Other invited speakers include Professor M. Munro, Dr J. Blunt, Professor P. Bergquist and Dr J. Croft. An opportunity will be available for other participants to present their work in poster form.

All those interested in attending this symposium which hopes to repeat the success of the 1982 symposium "Chemistry and the Undersea World," should contact: Professor R.C. Cambie, Department of Chemistry, University of Auckland, Private Bag, Auckland.

The fee for this informative one day symposium including teas, lunch and a mixer is a modest $50.00. Bona fide students may register for the symposium for a reduced fee of $20.00.

56th ANZAAS Congress, Palmerston North, 26-30 January, 1987

Energy, health, women's and nuclear issues, new technologies — and the popular attraction of Dr David Bellamy are features of the Australian and New Zealand Association for the Advancement of Science congress programme announced by organisers.

The 56th ANZAAS Congress will bring over three thousand Australasian scientists to Palmerston North in January 1987 mixing state-of-the-art specialist topics with general public sessions.

Planning for the multi-faceted congress has been progressing throughout this year and organisers have now confirmed the highlights of the main science programme.

Fresh from his conservation battles in Tasmania globe-trotting botanist and media personality Dr David Bellamy has accepted a place as a main congress lecturer and will deliver a paper titled 'Planting a Future'.

Also speaking as a main lecturer will be Professor John Cadogan, an internationally recognised energy specialist and expert in visual aid presentation techniques who is currently Director of Research for British Petroleum.

The prominence given to women's issues at recent ANZAAS congresses will be continued with many discussion sessions devoted to the subject, highlighted by two main symposia — 'Women in Science' and 'Women's Lives and Visions.'

Eight health symposia grouped under the title 'Health Sciences' will focus on high-interest topics such as AIDS, in vitro fertilisation, brucellosis, sports medicine and work injuries.

Featured in the health programme is Nobel Laureate Dr D. Carleton Gajdusek who leads the laboratory for central nervous system studies at the National Health Institute in the United States.

Congress organisers believe that scientific debate on the nuclear question is of primary importance, and a major symposium on nuclear issues will include American scientist Dr R. Schribner — an active contributor to discussions on arms control and international security.

The developments and consequences of new technologies are also key areas in the programme with lectures on the implications of tecnological advance, legal issues and a series of sessions dealing with gene manipulation in plants, animals and microorganisms.

Congress organisers stress that anybody can register to attend ANZAAS and that programmes are designed for broad, wide-ranging disussions rather than technical detail.

For further information, contact the Organising Secretary, Dr M. Baxter, Massey University, Palmerston North.

Methane Conversion: A symposium on the production of fuels and chemicals from natural gas.

University of Auckland, 27-30 April, 1987. The recent commissioning of the world's first Gas to Gasoline plant at Motunui, New Zealand, has drawn attention to the growing importance of routes to liquid fuel and chemicals from sources other than crude oil.

The University of Auckland is hosting a 3-day symposium with the theme of methane conversion to liquid fuels and chemicals. The symposium will be followed by a 1-day excursion to the Motunui Gas to Gasoline plant. The symposium programme in Auckland will consist of invited lectures and contributed papers

Continued on page 153

MATTECH – Materials Science & Technology Research Seminar

MatTech a materials science and technology research seminar was held on the DSIR campus at Gracefield on June 24. The seminar was organised jointly by **Dr R Whitney** of BRANZ, **Dr S Devine** of PEL and **Dr H Trodahl** of Victoria University and attended by about 80 scientists and technologists from both industry and institutions. The aim of the meeting was to promote communication between researchers in these fields by creating an awareness of facilities and expertise available in the Wellington area and promoting discussion on problems and future materials usage trends.

The Director of Physics and Engineering Laboratories, **Dr Bill Robinson** welcomed the attendees and spoke briefly on some effects Govenment policy is having on PEL. Papers were presented on facilities and expertise available, industrial case histories described and a Plenary speech presented by **Dr J Metson** of Auckland University.

Dr D Bibby of DSIR Chemistry Division spoke on "Synthesis and Characterisation of Microporous Solids," an area which includes zeolites such as the ZSM-5 used in the gas to gasoline project. He covered synthesis and structural elucidation using many of the techniques available in Chemistry division for materials research. These included; X-ray powder and single crystal diffraction, solid state NMR, BET surface area measurements, atomic absorption, thermal analysis and of course chemical analysis.

Dr H Trodahl of the Physics Department at Victoria University described the materials research which is included in the research programmes of the Chemistry and Physics departments and the Research School of the Earth Sciences. He used the study of amorphous materials to illustrate the use of many of the facilities such as; vacuum deposition systems, X-ray and electron diffraction, X-ray fluorescence, electron microprobe, electron microscopy, thermopower measurements and far infrared and Raman spectroscopy. Dr Trodahl emphasised that graduates were an important product of the University in the Materials Science and Technology field and that the University would welcome any suggestions from practitioners in this area on a proposed course to be set up by the Chemistry and Physics Departments.

Dr W Sharman of the Building Research Association of New Zealand spoke on the building materials research and testing activities of the Association. These are centred in the areas of fire, building physics and materials durability. Facilities described included; flammability, early fire hazard, pilot and full scale furnace testing, guarded hot box and controlled climate chambers, xenon-arc weatherometer, salt-fog cabinet and universal testing machines.

Dr J Tallon spoke on materials research and engineering at PEL. The research at PEL was divided into four areas; looking at the mechanical, thermodynamic, electronic and optical properties of materials. Facilities available include; electrical impedance spectroscopy, FTIR, ESR, ultrasonically modulated electron resonance, scanning and transmission electron microscopes with EDAX, ultrasonic composite oscillator, ultrasonic viscometer, Instron test machine and programmable Dartec test facility.

Mr J Whitehurst spoke on industrial metallurgy at Industrial Processing Division of DSIR. Metallurgy is not at present taught in New Zealand Universities so expertise is brought in from overseas. He outlined the type of problems that were dealt with and illustrated these with examples. Common problems included welding faults and incorrect specification of materials such as stainless steel.

Case histories involving materials problems were presented. **Mr R Wakelin** of Expandite presented a problem of joint design in concrete floors. **Mr R Hastie** of Pilkington Brothers NZ spoke of materials problems encountered in the manufacture of safety glass. **Mr R Freeman** of the New Zealand Concrete Research Association outlined some of the Associations work on measuring the permeability of concrete as a means of determining concrete durability. **Mr C Gooch** of Resene Paints described a problem with a timber stain on Pinus caribea timber in Fiji. **Dr P Driver** of Chemical Cleaning Ltd outlined some of the problems his company gets involved with. He sees the use of plastics as engineering materials an area where more expertise is needed. He also suggested that the big majority of problems could be solved with existing expertise if the industry knew where to get it. He saw the secondment of researchers to industry for periods of time as a means of raising awareness of industry problems.

Dr J Metson presented the Plenary lecture "Studying Surfaces — the case for a New Zealand Surface Analysis Facility." He identified New Zealand's investment in the energy sector and our extensive use of metal products in a corrosive environment among the reasons for needing surface analysis tools. The lack of facilities has also led to a low exposure to these techniques of students in the university system. A single multi-instrument laboratory able to serve a broad range of interests to be sited at Auckland University was proposed. The choice of instruments was; firstly XPS (X-ray photoelectron spectroscopy), then SIMS (secondary ion mass spectrometry) and thirdly AES (auger electron spectroscopy).

During discussion at the conclusion of the seminar some interest was expressed in workshops to further knowledge in individual areas. **Professor D Beaglehole** in summing up expressed the opinion that the expertise to answer most problems already existed and that ways were needed to get that expertise to the industry rather than acquire new facilities and techniques.

At this point a useful step would be the preparation of a document containing lists of facilities and expertise available and giving some indication of the accessibility, cost and time delays involved, for their use by the industry and other researchers.

Conferences Cont. from Pg. 150

on the following topics: Methanol to gasoline and related chemistry, Process development, Alternative routes, Acid zeolites and related catalysts, Commercialization of Methanol to Gasoline, for further information contact: Dr R.F. Howe, Chemistry Department, University of Auckland, Private Bag, Auckland, New Zealand, Tel. (09) 737-999, ext 8313, or Dr C.D. Chang, Mobil Research and Development Corporation, P.O. Box 1031, Princeton, New Jersey, USA 08540, Tel. (609) 737-4248.

9th Australian Symposium on Analytical Chemistry.
Sydney, 27 April — 1 May, 1987

Analytical chemistry symposia traditionally provide expert speakers in a range of specialist areas and 9AC has fulfilled this role by inviting some 15 distinguished scientists from around the world (including Australia and New Zealand) to review their special areas. Subject areas covered will include the following: Agriculture, Clinical & Biological Chemistry, Computers & Laboratory Automation, Environmental, Food & Carbohydrates, Mining & Metallurgy, Occupational Hygiene, Pharmaceutical Chemistry.

Instrument analysis reviews will be presented in the following: Selectivity & Opimisation in High Performance Liquid Chromatography, Analytical mass spectrometry, Capillary gas chromatography, Flow Injection Analysis, Analysis using Inductively Coupled Plasma and mass Spectrometry, Ion chromatography, Electrochemistry. Registration forms are available from Mr John Eames, Post Office Box 137, North Ryde, N.S.W. 2113, Australia. (02-8878688).

The Asia-Pacific Congress on Occupational Health and Safety

A conference with a difference but one of special interest to all chemists and chemical engineers is to be held at Massey University from November 17 to 20 1986. The conference is being jointly sponsored by the Accident Compensation Corporation and the Faculty of Business of Massey University.

The theme of the conference is, Health, Safety and Productivity: Partners in Progress Towards 2000.

A number of overseas speakers will be presenting papers and among the topics to be covered are: Toxicology, Hazard Assessment, Biological and Environmental Measurement, Health Hazard Control, Cost-benefit and Productivity, Specific Hazards, Ergonomics, Noise and Vibration, Epidemiology, Risk Management. Another important aspect will be the coverage of the systems and management approach, which is so essential, if all the disparate elements essential to successful action are to be brought together.

For further information write to The Congress Administrator, Management Education and Development Centre, Massey University, Private Bag, Palmerston North.

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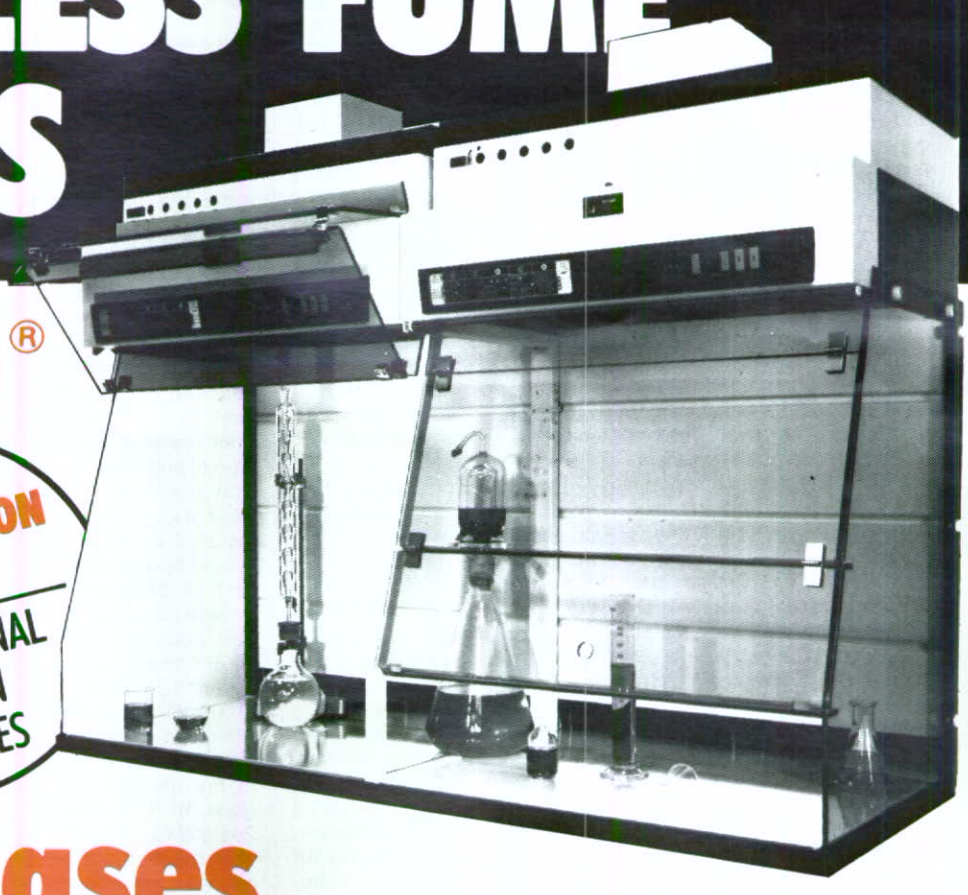

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SAFETY

Call for Submissions –

Assessment and Control of Major Accident Hazards in Industry.

The NZIC has been invited to submit comments on a document prepared by the Department of Labour on "The Assessment and Control of Major Accident Hazards in Industry." This has been prepared for a working party established by the Advisory Council for Occupational Safety and Health, to consider the question of requiring the adoption of hazard assessment procedures in industry. (The term hazard assessment is taken to include the techniques known as hazard analysis and hazard operability).

Before any final decision is made, the working party is seeking comments on the proposals set out in a discussion paper. In particular, comments are sought on the threshold for the application of these proposals, and on the type of information which should be included in the hazard assessment guidelines which are to be prepared to assist companies to meet the new requirements.

Copies of the discussion paper should be available from the Dept. of Labour, Head Office, Private Bag, Wellington. The deadline for comments is 30 November, 1986. The NZIC submission will be prepared by the Hazardous Chemicals Committee, and anyone wishing to have an input on this should contact the chairman, Dr W.A. Temple, National Poisons Information Centre, Box 913, Dunedin, before 20 November.

Background

The need for this document arises out of the current public concern over major industrial hazards, which has been heightened in recent years by events such as those at Bhopal, Mexico City, Seveso, and of course the ICI fire. It is recognised that a number of problems exist with the current system of controls in this country and this document proposes an administrative arrangement which will address such problems. It will also ensure that Government and the public generally can be assured that industries are conducting their potentially hazardours activities in a safe manner.

Scope

It is proposed that the system will cover major accidents (emissions, fire or explosion) which are likely to lead to a serious danger to persons or the environment. These would have resulted from **uncontrolled developments** in the course of an industrial operation and would involve one or more hazardous substances or a potentially hazardous process or pressurised system.

The industrial operations which will probably be covered include bulk storage, manufacturing plants, waste disposal by incineration, chemical decomposition or other potentially hazardous methods, and operations utilising potentially hazardous pressurised systems. Hazardous substances are defined as those which pose a serious risk to persons or the environment in **uncontrolled situations**, and this definition would include explosives, flammable gases, highly flammable liquids, and toxic substances ("Dangerous and Deadly Poisons" — as defined in the Toxic Substances Act).

The threshold for the introduction of hazard assessment procedures will be defined in a number of ways, including such factors as the quantities of material on site or in use, and the type of process or pressurised system. Appropriate thresholds for New Zealand have not yet been determined but some examples of values prescribed in overseas legislation include ammonia, 60 Tonnes, chlorine, 10 Tonnes, LPG, 50 Tonnes, petroleum, 10,000 Tonnes, and sulphur dioxide, 20 Tonnes.

Requirements

The administrative arrangements for hazard assessment may be applied to both new and existing plants. Organisations intending to establish a new plant or alter an existing one will be required to notify the appropriate authorities of their intention at the earliest possible stage. For these and for all existing plants, the authority may require the provision of detailed information on the potentially hazardous operations and the management systems and other measures adopted to control these hazards — if it considers that significant or unusual risks are likely to exist. For new plants and alterations to existing plants information may be required on the hazards associated with construction and commissioning, as well as the operation of the plant.

The information that will be required may include the following:

The names and quantities of hazardous substances, descriptions of processes and operations involving these, and other potentially hazardous operations, and descriptions of the hazards which may be created by the activities.

Maps of the site and surrounding areas showing the location of the hazardous activities or substances, significant local feature that may have a bearing on, or be affected by the hazard, and indications of the numbers of people likely to be on site and in the surrounding areas.

Details of management systems, such as Health and Safety policy statements, staffing arrangements for normal operations and in the event of an emergency, quality assurance procedures for safety equipment and systems, and staff training arrangements.

Details of the measures taken to prevent or control potential accidents, including minimising the consequences for the neighbouring community and the environment, and the emergency procedures laid down for dealing with a major accident, including those to be adopted in the local community.

Safety Rates Highly In Chemical Plant

Fernz Corporation's agricultural chemicals complex at Otahuhu has been awarded a two star rating in an International Safety Rating system. It is the third organisation in Auckland to receive a rating, and recognises the $10 million plant's emphasis on safety controls.

The complex was opened in 1983 by Sir Robert Muldoon who called it the most sophisticated chemicals plant in the Southern Hemisphere. Horticultural and agricultural chemical requirements for the national market are manufactured on this site.

The International Safety Rating system is recognised in over 30 countries and rates industrial management with particular emphasis on measuring the effectiveness of safety programmes. The New Zealand audit is carried out by the Accident Compensation Corporation. Mr Brian Houston, regional safety consultant for the ACC said the programme's main objective was to determine the loss control effectiveness of a company's safety programme. "We carry out a systematic critical evaluation of all elements of the safety programme, analyse the company's efforts to identify, evaluate and control potential accidental loss, and we also evaluate the level of compliance with occupational health and safety legislation and the rules established by the company," he said.

Farmers Fertiliser plant manager, Mr Steve Chaney, said he was proud of the way the company had rated. "We received our highest score for employee training (87%) with a very creditable 79% in health control services," he said. The International Safety Rating is audited each year and in March 1987 Farmers Fertiliser intends trying for the four star level of competence.

Farmers Fertiliser Otahuhu staff (from left to right): Richard Ralph, Belinda White, Lynne McLean (centre with certificate), Peter Taki and Steve Chaney with the International Safety rating certificate.

SAFETY PRODUCTS

Road Transport of Hazardous Substances

The road transportation of hazardous substances should be more tightly controlled, according to the recommendations of a report currently being circulated by the Ministry of Transport. The report, prepared by Mr Paul Heveldt of Acousafe Consulting and Engineering Limited, was commissioned in 1985. The terms of reference called for statistics and trends, levels of knowledge of personnel in the industry, operator and union problems, the relative risk of hazardous substance cartage, adequacy of controls such as legislation and enforcement, and recommendations for overcoming inadequacies. Copies of the report are being circulated for comment, and are available from the Secretary for Transport, Private Bag, Wellington.

A key recommendation of the report relates to the 1983 Code of Practice for the Transportation of Hazardous Substances on Land (NZ Standard 5433). According to the report: The transportation of hazardous substances by road in non-bulk container quantities should be controlled (with certain exemptions) by a licensing system based on NZS 5433:1983 as the standard.

Importers, manufacturers, consigners, freight forwarders, and transport operators should all be subject to this licensing. Drivers should be required to hold a special form of the Heavy Traffic Licence which would be granted after certification that they had satisfactorily completed an approved course of training in matters associated with the road transport of hazardous substances. Hazardous Substances Declarations should accompany each individual type of substance carried by road, as required by NZS 5433.

If the above recommendations were adopted it appears that they would be readily accepted by at least some members of the transport industry. According to the September issue of Standards magazine "carriers admit they wanted the Standard, and they thought they would use it voluntarily, but competitiveness in the market-place means they still take risks. And many of the casual carriers of hazardous substances have not even heard about the Standard."

NZS 5433 is but one of a number of standards related to the transportation of hazardous substances. The most important of these are detailed below.

NZS 5433: 1983 Code of practice for the transport of hazardous substances on land

This Standard is all-embracing. It covers the classification of hazardous substances, the labelling and marking of packages, containers and vehicles, packaging of hazardous substances, carriage in bulk of liquids and liquefied gases, storage and compatibility, documentation and transport procedures.

An important aspect of the Code involves driver training, with emphasis on emergency procedures in the event of an accident or breakdown.

NZS 5433 has been published in a format that is convenient for drivers. It is A5 size and is bound in an easily identifiable red ring binder. Sections 1-9 are bound together in one compact volume, while section 10, containing lists of substances, drawings and glossary, is in loose leaf format to enable quick and easy updating.

NZS 5418: Transportation containers for hazaardous substances Part 1: 1983 Specification for tanks for the multimodal transportation of hazardous liquids.

This volume deals with tanks used for the carriage of hazardous liquids within New Zealand by any combination of road, rail, and sea but not air. Included are the requirements for design, construction, testing, and use of rigid portable metal tanks with a capacity of more than 450 litres.

Part 2: 1983 Specification for small packages for transportation by land, sea and air

Part 2 applies to the transportation of small packages (maximum net weight of 400 kg or a maximum capacity of 250 litres) by land, sea, and air. Any package complying with this section is eligible for a New Zealand Standard Certification Mark and a UN packaging symbol.

NZS 5417: 1980 Transportation labels for hazardous substances

This Standard specifies the warning labels that should be used by all carriers of hazardous substances. It covers design, colour, fixing and durability of labels. The labels are based on the internationally accepted diamond labels and symbols. The Standard devotes several pages to illustrating the various labels. Also included at the back of the book are several information documents such as a specimen dangerous goods declaration and typical examples of transport emergency instructions.

Continued next page

SAFETY PRODUCTS

NZS 5445: 1986 Webbing load restraint assemblies for use in surface transport.

This Standard is a specification for this type of restraining system. Recommendations are also given on use and application. As this Standard covers product safety, manufacturers are advised to apply for a licence to use the New Zealand Standard Certification Mark. Details from the Certification Manager at SANZ.

(This article is based on material published in Standards, Vol. 32, No. 6, and NZ Engineering, September 1986).

New Australian Standards: Fume Cupboards, and Chemical Safety

The Standards Association of Australia has recently released a new Standard for laboratory fume cupboards, and two sets of safety reference cards covering emergency procedures and safe storage and handling.

AS 2243 Safety in Laboratories, Part 8 — Fume Cupboards: sets out the required safety criteria and specifications for general purpose laboratory fume cupboards and describes the test methods for estimating efficiency of performance. Useful guidance is given on materials of construction, air flow and fume extraction and dispersal requirements and on siting and commissioning tests. Appendices include test methods for air flow and face velocity and an expanded section on special applications.

AS 1678 Emergency Procedure Guide — Transport: comprises a series of quick reference cards to be maintained in road transport vehicles for use in an emergency involving fire, spill or leak, or accident. Information on hazards and first aid procedures are given.

AS 2509 Safe Storage and Handling: sets out the essential information required for safe storage by personnel of stores and warehouses. Procedures for dealing with spills and fire situations are summarised and first aid instructions are included. Dangerous goods labels. HAZCHEM codes, UN substances numbers, and NFPA codes are given.

Plastics for Chemical Plant

The handling and storage of corrosive chemicals can be facilitated by the use of the correct type of plastic material incorporated into a well designed product.

An Auckland company specializing in the custom manufacture of plastic products has a wide experience in the production of specialized equipment for use in corrosive environments.

The products are generally applicable in three main areas.

Handling of corrosive liquids. Tanks, trays, vessels and tank liners for storage and process work involving chemicals, and associated covers, troughs, pipes and valves. **Handling of corrosive fumes.** Hoods, ducting, axial and centrifugal fans, silencer and scrubbers. **Laboratories.** Fume cupboards and fume extraction systems, polypropylene waste piping, sinks, bench tops.

Clientele for these products include several government departments, hospitals, universities and many major companies for large and small scale work.

The engineering staff have a broad experience in plastic fabrication and its use with harsh corrosive chemicals and are pleased to offer technical information on the suitability of materials to be used, the application of fabrication methods to achieve the best results, and the design of complete systems.

For further details contact Mr M. Hubbard, Chemical Plant Ltd, 13 Patiki Road, Avondale, Telephone (09) 886-054.

For further information please circle no. 7 on reader reply card.

SUPER CAPTAIR 1000

Kempthorne Medical Supplies Ltd moves a step forward by adding the NEW SUPER CAPTAIR 1000 to the current line of CAPTAIR ductless portable fume hoods for the total filtration of toxic substances.

Offering a double retention capacity of 3000 grams for the filtration of toxic substances (average figure of retention capacity before saturation), the new unit has a much larger enclosure:

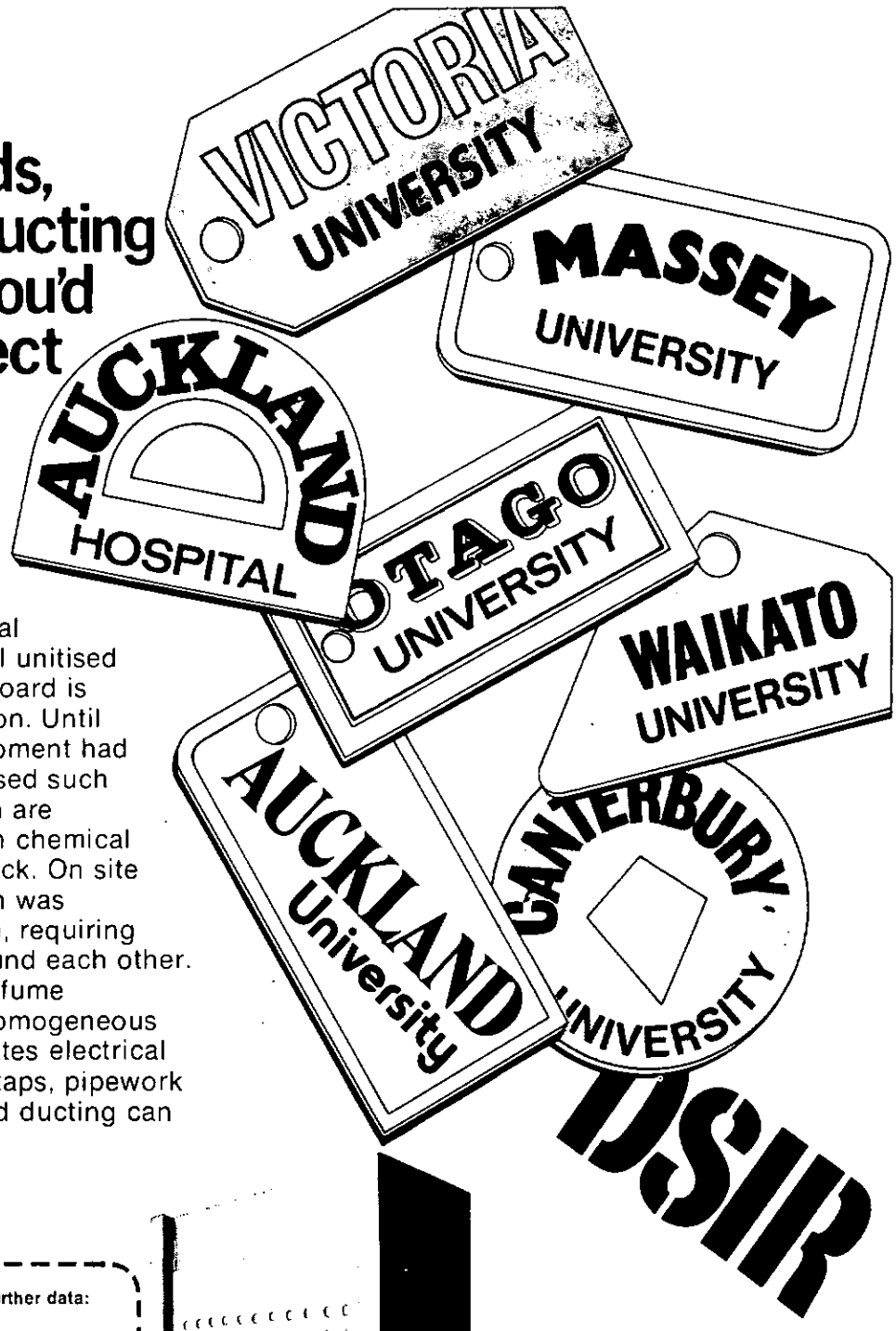
length	944mm
width	654mm
internal height	1090mm

This volume allows the use, within the hood, of much larger equipment as required for instance on control laboratories or analysis laboratories. The air flow of 300 m^3 / hour gives a face velocity of 0.52 to 0.75 m/second with the front panel down, as per Class 1 recommended requirements for work with high toxicity materials.

As for all other units in the CAPTAIR line, filter cartridges are readily available and easily interchangeable. They ensure the total filtration of toxic substances for the duration of their life.

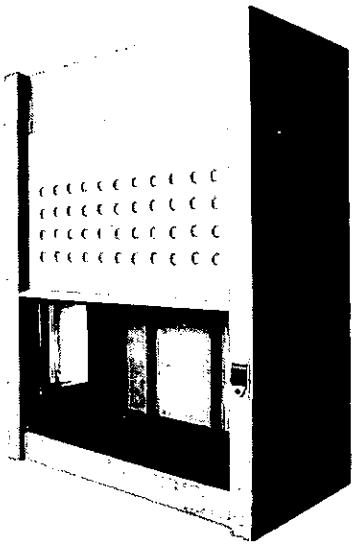
For further information please circle no. 5 on reader reply card.

Our fume cupboards, fans and ducting are where you'd most expect them.



Maskell are in all universities and the greater proportion of research and educational institutions. The Maskell unitised PVC or GRP fume cupboard is something of a revolution. Until recently, design development had been static. Materials used such as wood and aluminium are ill-equipped to deal with chemical and corrosive fume attack. On site construction installation was awkward and expensive, requiring tradesmen to work around each other. The Maskell developed fume cupboard is a single, homogeneous unit. The unit incorporates electrical fittings, water and gas taps, pipework and sinks. PVC fans and ducting can also be built-in.

Simple.



Maskell invite your enquiry for further data:

MASKELL PRODUCTIONS LTD
Bowden Road, MT WELLINGTON
P.O. Box 11-185, ELLERSLIE.

Please send your free brochure.

Name .....

Address .....

.....

NOT ALL FUME CUPBOARDS ARE EQUAL

maskell PRODUCTIONS LTD.

P.O. BOX 11-185, AUCKLAND 5, NEW ZEALAND
FACTORY: 24 BOWDEN ROAD, MT. WELLINGTON
PHONE: 574-398, 574-768. TELEX: 60322
CABLES: MAKPRO.

For further information please circle no. 43 on reader reply card.

Cover Story:

PERKIN-ELMER 800 SERIES

Ratio Recording Infrared Spectrophotometers

The 800 series is a totally new and innovative range of IR spectrometers embodying Perkin-Elmer's years of experience in both advanced optical design and computer technology. While maintaining a tradition of user friendliness, the instruments offer outstanding spectroscopic performance, complemented by an unprecedented range of built-in data handling features.

The 800 series is based on an entirely new optical and electronic design, with spectroscopic performance and versatility foremost in mind.

High optical throughput and fast detector response allow excellent full range spectra to be measured in less than a minute.

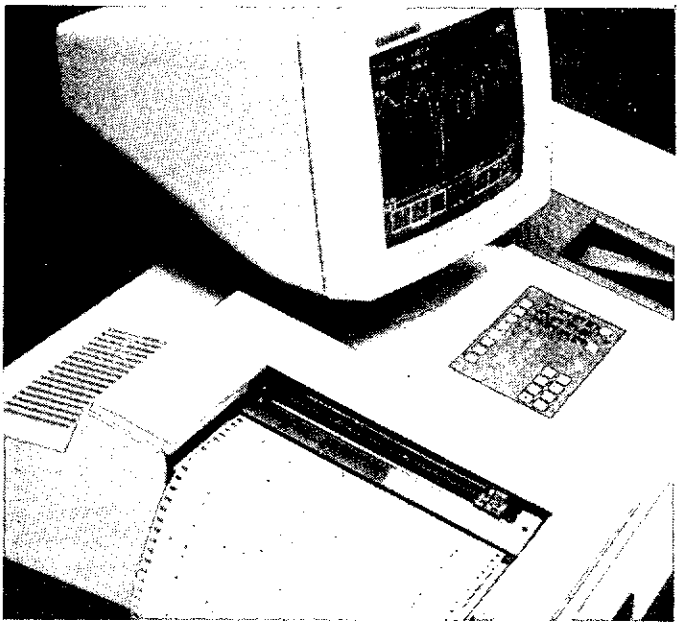
Instrumental settings, such as resolution, signal to noise ratio, and scan time are conveniently chosen by the use of the Integrated Scan Modes. These parameters are automatically matched so only valid combinations can be used. For instance, bands can not be distorted by over filtering, or scanning too fast and no time is ever wasted by scanning too slowly for any given slit setting. For full versatility, additional smoothing may be used, and a manual override system allows users to select their own combinations of parameters. A multiple scan facility is provided either for averaging to further improve signal:noise ratio or to monitor time dependent spectral changes.

A pre-sample chopper option is available to effectively eliminate ordinate errors caused by sample emission.

The 800 series incorporates data handling software normally associated with the use of external computers. Access to this software and control of the instrument are via an easy-to-use keyboard and VDU screen. The keypad consists of numeric input keys, a set of function keys for the most commonly used routines and a row of eight "soft keys" whose functions change depending upon how the instrument is being used. This concept allows full versatility but makes the instruments elegantly simple to use.

Full range IR spectra may be stored in memory and can be processed after the scan is completed. Data manipulation routines include digital smoothing (SMOOTH) for noise reduction, absorbance expansion (ABEX) to simulate changes in concentration or pathlength, and base-line flattening (FLAT) for automatic correction of curved or sloping baselines.

Spectral subtraction (DIFF) is another powerful feature of the



800 series. This allows spectra to be obtained of individual components in a mixture without having to physically separate them.

For QC applications a comprehensive quantitative analysis package is included as a standard facility on every 800 series instrument.

High quality hard copy output is provided by an ultra-fast digital printer/plotter. An RS-232 interface is included as standard for communication to external computers but most of the data handling ever likely to be needed is built into the basic instrument.

Join the move to the world standard in IR instrumentation, contact your nearest Sci-Med branch for more information or to arrange a demonstration.

For further information please circle no. 15 on reader reply card.

PRODUCT NEWS

PhastSystem (TM and PhastgelTM)

Pharmacia have pleasure in introducing a new concept in electrophoresis — PhastSystem.

Years of development work at Pharmacia has resulted in a new electrophoretic system, which is a lot faster than conventional systems, vertical or horizontal. SDS-PAGE (10-15%) or isoelectric focusing (pH 3-9) takes only 30 minutes. Automatic coomassie in another 30 minutes gives you a total time from sample to ready in gel in just one hour.

The system consists of two units, one Separation Unit and one Development Unit. Gels are put on an electrical cooling plate (no cooling water required). Samples are applied automatically and the running parameters are controlled exactly (voltage, current power, temperature of cooling plate and volt hours). Up to nine different running programs of up to nine steps can be stored, eg an IEF run can start with a high voltage pre-focusing for a given time, voltage is then automatically decreased and the sample is applied through a special applicator. After a specified time the sample applicator is removed and the voltage increased for the final focusing. After the run, the gel(s) (one or two) is/are moved to the development unit. The development unit consists mainly of a development chamber, a 10-port valve and a pump. Up to nine solutions (eg fix, stain, destain etc) can automatically be pumped in and out of the chamber. To increase the speed of the staining step, solutions can be heated up to 50°C. Once you have started to develop one (two) gel(s) you can start a new electrophoresis in the separation unit but apart from that the two work independently.

Gels are only available precast. Presently Pharmacia have 5 different gels — Gradiant Gels 10-15 and 8-25 and three different Isoelectric Focusing Gels, 3-9, 4-6.5 and 5-8. Instead of buffers for the gradient gels, small agarose strips containing buffer are used. When doing isoelectic focusing electrodes are applied directly into the gel.

With precast gels, ready-made buffer strips and complete control over both separation and development many chances of failing are removed. The term user-independent has been used.

PhastSystem is easily summarized with words like fast, reproducible, high-performance, reliable, convenient etc. The customer response so far has been very positive. Many people think that PhastSystem has as great, if not greater potential as FPLC!

Pharmacia are represented in New Zealand by Watson Victor Ltd.

For further information please circle no. 13 on reader reply card.

Voltammetry Automated

EG & G Princeton Applied Research have introduced a completely automated analytical system comprising the model 309 Automatic Voltammetric Electrode, 319 Sample Changer, 384 B Polarographic Analyser and X-Y Plotter.

The Model 309 can be used in manual systems to de-aerate and transfer the sample or, in conjunction with the sample changer, to set up a completely automatic analytical system capable of performing 20 to 40 analyses per hour. An entire sequence of analyses using any of nine different voltammetric techniques can be set up in the model 384 B.

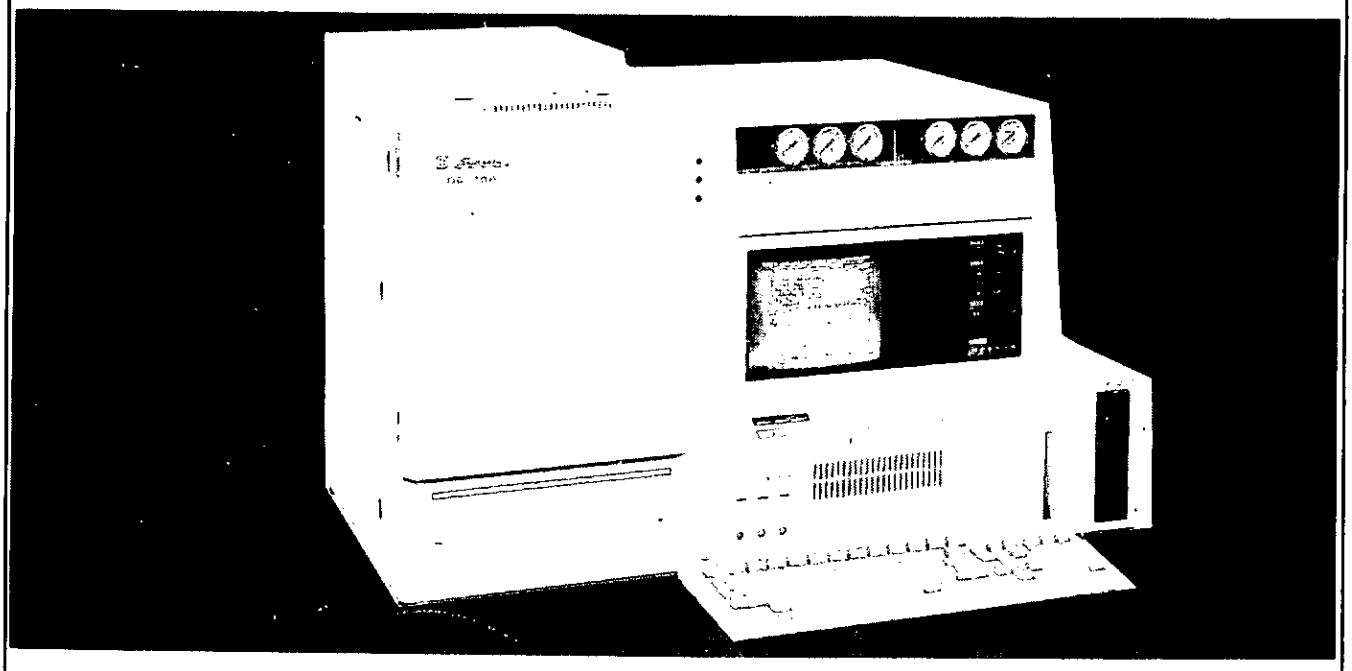
Such a mix of techniques applied to a biological sample can automatically produce multielement analyses at trace levels for selenium, cadmium, lead, copper, zinc, nickel and cobalt as reported by Adeloju, Bond and Briggs.

E G & G Princeton Applied Research are represented in New Zealand by Alphatech Systems.

For further information please circle no. 14 on reader reply card.

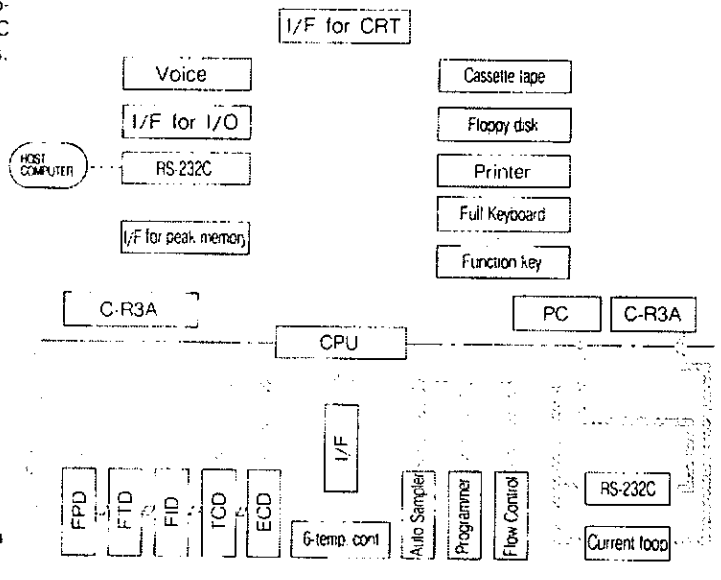
Shimadzu GC-15A/16A

Gas Chromatographs



New directions in gas chromatographic instrumentation.

The Shimadzu GC-15A and GC-16A are designed not only as independent high-performance gas chromatographs but also as the core instruments for multi-GC systems or computerized laboratory automation systems.



System Block Diagram

For details contact:-

Auckland Box 1363 Ph: 760-129

Wellington Box 830 Ph: 851-279

Christchurch Box 32-054 Ph: 890-449

Dunedin Box 5070 Ph: 777-485

AWA SCIENTIFIC & MEDICAL

A DIVISION OF AWA NEW ZEALAND LIMITED

For further information please circle no. 41 on reader reply card.

PRODUCT NEWS

DISCOVERY — a data acquisition system

DISCOVERY is a new software tool for engineers, scientists and technical workers who need to collect, analyse, reduce and interpret data quickly and efficiently.

Programming is eliminated since DISCOVERY is menu-driven with graphic displays of data as it is acquired. DISCOVERY is specifically designed to support the ISAAC hardware interfaces, the IBM Data Acquisition and Control Adaptor and LOTUS 1-2-3 spreadsheet. Captured data is displayed graphically and the user can "scroll" through the graph to read data values, expand the display or apply data reduction.

A partial list of functions includes —

- Find X on Y value
- Find slope
- Delta X, delta Y
- Minimum, maximum
- Area
- Standard deviation
- Mean
- Add or multiply by constant
- Sum stored and displayed signal
- Integrate, differentiate
- FFT
- Auto correlate, cross-correlate
- Windowing

When user-programming is essential, a LABSOFT programmers toolkit provides a family of functions in BASIC.

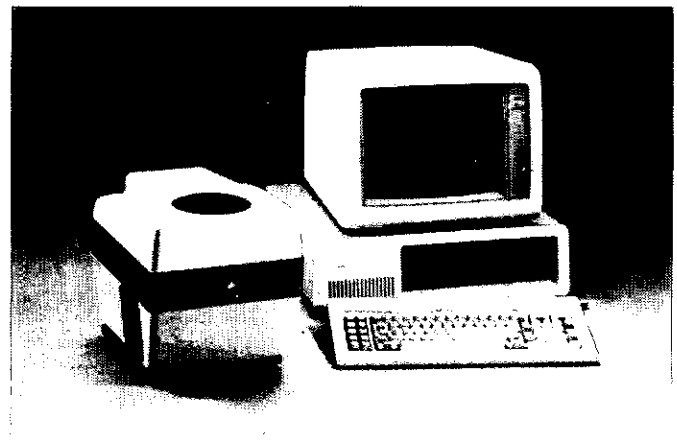
DISCOVERY is available through: John O'Neill, Alphatech Systems, P.O. Box 37-583, Auckland. Telephone: 770-392.

For further information please circle no. 6 on reader reply card.

Hunterlab Introduces New Labscan® II With IBM®

RESTON, VA — Hunterlab has introduced the new LabScan II Spectrocolorimeter for color and appearance measurement. Now LabScan II interfaces Hunterlab's proven illumination/45° circumferential-viewing optical sensor to an IBM® personal computer. You can use this versatile instrument to successfully measure the reflected color of most products — from powders and pellets to foods and fabric.

LabScan II's 0°/45° sensor is designed to "see" color the way the human eye sees color. With color values that closely simulate visual observations, LabScan II is ideal for use where visual correlation is desired. Sensor design incorporates circumferential viewing and averaging to reduce measurement problems caused by directional or textured samples. LabScan II continuously scans the visible spectrum, from 400-700nm, providing tristimulus values based on 10nm spectral data. Variable sample illumination allows measurement of large (44.5mm) or small (6.4mm) samples.



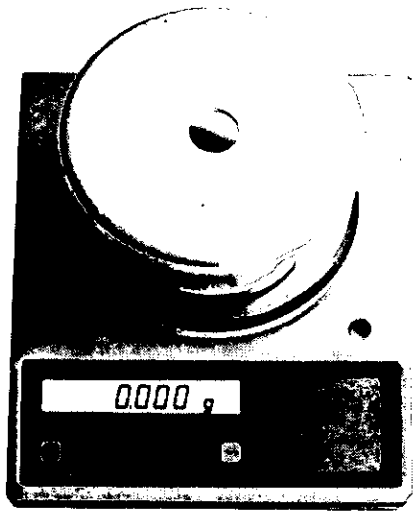
Hunterlab's new LabScan II spectrocolorimeter combines a 0°/45° sensor with an IBM® personal computer.

An IBM personal computer, with color display, provides rapid and dependable data processing. The system allows virtually unlimited storage of sample, standard and tolerance data. LabScan II software is easy to understand and can be quickly mastered by the first-time operator. A color and appearance glossary explains unfamiliar terms and "HELP" messages guide you through the measurement process. LabScan II offers a variety of color scales, indices and illuminants to tailor the system to specific requirements in your industry.

The LabScan II Spectrocolorimeter is available through Max Hall, Advanced Electronics, Ph: (09) 419-1448.

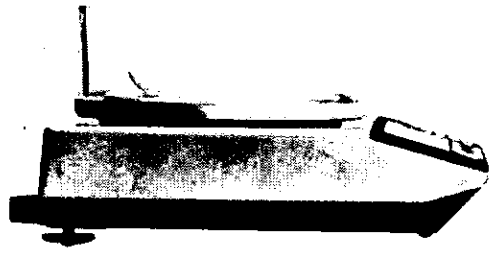
For further information please circle no. 8 on reader reply card.

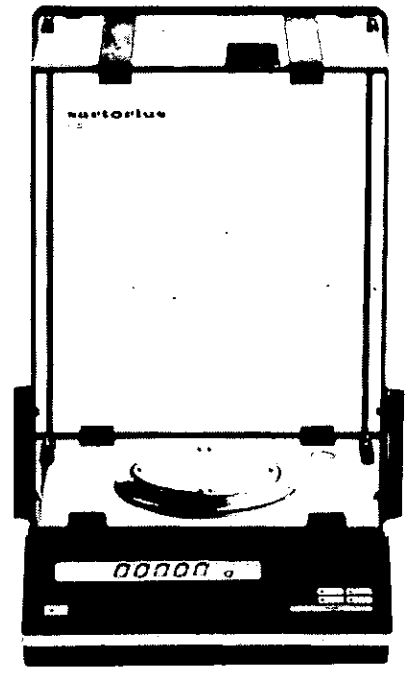
CLEARLY BETTER BALANCES



Sartorius excellence E 1200 S. 1.2 kg capacity, 1 mg resolution: SuperRange. A first — weigh in the kilogram range with milligram precision.

Sartorius laboratory L 420 S. 420 g balance with 1 mg resolution: SuperRange. A first — fully automatic calibration for 1 mg models.

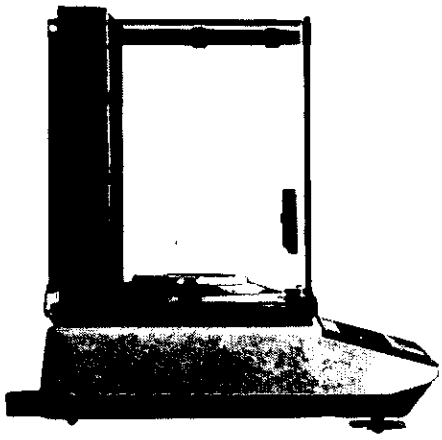


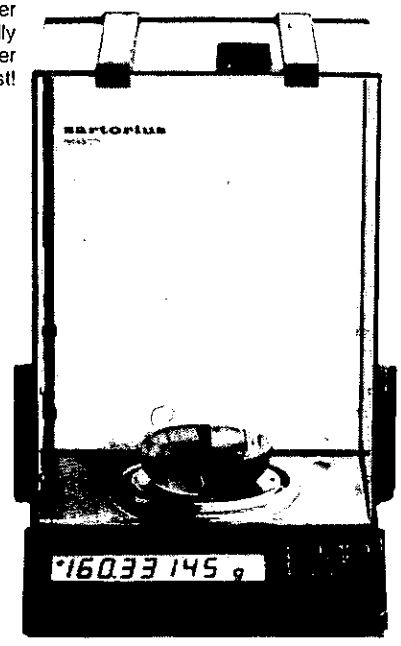


Sartorius analytic A 200 S. 202 g capacity, 0.1 mg resolution: SuperRange. The first fully-fledged electronic analytical toploader with an all-around, see-through draft shield. High tech at its best.

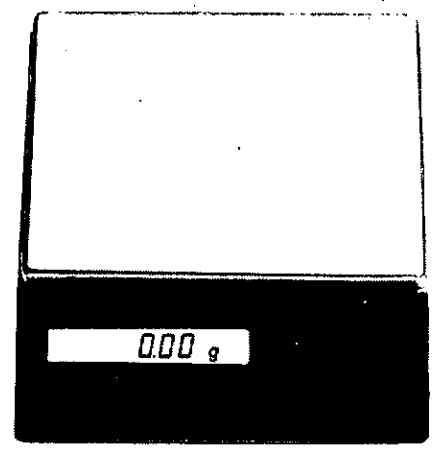
Sartorius research R 160 P. 162 g capacity, 0.01 mg resolution: PolyRange. Weigh directly into the same container (like 400 ml beakers) in the fully electronic semimicro-range — another first!

Sartorius handy H 51. The price of a small analytical with the technology of a big and powerful one: 51 g including 20 g for tare compensation.





Sartorius universal U 3600 P. Weigh 3.6 kg to exactly 10 mg: PolyRange. The large size weighing pan is only slightly smaller than the balance base to provide maximum useful space.



sartorius

The world's most advanced weighing technology.

Sartorius leads the field in state-of-the-art weighing technology, with a full range of balances which have proved their prowess in thousands of laboratories.

Now there is a new, pacesetting, generation of electronic scales and balances without equal. The new series of MP8-4 balances from Sartorius feature clear, unobstructed views of the weighing chamber and pan, big bright liquid crystal display, and a host of features you will not find in any other balance.

Call us for a demonstration, and you'll see why Sartorius balances are clearly better. Sartorius — the world's most advanced weighing technology.

WNT 106

Marketed by

Salmond Smith Biolab Ltd

Wilton Instruments Division

AUCKLAND	WELLINGTON	CHRISTCHURCH
Private Bag Northcote 9	P.O. Box 31-044	P.O. Box 1813
Phone 483-039	Phone 697-099	Phone 63-661

WILTONS

For further information please circle no. 40 on reader reply card.

PRODUCT NEWS

The Sartorius universal. The versatile toploader for all procedures from 10mg to 6.1kg.

Toploader for industrial and laboratory applications

With the "universal" line, Sartorius is launching a program of toploaders targeted for a broad array of both industrial and laboratory applications. **Theme:** reliable toploaders with an extra measure of precision. **Noteworthy features:** the wide range of 4140g paired with automatic fine range selection "Sartorange Poly" for adaptable readabilities from 10. . .50mg, plus a large pan that is only slightly smaller than the toploader's base. **Important news:** weighing precision is unconditionally guaranteed at every point of the pan clear to the outer perimeter. These toploaders operate extremely fast and are virtually immune to interference signals from the environment. Integrated functions permit the user to adapt the balance to variables of the application and operating site. Added versatility comes from an integrated Data Input keyboard, which makes the toploader instantly systems-capable for use as a weight data terminal in a high-ranking network or ready to use as an intelligent stand-alone measuring station.

Ingenious balance "Sartorius research"

Certain procedures have traditionally suffered from precision loss due to sample residue adhering to the smaller tare vessel when the sample required transfer to a larger container. This drawback has been relegated to the past thanks to the new "Sartorius research" R 160 P. This ingenious balance functions both as a semi-micro reading up to 10ug and as a macro with 0.05mg readability — in either case to 162g, automatically eliminating the compromise between range selection and precision. An electronic stability indicator makes sure only reliable results are read and prevents transmission of questionable weight data to the data output. Result: the user can rely 100% on the data fed to the processing computer. In weighing-in, the "R 160 P" ensures that the fill quantity is never underweight as happens with conventional balances, because their displays lag behind. The "R 160 P" accelerates the display during the brisk filling phase and will blank out the last decimal — if the user likes. Once the operator starts slowing down, the last decimal reactivates automatically for on-target weight precision.

Sartorius are represented in New Zealand by Wilton Instruments Division, Salmond Smith Biolab Ltd.

For further information please circle no. 9 on reader reply card.

Portable Instruments
The New Generation Has Arrived!

An MPM "Multi Probe Meter" is a radical change in instrumentation, being capable of interfacing with dozens of different sensors and probes by using its custom micro-processor. The MPM concept is the coherent solution that breaks out of the endless circle of purchasing one portable instrument, followed by another, followed by another.

The first step forward in this new direction for portable instruments is the MPM 500, a multifunctional meter that has been specifically designed for environment, heat and ventilation applications. The MPM 500 is the world's first portable THERMO-HYGRO - TACHO - ANEMOM - ETER — you can use both Pt 100 and thermocouple temperature probes, electronic relative humidity probes, non-contacting tachometer probes, thermal and vane anemometer probes, all with one instrument. The MPM 500 replaces a whole tookit of meters. All in one hand.

Now take the next step forward with Solomat Modumeters. A Modumeter plugs into the MPM 1000 or MPM 2000 main frame, and transforms it into a custom instrument, ready for use. Choose from over a dozen Modumeters available covering heat and vent, water pollution control, electronics and chemistry.

Solomat instruments are available through Kempthorne Medical Supplies.

For further information please circle no. 10 on reader reply card.

New solenoid valve for aggressive gases and liquids

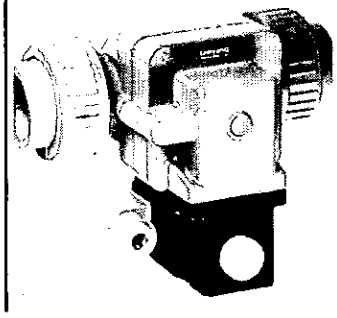
A new solenoid valve which has wide-ranging applications in the control of aggressive gases and liquids such as chlorine in the water treatment field, highly concentrated acids and alkalis, seawater and any chemical prone to crystallisation, etc. is now available from Burkert Contromatic N.Z. Ltd.

The Burkert Type 141 is a servo-assisted, 2/2-way solenoid valve with coupled diaphragm system, normally-closed with a pressure range of 0-6 Bar and orifice sizes of 15-32 mm. Body and internals are of rigid-PVC, static sealing elements of EPDM or FPM, and dynamically-loaded sealing elements are of PTFE. A double seal, consisting of the PTFE-covered seal pivot and elastomer diaphragm, hermetically isolates the fluid from the solenoid actuator.

An important aspect of its construction is that the actuator consists of an epoxy-encapsulated coil with profiled armature and electronically-controlled power consumption. Until recently, most solenoid valves available in New Zealand have had the outdated push-over metal can type solenoid cores which have been prone to burn out or failure within 6-12 months coping with high cycle rates and critical performance pressures.

Burkert pioneered the development of the epoxy-encapsulated solenoid system which, as it has a significantly reduced air gap, draws approximately 8 watts compared with the 12-15 watts for an equivalent push-over can type. This results in lower power consumption, less heat, longer seal life and the ability to cope with higher pressures.

Type 141 solenoid actuator provides a high transient power of 100 watts during the switching phase which is then reduced to a steady-state figure of 9 watts. The actuator is designed for a.c. (50 or 60 Hz) or d.c. use and the standard manual override facility provides for stand-by operation in the event of a power failure.



The Type 141, with a choice of either solvent-joint or threaded port connections, can be easily removed from the pipework and is available ex-stock from Burkert Contromatic NZ Ltd, P.O. Box 9782, Wellington.

For further information please circle no. 11 on reader reply card.

Granular activated carbons for air treatment

Protecting sensitive electronic equipment, purifying industrial process gases and recovering solvents are some of the more usual applications being found for a range of granulated activated carbons available from air movement specialists, Ipsco Sales and Manufacturing Ltd.

Activated carbons were developed many years ago as versatile solid adsorbents, specifically for air treatment. However, the event that stimulated the development of the high quality carbons used today was the use of chlorine gas in the First World War, and for which an effective countermeasure had to be found quickly. Activated carbons were utilised at that time in the filters of military gas masks.

Today, in the growing fight against air pollution, activated carbons are being increasingly used to remove industrial pollutants from air. In New Zealand, for example, Sutcliffe Speakman activated carbon has been supplied to the National Library to protect sensitive documents, and to the Ohaaki power station so that they can provide purified air to their control systems.

Activated carbon is essentially a non-crystalline structure with a very highly developed internal surface area, produced by controlled oxidation of both opal and coconut shells. The internal surface is a mass of thousands of tiny pores, the size of which is determined by the raw material and activation process used in manufacture.

Coconut shell carbons have a very small pore radii and are, therefore, ideal for the adsorption of small molecules, usually in the gaseous phase. Coal based carbons, however, contain relatively larger pores and are used in both gaseous and liquid phase applications to adsorb the larger molecules.

Ipsco supply granulated activated carbons, provide a complete design and build service and offer a free advisory service.

For further information please circle no. 12 on reader reply card.

PRODUCT NEWS

Waters Gas Chromatography Packings

PORAPAK porous polymer Packing

Waters PORAPAK porous polymer column packing materials provide sharp, symmetrical peaks and low retention volumes for water, glycols, free fatty acids, esters, ketones, aldehydes, and low molecular weight materials containing halogens or sulfurs. PORAPAK GC packings are cross-linked polymers which may be used directly in GC columns without coating with a stationary phase.

The eight types of PORAPAK packings have different retention properties as a result of the various functional groups incorporated into the porous polymer. In order of increasing polarity (increasing elution volume for water) the eight types are PORAPAK P, PS, Q, QS, R, S, N and T. PORAPAK P is a styrene-divinylbenzene copolymer, and PORAPAK Q is an ethylvinyl benzene-divinylbenzene copolymer. The other PORAPAK materials are variations of these polymers with different monomer providing a range of polarities. The PS and QS packings are recommended for analysis of polar compounds which usually fail badly on other packings (glycols, free fatty acids, etc.) and for trace analyses. They are similar in relative retention characteristics to PORAPAK P and Q respectively.

PORAPAK materials are used for a wide variety of gas analyses and for separating most compounds in the moderate boiling range (up to 250 degrees). With temperature programming, mixtures with a wide boiling range can be analyzed with a single PORAPAK column.

DURAPAK GC Packing

Eliminates Many Problems Associated with Liquid Coated Column Packings

DURAPAK GC packings eliminate many of the problems typically associated with liquid-coated column packings, such as column bleed, liquid pooling, limited packing life, and excessively long column preconditioning times. The chemically bonded functional group of DURAPAK packing permits the chemist to perform many separations not previously feasible. Many difficult separations become routine with DURAPAK GC packing.

DURAPAK GC packings consist of an organic functional group chemically bonded to PORASIL — a spherical, totally porous, silica packing. The amount of bonded phase ranges from 2 to 8 percent, depending on the particular DURAPAK material. Batch-to-batch coating levels for specific DURAPAK materials vary between 0.5 and 1.0 percent. Although the optimum velocity of a solvent through DURAPAK material is 6 to 10 cm/sec (approximately 60 to 100 ml/min for a 0.25 in. OD column), these packings can be used at flow rates substantially higher than optimum with little loss in efficiency.

Both PORAPAK and DURAPAK are available from: Alphatech Systems, P.O. Box 37-583, Auckland. Phone: 770-392.

For further information please circle no. 3 on reader reply card.

Safety Assurance with Carbon Monoxide Detectors

Carbon Monoxide is a by-product of incomplete combustion. Smoke, fumes or exhaust usually contain carbon monoxide in varying amounts. It is also a byproduct in petroleum refining, steel production in blast furnaces, steel mills, chemical plants, mines and so on.

The COTEC Model CM-2B Carbon Monoxide Mini Monitor, available from Kempthorne Medical Supplies, was designed to protect personnel in industrial plants, chemical, petroleum and mining industries from the harmful effects of carbon monoxide exposure. Used as an area monitoring instrument, the alarm function is to warn of the increase in concentrations of carbon monoxide before dangerous levels are reached. This does not require skilled or experienced personnel for reproducible positive results.

COTEC Model CM-2B employs a controlled potential electrolysis method — the oxidation of carbon monoxide by electrochemical reaction at the liquid/gas interface, in the presence of a catalyst. The system provides buzzer alarm at 2 levels of CO concentration, with digital readout. As soon as CO concentration attains the preset level, the COTEC Model CM-2B sounds with intermittent buzzer and flashing L.E.D. Also if the CO concentration is three (3) times higher than the pre-set level a continuous alarm sounds with flashing L.E.D.

Mini Monitors are also available for the measurement of oxygen and H_2S levels.

For further information please circle no. 4 on reader reply card.

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