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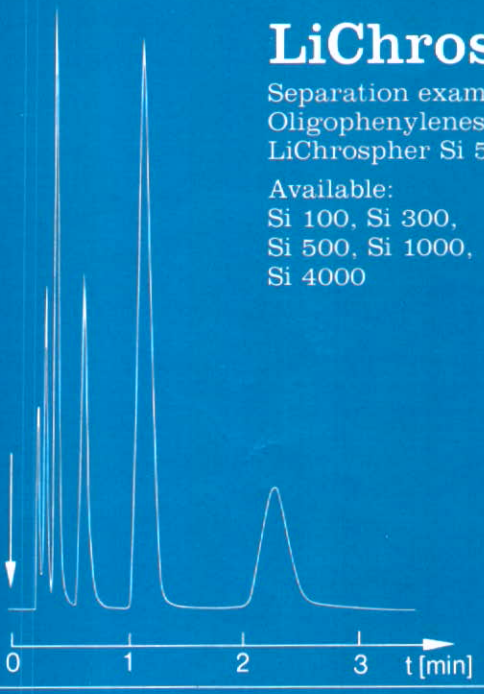

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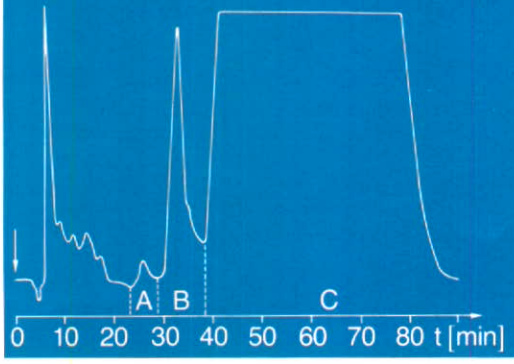

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Front Cover: the Perkin-Elmer SMS/200 Sample Management System. On the left at the rear of the photograph is the 1300 Series infra-red and the Model 3600 data station and on the right of the photograph is the Sigma 115 gas chromatograph.

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CONTENTS

Science in parliament

Science needs an articulate advocate in high places — someone who has the ability to understand the advantages to the country which scientific discoveries can bring and who also can describe them in laymen's terms to his colleagues and the public. Too many discoveries are concealed in papers full of obscure jargon and turbid prose.

A minister of science has advice available to him, but it would be of assistance to him and the legislature, if we had in New Zealand something equivalent to the United Kingdom Lords Select Committee on Science and Technology, or the Commons All-Party Parliamentary and Scientific Committee to give the minister support in the political field and to be the base for informed discussion in the House.

To be a success a minister must of course be elected to parliament as representative of a political party with all its connotations. The party must command a majority in the House. He must then be selected for cabinet and be allocated the Science portfolio. In none of these steps is a knowledge of science a pre-requisite. To be successful in the eyes of his departments the minister must be able to secure at least somewhat more than his share of funds at budget time and be able to persuade his cabinet colleagues that major allocations of money in the estimates should actually be spent. After all this has been achieved it is a bonus if the minister can talk on equal terms to his staff and can appreciate the value of the work they are doing. This understanding would be a valuable morale builder.

Our policy makers should have an appreciation of the importance of science to the development of New Zealand and to the welfare of our citizens. There should be a body of informed opinion in our Parliament. Equally it is important that this opinion should be reflected in cabinet. Even this is not sufficient if the Ministers of Finance or Treasury are not sympathetic. Even a prime minister with a science education may not be sufficient. The possession of a chemistry degree by Margaret Thatcher has not saved British Universities and research institutions from drastic cuts in recent times. It may be that this can be accounted for by her switch to law after her graduation.

Terence McCombs

Sir Terence McCombs is a foundation member of the NZIC and is an honorary fellow. He was Minister of DSIR in the Labour government of 1947-9 and later New Zealand High Commissioner in London. He is still active in politics and is a member of the Christchurch City Council.

Penultimate polemics from the pulpit

This month has been crowded with incident for us; we began by visiting parts of our Archdiocese in Wellington, Dunedin and Christchurch; gave our benediction at many sessions of the Golden Jubilee Synod and spent the last weekend on an ecclesiastical excursion with would-be clergy. In between we reached the situation' justifying a concelebration in the senior common room of the local university with some of the kind faithful. We appreciate their happy inspiration.

In Wellington, we were stung in the Beehive and further conditioned in the lean-to next door for opposing priests; the results are seen on following pages. Chemistry is alive and well in Otago; Aramoana (supported in the press by the Gang of Four[2]) and the utilisation of Southland lignite will bring new challenges to the faithful in the diocese.

At the University of Canterbury we attended a good meeting addressed by Peter Rothbaum; as in Dunedin the number of points on the attendance graph were inversely related to the graph of speakers' quality. This could be the subject of a suitable thesis.

At the Synod, references to ecclesiastical stories shone out among a lotus bed of luminaries, showing that some seed has fallen on good soil (Hallelujah!). At the Golden Jubilee dinner we listened with more than our usual keen interest to the sagacious sermon of our colleague, Cardinal Parton, pontificating on a point we have referred to earlier in these columns. By a somewhat eccentric exegesis, His Eminence considered that the reference to a lake of burning brimstone[3] must be interpreted as sulphur refluxing at its boiling point, thus fixing the temperature of Hell at 444° C, which is the only point at which the situation could remain indefinitely at equilibrium. By continuing curious casuistry, the cardinal suggested from recondite references which we could not recover that the heat of heaven imposed an even greater need of asbestos surplices.

At the later ecclesiastical excursion, we were told by a person (whose interpretation of such authorities as the Bible and Beilstein differs from ours by several orders of magnitude) that the second coming of the Lord, like the second law of thermodynamics, is imminent, on which occasion He would sweep grade A christians up into Dr Parton's high temperature heaven. As a cardinal, he must be in grade A and therefore we pray fervently for his sake that his commentary is uncanonical.

Stan Brooker

References:

1 Ps. xc, 10
2 Corbett, E., Buckingham, D., Grant, P., & Campbell, A.
3 Rev. xxi, 8

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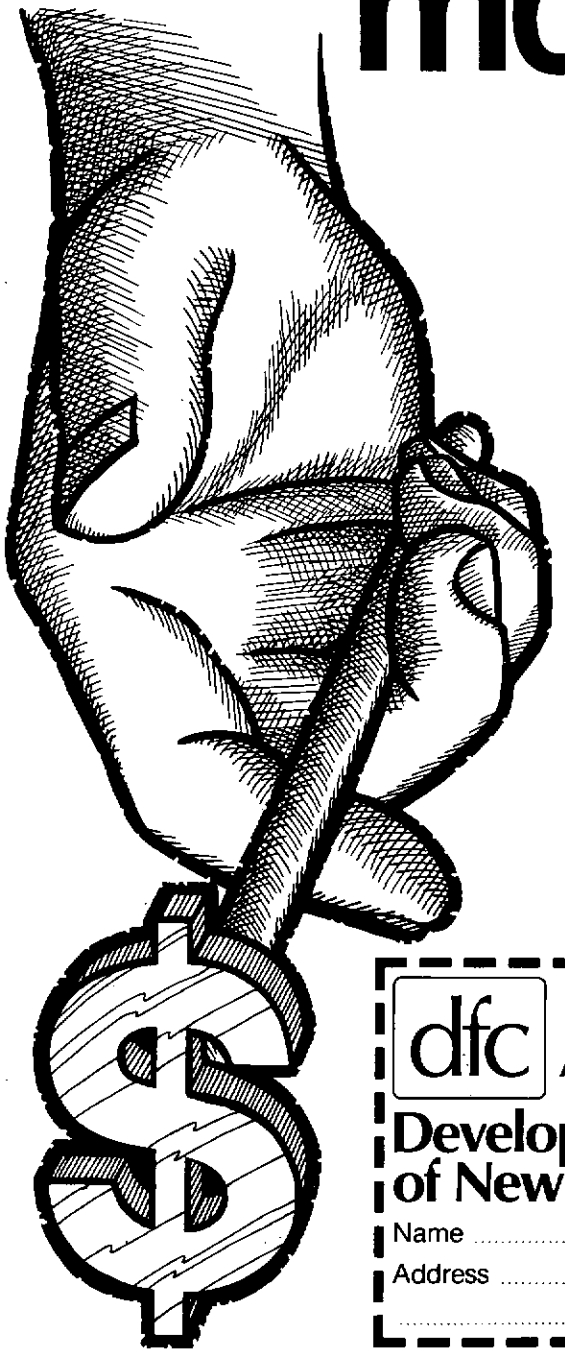

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The Environmental Chemistry Of Trace Metals

Robert R. Brooks

Abstract

The occurrence, pollution problems and toxicology of trace metals, lead, mercury, arsenic and cadmium, in New Zealand are reviewed.

Introduction

In recent years, increased concern about the environment and the quality of life have led to the rapid development of environmental chemistry. Progress in this field has been linked very closely with that of analytical chemistry and it is probably true to say that it has followed, rather than stimulated, progress in the analytical field. For example the current interest in mercury in the environment has been largely stimulated by analysts already possessing versatile new instruments[1] and looking for work for them, rather than there being an initial need leading to purchase of a particular instrument.

Mercury

The natural sources of mercury are mainly the weathering process and terrestrial and submarine vulcanism. Mercury is a common element in New Zealand since virtually all our geothermal areas discharge mercury[2].

The world's annual consumption of mercury averages 10,000 t, of which about half is used in the production of chlorine for bleaching paper pulp. During the electrolytic process, a substantial amount of mercury escapes into the environment where it enters the river systems and is steadily concentrated in the food chain.

In its inorganic form, mercury is far less toxic than as methyl — or dimethyl mercury which are readily formed in reducing environments. In 1953, 52 residents of Minamata, Japan, became ill and later died from an ailment known as "Minamata Disease"[3] which was later found to be due to accumulation of this element in shellfish through pollution from a nearby plastics factory. The physiological effects of mercury[4] are caused largely by its ability to enter the brain and cause injury to the cerebellum and cortex[5]. Clinical symptoms are numbness, awkwardness of gait, and blurring of vision[6].

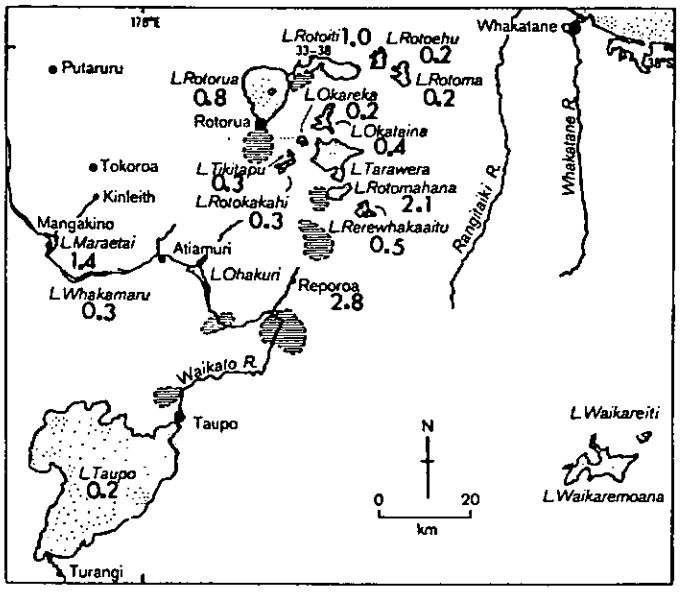

Figure 1

A particularly disturbing feature of mercury poisoning is that its effects are not immediately obvious. Since the brain already contains an excess of cells for any particular purpose, clinical symptoms usually do not appear until this excess has been used up. Mercury can also enter the placenta and damage the foetus[7]. The World Health Organization has proposed an acceptable daily intake of 0.3 μ g, of which not more than 0.2 μ g should be in the form of methyl mercury.

In New Zealand, the main health problem of mercury is its concentration in fish. Studies on natural levels of mercury in fish[8] have shown that they are usually not far below the accepted safety limit of 0.5 μ g/g (wet weight). The fact that natural concentrations of mercury in fish are so close to the maximum permitted levels, makes this element unique among pollutants. The present high values in pelagic fishes are not necessarily a result of human interference because studies on museum specimens of tuna caught between 1878 and 1909 showed that these fish averaged 0.95 μ g/g compared with 0.91 for a random selection of recently-caught fish. It seems that fish at the top of the food chain, such as tuna and shark, contain the highest levels of mercury.

Mercury levels in shellfish have been determined in Tasmania[10] where anomalously high amounts were found in oysters. In New Zealand[11], background levels were found to be 0.02-0.06 μ g/g in shellfish.

Mercury levels in freshwater fishes can sometimes cause problems. High values were found in rainbow trout in the Central Volcanic Plateau, North Island[12] in regions adjacent to geothermal areas. Levels frequently exceeded 1.5 μ.g/g and were in some cases attributed to pollution from a paper mill. Other workers[13] extended this work to other areas in the plateau and found that in the lakes, pollution was greatest in Lake Rotomahana (2.1 μ g/g in fish) and lowest in Lake Taupo (0.2 μ g/g).

This paper is based on lectures delivered by Dr Brooks to high school pupils in the Manawatu and Hawke's Bay areas under the auspices of the Manawatu Branch.

Dr Brooks is a reader in chemistry at Massey University. His interests are in analytical and environmental chemistry. His work in New Zealand and overseas has been centred around mercury and lead pollution. He has also carried out studies on the use of vegetation in prospecting for minerals (biogeochemical prospecting).

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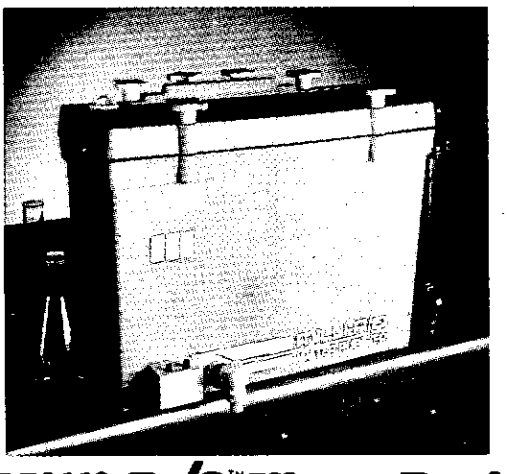

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Fig.1 shows a map of the area with mercury values in trout indicated as numbers adjacent to the name of the lake.

Control measures to reduce mercury pollution have resulted in lower levels in many waters[14]. Outright banning of use of mercury in pesticides has now been enacted in many countries.

Lead

Lead is currently the most serious heavy-metal pollution problem in New Zealand. Worldwide, about 3,000,000 t of lead are mined annually and 40% of this output is used in storage batteries with a further 20% added to petrol as tetraethyl lead (TEL) or tetramethyl lead (TML). During the combustion of petrol in motor vehicles, about half of this lead finds its way into the atmosphere either as gas or particulates and is deposited within 30 m of major roadways. Lead levels measured in snow layers of Greenland[15] show a remarkable increase during the last 30 years.

Up to 0.22% lead in soils and 0.10% in vegetation was found along the Auckland motorway.[16] Concentrations at different points were related to traffic densities. In experiments on sheep grazed near highways,[17] 0.90 g/ml was found in the blood of sheep exposed to traffic fumes compared with 0.20 g/ml for sheep from a nearby uncontaminated area. When sheep from the roadside were placed in an uncontaminated paddock, the lead content of the blood decreased rapidly during the first 10 days and then more slowly. After 185 days lead levels in the blood had still not reached background levels. The same was true of the bones and soft organs of these animals.[18] Sheep from an uncontaminated area showed an immediate rise in blood levels when placed near a major highway. Sheep placed in a concrete pen away from motor vehicle emissions showed a rise in blood lead levels when fed with forage cut from the verges of a busy highway and the maximum lead concentrations were found in the kidney cortex and liver. Sheep placed near a highway but fed with uncontaminated forage showed a similar increase of blood lead levels but there was a much higher lead increase in the lung tissue, and it was concluded that in this case inhaled fumes had been partly responsible for the accumulation of lead in the animal. It is suggested that offal of animal grazed adjacent to highways should be discarded because of the risk of its finding its way into pet foods which are sometimes consumed by humans.[18]

The toxicological effects of lead are well documented[19] particularly in regard to children.[20] One of the most insidious effects of inorganic lead is its ability to replace calcium in bones and form a semipermanent reservoir for long term release long after the initial absorption. Indeed it has even been suggested that the high lead content of bones from the Roman period provides a valid reason for the fall of this empire.[21] TEL and TML are even more toxic than inorganic lead (cf. mercury) and give symptoms of excitement, depression and irritability. The whole blood lead content is diagnostic of poisoning from this source and suggested safety levels range from 0.2-0.8 g/ml. The lower value is

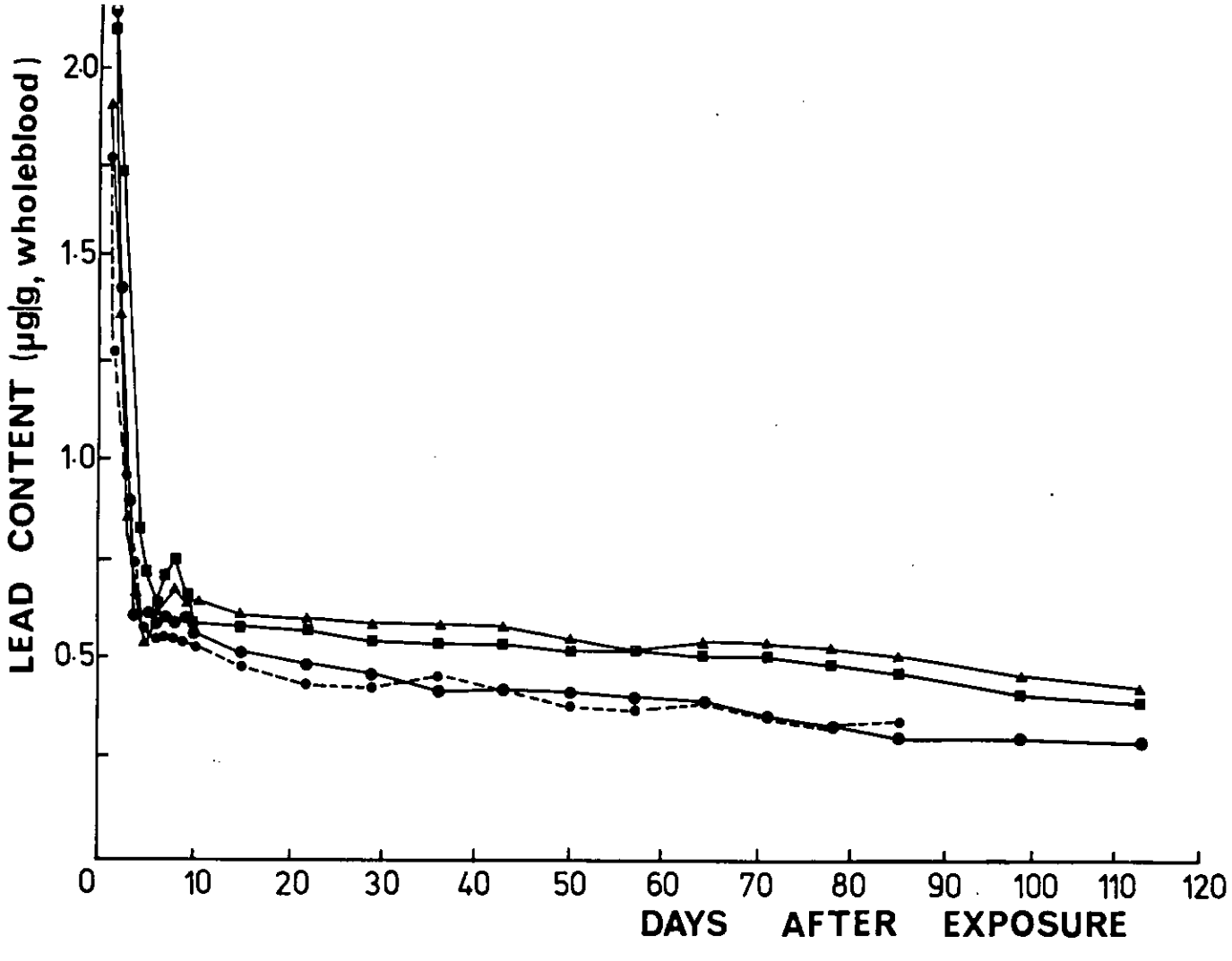

Figure 2

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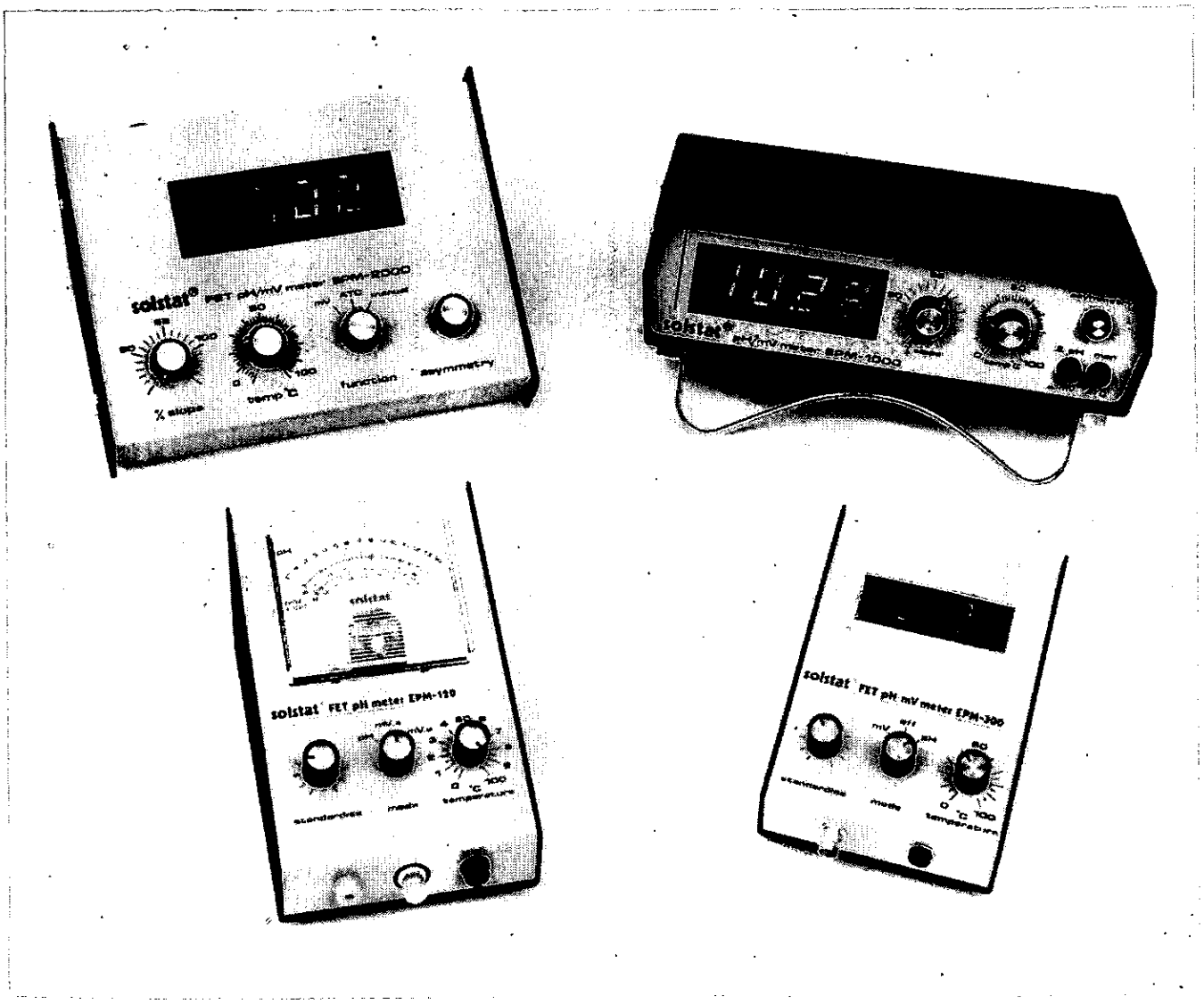

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found in New Guinea natives not exposed to industrial pollution.[22] Natural levels of lead in blood are unfortunately very close to the various toxic thresholds which have been variously set at 0.36, 0.50 and 0.80 μ g/ml.[23]

In New Zealand there have also been cases of children eating old lead-based paint from houses and suffering accordingly. Pottery glazes are another source of contamination and should not be in contact with acid drinks such as beer or lemonade. The cycle of lead in the environment is shown in Fig.5.

Removal of lead from petrol is the obvious solution to the above problems and there is a worldwide trend to lowering the levels, though at the same time increasing the amount of crude oil needed to produce lead-free petrol.

Other Heavy Metals

Apart from mercury and lead, only arsenic is of much concern to New Zealanders. Arsenic is emitted from geothermal areas[2] and levels of up to 0.037 g/ml have been reported in the Waikato River.[24] Extensive contamination has also been found on farms near Reporoa.[25] Although all the arsenic pollution of the Central Volcanic Plateau is of natural origin, geothermal power stations add to the arsenic burden of the environment because of the higher draw-off of steam. There is no effective way of reducing this form of pollution.

Cadmium has been associated with lead and mercury as part of the "big three" of metal pollutants. In Japan a cadmium-induced disease known as "itai-itai" has been responsible for several deaths[26] and has also produced osteomalacia resulting in multiple fractures. The main problem with cadmium is that the body seldom excretes as much as is ingested. An overall daily intake of about 2 μ g by humans is compounded by a further 1-4 μ g by heavy smokers. Hypertension has been associated with high cadmium levels in human kidneys.[27] Most health authorities allow a maximum of 1 μ g/g cadmium in foodstuffs but an exception will have to be made for some shellfish such as scallops which often contain quite high cadmium levels.[28]

The Future

The effect of pollution upon the future of this planet has long been a topic of extensive discussion. It will suffice to give a quotation by Barry Commoner,[29] a well-known environmentalist and unsuccessful US presidential candidate in 1980: "..... it has been pointed out long enough that environmental pollution represents a long-unpaid debt to nature. Is it possible that the US economy has grown since 1946 by deriving much of its new wealth through the enlargement of that debt? If this should turn out to be the case, what strains will develop in the economy, if, for the sake of survival of our society, that debt should now be called? How will these strains affect our ability to pay the debt — to survive?"

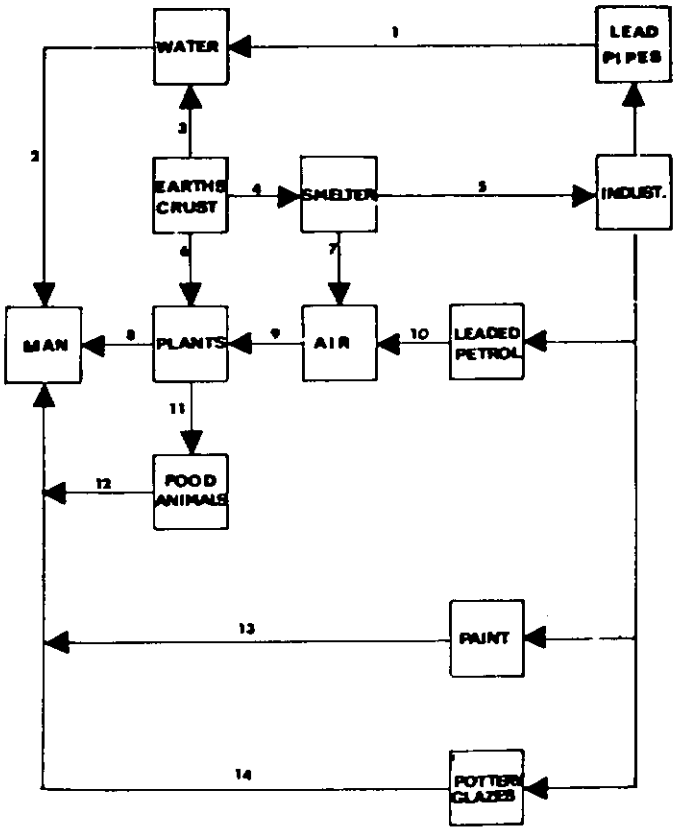

Figure 3

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Legends

Fig.1 *Central Volcanic Plateau, showing lakes, rivers and geothermal areas (shaded). Numbers adjacent to each lake refer to the mean mercury content μ g/g wet weight) of trout caught in the lake.*

Fig.2 *Decrease of blood levels μ g/ml) in four sheep after removal from contaminated pasture near a major highway.*

Fig.3 *The cycle of lead in the environment.*

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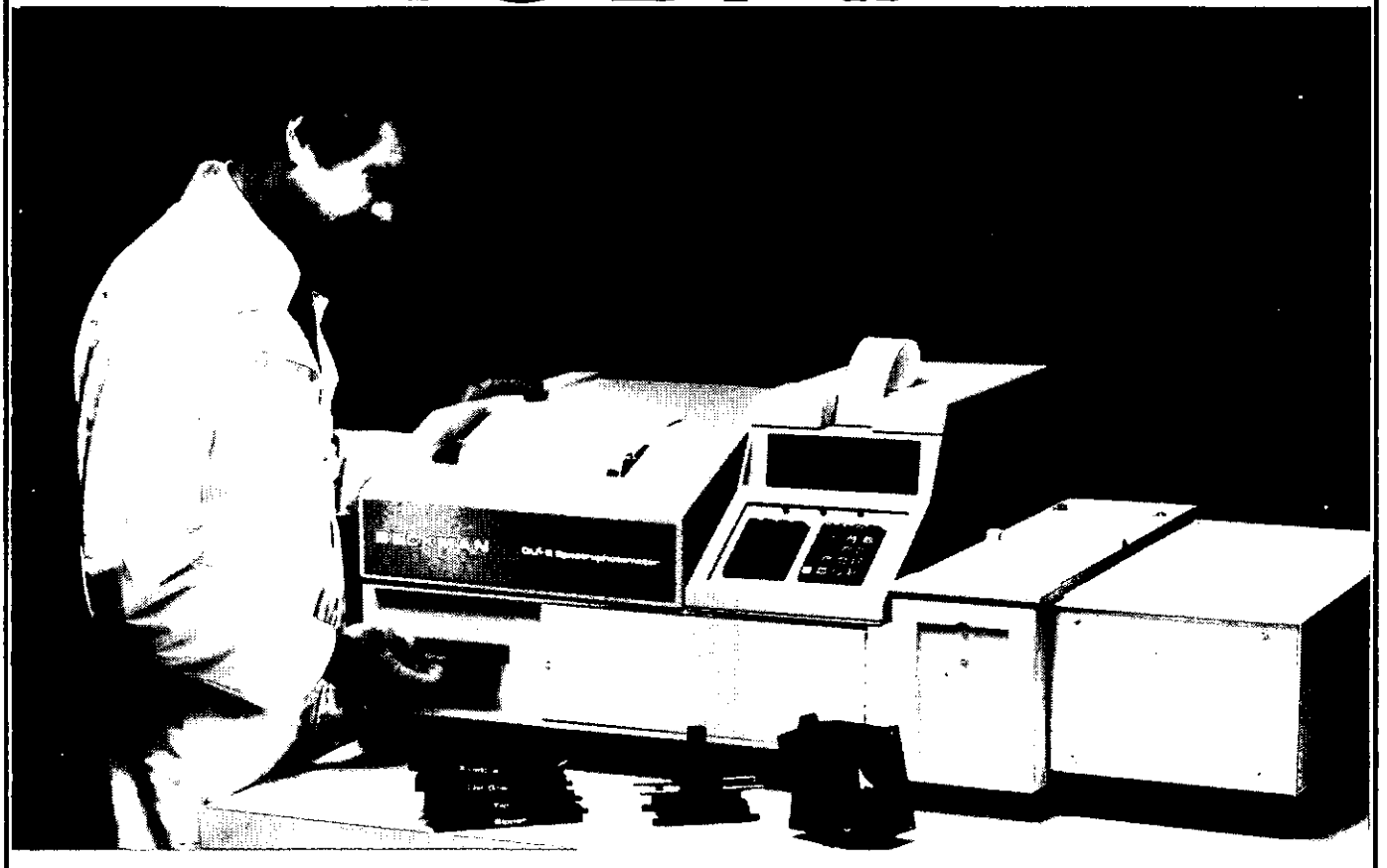

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Science In Yugoslavia★

B. Kamenar

Laboratory of General and Inorganic Chemistry, Faculty of Science, The University, Zagreb, Yugoslavia.

Introduction

The development of research activities in Yugoslavia★★ is closely connected with that of the whole country. Yugoslavia is still a developing country: in 1978 it had just over US$2000 of GNP per capita.

In the last 35 years, i.e. since World War II, science in Yugoslavia has passed through three distinct stages of development.

(i) From 1945 to the early 1960s development was mainly oriented towards creation of new institutional and professional bases. In these years many new institutes were built and many young scientists trained abroad and at home. In this period the Federal and the Republican governments established many new institutes, particularly those for nuclear research. Fortunately all of them later became significant centres of fundamental and applied research.

(ii) From the early 60s to the mid-70s a new stage began in which the scientific institutes were less financed from the budget and subject to less planning by the Government. In this period new funds for science were established, and scientific research at the universities was better supported. This, as well as other circumstances, caused significant expansion of new universities. Another characteristic of this period was a transfer of new knowledge and new technology from more developed countries. Although the period represents significant progress in the Yugoslav economy it meant, at the same time, the beginning of greater dependence on foreign licences and "know-how".

(iii) From the mid-70s began a stage of restructuring of science in Yugoslavia with the clear intention of directly linking science with industry and the economy of the whole country.[2]

Research Workers

Research activity is mostly concentrated at 19 Yugoslav universities. About half of the country's 16,500 research workers are at universities; others are employed either by independent research institutes or units belonging to industry. More than one-third of workers have PhD, MSc or MA degrees. Others are mostly engineers engaged in applied research and development. The distribution of these 16,500 research workers is as follows: natural sciences 13.1%, technical sciences 46.9%, medical sciences 9.4%, biotechnical sciences 12.6%, and social sciences and humanities 18.0%.[2]

Funds For Research And Development

According to UNESCO data for 11 European countries, Italy and Yugoslavia have the lowest expenditures for research and development. In 1975 Yugoslavia invested 1.03% of its GNP. This is about half of that, for example, of Switzerland and France, or 40% of that of West Germany or the USA. It is not the only problem: countries such as West Germany, France, Switzerland or Sweden with approximately three times more GNP per capita than Yugoslavia, invest in research and development 6 to 8 times per capita more than does Yugoslavia.[3]

The main characteristic of research financing in Yugoslavia is that only 20% of the research money goes into research through special funds; 80% is a matter of direct interchange between industry and research institutes. Such direct linkage and financing between scientists and the users of scientific results are generally accepted as the main point of Yugoslav policy. One-fifth of the financial means for research comes from the income of all Yugoslav firms, factories or similar institutions and is distributed through special organizations and funds. These organizations are so-called "self-managing communities of interest" (SCI) and are independent of both Federal and Republican Governments. The SCI have important and decisive roles in the planning, as well as in the financing, of research in Yugoslavia. How are they organized and how do they function?

Each republic or autonomous province has its own Republican or Provincial SCIs for research and development. In the Republic of Croatia, there are 7 SCIs for 7 different branches or disciplines or research-activity, such as (i) metallurgy, metal, machine and electroindustry; (ii) chemical industry; (iii) agriculture and food production, as well as for other social or economic activities. The Republican SCI is a coordinating body of individual disciplinary communities and is a part of the Republican legislature. By Constitutional right the Assembly of the Republican SCI is a part of the Republican Parliament when problems and bills concerning science, research and development are discussed. In such cases the members of the Assembly have the same rights as regular members of Parliament. The Assembly of the Republican SCI as well as the Assemblies of individual disciplinary communities are composed of two chambers: a chamber of delegates elected directly by industry and other non-scientific institutions (They are considered as users of scientific results) and the chamber of delegates elected by research institutes and universities (considered as producers of scientific results). SCIs are the places where the people from industry and research meet directly, where research projects are approved or otherwise and where research grants are distributed. Both the Republican and the disciplinary SCIs have their executive committees, different commissions and their secretariats.

On top of all Republican and Provincial SCIs stands the Yugoslav Union of Republican and Provincial Self-Managing Communities of Interest as the federal coordinating body.

Results Of Research Activities

Scientific results are most often given statistically as the number of publications, whereas technological results are usually presented as the number of patents and inventions. Yugoslav research workers have made remarkable progress in publishing their results, having in 1977 0.74 publications per research worker. Although many (about 80%) of these papers were published in domestic journals, the number is still very satisfactory, since the world average is 0.5 publications per researcher per year. However, there is a wide gap between fundamental and applied research. This gap is best seen from the number of Yugoslav patents. Yugoslavia is, by a factor of 10, behind the countries that are otherwise only two to three times more developed than Yugoslavia.[2] These data show not only the gap between

★*Based upon a lecture presented at the Annual General Meeting of the Auckland Branch of NZ Institute of Chemistry held on November 11 1980.*

★★*Most data are related to the whole research activity in Yugoslavia, not only to the sciences, since all branches of research are almost always treated together both financially and statistically.*

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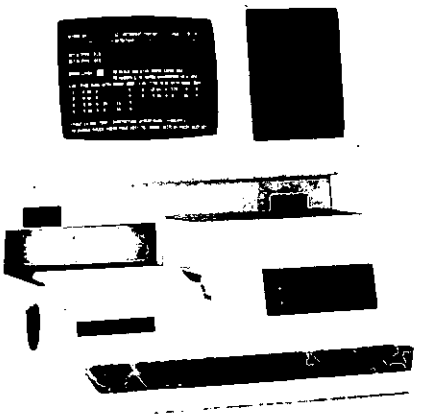

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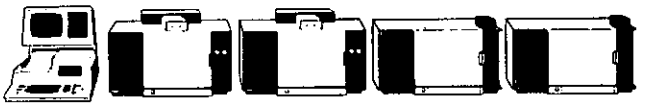

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fundamental and applied research but also the lack of stimulation of technological research and development, and, more importantly, the degree of dependence on foreign technology based on purchased licences. To a certain extent they also show a common attitude towards technological and industrial tradition. For example, for decades, chemists, and in particular chemical engineers, were educated mostly as analytical chemists in order to analyse exported raw materials and imported industrial goods and final products. Even now many university curricula lack good courses in chemical synthesis and chemical engineering. Yugoslavia is a small and developing country and to some extent should appreciate and use foreign scientific and technological results. Yet, sometimes, it is thereby put in a very inconvenient position. The contracts between Yugoslav firms and foreign companies often contain severe restrictions. They limit the market for Yugoslav products, limit research within the framework of the licence, and even determine the type of machinery, plant and raw materials Yugoslav firms should use.

International Collaboration

Yugoslav scientific collaboration with other countries is very good indeed. Yugoslav scientific institutes and universities actively collaborate with many institutions in more than 20 countries. There have been 110 joint projects with Western European countries, and 114 with the USA. Immediately after World War II Yugoslavia was only an acceptor of foreign assistance, but from 1960 it has also been a donor of technical aid, particularly to underdeveloped and developing countries. Up to 1979 about 9000 experts and about 160 consultant missions have been sent to different developing countries. Apart from this many students from these countries have attained their degrees in Yugoslavia. Yugoslavia has very good relations with many UN agencies and intensively collaborates with them and other international or regional organizations such as the UN Development Programme, the UN Environment programme, UNESCO, UNIDO, OECD, EEC and other similar organizations.[2]

Programme Of Scientific Research

This programme is based on two documents: (i) the social development plan of Yugoslavia from 1976 to 1980 (The new one from 1981 to 1985 is in the process of discussion and preparation), and (ii) the basis for long-term development of Yugoslavia to 1985.

Research programmes and projects are generally two-fold: federal and republican. Federal projects are related to research of significance for the whole country. Such projects, for example, are: geological research in connection with the discovery of new mineral and energy sources, research related to meteorology and seismology, investigations connected with the problems of the Adriatic Sea and so on. Republican projects are more concrete and specific, and are related to the problems of the regions.

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2. *Znanost u Jugoslaviji (Science in Yugoslavia),* Institut za drustvena istrazivanja Sveucilista, Zagreb, 1980.
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Ion Chromatography

Peter G Robinson
Waikato Technical Institute
Hamilton

(On leave until May 1981 as UK Cystic Fibrosis Trust Senior Research Officer, Department of Child Health, Welsh National School of Medicine, Cardiff, Wales.)

Introduction

The two techniques of ion exchange chromatography (IEC) and conductivity detection (CD) have been used for many years but, until recently, it has not been possible to combine them as the resins that were available required very high molar strength eluents to elute the sample ions, and the high background conductivity of these eluents swamped that of the ions of interest.

The recent development of low capacity resins coupled with eluent suppression columns allowed IEC and CD to be used together with many consequent benefits. A block diagram of a typical set-up is shown in Fig.1.

The Ion Exchange Resin

The resins used are styrene/divinylbenzene based and have either sulphonic acid (for cation exchange) or tetramethylammonium (for anion exchange) active sites. The cation resins are formed by reacting the S/DVB substrate with H_2SO_4 to provide SO_3^- sites and the anion resins by agglomerating small anion exchange particles to a cation exchange substrate. As the resins used are pellicular (containing only surface-active sites) as opposed to porous (active sites right through the resin) they have a very low capacity and so allow the use of low molar concentration eluents e.g. 0.003M $NaHCO_3$/ 0.0024M Na_2CO_3 for anion analysis.

The Suppressor Column

In order to combine conductivity detection with IEC it is necessary to remove the "background" ions from the effluent. In IC this is achieved by placing a second ion exchange column downstream from the separator column. The resins in the suppressor column are capable of suppressing the eluent conductivity while converting the sample ions to a common ionic form e.g. all hydroxides or all acids. The sample ions then enter the detector and are quantified by their conductivity.

Consider the analysis of a sample containing the following cations; Na^+, K^+ or NH_4^+. Dilute acid (say 0.01M HNO_3) is used as the eluent and the sulphonic acid cation exchange resin exchanges H^+ for Na^+, K^+ or NH_4^+. When a mixture of the cations is injected into the system the ions move through the separator column at different rates depending on how strongly they interact with the sulphonic acid group and elute in a background of dilute HNO_3. The suppressor column in this case contains a strong anion exchange resin in the OH^- form and two important reactions occur. The sample ions, as nitrates, are converted to their hydroxide forms:

$$\text{Resin-OH} + Y^+NO_3^- \longrightarrow \text{Resin-NO}_3 + Y^+OH^-$$

and, more significantly, the eluent acid is converted to a non-ionic product;

$$\text{Resin-OH} + H^+NO_3^- \longrightarrow \text{Resin-NO}_3 + H_2O$$

This means that the background conductivity of the effluent is reduced to virtually zero and the components ductivity associated with their elution from the columns.

For anion analysis a strong base anion exchanger in HCO_3^- form is used in the separator column and a strong acid cation exchanger in H^+ form in the suppressor column. With dilute $NaHCO_3^-$ as the eluent the suppressor reactions are:

$$\text{Resin-H}^+ + Na^+X^- \longrightarrow \text{Resin-Na}^+ + H^+X^-$$

$$\text{Resin-H}^+ + Na^+HCO_3^- \longrightarrow \text{Resin-Na}^+ + H_2CO_3$$

The carbonic acid formed has very low conductivity and the anions in acid form are analysed in the detector.

Ion Chromatography Exclusion

This technique allows the analysis of both organic and inorganic ions in the one sample. It is similar to two IC systems linked through a concentrator column.

The sample is run through the first, ICE, column with dilute HCl as the eluent. As the ICE resin is a strong cation exchanger the strong acids pass straight through the column, through a halide suppressor and are collected on the concentrator column. The weak acids elute from the ICE column at a slower rate and pass through the detector before going to waste. The strong acids are then analysed using a standard IC system.

Practical Details

As the suppressor column removes ions from the effluent stream it has to be regenerated periodically. For optimum performance the volumes of the separator and suppressor columns must be balanced to maximize the number of samples which can be analysed before regeneration, taking into consideration that:

a. The ratio of suppressor:separator volumes should be as small as possible or the resolution obtained in the separator will be lost. Ratios of less than one are preferable but up to 10x can be satisfactory.

b. The capacity of the suppressor column must be as large as possible to maximize the number of ions which can be removed before saturation occurs. Conventional resins with a high degree of cross-linking provide the high capacity combined with structural rigidity in the suppressor column while low capacity pellicular resins in the separator bed allow low concentrations of eluent to be used. This increases the time that the suppressor can be used before regeneration.

Further benefits of the low capacity analytical resins are their fast separation and excellent resolution but care must be taken not to overload the column with sample ions.

One other factor which has to be considered is that the eluting ion **must** form a species of low conductivity in the suppressor column.

A sample concentrator column is available for trace analysis, but with minimum sample volumes of around

4ml (for 100 µl injected) and the only sample preparation usually being dilution and/or filtration; this is not usually needed. Sensitivity is better than ppm for most ions and the use of the concentrator column allows better than ppb for many e.g. with a 10ml injection SO_4^{2-} can easily be measured at 1ppb.

Applications

Examples of typical separations are shown in Figs.2, 3 and 4. A large number of applications have already been found for this technique and a few examples are: air pollution — analysis of aerosols for nitrate and sulphate; water pollution — ion analysis in waste effluents and routine ground water analysis; elemental analysis — organic F, Cl, Br, I, S and P after combustion of polymers and coal; brine analysis; quality and process control — phosphate and ammonium in fertilizers, fluoride, sulphate and chromate in plating baths, glycolate in surfactants, amines in monomers, halides and sulphates in food, etc.

Instrumentation

Dow Corning hold the patents on the ion exchange resins used and complete analyser systems are marketed under license by Dionex Corporation, Sunnyvale California. Only complete systems are available at the moment with an approximate price range of $US8000-15,000. The top-of-the-range Model 12 is completely automatic and will handle up to 99 samples without operator intervention. According to the manufacturer the system offers "multispecific, rapid and precise determinations requiring minimal operator time. Typically, 80 samples can be analysed per day with only 2 hours set-up time."

There are at present no plans to market columns (priced from $US125-800) or resins to anyone who has not bought a Dionex analyser.

Personal Note

Brief hands-on experience showed the equipment to be easy to use and it looked straightforward. It is **not**, as presently supplied, suitable for biomedical analyses e.g. blood, tissues or urine, but certainly has a wide application in the industrial and pollution fields. The ability to quantify sulphate, in particular, as well as other anions like nitrate and phosphate is most impressive.

Peter Robinson was born and educated in Gisborne. After obtaining a PhD in Radiochemistry and Gas Chromatography under Prof A L Odell at Auckland University in 1972 he joined the Paediatrics Department at the Auckland Medical School as a Research Fellow. During 6 years working with Prof R B Elliott, including 2 years as Ruth Spencer Medical Research Fellow, he gained COP in Biochemistry III and developed an interest in the disease cystic fibrosis (CF) which culminated in a trip to the VIIth International Congress on CF in Paris to present 2 papers. A change of occupation in 1978, after a brief stint as computer programmer with Dr T Kjellstrom at the Auckland Medical School, lead to a shift to Hamilton and a job as tutor at Waikato Technical Institute which included designing the biochemistry course for the new nursing course there.

An unexpected offer lead to a further shift in 1979 to Cardiff as a Senior Research Officer at the Welsh National School of Medicine to investigate the role of essential fatty acids in CF. He returned to Hamilton this year.

Peter became a member of NZIC in 1971 and was secretary of the Auckland Branch from 1973-4 and a committee member of the Waikato Branch in 1978. He was co-founder of the Chromatography Group in 1972 and Chairman until 1976.

His other interests include squash, philately, orchids, backgammon and microcomputers. He is married with 2 children.

NZIC golden jubilee pictures

The success of this year's annual conference in Auckland fitted the importance of the Institute's Golden Jubilee. It attracted an attendance of 440, with 42 from overseas; including two chemists from Nigeria, which must be a first.

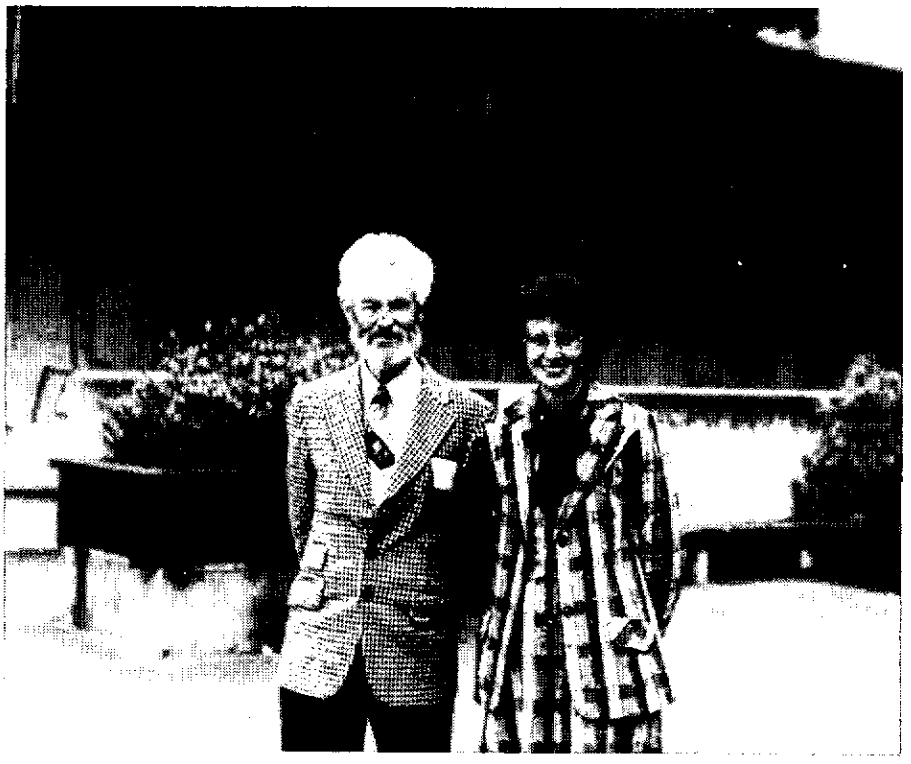
A good deal of this success lay in the hands of the chairman, Alan Mackney, who applied his business expertise, and his knowledge of the right people, both in New Zealand and overseas, to get a top line panel of speakers.

We owe a lot also to the generosity of various business firms in New Zealand which contributed $14,000 to a fund for bringing these overseas speakers to our shores.

There were also many excellent papers in the ordinary technical sessions, not least in the Parton symposium honouring Prof. Hugh Parton on the occasion of his 75th birthday.

The conference secretary is always a key man: Duncan McLennan proved a key that was used very efficiently and a great deal.

We publish here some photos of the conference; an assessment by an overseas visitor will appear in a future issue.



Father and daughter. Dr John Ronaldson (Ruakura Research Station) and his daughter Dr Kathlyn Ronaldson (Auckland University) at the conference.

At the conference dinner. Back row (left) President Jim Ellis and Chairman Alan Mackney; front row (left to right) Mrs Mackney, Professor H.M. Parton, Mrs Parton.

Sticky problem. (left to right) Professor B Hartley (Imperial College London), Alan Mackney (Conference Chairman), Professor A Renwick (Auckland) and Dr Jim Ellis (NZIC President).

Taking a break. (left to right) former NZIC Secretary (1941-1944) Jim Nash in discussion with Professor Bernard Ralph (Sydney) and Dr C Goring (Dow Chemical USA).

In discussion (from left) Professor Cadogan (BP,UK), Phillip Tse (BP Auckland), Professor Malcolm (Massey), Dr Rob McKeown (Otago) and in front Dr George Emerson (Otago).

Science and politics

In an attempt to gauge how the three main political parties view science and its role in the community, "Chemistry" asked all three to respond to written questions.

Labour and Social Credit used their spokespeople on science to reply and their answers (together with the questions) are reprinted below. Kerry Burke is the Labour MP for West Coast and Pat Wojcik is the Social Credit candidate for Waitakere.

Pressure of other duties did not allow, the present minister of science Dr Ian Shearer, to meet an extended deadline. His contribution will be published in December.

Do you think that New Zealand's spending 0.9 percent of its GNP is adequate for scientific research and development?

Burke: New Zealand spends 0.9 percent of its Gross National Product on scientific research and development. To say that this is adequate would imply that enough research is being done and that there is no need for any expansion of activities.

However, there are fields where very little measured information is available. This applies especially in the social areas. We still have no household survey information to show the true level of unemployment and there are many theories but few facts to show the extent of poverty, to give two examples.

A Labour government would seek to increase the level of spending on scientific research and development. However, any such increase would be in areas where a clearly demonstrated need for better information had been established and where economic or social justification could be made for the extra funding.

Wojcik: the adequacy of any percentage of GNP devoted to scientific research and development depends very much upon the health of the economy in general and the uses (if any) to which such research will be put.

Social Credit's first concern is to establish a healthy economy. It resolutely opposes that acceptance of internally-generated inflation implicit in the policies of both National and Labour. Section 10 of the "N.Z. Credit & Currency Bill" introduced into parliament by Bruce Beetham reads: "The Reserve Bank shall create and cancel money from time to time so as to maintain a state of equation of the money supply (coins, notes and bank credit) with the value of the current output of goods and services." Social Credit is committed to building a nation that lives within its means.

Taxation has reached a level which represents a serious disincentive to production. Social Credit has therefore pledged itself to reduce, step by step, the level of government spending from 45 per cent to 35 per cent of GNP. Simultaneously, it will increase the level of investment available to private industry at progressively diminishing rates of interest.

As production expands and internal costs come down, science will be better funded even on existing levels of public expenditure. Contributions from the private sector are likely to increase.

The isolation endured by research staff is one aspect of research and development which Social Credit will alleviate by immediate additional funds. Cross-border weekend seminars and visits, enjoyed elsewhere, are simply not possible for New Zealand scientists; nor has New Zealand the industry or financial capacity to cater fully in research fields such as industrial chemistry, physics and engineering. All scientists employed in state-funded institutions, of whatever kind, should be eligible for overseas experience, regularly or from time to time as particular needs dictate.

Social Credit is also eager to sponsor periodic exchange of research staff between tertiary teaching institutions, government departments and industry.

The Social Credit spokesman on finance has indicated that he expects to raise spending levels to one per cent of GNP in his first budget and to increase this expenditure to 1.2 per cent GNP by the following year.

If economic health justifies applied research through downstream development, he will increase expenditure progressively, to an upper ceiling of two per cent of GNP. Above this figure, he is likely to apply state expenditure, not as direct grants, but as tax relieft ot industry in proportion to its contribution to scientific research in public institutions.

What specific areas of research and development would your party emphasise or de-emphasise?

Burke: Labour would not interfere with the ongoing research activities of the DSIR, university departments and other research organisations. We recognise, however, that there is a need for closer co-ordination of these efforts so that government funds are equitably distributed to cover all aspects of research, including the social areas.

Social science is at last beginning to be recognised at its true worth. Sociologists, psychologists and anthropologists, for example, have been often dismissed by the "pure" scientists as not "real" scientists. As an example of their lower status, within the Public Service DSIR scientists are paid on a science scale while, with a few exceptions in places such as the Ministry of Energy, social scientists with equivalent qualifications are paid on a lower scale.

Labour believes that this situation should not continue and would look towards the establishment of an independent Social Research Institute along the lines of the New Zealand Institute of Economic Research.

This would ensure that there is an adequate mechanism for the monitoring of programs and evaluation of the effects of social policy. Politicians must also be provided with soundly based information on social problems so that their decisions can be made on the basis of identified needs.

Another area where there is a need for greater emphasis on research and development is manufacturing. Research in this area should be regionally based in order to ensure that it arises from local needs. An example would be the development of natural resources for industry in an area such as Northland. Labour is looking towards a number of development schemes that would require careful research and evaluation before they could get underway.

Wojcik: major scientific advances have been, for the most part, the accidental outcome of pure research. Social Credit believes that it is essential to support that thirst for knowledge for its own sake which is the raison d'etre of the university.

Pure research is freely published, because its allegiance is to the public and not to commercial interest. It is the monitor of every side effect — physical and social — which technology generates.

Finally, directorship of research is an essential function for university teachers, whose primary aim is to stimulate original thought by example.

Although academic freedom reaches its zenith in universities, a Social Credit government will legislate to make disclosure of scientific information from all publicly-funded research the rule rather than the exception.

In applied research, Social Credit will emphasise:

- Planning for a growth rate which can be sustained long term. Projections should be for the succeeding 50 years.
- Envrionmental enhancement and protection by means of investigation into:
  - ★ environmental law,
  - ★ land tenure and use,
  - ★ energy conservation,
  - ★ flood control and water quality,
  - ★ the theory and practice of ecological principles in farming, horticulture and forestry, with particular emphasis on animal health, soil health, crop diversification, replacement of pesticides and recycling of wastes,
  - ★ wildlife and game resources,
  - ★ marine resources and aquaculture,
  - ★ prevention and correction of pollution by industry, transport and urban living,
  - ★ occupational health and safety.
- Preventive medicine and delivery of health care to and in the community.

- Energy self-sufficiency from:
- ★ use of CNG, ethanol and electricity in transport; use of wind-power for ships,
- ★ hydrogen and producer gas as fuels,
- ★ thermal efficiency in the combustion of coal,
- ★ less wasteful use of geothermal energy, together with re-injection of waste waters to preserve the fields and cut chemical and thermal pollution,
- ★ solar heating and solar cells,
- ★ refinery expansion not geared to bulk throughput of petrol and diesel from Arabian crude but to limited production of a wide range of solvents, aviation and shipping fuels, oils and waxes from various local feedstocks.
- Agriculture, fishing and aquaculture, horticulture, forestry and downstream processing there from.
- Coal processing to activated carbon and petrochemicals.
- Steel, titanium, silicon carbide and phosphate deposits for domestic use and exports of real national advantage.
- Market research and professional marketing techniques overseas.
- Backing for research in Antarctica and southern oceanic ecology.

Social Credit will de-emphasis:

- Use of natural gas as feedstock for methanol, synthetic petrol, ammonia-urea.
- Nuclear power production except as an academic exercise.

Do you think the National Research Advisory Council should be given executive powers to direct scientific research and development?

Burke: under the next Labour government the functions of the National Research Advisory Council will be included within the responsibilities of the Minister of Science. The council will comprise public servants and professional people on secondment from universities, other government departments and the private sector. It will be responsible for oversight of science expenditure and the promotion, planning and co-ordination of scientific research in New Zealand.

While the semi-autonomous research organisations, such as the NZCER, NZIER and the Medical Research Council, will continue to operate as at present, discussions will be instigated between them and the Ministry of Science to work out ways in which all relevant research can be more closely co-ordinated.

The Social Science Research Fund, for example, which is currently administered by the Department of Social Welfare, will be transferred to the administration of the Ministry of Science.

Under Labour the DSIR, Ministry of Agriculture and Fisheries, Ministry of Energy and other government departments with scientific research sections, will be seen as national technical resources available to all those needing access to information through their data bases.

A similar structure will be devised for the manufacturing sector so that small industries in particular, which lack the time, finance or expertise to do their own research, have access to a computer terminal with links to relevant departments and agencies, such as the Development Finance Corporation or Small Business Agency. Such a dial-information service should be particularly valuable for regional manufacturers.

As part of the general co-ordination of research and development, Labour will establish regional offices of the Ministry of Science, using existing facilities wherever possible. Through these offices closer local links can be established between research organisations and universities and the sharing of resources can be developed and encouraged. This regionalisation will also make it easier for the DSIR to carry out its educational function within the wider community.

The main emphasis of a Labour government can thus be seen as a furtherance of scientific research and development; as an expansion through greater encouragement, especially in social areas; and as greater co-ordination of resources and facilities so that all can be used to the greatest economic and social advantage.

Wojcik: in general terms, Social Credit believes that government should set broad policy guidelines, fund them adequately and let people get on with accomplishing the goals in their own way, with the greatest possible autonomy in administering the funds allocated to them.

For this reason, Social Credit will reconstitute the DSIR as an independent Scientific and Industrial Research Corporation, freed from political influence.

Subject to agreement among the various scientific institutions and technical institutes on the membership of a National Research Council with executive powers, Social Credit would be **sympathetic to such a move.**

NZIC membership changes

To celebrate the Golden Jubilee, the council elected the unusually large number of 13 honorary fellows, including all those living original members of the institute who have not yet been honoured.

These are: *W L Barr* (Melbourne), *H W Crozier* (Christchurch), *Dr E B Davies* (Hamilton), *S R Gay* (Christchurch), *R E R Grimmett* (Tauranga), *J F Moffatt* (Christchurch), *N P Pitcaithley (Auckland), and D F Waters* (Hamilton).

Others elected were *P J C Clark* (Wellington), *Sir F J Llewellyn* (U K), *Dr W A McGillivray* (Tauranga) and *C L H Stonyer* (Auckland).

In addition a record number of new members and changes of status were dealt with by the council.

Elected to fellowships

Broughton, George Wilfred, BSc McLeod Bros Dunedin. (general manager).

Buisson, David Huon, MSc PhD (Auck) Division of Horticulture and Processing, DSIR, Auckland. (scientist).

Eyres, Lawrence, BSc (Hons) PhD (Umist) Abels Auckland (chief chemist).

Entwistle, Mrs Evelyn Ruth, BSc (Hons) (St Andrews) 9 Danube St, Dunedon (retired, formerly senior lecturer in home science).

Hardman Michael John, BA BSc (Hons) PhD (Cantuar) Department of Chemistry, Biochemistry and Biophysics, Massey University (senior lecturer).

Lockhard, Douglas Watson, MSc (NZ) 290 Main South Rd. Dunedin (retired, formerly head of department of science, Kings High School).

Mok, Kum Fun, MSc, PhD (Well) Chemistry Department National University of Singapore (associate professor).

Phelan, Edward Linton, BSc Wellcome Medical Research Institute, Dunedin. (research fellow).

Pope, Christopher George, BSc (Hons) PhD DIC (Lond) Chemistry Department University of Otago (senior lecturer).

Reeves, Roger David, MSc (NZ) PhD (RPI) Department of Chemistry Biochemistry and Biophysics, Massey University (reader).

Robb, James, MSc (NZ) Fur Dressers and Dyers (NZ) Dunedin (technical manager).

Scrymgeour, Alistair Neil, BSc AIB ANZIM Cadbury Schweppes Hudson Dunedin (chief chemist).

Shepherd, Maxwell Gilbert, BSc (Hons) (Cantuar) PhD (Calgary) Dental School, University of Otago (professor or oral biology).

Sirett, Nancy Elliott, BSc Department of Neurophysiology, Medical School, University of Otago (MRC senior research fellow).

Smith, Mervyn Graham, MSc (Otago) D. Phil (Oxon) department of Biochemistry, University of Otago (associate professor).

Sullivan, Patrick Alexander, MSc PhD (Otago) Department of Biochemistry, University of Otago (associate professor).

Elected to membership:

Allen, Kenneth William BSc Department of Health, Dunedin (regional air pollution officer).

Burns, Mrs Janet Ruby MSc (Well) Dip.Ed Chemistry Department, Victoria University of Wellington (teaching fellow).

Collier, James Bruce BSc New Zealand Cement Holdings, Dunedin (analyst).

Crump, Douglas Ronald MSc PhD (Auck) Chemistry Division DSIR Gracefield (scientist).

Duffy, Douglas Neil MSc DPhil (Waikato) Department of Chemistry, University of Michigan, Ann Arbor (post-doctoral fellow).

Fletcher, Mrs Kathleen Patricia BSc DipT-chg Central Hawkes Bay College Waipukurau (head of department of chemistry).

Hall, Roger Irvine MSc (Waikato) Ruakura Agricultural Research Centre Hamilton (technical officer).

Hendy, Christie Howard MSc PhD (Well) Chemistry Department University of Waikato (senior lecturer).

Lai, Chee Kong BSc (Hons) PhD (Otago) Department of Chemistry, Massachusetts Institute of Technology, Boston (post-doctoral fellow).

Lee Donald BSc PhD (Edin) Department of Surgery, Medical School (research fellow).

Ogden, Ian Ellams, BSc Lion Breweries Wellington (quality controller).

Patterson, John Ewan, MSc (Well) Chemistry Division DSIR Gracefield (scientist).

Perera, Dayantha Shresta, BSc (Hons) (Sheffield) PhD (Newcastle) Pottery and Ceramics Research Association Lower Hutt (acting director).

Perkins, Mark Allen BSc Nelson Secondary Schools Council (teacher).

Peszynski, Jack BSc Hutt Valley High School Lower Hutt (teacher).

Robinson, Brian Harford, BSc (Hons) PhD (Cantuar) Chemistry Department University of Otago (associate professor) (reinstatement).

Ronaldson Kathlyn Joy MSc D Phil (Waikato) Chemistry Department University of Auckland (junior lecturer).

Spencer, Michael Jay BSc Nelson Catchment Board (water resources assistant).

Town, Keith Gregory, MSc PhD (Well) BP Laboratory Petone (senior chemist).

Winter, David Stanley, Southland Co-op Phosphate Co Invercargill (works chemist).

Graduate members elected to full membership.

Alchin, William Davis, BSc NZ Co-op Dairy Co Hamilton (technical librarian).

Dawson, Bernard Stanley Winton, BSc (Hons) (Cantuar) Chemistry Department University of Canterbury (PhD student).

Galloway, Neil MSc (Well) Taubmans International Wellington (chemist).

Gibson, Jeffrey Raymond, BSc (Hons) PhD (Cantuar) Shell International Petroleum The Hague (process design engineer).

Guthrie, Alexander Kevin, BSc Canterbury Frozen Meat Co (chemist).

Johnson, Anthony Peter, BSc Tasman Pulp and Paper Co Kawerau (pulp mill process engineer).

Liddle, John Raymond, MSc (Massey) Department of Chemistry and Biochemistry Massey University (PhD student).

Lloyd, Rodney, BSc Rangitikei College (teacher)

Martin, Robert Wayne, MSc (Auck) Chemistry Department University of Auckland (temporary junior lecturer).

Nelson, Dennis George Anthony, BSc (Hons) (Well) Medical Research Council (postgraduate scholar - PhD student).

Rountree, Bruce William, BSc Waitaki NZ Refrigerating Co Wanganui (works chemist).

Wallace, Robert Gerard MSc (Auck) Chemistry Department University of Auckland (teaching fellow).

Associates elected to membership

Lowe, Michael David, Assoc NZIC NZCS Ruakura Agricultural Research Centre Hamilton (senior technical officer).

Mumford, Robert Neill, Assoc NZIC NZCS Electricity Department Ruakaka (station chemist, Marsden Point Power Station).

Elected to associate membership

Drysdale, Alexander Broadrick, NZCS DipAg NZ Agricultural Engineering Institute, Lincoln College (technician).

Gahaghan, Hugh Mackie, NZCS Analytical Research Laboratories Napier. (director).

McDonald, Alan, National Certificate in Chemistry UK BTN Holdings Auckland (laboratory manager).

Skarsholt, Olaf Harold NZCS T.J. Sprott and Associates Auckland (consulting chemist).

Technicians elected to associate membership

Banks, Warren John, NZCS NZ Co-op Rennet Co Eltham (technical officer).

Stratton, Malcoln Kenneth, NZCS Dominion Breweries, Pahiatua (chemist).

Webb, Vincent Mark BSc National Gas Corporation Hawera (process engineer).

Technician membership

Goldsack, Alistair George Raymond NZCS Hitchins Research Laboratories, Blenheim (Chemist).

Elected to graduate membership
Bloor, Stephen John, BSc (Hons) (Massey) Chemistry Division DSIR Gracefield (scientist).
Brockett, Gary BSc Hoechst NZ Auckland (development chemist).
Campbell, Graeme Keith MSc (Auck) Chemistry Department University of Auckland (temporary junior lecturer).
Cardile, Clay Mitchell, NZCS BSc Chemistry Department Victoria University of Wellington (demonstrator).
Chipman, Robert Neil, BSc Chemistry Department University of Auckland (MSc student).
Christmas, Michael John, BSc Chemistry Department University of Canterbury (MSc student).
Coll, Richard Kevin, BSc Empire Rubber Mills Christchurch (assistant chief chemist).
Dempsey Victor Joseph, BSc Chemistry Department University of Auckland (radiochemistry technician)
Dickson, Roderick John, BSc DipSci Empire Rubber Mills Christchurch (industrial chemist).
Fenton, Diana Marie MSc (Auck) Abels Auckland (R & D chemist)
Geursen, Arie, MSc (Otago) Department of Biochemistry, University of Otago (scientific officer).
Jacques, Phillip Richard, BSc NZ Co-op Dairy Co Hamilton (asst. water chemist).
Kennedy, James Alexander, BSc (Hons) (Cantuar) Chemistry Department University of Canterbury (PhD student)
Knight John Stephen, BSc (Hons) (Cantuar) Chemistry Department University of Canterbury (PhD student)
Knighton Derek Robin, MSc DipSci Department of Chemistry and Biochemistry Massey University (PhD student).
Laus, Anthony Ivan, BSc Montana Wines Auckland (R & D chemist).
Miskelly, Gordon Mark, BSc (Hons) (Otago) Chemistry Department Otago University (PhD student).
McKinley, Allan James, BSc (Hons) (Cantuar) Chemistry Department University of Canterbury (PhD student).
Morton, James David BSc (Hons) (Otago) Waitaki NZ Refrigerating Christchurch (research officer).
Rogers, David Alan, MSc (Auck) Chemistry Department University of Auckland (PhD student).
Watkinson, Philip John, MSc (Waikato) Chemistry Department University of Waikato (D.Phil student).
White, Belinda Mary, BSc NZ Farmers' Fertiliser Co Auckland (R & D chemist).
Wignall, Anne Philippa Dorothy, BSc Lincoln College Canterbury (temporary technician).
Yang, Chin Ming, BSc Chemistry Department University of Canterbury (MSc student).

Life membership
Rogers, Dr John Auckland (retired)

Deaths recorded
Barnicoat C R (Hon Fellow) Nelson 1980
McClure D Auckland 1979
Hughson W G M (Hon Fellow) Wellington 1981
Tiller L W Wellington 1981

Resignations
Deady L W, *McDowall* I C, *Pritchard* C W, *Wong* F S, *Farquarson,* B J, *Patchett* B J.

Deleted
Collister R C.

Wellington

The July meeting took the form of a visit to ICI-Tasman, Upper Hutt. A "fully-subscribed" group of members was addressed by biological production manager, *B. Pidford*, about the processes involved in manufacturing anaerobes and virus vaccines, both for New Zealand and world-wide markets and by quality control manager, *P. Morris*, about procedures used in testing these products. A short factory tour to accessible regions followed.

Branch chairman, *Dr Stuart Smedley*, also head of chemistry at Victoria University, spoke to the August meeting on the migration of ions in liquids. Some of the recent advances that have been made in the interpretation of the phenomena of electrical conductance, were briefly reviewed with reference to very high pressure and temperature of aqueous solution and in molten salts.

Dr Smedley went on to discuss how this knowledge could be applied to liquids of geological interest, for example in its conductance properties sea water is more appropriately regarded as a molten salt, while lavas seem to become more conducting and less viscous at high pressures — an unexpected result.

Dr Smedley intended to give the same address to Nelson members of the Wellington Branch in September, in conjunction with the local branch of the Royal Society.

More than 90 people attended a jubilee dinner at Wakefield House in July. Members, wives and invited guests enjoyed a very lively evening, the main speech being given by minister of science, *Dr Ian Shearer*. In his reply, the president of the NZIC, *Dr Jim Ellis*, paid particular tribute to the honorary fellows of the branch, briefly reviewing the backgrounds of the ones present at the dinner, *"Mick" Hughson* (since deceased), *Brian Shorland, Athol Rafter, Alan Johns* and *Ian Walker*, who received warm acclaim from the assembled diners.

Manawatu

The second jubilee lecture to schools in the Manawatu took the form of a mini-symposium on the topic, "What Does a Chemist do at Work?". *Dr Dick Garland*, from NZ Pharmaceuticals in Palmerston North, spoke on the work involved in the isolation of biochemicals from raw starting materials. *Neil Gunn*, DB Brewery, Pahiatua, discussed the work done by analytical chemists with the company. *Dr Geoff Lane*, of applied biochemistry, DSIR, discussed aspects of fundamental research and their applications to various problems.

Canterbury

The branch organised a successful series of activities recently to mark the 50th jubilee of the institute. A jubilee dinner was held in a central city hotel and attended by some 70 members and their spouses. The after dinner speaker was institute president, *Dr Jim Ellis*, who spoke on "Resources and Resourcefulness". During the same week a chemistry-oriented open day was held at the Lincoln College Campus. Groups were: Lincoln College departments of Soil Science, Biochemistry and Agricultural Microbiology; DSIR divisions of Crop Research and Applied Biochemistry; and the Wool Research Organisation, all of which had displays of their research activities.

Lynfield College student Gerda Kushel received her prize from Professor Allan Odell.

The July branch meeting was addressed by *Dr Murray McEwan* who spoke on scientific results of the recent Voyager spacecraft's close encounter with the planet Saturn. Dr McEwan has spent recent overseas leave at the Jet Propulsion Laboratory, Pasadena, where the Voyager mission control is located.

The August meeting was addressed by *Dr Peter Rothbaum*, Chemistry Division, DSIR, Petone, whose subject was "Silica Chemistry and Geothermal Problems".

The annual "Chemistry in Action" program sponsored by the branch for sixth and seventh form pupils, was again highly successful. Capacity houses were obtained in all of the three venues where the program was presented. Speakers this year were *Drs Murray McEwan* and *Colin Freeman* of Canterbury chemistry department. Dr Freeman spoke on "Careers in Chemistry" and Dr McEwan on scientific results of the Voyager spacecraft missions to Jupiter and Saturn. New ground was broken this year by taking the program to Blenheim (a highly successful and much appreciated innovation) as well as Christchurch and Timaru.

The headmaster of Riccarton High School, *Terry Hitchings*, recently spent six weeks in the United States and Belgium. He attended the sixth International Conference on Chemical Education at the University of Maryland from August 9 to 14.

This was co-sponsored by the International Union of Pure and Applied Chemistry, the American Chemical Society and the United Nation's Education, Scientific and Cultural Organisation.

Hitchings attended as a member of the Committee on Teaching Chemistry and chaired the plenary tandem lecture on "Making Difficult Things Easy and Easy Things Difficult" in connection with the world of chemistry. Hitchings and a woman delegate from Portugal, were the only two secondary teachers represented at the conference. The majority of the delegates were university lecturers and professors. Hitchings later went on to Belgium to a meeting of the conference committee to work on a substantial book which will deal with all aspects of the first conference.

Auckland

A "Chemistry Jubilee Scholar" competition was held at the University Chemistry Department on August 19. Schools had been invited to nominate up to three competitors from the seventh form and 53 entries were received.

The competition was divided into three activities: anion and organic unknowns (supervised and marked by *John Packer*); heat of solution of NH_4NO_3 and standardisation of silver nitrate solution against sodium chloride (supervised and marked by *David Wilkins* ATI); short answer paper (30 minutes), recognition of compounds by smell and sight (10 minutes) and a multi-choice test (30 minutes) (supervised and marked by *Graham White*).

Marking and collation was finished 40 minutes after completion of last session and the mastermind quiz between the top four took place a short while later. Considerable preparation, thought and trial running was put into this to ensure smooth running. The marks (/70/100) gained in the competition were added to the marks (/10) gained in two minutes in the mastermind chair.

Lunch was bought from the Student Union with the $100 donated for the purpose by NZ Farmers Fertilizer Company.

The laboratory sessions were prepared and run by the Chemistry Department's Stage I and Analytical Laboratory technical staff, who did a first class job.

The winner was *Gerda Kushel* of Lynfield College, with 86 points, followed by *Paul Austin* of Auckland Grammar School with 76, *Roger Fairgray* of Auckland Grammar School with 75 and *Christopher Dickey* of St Kentigern College with 72.

A copy of "Chemical Processes in New Zealand" was presented to each finalist, the winner also being presented with a book "Asimov on Science" and a trophy (made by the university's glassblower and workshop).

NEWS AND NOTES

Coal Research: *Dr Vince Gray* recently spoke to the Wellington section of the Institute of Mining and Metallurgy on the chemical properties of New Zealand coals.

Central Institute of Technology: recent seminars have been on enzyme-linked immunological assays by *Dr Jack Turner* of Wallaceville Animal Research Unit and "When Incest is Best", the "Myth of Altruism" by *M. Foggo* of CIT.

Dairy Research Institute: *Alison Fordyce* has been appointed research officer in the biochemistry section where she will work with *Dr Terry Thomas* on problems related to bacterial metabolism. *Steve Haylock* has been appointed to the casein and related products section, working on functional and theological properties of casein and caseinates.

J R Beck, general manager and a director of Lion Breweries, has been elected president of the Brewers' Association of New Zealand.

Consequent on the ending of oilseed operations at Fletcher Agricultural, Dunedin, A J D Robb is arranging for the disposal of the equipment used, while *Stuart Gray* has responsibility for the firm's lucerne and fishing operations.

At his eighth try, *Dr Linus Pauling*, a Nobel Laureate and head of the Linus Pauling Institute of Science and Medicine at Menlo Park, California, has won a grant from US National Cancer Institute to study the effect of Vitamin C on breast cancer in mice. The 80 year old scientist is very fit, which he attributes to his daily dose of 10g of the vitamin per day.

The NZIC chromatography group will hold a basic course in gas chromatography at the Waikato Technical Institute on November 17 to 20. Accommodation is available. Enquiries to *Dr Paul Judd*, Waikato Technical Institute, Box 982, Hamilton.

More copies of the October and December, 1979 issues of the journal are urgently required for exchange purposes. If you can spare yours, please send it direct to Exchange Librarian, Massey University.

To all members — are you planning to go overseas? There is a reduced subscription for overseas members away for a year or more (periods less than one year do not qualify).

To claim this you must notify the *Registrar*, Box 1926, Christchurch, preferably one month before you leave. Your return to New Zealand should be similarly notified.

Branch grants and members' accounts are computer-generated from central records.

It is no longer acceptable to be told in September that you have been away all year. Time spent overseas prior to notification being received cannot be counted.

A first announcement and call for papers is being made for the Water Conference, August 24 to 26, 1982, at the University of Auckland. Enquiries to the Centre for Continuing Education.

An International Conference on Chemistry and World Food Supplies (Chemrawn II) will be held under the auspices of IUPAC at Manila December 6 to 10, 1982. Enquiries to Dr Joyce Torio, Chemrawn II Co-ordinating Office, 1776 Massachusetts Ave., Washington 20036.

An International Symposium of Fibre in Human and Animal Nutrition will be held at Massey University May 23 to 28, 1982, sponsored by the Royal Society of NZ and the International Union of Nutritional Sciences. Enquiries to the secretariat, Massey University, Box 63, Palmerston North.

Plans are going well for the International Conference on Fats, Oils and Waxes sponsored by the Royal Society and NZIC to be held at the University of Auckland, February 13 to 16, 1983. Enquiries to S G Brooker, Dept. of Chemistry, University of Auckland.

New Fellow of the Royal Society of New Zealand: Prof J K Syres, FNZIC, head of the Department of Soil Chemistry at Massey, has been elected on the basis of his prolific researches into the use of chemical and radiochemical techniques to study trace elements in soils, particularly those which are essential in nutrition.

Chemistry textbooks available: Mrs Jenny Pain, whose late husband, Eric was active in chemical education, has handed over to the editor his collection of textbooks, which are available to anyone interested on payment of postage. Enquiries to S G Brooker, Chemistry Department, University of Auckland.

GOVERNMENT DEPARTMENTS

DSIR

The Plant Diseases Division of the DSIR, Auckland has changed its name to the Division of Horticulture and Processing. The staff includes a number of chemists including the section head, *Dr Don Burns*, a son of a past president NZIC, *Sir Malcolm Burns*.

Applied Biochemistry, Palmerston North: *Dr John Shaw* attended the seventh Biennial Conference of the Australian and New Zealand Society of Mass Spectrometry in Sydney, where he presented a paper on non-protein amino acids from *Lotus tenuis*. He also spoke at the Division of Food Research, CSIRO, Sydney.

Miss Sally Roach has left the division to join the State Services Commission as Graduate Liaison Officer in Wellington. She joined the division in 1979 to study the degradation of cellulose by ruminant micro-organisms.

Dr Clive Pankhurst has been awarded an Alexander von Humboldt-Stiftung Fellowship to study for a year at the Max Planck Institute fur Zuchtungsforschung, Cologne. He will be working on molecular aspects of *Rhizobium* competition of nodulation and will also spend three months at Queen's University, Kingston, Ontario.

Dr John Robertson, attended the 13th International Botanical Congress in Sydney, presenting a paper on ATP-ase activity in peri-bacterial membrane preparation from lupin nodules. He has been invited to work with *Prof M J Dilworth*, of the School of Environmental and Life Sciences at Murdoch University, Perth, WA, in a collaborative attempt to solve the problem of defining the site of Leghaemoglobin in legume nodules.

Dr A D Woodhouse of the organic section, Wellington, left recently for study leave at Georgia State University, Atlanta.

Dr T M Seward of the geochemistry section attended the IUPAC Congress in Vancouver in August. He will also visit the Canadian Oceanographic Centre and on his way home will inspect the Emperor gold mine at Vatukoula, Fiji.

Mr H V Brewerton, head of the food section, Wellington, has been appointed group leader for the applied chemistry and food sections, with additional responsibility for information and public relations.

Chemistry Division, Christchurch

Mrs Barbara Thomson has resigned, to travel with her husband to Canada where she hopes to continue in chemical work.

The government analyst, Christchurch, *Gordon Scott*, retires in November. He transferred to Christchurch as government analyst in 1973 from a similar position in Dunedin when the Dunedin lab was closed. He has been in charge of the Christchurch branch of the division serving the whole South Island since then. His successor will be *Dr Max Robertson* who has been deputy government analyst in Auckland.

News has been received that the long awaited contract to build a new laboratory block adjacent to the university campus at Ilam has been signed. The building is for the division and the Wheat Research Institute and is due for completion towards the end of 1983.

Wairakei

Recently the new laboratory block at Wairakei was opened by the minister of science, *Dr Ian Shearer*. On the same day, the director general of the DSIR, *Dr David Kear*, announced a structural change in the geothermal organisation within the department.

Dr Jim Ellis, assistant director general, was made responsible for the geothermal policy within the department and *Tony Mahon* was appointed geothermal co-ordinator. Mahon was transferred from Chemistry Division staff to head office staff and the administration and support staff at Wairakei was placed directly under head office control.

Dr R W Henley was later appointed officer in charge, Chemistry Division, Wairakei. The geothermal group at Wairakei has been renamed The Geothermal Research Centre, Wairakei and is locally administered by the goethermal co-ordinator.

Staff at Wairakei belong to five separate DSIR divisions. Divisions represented include Chemistry — officer in charge *Dr R W Henley;* Geophysics — officer in charge *Dr T M Hunt;* Industrial Processing — officer in charge *R E Jamieson;* Geological — officer in charge *Peter Otway;* and head office — administration officer, *D N Mackay*. A total of 30 staff work at the research centre.

Geothermal investigations are being carried out by the DSIR at Ngawha, Broadlands, Kawerau, Wairakei and Mokai. Exploration drilling is being carried out at Ngawha, Kawerau and Mokai, while at Ohaki, Broadlands, drilling has been directed towards the injection program.

Deep well drilling will recommence in December 1981 when the large GC350 rig comes back into full operation. The first of the deep wells will be drilled at Wairakei to depth of up to 2½ kilometres. Information gained from the deep wells will further the knowledge of the energy potential of each system.

Scientific project work continues on waste hot water injection at Ohaki and the understanding of related problems of mineral deposition from the injected fluids. Geophysical work has been concentrated on electrical resistivity measurements at Waiotapu, Mokai and Ngatamariki. Research is underway on heat exchange between geothermal fluids and other fluids.

The huge resource of energy present in geothermal effluents can possibly be best utilised through a heat exchange process. Geological studies have been concentrated in the Haroharo volcanic complex and petrological work on rock cores taken from wells at Kawerau and Ngawha.

Two relatively major hydrothermal eruptions occurred in the Wairakei-Tauhara area over the last two to three months. The first was in the Karapiti area and the second took place in Taupo.

UNIVERSITY NEWS

Massey

A senior lecturer, *Dr Andrew Brodie*, has been awarded a Nuffield Foundation Travelling Fellowship which will enable him to continue his current research in protein chemistry at Cambridge. He intends to investigate the synthesis, structure and reactivities of transition metal compounds related to his research on lactoferrin, the iron-binding protein in human milk.

Victoria

Dr A G Freeman will be spending eight months sabbatical leave at University of Cambridge, Department of Physical Chemistry, working with *Professor J M Thomas*.

Dr B Halton will be on leave for nine months from this month. He will spend the period as a Fulbright Scholar working with *Professor Peter Steng* at the University of Utah, USA.

Professor J W Tomlinson of the Physical Chemistry Department has been asked to extend his term of deputy vice-chancellor until December 31, 1982.

Mrs Janet Burns, from Wellington High School, is the 1981 Visiting Teaching Fellow in the Chemistry Department. She is involved in teaching mainly first-year classes and is carrying out an evaluation of senior chemistry in schools.

Canterbury

Recent visitors who have given seminars in the Chemistry Department were: *Professor Lloyd Smythe*, University of NSW, who spoke on Atomic Absorption Spectroscopy (a joint meeting with the local NZIC AA Group); and *Professor D L H Williams*, Durham University, whose topic was Nitrosamines and Nitrosation.

Two post-graduate chemistry students have recently distinguished themselves. *Evert Ditzel*, a 1980 honours graduate, has been awarded a 1851 Exhibition Science Research Scholarship. Ditzel will shortly commence a Ph.D. in chemistry at Cambridge University. *Selwyn Yorke*, a Canterbury Ph.D. student, was recently selected and attended a UNESCO sponsored SE Asian regional workshop on Structural Elucidation and Chemistry of Selected Natural Products at the Universiti Sains, Malaysia.

Professor R D Gillard, professor of inorganic chemistry, University College, Cardiff, has been awarded an Erskine Fellowship for the first term of 1982. Professor Gillard's researches have extended over many fields of inorganic chemistry, including stereochemistry and natural asymmetry, reaction mechanisms, bioinorganic chemistry, hydrogen bonding, dating of fossil protein and applications of chemistry to the preservation of archaelogical artifacts.

While at Canterbury he will lecture on inorganic stereochemistry and bioinorganic chemistry.

Auckland

Visiting at the University of Auckland are: *Professor E S Hansen*, of Arcadia University, Nova Scotia and *Dr J J P Stewart* of the University of Strathclyde, Glasgow. *Dr Maruta Zvagulis* of McMaster University, Ontario, is working with *Dr G Bowmaker* on a post-doctoral fellowship.

THE AUSTRALIAN NATIONAL UNIVERSITY

RESEARCH SCHOLARSHIPS

THE INSTITUTE OF ADVANCED STUDIES
COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN
THE RESEARCH SCHOOL OF CHEMISTRY

Dean: Professor L.N. Mander

The School is non-departmental and is well equipped to contemporary standards, especially in optical, NMR and EPR spectroscopy, mass spectrometry, X-ray crystallography, electron microscopy and liquid He cryogenics. A library and workshops are on the premises. The school is well supported by ancillary staff. In computing there is access to the School PDP 11/45 and the University Univac 1100/82 systems.

ORGANIC CHEMISTRY

Professor A.L.J. Beckwith, F.A.A., Professor L.N. Mander, Mr R.W. Rickards, F.A.A., Dr. J.K. MacLeod, Dr. L. Radom

Mechanistic and synthetic organic chemistry; chemistry and biochemistry of biologically active compounds; microbiological chemistry; biomimetic reactions; reactive intermediates. Applications of ICR and mass spectrometry, and ESR spectroscopy. Theoretical organic chemistry, *ab initio* molecular orbital theory.

INORGANIC CHEMISTRY

Professor B.G. Hyde, F.A.A., Professor A.M.Sargeson, F.A.A. Dr M.A. Bennett, F.A.A., Dr. G.B. Robertson, Dr. S.B. Wild.

Solid-state chemistry; non-molecular crystal structures, electron microscopy/diffraction (Hyde). X-ray crystallography, neutron diffraction (Robertson). Synthesis, structure and mechanism of reactions of coordination complexes: reactions of coordinated ligands and their relation to biology and catalysis, reactive intermediates, quantitative conformational analysis, caged metal ions (Sargeson). Synthesis and catalytic properties of organotransition metal complexes (Bennett). Resolution of chiral tertiary arsines and phosphines using metal complexes; asymmetric synthesis (Wild).

PHYSICAL AND THEORETICAL CHEMISTRY

Professor D.P. Craig, F.A.A., F.R.S., Dr. J Ferguson, Dr R. Bramley, Dr. T.R. Welberry.

Molecular and crystal theory (Craig). Spectroscopy and photochemistry (Ferguson). Optical and magnetic resonance studies of photophysical processes (Bramley). Optical analogue, X-ray diffraction and theoretical studies of disordered materials, particularly organic molecular crystals (Welberry). Theoretical organic chemistry (Radom) is listed under Organic Chemistry.

ANALYTICAL CHEMISTRY

Miss B.J. Stevenson.

Applicants for scholarships should be of high scholastic calibre with capacity for research, and hold, or expect to hold, a good honours degree or equivalent from a recognised university.
Subject to satisfactory progress, a scholarship is tenable for the whole period of the course for the degree of Doctor of Philosophy, normally three years. In some instances, a scholar may be required to enrol initially in a course leading to the degree of Master of Science. Examination for both degrees is by submission and assessment of a thesis based upon research carried out during the course.

Basic Allowance: $Aust 4,900 per annum tax free. A scholar may apply for family allowances for his dependants. Return fares are normally paid; assistance with accommodation is given wherever possible.

For details and application forms write, stating field of research, to:

THE DEAN,
RESEARCH SCHOOL OF CHEMISTRY,
THE AUSTRALIAN NATIONAL UNIVERSITY,
BOX 4, P.O.
CANBERRA, A.C.T. 2600, AUSTRALIA

Closing dates: 31 October 1981
30 April 1982
Applications may be made at any time.

New president is elected

Our new president, Dr W.S. (Stan) Simpson was born in Karamea and went to Christchurch Boys' High School and the University of Canterbury, where he took his MSc in 1956 with the first thesis from there on crystallography. From 1956-62, he was a defence science scholar at Leeds, where he gained a PhD in textile physics.

In 1962 he joined the newly formed Wool Research Organisation, working with Chemistry Division at Gracefield until the permanent laboratories of the organisation were opened at Lincoln. Stan was appointed director in 1978.

He has published 45 papers on wool protein, polymer chemistry and structure and has been involved in seven patents, two of which are maintained internationally by the International Wool Secretariat.

He has also worked on non-flammable wool products, anti-static carpets, novel dyeing techniques, fabrics with ion-exchange properties and treatments to prevent degradation of wool fibres by sunlight.

The Wool Research Organisation of NZ (WRONZ) is supported by the Wool Board, Wool Scourers Association, Carpet Manufacturers' Association, miscellaneous textile manufacturers, and the Lanoline Trading Company with their contributions being subsidised by the DSIR. There is a staff of 90, including 13 professional chemists and chemical engineers and 17 chemistry technicians.

The principal mission of WRONZ is to ensure profitable marketing of about $1 billion of raw fibre by contributions to efficient and versatile process and product technology, with an increasing emphasis on added value before export, particularly with regard to carpets.

Stan's hobby is a study of the effects of cigar smoke on atmospheric pollution.

Two senior DSIR men to retire

Two senior members of the Chemistry Division of the DSIR are due to retire in the coming months.

Gordon Scott, government analyst and officer in charge of the division in Christchurch, retires next month, while Dr Donald Nelson, who holds similar posts in Auckland, leaves in January.

Scott is being replaced by Dr Maxwell Robertson, presently deputy government analyst in Auckland and Dr Nelson's position is being taken by Dr Michael Kingsford, presently scientist in charge of the applied chemistry and pharmaceutical section of the division in Lower Hutt.

Scott has held his posts since 1973. He was born in Christchurch in 1921 and graduated from Canterbury University College, with a BSc in chemistry in 1943 and MSc in 1951.

In 1944 he worked at the Wool Research Institute at the University of Otago; later serving with the RNZAF meteorological section. He returned to Dunedin to join the DSIR Dominion Laboratory and was later appointed an analyst and a gas examiner.

In 1959 he was promoted officer in charge and government analyst for Otago-Southland. The Dunedin branch laboratory closed in 1973 and Scott transferred as officer in charge of the Christchurch laboratories.

Since his time as government analyst at Dunedin Scott developed a particular interest in forensic science — a section of the division's work which remains as his special sphere of interest.

Dr Nelson joined the Dunedin branch of the Dominion Laboratory as a cadet in August, 1940.

In 1943 he graduated BSc (chemistry) and 1947 MSc, when he transferred to the petroleum section of the Dominion Laboratory (now Chemistry Division), Wellington.

In 1948 he studied dairy bacteriology at Massey College and in 1949 returned to the Dunedin Laboratory. Although his primary duties were on food studies, he increasingly became interested in forensic science and was assigned case responsibility.

In 1959 he received a Fulbright award to study under Prof. Paul L. Kirk at the Berkeley campus of the University of California and developed the use of pyrolysis gas chromatography in identifying barbiturates and plastics. For this research, in 1963 he was awarded the first Doctorate in Criminology ever to be conferred in the world.

Dr Nelson returned to the Auckland branch of the Dominion Laboratory, where he was appointed leader of the forensic section. In 1975 he was appointed government analyst, Auckland and continued his work on criminalistics when complex cases required his expertise, or when other suitable staff members were not available.

He has had a long association with the Institute of Chemistry and was elected a fellow in 1967. He is also a member of the Australian Academy of Forensic Science, the Forensic Science Society, the NZ Association of Scientists and the Auckland Institute and Museum.

Dr Robertson was born in Dunedin and educated at Taieri High School. He graduated from Otago University BSc (Hons) in chemistry in 1966 and PhD in organic chemistry in 1969.

That year he joined DSIR's Chemistry Division food and water section, Auckland, of which he became chief scientist in 1971. In 1975 he was promoted deputy to the Auckland government analyst.

Dr Kingsford was born in Kurow, North Otago and educated at Kings College, Auckland, where he was dux in 1953 and from which he was awarded a university scholarship. He graduated from the University of Auckland: BSc in chemistry and pure mathematics in 1957, MSc with first-class honours in chemistry in 1958 and PhD in chemistry in 1963.

In 1961 he was appointed foundation tutor in pharmaceutical chemistry at the School of Pharmacy, Petone. While there he was sponsored by the Department of Education on a study tour of eastern Australian schools of pharmaccy.

Dr Kingsford joined DSIR in 1966 as leader of the Chemistry Division, food and drug section.

'New era' for chemical industry

The new Chlor-Alkali plant at Forest Products' Kinleith Mills will usher in a new era in New Zealand's chemical industry, according to the company.

Based on the process of electrolysing salt to chlorine, caustic soda and hydrogen, the new plant will cost more than $6.4 million. It will operate on a daily production rate of 25 tonnes of chlorine and 28 tonnes of caustic soda — more than doubling the present Kinleith production.

The caustic soda — replacing imported alkali — will be used in NZFP's pulping and bleaching operations. Chlorine will also be used in the bleaching process.

Surplus chlorine will be sold in liquid form, replacing imports and some will be burned with the by-product hydrogen to yield hydrochloric acid. In addition, sodium hypochlorite will also be marketed.

The overall overseas exchange gain will be in excess of $2.5 million a year at current chemical prices, says NZFP.

The previous plant at Kinleith was based on the so-called mercury process. The new, highly automated plant, representing the very latest advances in membrane cell technology, will eliminate the use of mercury and also reduce electricity power demand.

A spokesman says high safety factors are a feature of the plant and include an automatic shut-down of power should any difficulties arise.

Increased efficiencies from the new installation will boost the availability of chlorine, sodium hypochlorite and hydrochloric acid to New Zealand users.

NZFP is particularly enthusiastic about the potential for hydrochloric acid. Sales of this chemical have in the past been restricted by production constraints. However, the company says the new plant ensures the acid will be available in unrestricted quantities, which, coupled with a new, lower price, is expected to lead to a large upsurge in usage.

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A History of Chemistry Division

By W.G.M. Hughson and A.J. Ellis
Published by DSIR Wellington.

The Chemistry Division of the Department of Scientific and Industrial Research pre-dates that department by some 60 years and in its centennial year 1965, it issued a bulletin which described the changes which had occurred in its organisation over ten decades and many of the projects in which its staff had been involved.

This Journal (Vol. 29 No 3 June 1965) published an article by George Chamberlain in which a concise picture of the division's history was given and the personalities of the first two directors (to use a later designation) W. Skey and J.S. Maclaurin, were recalled for those to whom they were no more than names.

Now a recent director A.J. Ellis and W.G. (Mick) Hughson (whose passing occurred almost on the eve of the Institute's Golden Jubilee) have given us a substantial history of an institution of which all New Zealand scientists can be proud.

They have confronted with skill one of the problems which besets anyone who tries to condense a century of endeavour into readable compass: how to do justice, to a reasonable degree both to those whose records are long since complete and who may in consequence seem a little larger than life and to those who bore the load in the past-war years, when "program limits were set mainly by the availability of staff' and when the rapid increase in sophistication of equipment enabled chemists to investigate problems which their predecessors could scarcely formulate.

So we are given adequate sketches of Skey, Maclaurin, Donovan, Andrew, Joiner, Grigg and Walker and of many staff members of ability and dedication who worked under then. The post-sixties with Ellis and McDonald successively directors, in which the permanent staff increased by 50 per cent are inevitably left to a future historian.

While the authors remark that history of this type is of particular interest to those who participated in it, their hope that the publication may also be of wider interest, is specially justified for members of the Institute of Chemistry.

About one-third of the institute's presidents have come from DSIR and the research association (university professors seem to be over represented in the list) and Chemistry Division has provided its share.

In general, scientists in New Zealand are concentrated in the state services (to a degree which is more than twice the average for OECD countries), so the record of their achievements is a major part of the history of science here.

It is timely that the history of Chemistry Division. should be made available in a period of economic stagnation and widespread questioning of the country's future in this increasingly technological age.

The development of the division from its 'Dom Lab' days when chemical analysis was paramount, to its current status as a research centre — a development in which I.K. Walker was an outstanding leader — should be seen as an inspiring part of the story of science in New Zealand and so as a significant part of our history.

Professor Parton is an Emeritus Professor of Chemistry at Canterbury and a member of the U.G.C.

H.N. Parton

New Zealand in the future world — international relations — opportunities

Prepared by Alan Parker for the Commission for the Future, Government Printer, 1979.

This booklet discusses the alternatives open to New Zealand in view of the declining dependence on Britain in terms of trade, and political alignment.

The essence of the change is that New Zealand, once part of the European body politic, has been forced increasingly to accept the implications of its geographic position and to shape its existence in an area of the work, exhibiting different cultures.

Stimulating appraisals of the patterns of power existing in the USA, USSR, China and Japan are given together with predictions on possible future power basis.

Economics and trade are discussed stressing the disadvantages of New Zealand's small size and geographical isolation but pointing out our inherent advantages. The areas of opportunity such as Australia, the South Pacific, Japan and South East Asia are discussed and the advice given would be well heeded by the intending exporter.

Before New Zealand pursues an international policy, however, she must resolve her own domestic issues and choose which path she intends to follow. The reviewer can fully recommend this booklet for any New Zealand concerned for his country's future.

L. Eyres

New Zealand in the future world — Societies in change — a question of scale

Prepared by Nick Zepke for the Commission for the Future, Government Printer, 1979.

"Societies in Change" is a 50 page booklet which explores important issues affecting New Zealand's future.

The booklet outlines some social trends within New Zealand and the various options open to government. Changes in population growth, internal migration and economic factors are discussed with plentiful statistics taken from the New Zealand Yearbook and other sources.

Some of the major problems facing the country today are racial integration, population changes, education and technological changes affecting work patterns.

These problems are discussed and some alternative solutions are presented. The booklet provides plenty of material for thought and although it provides background data for future scenarios, no dogma is preached. The booklet is well presented comprehensively referenced.

Dr. Eyres is chief chemist of Abels, Auckland.

L. Eyres

Kinetics applied to organic reactions

Windelt Drenth and Harold Kwart

Vol 9 of "Studies in Organic Chemistry", Series editor, P.G. Gassman, Marcel Dekker Inc., New York, 1980, 207 pages, $23.70 paperback.

In the preface, the authors point out that with declining graduate school enrolments, traditional courses are no longer cost and time efficient. They suggest a tutorial system based upon a "well written book of carefully delineated scope" is a viable alternative and "may even be superior as a way of maintaining the continuity of the educational process". They could well be right but, unfortunately, have not written a suitable book.

Surely a self-study kinetics book should contain a number of worked examples of many problems. There are none of either and in fact almost no actual kinetic data are given. Nearly one fifth of the book is given over to a thorough and extensive chapter entitled "Isotope Effects", an area in which Kwart has made a number of worthwhile contributions. Other topics that are more briefly but adequately discussed include "Fast Reactions" and "Chain Reactions", but other important topics are neglected.

Thus the activation parameters are derived and discussed in two pages with the volume of activation occupying a further four pages. Linear free energy relationships are represented solely by the Bronsted Catalysis Law. Ionic strength effects, solvent effects, substituent effects etc., are only alluded to or barely mentioned.

The format used is unusual — the text runs across, not down the page in a 12 cm band with a seven cm band on the right used for references, diagrams, some chemical equations, etc. While this format has advantages, it was not very effectively used. For example, on pages 45 through 67, less than 25 column cm of material appears on the right hand third of the pages; on pages 106 through 112, one equation and eight lines of print appear there. This column should have been much more extensively used to define terms, summarize discussions, record important equations (such as the common rate expressions...) for ready reference.

A text that purports to be for post-graduate students should have included far more references, both to more extensive discussions of the appropriate theory and to the original sources of the experimental results mentioned.

Despite the deficiencies discussed above and the far too numerous typographical errors, this brief book does have some merit. Many chemists might consider the chapter on isotope effects alone make acquisition worthwhile. Other topics including the principle of microscopic reversibility, the compensation of $\triangleleft H^{\ddagger}$ and $\triangleleft S^{\ddagger}$ the isokinetic relationship and line broadening and kinetics by nmr are very succinctly presented.

Professor Stein is professor of organic chemistry, Memorial University, St John's Newfoundland.

A.R. Stein

SYSTEM DESIGNED AS A LAB AID

Warburton Franki is the agent in New Zealand for the American Perkin-Elmer Corporation's SMS/200 Sample Management System, which is designed to aid a laboratory manager to improve productivity and act as a record keeper.

The system is used in conjunction with the Perkin-Elmer 3600 Data Station. According to the manufacturer, it can carry out virtually an unlimited number of record keeping functions including:

* a data base of formulations in a research laboratory;
* a list of customers with pertinent data on each;
* a record of data on laboratory supplies (i.e. information on reagents which have a limited shelf life);
* an history of exposure to radiation carcinogens, together with associated test data;
* a log of maintenance activity;
* a record of laboratory notebooks and what they contain.

Perkin-Elmer maintains that the system is appealing to small laboratories or to small sections of large laboratories, claiming the SMS/200 is a low cost means of better managing the laboratory.

The only hardware items needed are the Model 3600 and a printer.

Examples of its use include: the checking by a customer of the status of his samples involves inserting the sample

tracking and data disks into the 3600, entering several keystrokes and the submitter's name and the status of all samples and their associated tests appear on the screen.

The screen can be printed and a hard copy sent to the submitter.

If complaints were being received concerned the response time from a laboratory the manager can determine the laboratory's level of performance by calling up an aging analysis, which will enable checks to be carried out.

The system also allows a laboratory to do away with paper records of analyses performed for customers by storing the certificates on floppy disks. When a customer request comes in and after ascertaining a few basic details such as name and a range of possible dates the sample was submitted, the appropriate analysis can be found in a matter of minutes (instead of sometimes days) by searching across several disks.

The supplier, Warburton Franki (with bases in Auckland and Wellington) also handles Perkin-Elmer's range of atomic, infra-red, ultra-violet or fluorescence spectroscopy, thermal or elemental analysis, or gas or liquid chromatography instruments.

ELECTRIC APPLICATOR FOR CYANOACRYLATES

Cyanoacrylate adhesives can now be safely dispensed with what is claimed to be a unique, low-cost electric applicator designed to eliminate nozzle blockage problems and currently being marketed by Bostik.

The company says until now the problem with dispensing cyanoacrylates has been blockage at the nozzle caused by the adhesive polymerizing when in contact with molecules of moisture in the atmosphere.

A feature of the Bostik 1000 applicator is the ability to move the applicator pen along the material feed line, thus enabling use of the line end as the dispensing point for the adhesive. Should a blockage occur, the line can be simply pulled forward and the blocked end cut away.

In addition to dispensing cyanoacrylates from larger, more economical containers, the applicator is suitable for dispensing fluids up to 1000 cps and may be used to oil small moving parts, to dispense soldering fluxes and coatings in small emblem manufacture, to dispense anaerobic adhesives, for culturing in laboratories and to dispense cutting oils when drilling or milling.

PEOPLE

We regret to report the death of *W G M (Mick) Hughson* recently. He played a tremendous part in the life of the NZIC, being general secretary for 12 years (1945-56) and president in 1963. For many years Mick really *was* the institute. For most of his working life he worked in coal, chiefly in the DSIR. An obituary will follow in a later issue.

Gordon Stace also died in August. He was active in the *NZIC* in his earlier years being secretary of the Auckland branch in 1949. Most of his working life was spent in the Auckland branch of the chemistry section of the *DSIR*, where he was deputy government analyst for many years. He suffered health problems which interfered with his studies, but he earned a reputation as an excellent analyst. Our sympathy goes out to his wife and children.

Leslie Tiller, who earned a considerable reputation for his work in horticulture, both in the application of fertilisers and in the storage of fruit, has also died. He worked first at the Cawthron Institute, but later joined *DSIR*, where he rose to be assistant director-general. He joined the institute in 1954.

L R Darroch has stepped down as chairman of the board of Aakronite NZ and has founded his own company, *Darroch Enterprises* at Browns Bay, Auckland.

L Ares has left BP Chemicals to go to *Quick Stik International*, in Auckland.

Lin Drake has gone from the AHI Technical Centre, Auckland to the *TNL Group*, Nelson.

C C Harvey has been awarded the degree of Ph.D. and has left NZ China Clays to join consultants, *Kingston, Reynolds, Thom* and *Allardyce* of Auckland.

C J Mackey, previously with Butland Industries is now with *NZ Farmers' Fertilizer* in Auckland.

M W Phillipps, who was with Flinders Cook Technical Services in Auckland, has joined *Pacific Steel*, Otahuhu.

J K Seadon has finished his training at Auckland Secondary Teachers' College and is now on the staff at *Auckland Grammar School.*

P O'Donnell of Prepared Foods is now with *Winstone Plastics*, both in Palmerston North.

B H Breach has gone from NZIG, Lower Hutt to *Northrop*, Wellington.

Mrs B E Rodgers has resigned from the *Dental Research Unit*, Wellington.

N C McDonald has left NZ Breweries, Christchurch to join *Searle Laboratories* in Sydney.

D W Lockhart, head of science at *King's High School*, Dunedin has retired.

D G Weavers, previously of St Kentigern's College, Auckland, has returned from overseas and is now teaching at *Mt Roskill Grammar School.*

Dr L D Melton has the rank of senior lecturer in the *Dept of Nutrition* at Otago.

R A Hodge has given up the Tiverton Service Centre and is now at *Secondary Teachers' College*, Auckland.

Miss J F McClellan has returned from overseas as *Mrs Hipperson* and joined *Feltex Rubber*, Auckland.

B R Clark has been promoted to principal of *Taihape College.*

P J Dawson has launched himself as *P J Dawson Laboratories*, Taradale, Hawkes Bay.

L M Olivecrona has left Technical Waxes for *W R Grace (NZ).*

Mrs L Sew Hoy has gone from the Dept of Microbiology, Lincoln to *Waitaki-NZR*, Hornby.

D Holey has transferred from Henry York & Co to *Bayer NZ*, both of Petone.

Prof N F Curtis has been elected member bodies fellows councillor of the *Royal Society of New Zealand.*

L P Evans has left Union Carbide in Auckland and is now self-employed at *438 Richardson Rd., Mt. Roskill.*

H C Green, formerly of the AID Auckland, is now with *Prochem*, Silverdale.

R C Lawry has retired from the *Nelson City Council.*

Herb Hebden of *Unilever*, Motueka has retired, but is still living in the same area.

Prof Dick Earle was a keynote speaker at the IUPAC meeting at Vancouver in August.

K J Lewis, previously at the University of Newcastle-upon-Tyne, England, is now at the *University of Ulm*, West Germany.

H S Robie has left Kaipara Dairy Co, Helensville to join *Catoleum*, Auckland.

R H Slater has gone to *Caxton Printing*, Henderson from Winstone Wallboards, Auckland.

A E Svoboda previously of NZ Farmers' Fertilizer, is now with *A C Hatrick*, both of Auckland.

J C Thompson is now manager of *Chemtest Laboratories*, Papatoetoe.

Dr R Whiting from Nylex Fletcher is now teaching at the *Auckland Technical Institute.*

Ian Hunt of Tauranga has retired to work as a part-time consultant.

T C Lee has left Taubmans, Kilbirnie, to join *Dulux*, Gracefield.

R H Shepherd, staff manager *ICI*, Wellington has retired.

Dr R G Richards has gone from the industrial processing division, DSIR, Wellington, to *Mineral Deposits*, Southport, Queensland.

Dr J G Buchanan has been transferred from *BP* in Switzerland to Wellington.

Dr A E Cutten, formerly of the University of Sydney is now at the Dept of Medicine of the *Westmead Centre* in NSW.

Prof J R Erskine has resigned from Kwazulu Development Corp, Durban to join the staff of the *University of Natal* at Pietermaritzburg.

L A Jenkins has left AIS, Woolongong for *Betz Australasia*, Caringbah, NSW.

Dr Y S Ng, previously with Berger Paints in Sydney, is now with *CSR.*

Dr J R Ruck Keene is retiring after 35 years service with the Royal Society of Chemistry and *Prof R D Guthrie*, head of science at Griffith University, Brisbane since its foundation in 1973, will take over from the beginning of 1982.

Dr J R L Walker and *Dr A L J Coe* of the University of Canterbury have a two year contract with the *Bayer Company* of Leverkussen, Germany to do screening trials on New Zealand indigenous plants for antibiotics.

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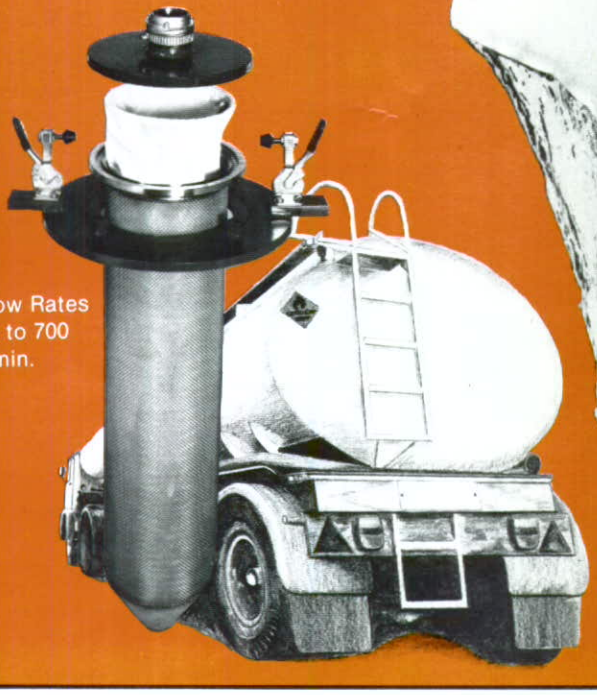

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