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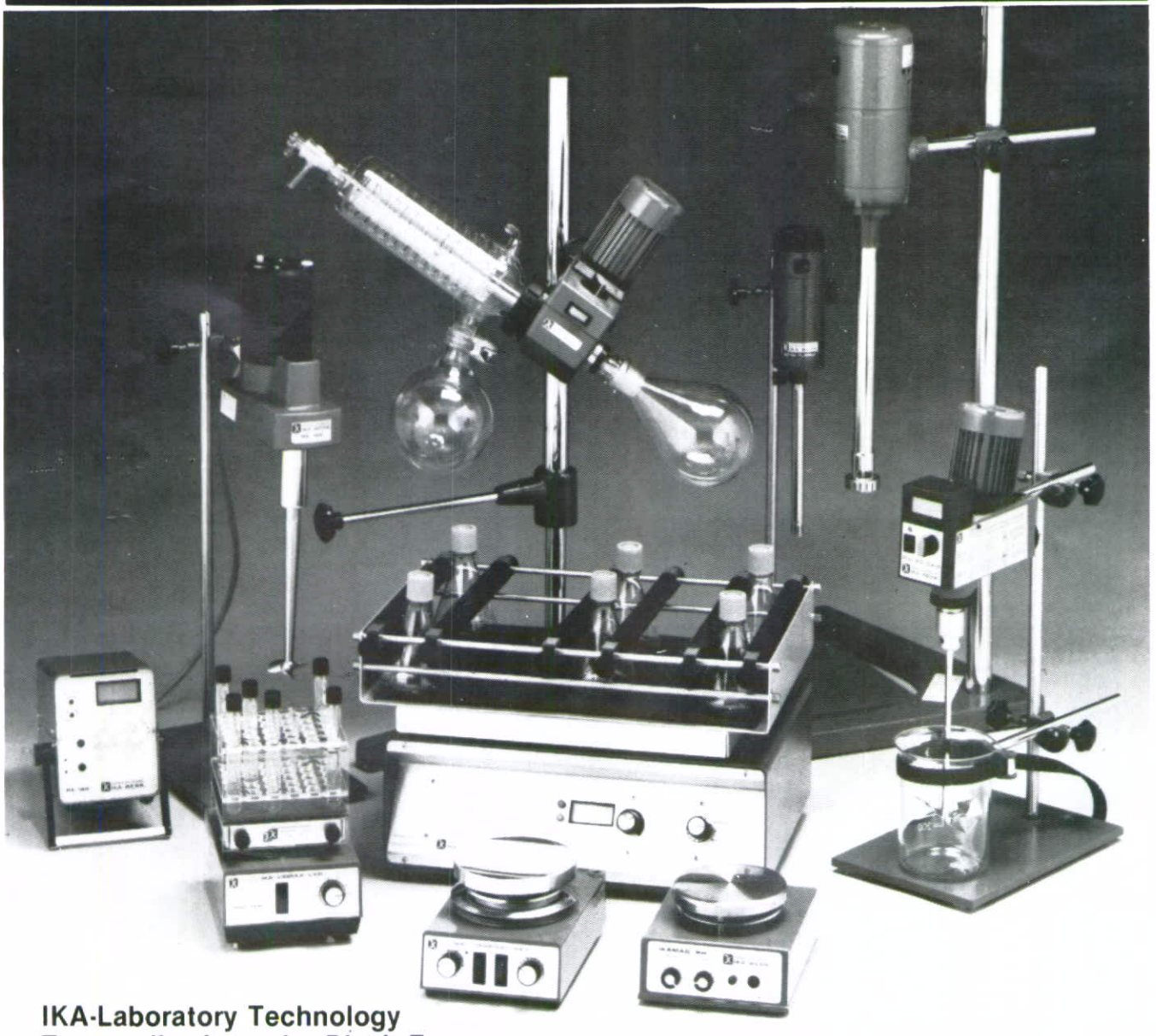

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Vol 51 No 5 October 1987

Front Cover Story

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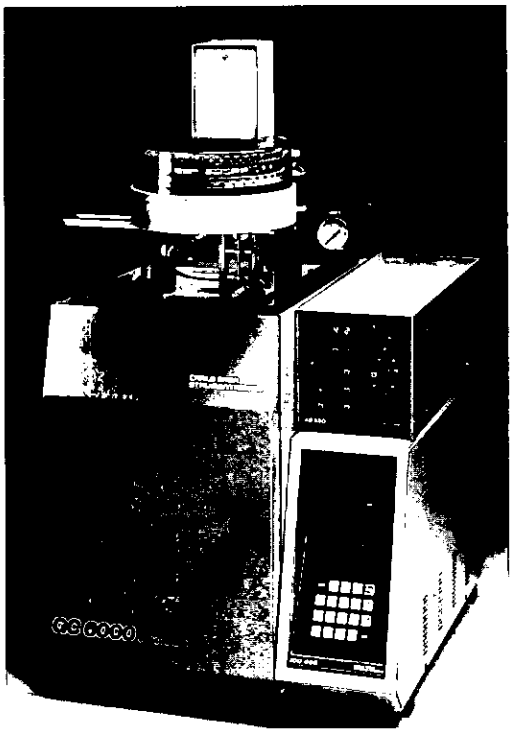

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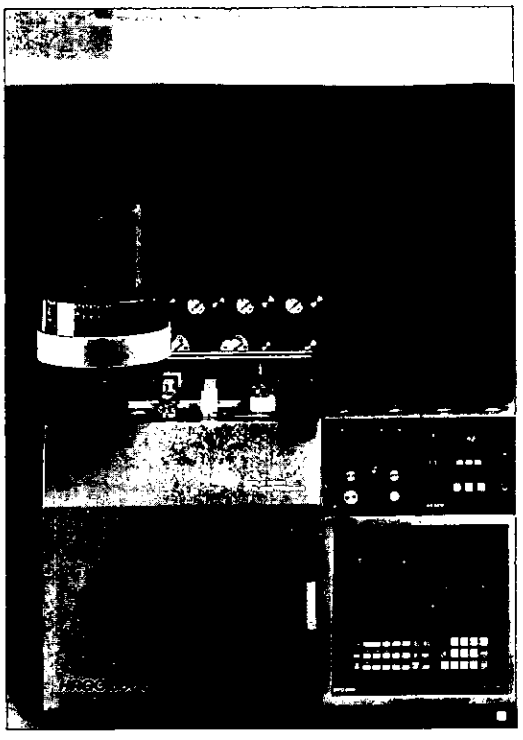

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PEOPLE

NZIC President 1987/88

Terry Hitchings, this year's President, is a graduate of Victoria University. He has spent most of his professional career in the South Island, teaching in Southland and Canterbury. He recently retired as Principal of Riccarton High School.

In 1966 he was a Visiting Teaching Fellow at the University of Canterbury and in 1967 an Inspector with the Department of Education. He was awarded Woolf Fisher Fellowships, visiting Australia in 1962 and Europe, North America and South Africa in 1982.

For nine years he was National Representative to the Committee on the Teaching of Chemistry, IUPAC, and attended conferences in a number of countries.

He was President of the New Zealand Science Teachers Association in 1976-77 and has been a Fellow of the New Zealand Institute of Chemistry since 1969.

At present he is working with the Department of Education in the selection of graduate students for teacher training. His chief professional concern is chemical education and his recreational interests include fly fishing and gardening.

F R S N Z

Five scientists were elected to Fellowship of the Royal Society of NZ this year, for their distinguished contribution to science in New Zealand. Amongst this group were two Fellows of the Institute, **Dr Ward Robinson** and **Dr Ted Baker.**

Ted Baker is a Reader in the Department of Chemistry and Biochemistry, Massey University. Dr Baker initiated the research programme in protein crystallography at Massey University which is now firmly established as one of the leading laboratories in this field. His solution of the 3-dimensional structure of the enzyme actinidin (found in Kiwi fruit), completed in 1976, represented the first successful work of this type that had been performed outside Europe or North America. More recently he has made distinguished contributions to the study of the structures of the bacterial protein azurin and the milk protein lactoferrin.

Further news of Dr Baker, and a photograph of the Massey crystallography group can be found in University News (this issue).

Ward Robinson is a Reader in the Chemistry Department at Canterbury University. As a graduate student at Canterbury, he worked with Dr (now Professor) Bruce Penfold and Dr Jack Fergusson to elucidate new structures of molecules containing multiple metal-metal covalent bonds. Since then studies of the chemistry of molecules containing such metal atom clusters have proliferated because of their relevance to commercial catalytic processes.

In the early seventies, Dr Robinson and Dr Gordon Rodley determined the spatial arrangement of molecular oxygen when it binds to cobalt atoms. Then, in collaboration with synthetic chemists at Stanford University, Dr Robinson went on to demonstrate the same mode of binding to iron atoms in haemoglobin and myoglobin.

In the current decade, Dr Robinson, using a completely re-equipped laboratory, has worked on simultaneously improving the quality and quantity of accurate data obtained from diffraction experiments. Since those data are supplied to Waikato and Otago Universities, the Chemistry Division of DSIR and overseas collaborators, optimum throughput is essential.

Dr Robinson has spent a total of five years at Brown Universtiy, Providence, Rhode Island, and at Stanford and Bristol Universities. In the last 18 months he has made three visits to the People's Republic of China to instruct in three Academia Sinica laboratories and other tertiary institutes.

(the above reproduced with permission from University of Canterbury "Chronicle")

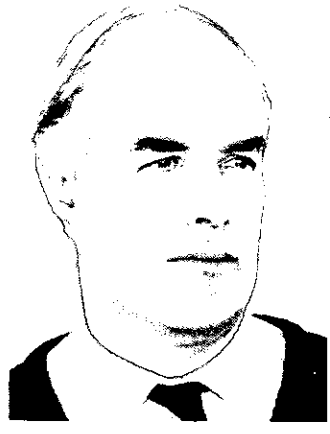
Shell Prize 1986

At a meeting of the Manawatu Branch on 21 July, **Mr Neil Blazey,** Technical Manager at New Zealand Pharmaceuticals Ltd., Linton, received the Institute's Shell Prize for Industrial and Applied Chemistry. The prize was presented by **Mr Peter Briggs,** a representative from the Shell Oil Co. **The Hon. Bob Tizard,** Minister of Science and Technololgy, was the guest speaker at the function. He paid tribute to the achievements of the New Zealand pharmaceutical industry and of universities and research institutes involved in research of pharmaceutical interest.

Mr Blazey then addressed the meeting, describing the industrial recovery of sulphated mucopolysaccharides (glycosaminoglycans), in particular the anti-coagulant and anti-thrombotic agent, heparin. He described the chemical identity, biological sources and clinical applications of heparin, followed by the evolution of New Zealand Pharmaceutical's novel process technology for the large-scale recovery and purification of heparin from ovine mucosa. Mr Blazey referred to the impact of market forces on research and development activities during the development of the process technology. The potential importance of two other glycosaminoglycans namely, heparan sulphate and dermatam sulphate was also discussed.

New Chemistry Head — University of Canterbury

Dr Colin Freeman has been appointed Head of the Chemistry Department for a period of 3 years from December 1st to succeed **Professor Bruce Penfold.** Dr Freeman, who is 44, is a Senior Lecturer in chemistry.



He completed his Ph.D. at Canterbury in 1967, and has worked at Heriot-Watt University, Cambridge University, CSIRO Division of Chemical Physics and the University of Western Australia. His current research interests in very fast gas-phase reactions have applications in atmospheric and interstellar chemistry, combustion processes and theories of chemical kinetics. Dr Freeman has been active in Institute affairs in Christchurch, having served on the Branch Committee as treasurer, and as treasurer for two NZIC conferences.

Science, Settlers and Scholars

The Royal Society of New Zealand is pleased to announce the publication of "Science, Settlers and Scholars" by Sir Charles Fleming, in commemoration of the Society's first 100 years as promoter and arbiter of science in New Zealand.

"Science, Settlers and Scholars" is both a history of the Royal Society and its predecessor, The New Zealand Institute, and an introduction to the history of science in New Zealand.

During the latter half of the 19th Century the New Zealand Institute and its regional societies served as local academies for the presentation and discussion of scientific research until the University Colleges were established. They provided a source of informed opinion to stimulate local action on nature conservation, education, public health and technology. Similarly it was through the encouragement of the NZI that Government science was reorganised in the early part of this century.

Although science today has become far more diverse and complicated, the Society continues to provide a key function in promoting the advancement of science, encouraging high standards of scientific endeavour, liaising between its 16,000 members, initiating and maintaining contact between scientists within New Zealand and with scientists internationally, administering funds for research, and informing and advising Government.

"Science, Settlers and Scholars" is a valuable and comprehensive record of the contribution of science and scientists to the development of New Zealand, and a worthwhile commemoration of a unique New Zealand achievement — that of a Federation of Scientific Societies which have served the function of a National Academy of Science for more than a Century.

For further information contact:
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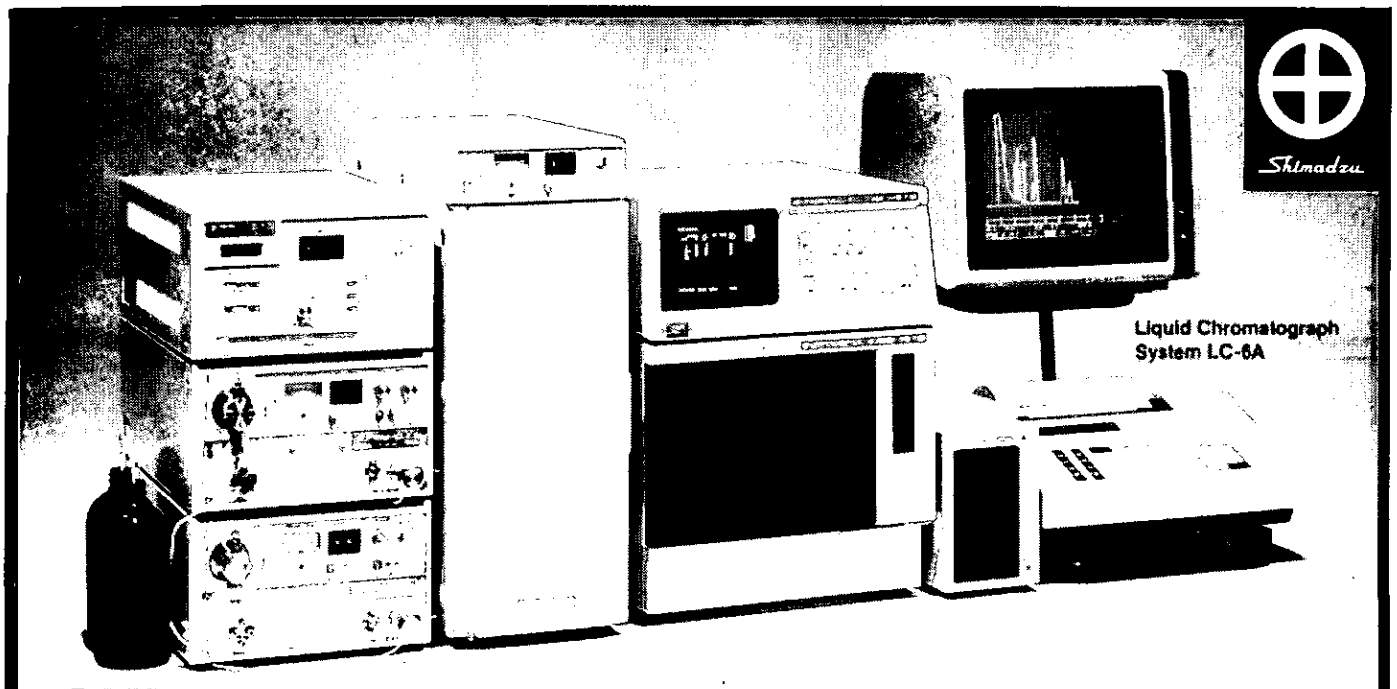
We note with regret that Sir Charles Fleming died on 11 September 1987, at the age of 71. - Ed



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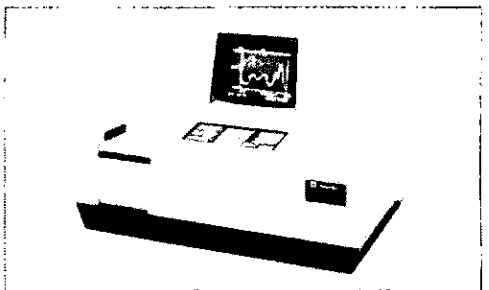

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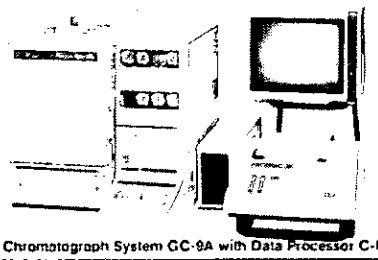

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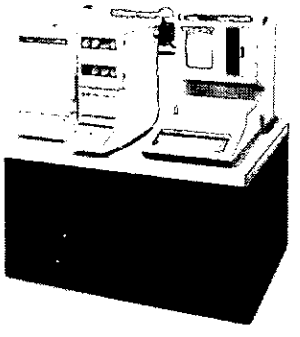

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THE CHEMSET PROCESS: THE DEVELOPMENT OF A CONTINUOUS PACKAGE-TO-PACKAGE SCOURING AND SETTING PROCESS FOR WOOL YARNS

R.G. Stewart, A.J. McKinnon, and C.T. Page
Wool Research Organisation of New Zealand (Inc.), Christchurch

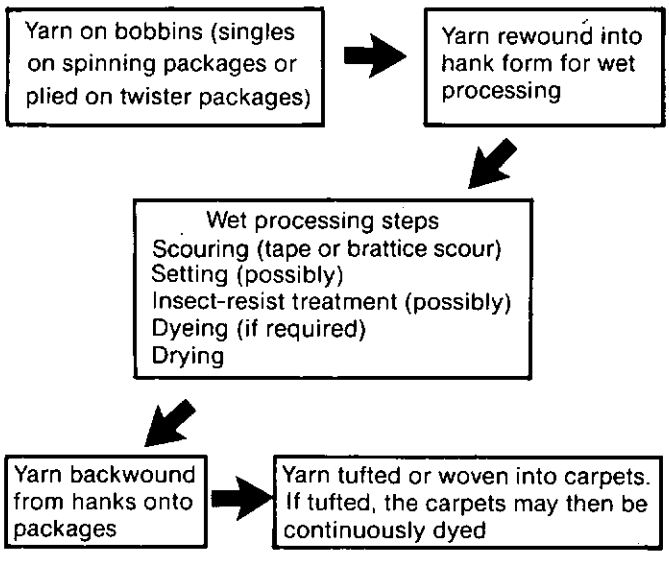
Introduction

New Zealand is the world's largest exporter of coarse wool, i.e., wool with a mean fibre diameter over 32.5 microns[1]. The total FOB value produced (as greasy, scoured, slipe, or woolly skins) amounted to $1279 million in the 1985/86 season and a further $246.7 million in value was also added by domestic manufacturers. It is estimated that 60% of our production is used in carpets and so the economics and technical benefits of using New Zealand wool in this end-use are of vital importance to the demand for our wool on the world market. Wool is also one of the few commodities which are traded internationally with minimal tariff barriers, provided it has not been taken too far down the manufacturing route. Only about 10% of our wool is taken past the scouring stage in New Zealand. The rest is exported as greasy or scoured and processed overseas, often being blended with wool from other countries. One of the principal tasks of wool scientists and technologists in New Zealand is to develop cheaper processing routes for and better products from our wools which can then be used profitably by both our own mills and the much larger number of processors overseas. In this way our goal of increasing the demand for New Zealand wool can be achieved. The CHEMSET process described in this paper fulfils both these basic requirements.

Carpet Yarns

Yarns intended for carpets can cover a wide range of linear densities (measured by mass per unit length) and twists (turns per metre) depending upon the effect required in the finished carpet. This can be cut-pile, loop-pile or a combination of the two, and be fabricated by the tufted or woven routes. In this paper, only yarns for cut-pile construction will be considered, for use in tufted carpets or other 'cut-pile' products (e.g., wool mattress overlays).

To appreciate the significance of the CHEMSET development in this context it is necessary to understand the conventional processing steps which a carpet yarn may encounter during its manufacture and utilisation. The steps may be illustrated diagrammatically as follows, starting after the yarn has been spun:-



The steps from twister packages to tufter packages can involve up to 14 individual 'yarn movements' with concomitant opportunities for uneven treatment or mixed batches. Hanks are usually small compared with the amount of yarn on a tufting package and this together with breaks during hanking and backwinding can result in extra yarn joints which can give problems in subsequent tufting or weaving. However, by far the greatest disadvantage of the conventional route is the variability inherent in the batchwise steps. Such yarn, when tufted into cut-pile broadloom carpet and then continuously dyed (a common method of carpet coloration in high-technology countries like the U.S.A.) very often has faults. These are manifested by stripes of various sorts due to the unlevel treatment the yarn has received and a poor appearance due to inadequate setting of the yarn twist. The latter causes the yarn to untwist during the vigorous wet treatments associated with continuous dyeing. These problems are exacerbated if the carpet is dyed to a plain pastel shade.

Thus the objective we had and the key to opening marketing opportunities for New Zealand carpet yarn in the U.S.A. was to devise a process for the production of carpet yarn able to be used satisfactorily in the production of continuously dyed cut-pile plain-shade carpets free from stripes, and with a satisfactory texture both at the point of sale and in subsequent use.

Problems to be Overcome

Yarn scouring

In New Zealand wool yarn used in carpet production is produced via the woollen or semi-worsted routes. When delivered from the scour it will have about 0.5% of dichloromethane (DCM) extractables comprising residual woolwax and some detergent, together with debris from the fibre surface, fibre fragments, and inorganic dirt. The composition of the DCM residual woolwax material has not been fully elucidated; however, different solvents have been shown to extract widely different amounts of residual wax, probably from both inside and outside the fibre[2]. The residual detergent will be a nonylphenylpolyoxyethylene with an average of 8.5 moles of ethylene oxide which is used universally in New Zealand for raw wool scouring. The fibre debris, termed protein contaminants (PC) by Australian workers[3], has been implicated in difficult-to-remove complexes on wool, responsible for poor colour and dust during processing.

The scoured wool is lubricated before carding with about 3% of a water-soluble lubricant if processed on the woollen system and less (<1%) if semi-worsted processed. This lubricant will usually be a homopolymer of ethylene oxide or a block copolymer with propylene oxide[4].

These materials must all be removed during yarn scouring. If they are not they either reduce the reflectance of light from the surface (as when inorganic dirt is present) making the wool appear to be dull or they increase the surface energy of the fibre and hence its propensity to absorb soil more readily than it might otherwise do[5]. In addition, any soil picked up will be wetted by the oily residuals and appear more obvious than if the soil remained dry and was able to reflect and scatter incident light.

We found that thorough and uniform scouring efficiency

NZIC SHELL PRIZE — 1985

Rex Stewart *is head of Chemistry and Engineering at WRONZ. He graduated M.Sc. in Chemistry from the University of Otago, and is a member of the Royal Society of Chemistry. He has had industrial experience in U.K. and U.S.A. and has been involved in many areas of wool processing, especially scouring. His wool career began in Dunedin in 1959 with the Wool Industries Research Institute, which was subsequently amalgamated with WRONZ.*

John McKinnon *is Leader of the Textile Chemistry Group at WRONZ. He studied at Victoria University and University of Auckland graduating M.Sc. in Chemistry in 1963. On receipt of a Ph.D. fellowship from the nascent Wool Research Organisation, he studied polymer chemistry at Princeton University, graduating in 1966. Apart from a secondment to Britain he has worked with WRONZ since. He is a past Chairman and Secretary of the Canterbury branch.*

Campbell Page *is a Senior Scientist in the Textile Chemistry Group, and a Chemistry Graduate of Canterbury University (B.Sc. (Hons) 1974 and Ph.D. 1978). He has been with WRONZ since 1977, and is currently on secondment to the Wool Bureau Inc., Atlanta, Georgia, where part of his brief is to provide technical back-up to the current efforts to develop the market for CHEMSET yarns in the U.S.A.*

depends on a number of factors, the most important being the choice of detergent, maintenance of an adequate flowback such that scouring conditions remain uniform over a long period,and the provision of a good squeeze as the yarn emerges from the scouring bowl. The rapid expression of water at this point appears to dislodge swollen soil complexes which otherwise tend to adhere to the fibre surface. The fact that the coiled yarn blanket of the CHEMSET machine presents a uniform profile to the squeeze press instead of the discontinuous one presented by a hank assists in uniform contaminant removal.

Yarn twist-setting

Torque in yarns: During spinning yarns are twisted to enable them to support the tensile forces imposed. Twisting generates a restoring torque in the yarn, predominantly arising from the tensile stresses in the fibres near the yarn periphery, where they are constrained to a longer helical path. When the yarn is plied (to two- or three-fold) the ply twist is invariably in the opposite sense to the singles yarn twist so that the tensile stresses in the singles yarn are alleviated; at a certain level of ply twist, the so-called balanced twist, the resultant torque will be zero. However, in order to obtain a tuft which has a good 'definition', i.e., a stable and compact arrangement of fibres, it is necessary to insert ply twist to a level much higher than the balanced twist, which again generates considerable torque in the yarn, and to stabilise the yarn in this configuration by relaxing the torsional stress. The torque-relaxation process is called twist setting. It is often one of the most important and difficult operations in yarn manufacture.

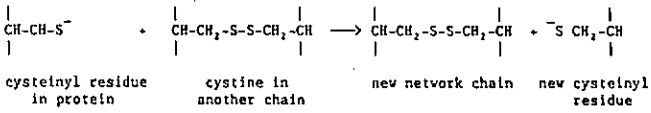
Setting mechanisms: The chemorheology of torque relaxation (which in fibre terms is largely a matter of tensile-stress relaxation) involves several of the structural features of the fibre, which may be idealised as a composite of the following elements in parallel:

(i) a fibrillar aggregation of α-helical chains, of high initial modulus, which yield suddenly at a certain stress corresponding to conversion to a β-pleated sheet conformation (the $\alpha \rightleftharpoons \beta$ transformation);

(ii) a matrix, surrounding the fibrils, of relatively globular cystine-rich proteins, highly cross-linked by disulphide bonds both within the matrix and to the sulphur-rich components of the fibrils; in tensile properties when wet this component may be fairly compared to a polysulphide rubber;

(iii) a complex network of salt links, hydrogen bonds, and hydrophobic interactions which together may be regarded as forming a secondary network of highly labile bonds.

Under practical conditions of torque relaxation it is the second, disulphide-crosslinked, system which is principally responsible for stress decay. This occurs via the thiol-disulphide interchange mechanism, as first clearly characterised in polysulphide rubbers[6]. This mechanism depends on the fact that in any disulphide bond network there is always a small concentration of thiol groups (ionised to cysteinyl residues at pH > 5) in equilibrium with the disulphide bonds. Under near-neutral or mildly alkaline conditions these anions attack a disulphide bond, forming a new disulphide bridge and another cysteinyl anion:



According to the precepts of chemical stress relaxation the new network chains are created (on average) in a stress-free condition; this process, occurring in a network under stress, therefore substitutes stress-bearing network chains with chains which are stress-free, thus resulting in progressive stress-relaxation of the network in its deformed state.

One of the principal characteristics of the chemical stress-relaxation of polysulphide rubbers is their near-perfect Maxwellian decay; that is to say they behave like a simple Maxwell viscoelastic element (spring and dashpot in series) in which the stress at time t, f(t), follows a simple exponential form:

$$f(t) = f_o \exp(-t/\tau).$$

In the case of interchanging chemical networks, τ is defined as the chemical relaxation time. It has a simple Arrhenius-type dependence on the activation energy of the interchange reaction.

$$\tau^{-1} = A \exp(-E_A/RT).$$

It has been shown that the stress decay of wool is indeed approximately Maxwellian[7], with an activation energy of 21-23 kcal/mole, as found for polysulphide rubber networks. Although such findings support the overriding importance of the disulphide-interchange reaction in stress decay and setting, it must be emphasised that the quasi-Maxwellian network is only one of the mechanical and structural components of the fibre.

Under typical setting conditions the secondary network of hydrogen bonds, salt links, etc., will also rapidly reorganise to stabilise the structure in the set state. However, this network, being highly labile under set-release conditions, confers very little additional permanence to the set condition beyond that achieved by the disulphide-interchange mechanism.

The rate of the disulphide interchange depends on the cysteinyl anion concentration, and thus on the extent of disulphide bond reduction and the pH. The setting reaction is therefore accelerated by reducing agents which convert disulphide to thiols. In commercial practice, the cheapest and simplest reducing agent is sodium bisulphite (in solid form $Na_2S_2O_5$ - MBS). The following reactions occur on reduction:

$$W\text{-}S\text{-}S\text{-}W + HSO_3^- \longrightarrow W\text{-}S\text{-}SO_3^- + W\text{-}SH$$ (W = wool protein chain)

$$W\text{-}SH \longrightarrow W\text{-}S^- + H^+$$

Thiol-disulphide interchange then takes place as previously described.

An accelerated process using bisulphite can be readily

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Sir David Beattie, our chairman, has identified in his recent report to government the key to New Zealand's future prosperity is closer co-operation between scientists, technologists and private enterprise. To fulfill this aim Bioscience has entered into a number of agreements with Government Bodies, Institutions and Universities, including MAFTech, Lincoln College and the University of Otago, to evaluate and commercialise where appropriate, technologies and research projects.

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adapted to a continuous industrial process. In contrast, other setting procedures not involving reduction (such as boiling or steam autoclaving) are much slower and thus potentially damaging to the wool; also they are only adaptable to batchwise processing operations.

The set achieved through the reorganisation of disulphide bonds is only relatively permanent under appropriate conditions such as when the fibres are dry. Under other conditions the 'locked-in' internal stresses from the $\alpha \rightarrow \beta$ transformation and other conformational changes which exist in parallel with the disulphide network can cause a partial reversal. Thus if the set fibre is subjected to a suitable set-release procedure (such as agitation in hot water) these other forces will again impose an 'internal stress' on the disulphide-bond network causing it to relax with the removal of some of the initial set.

An integral part of a bisulphite-mediated setting process is therefore the final reversal, as completely as possible, of the disulphide reduction step before any set-release operation can come into play. To minimise set release, the reducing agent must be removed and as many thiol groups as possible reoxidised to disulphides. This may be achieved by the use of an oxidising agent such as perborate, or by efficient rinsing procedures. The latter are used in the CHEMSET process.

The attainment of a good set for yarn in cut-pile structures is important for reasons of initial texture and texture retention. As well as the desirable aesthetic effect of good tuft definition, loss of definition by wear or wet cleaning leads to highly undesirable textural contrasts between worn and unworn areas. If the twist is not well set, the yarn untwists, the pinpoint definition is lost, and the overall effect is an undesirable 'mushy' or plush appearance.

The degree of set developed in the yarn can be measured by counting the number of yarn snippets which unravel under specified conditions of agitation (set release) in warm water[8] (see Figure 1).

Development of the CHEMSET Process

This process grew out of both the accumulated knowledge on chemical setting built up to improve the efficacy of setting in a tape scour and the increasing awareness that such a procedure did not overcome the essentially batchwise nature of the process and the necessity for making hanks.

Work by Forbes and Dittrich[9] had established that, taking into account the desire to minimise damage to the yarn, the optimal degree of set is obtained with carpet yarns when the setting treatment is with 10g MBS per litre for 2 min at 85°C and pH 7. This accomplishes the necessary stress relaxation in most yarn structures without introducing unacceptable fibre damage. They also found that the removal of excess bisulphite and the reformation of disulphide bonds through disulphide interchange was achieved most economically by rinsing the yarn in hot water at an elevated temperature. The process which evolved as a possible continuous treatment was as follows:-

1. Scouring of impurities from the yarn (2 min at 60-65°C).
2. Treatment with sodium bisulphite (2 min at 85°C).
3. Rinsing with water at an elevated temperature (2 x 2 min at 85°C).

After confirming these steps on a single-yarn laboratory rig, the parameters were established for a large-scale pilot plant[10].

This took the form shown in Figure 2. It comprised a creel holding packages of yarn and feeding 6 ends of yarn at 300 m/min to a Gilbos coiler which threw the resultant rope of yarn into a continuously coiled blanket on a conveyor moving at 2 m/min. This conveyor took the yarn through 4 bowls and squeeze presses such that the residence time in each bowl was 2 min. Bowl 1 was maintained at 60°C and contained a detergent of the 15-molar ethoxylated nonylphenol type. Bowl 2 was used for the treatment with bisulphite while bowls 3 and 4 were rinse bowls.

After the last bowl the yarn blanket was passed through a drum dryer and deposited onto a conveyor which served as a yarn accumulation zone. Because of the time-dependence of the treatments in the wet bowls it was considered undesirable to stop the yarn blanket anywhere in the wet-treatment or drying zones. Accordingly this yarn-accumulator zone took the form of a slow-moving conveyor (2 m/min) which allowed for stoppages for full packages to be removed from the winder or for yarn breaks to be repaired in either the coiling or uncoiling zones.

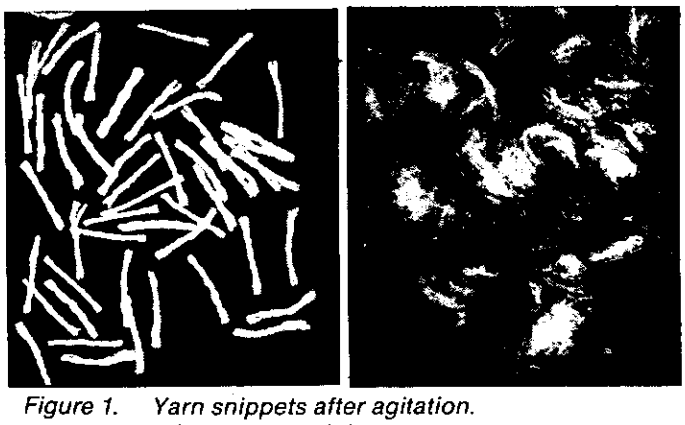


Figure 1. Yarn snippets after agitation. left: set yarn right: unset yarn.

A trolley carrying yarn-restraining mechanisms automatically followed the front of the blanket as it moved backwards and forwards on the accumulator conveyor. The blanket was finally uncoiled and the yarn separated into the original six ends for winding on an automatic Gilbos winder.

Components of this prototype were imported from overseas (coiler and winder) or manufactured locally (bowls and squeeze presses — Andar, Timaru; creel and uncoiler conveyor — WRONZ workshop; dryer — loaned from Alliance Textiles) and the plant was commissioned in early 1984. Provision was made for the general recirculation of the liquor within each bowl and a flowback from bowl 4 → 3 → 1 → drain via a heat-exchanger ensured control over this part of the process. A PLC-based control station developed by WRONZ incorporated the various strategies for coiling, uncoiling, and fault repair and was an essential part of the process.

All interested mills in New Zealand and many from overseas trialled yarn samples for almost two years and the trials confirmed the earlier prognoses made for the plant[11]. The first of these was the excellent and uniform scouring given to the yarn blanket, the DCM extractables being in the region of 0.1-0.2% over extended periods. A flowdown of 500-1000 litres/h from the scouring bowl and the efficiency of squeezing the yarn blanket also resulted in very little

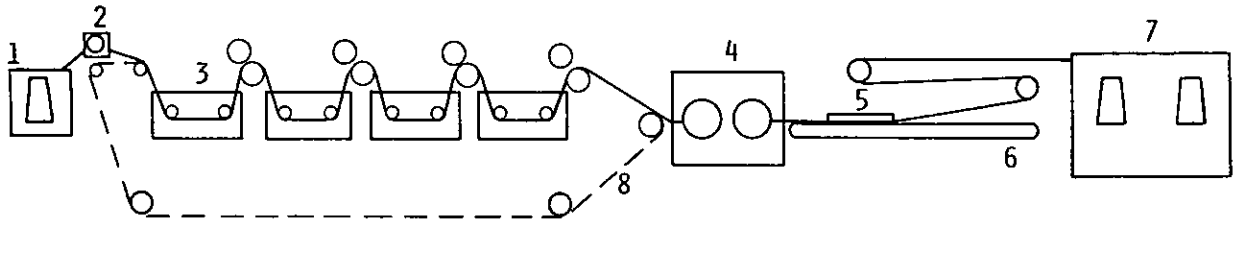


Figure 2. Layout of the prototype WRONZ CHEMSET process. 1 = creel; 2 = coilers; 3 = wet processing bowls; 4 = dryer; 5 = uncoiling zone; 6 = yarn accumulator; 7 = cone winders; 8 = main conveyor belt

carryover of contaminants from bowl 1 into bowl 2, as shown in Figure 3.

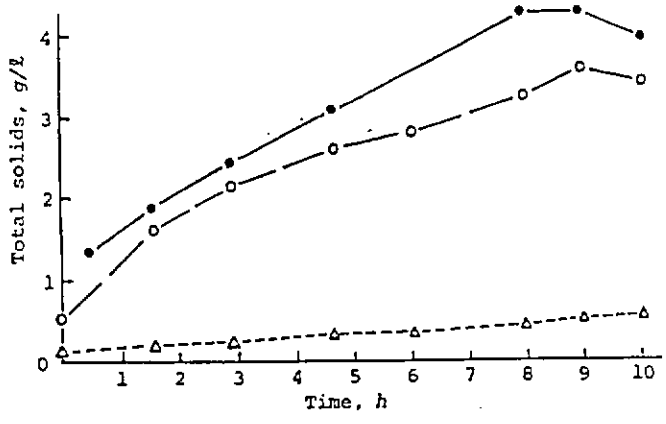


Figure 3

Contaminant levels in liquors when scouring yarn.
●—● bowl 1 squeeze-liquor; o – – o bowl 1;△···△ bowl 2

Set test results also confirmed the high level of set obtainable on carpet yarn, shown in Figure 4.

Sodium bisulphite also has a mild reductive bleaching action on wool and this was a distinct benefit when bright pastel shades were sought in the finished yarn. In Table 1 the difference in the tristimulus values (Y-Z) is a measure of the yellowness after various treatments.

Another hitherto unsuspected benefit related to a phenomenon in tufted cut-pile carpet called 'tip curl'. This arises because of the natural tendency of an unbalanced yarn to kink or form curls on itself when held under low or no tension. When yarn in hank form is given a setting treatment the kinks become set into the yarn. When the yarn is tufted and the pile cut, the kink (if it is in the right place) manifests itself by the top 1-2mm of a tuft bending over. The light-reflective properties of the side of the yarn are different from those of the cut end and so the fault appears as a lighter 'fleck'. When this occurs in a plain-shade carpet it is regarded as highly undesirable.

We found fortuitously that the reinforcement that the coiled rope gave to the individual ends of yarn largely prevented such kinking from occurring and we believe tip curl could be eliminated by suitable manipulation of yarn properties.

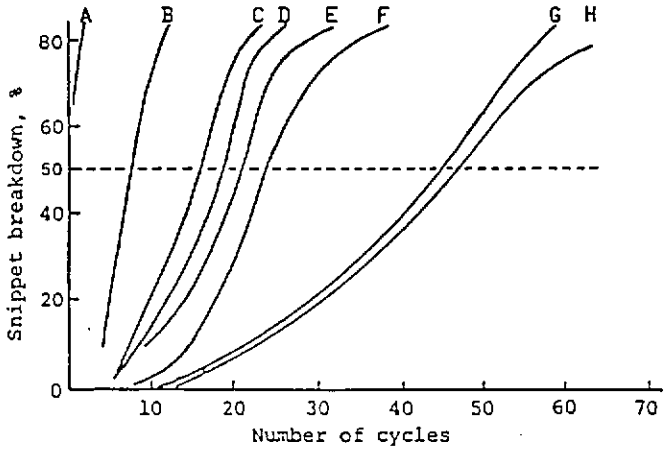


Figure 4
Set of CHEMSET-treated yarn compared with the results of autoclave and water setting (WRONZ Set Tester).
A = unset
B = scoured only;
C = commercial tape scour, chemically set;
D = CHEMSET, 5g MBS/l for 2 min;
E = CHEMSET, 10g MBS/l for 1 min;
F = autoclave-set;
G = CHEMSET, 10g MBS/l for 2 min;
H = set in boiling water.

Resistance to the larvae of insects that attack wool (moths; carpet beetles) is usually required in carpet yarns. As insect-resist agents need to be applied from an acid bath at an elevated temperature it is convenient to apply them while the yarn is being scoured and set in the CHEMSET process. As this is the last wet-processing step the wool is likely to encounter, undue losses of the agent are thus avoided as against treating at an earlier stage.

However, the major goal we set out to achieve at the outset of this project was to produce set carpet yarn suitable for the production of commercially acceptable continuously dyed plain-shade cut-pile carpet. Trials both in New Zealand and overseas have confirmed that CHEMSET yarn can in fact meet this goal.

Table 1. Yellowness of Treated Yarns

Treatment	*Y-Z*
CHEMSET, 10g MBS/l, 2 min at 85°C	*0.0*
CHEMSET, 5g MBS/l, 2 min at 85°C	*0.6*
CHEMSET, 10g MBS/l, 1 min at 85°C	*0.7*
Scoured only, 1 min at 60°C	*1.8*
Boil set, 30 min at 100°C	*3.8*
Autoclave set, 3 x 5 min at 110°C	*5.1*

Epilogue

In mid-1985 three New Zealand mills ordered full-scale commercial machines. A photograph of one of the machines is presented in Figure 5.

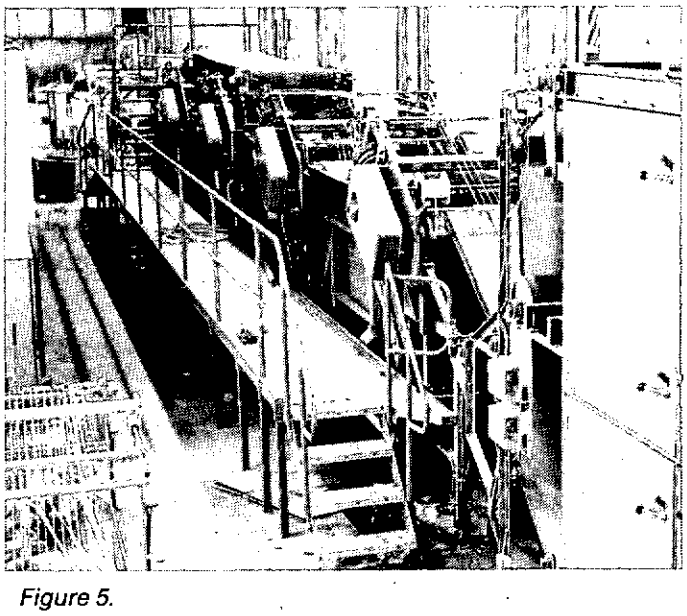


Figure 5.
View of a commercial plant at Christchurch Carpet Yarns Ltd, Christchurch.

These were 24-end double-channel units with 70% of the components made in New Zealand, the principal contractor being Andar Ltd of Timaru. The plants each have the capacity for producing up to 30 tonnes of scoured and set yarn per week.

The plants were commissioned between March and May, 1986, and are currently processing yarn for manufacturing into carpet in New Zealand or for export overseas. The first large-scale tufting and carpet-printing trial has just (January 1987) been concluded successfully in the U.S. Enquiries from European carpet-yarn spinners for the technology are strong and in December 1986 the first overseas plant was ordered by a Danish mill, Wittrup A/S. WRONZ and the New Zealand industry feel that the marketing opportunities thus opened are most exciting for this wool-specific New Zealand-exclusive development.

Acknowledgements

We would like to acknowledge the inputs made to this project over eight years by our colleagues at WRONZ, some but not all of whom are referenced in this paper, the New Zealand Wool Board which made a special grant available,

the New Zealand carpet and carpet yarn industry which assisted with funding and with numerous instances of trialling facilities, and the commercial companies involved in the construction of the pilot-plant and full-scale machines. As this is the largest machinery development undertaken by WRONZ to date, its success owes much to these inputs. The benefits already being returned to New Zealand through yarn sales and the potential benefits from technology sales overseas are also an excellent return to the New Zealand taxpayers for their investment in WRONZ via the DSIR support to research associations and are a powerful argument for the continuation of such support.

References

1. New Zealand Wool Board. 'Wool, future directions', submissions to the Economic Summit Conference, Wellington, Sept. 1984.
2. C.A. Anderson and J.D. Leeder. Text. Res. J. **35,** 416-421, (1965).
3. B.O. Bateup. CSIRO Symposium on Scouring and Carding, Geelong, 5-7 Nov. 1986.
4. D.A. Rankin and A.J. McKinnon. WRONZ Report No. R100, (1982).
5. A.J. McKinnon. 11th SDCANZ Symposium, Auckland, 14-17 Oct. 1986.
6. M.D. Stern and A.V. Tobolsky. J. Chem. Phys. **14,** 93-100. (1946).
7. H.-D. Weigmann, L. Rebenfeld, and C. Dansizer. Text. Res. J. **36,** 535-542, (1966).
8. E.A. Forbes, J.-H. Dittrich. J. Bedford, and P. Butcher. WRONZ Commun. No. 58, (1978).
9. E.A. Forbes and J.-H. Dittrich. J. Soc. Dyers Col. **96,** 10-14, (1980).
10. D.B. Early, R.G. Stewart, A.J. McKinnon, G.V. Barker, C.T. Page, E.A. Forbes, J.-H. Dittrich, and C.H. van Zijll de Jong. Proc. Int. Wool Text. Res. Conf., Tokyo **III,** 274-282, (1985).
11. C.T. Page. D.B. Early, A.J. McKinnon, M.M. Dodds and M.E. Trounson. Proc. Int. Wool Text. Res. Conf., Tokyo **III,** 283-292, (1985).

CORROSION MONITORING IN PROCESS INDUSTRIES BY THIN LAYER ACTIVATION

L.H. Boulton* and G. Wallace†

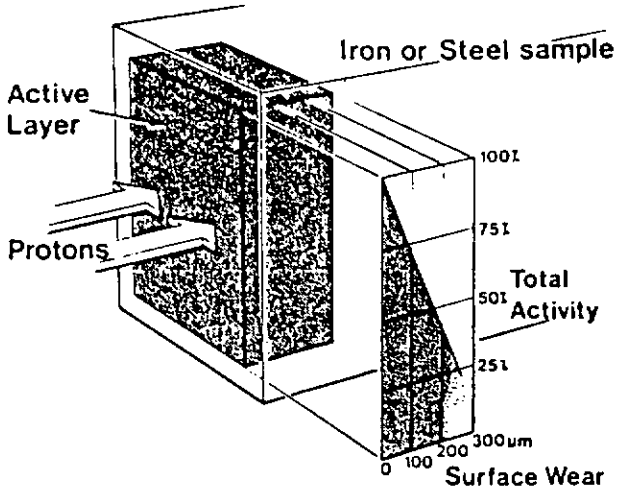
Thin layer activation (TLA) is a technique which provides for direct measurement of the loss of surface material arising from wear, corrosion or erosion. The surface under test is bombarded with a beam of charged particles (usually protons or deuterons) which are produced by a nuclear accelerator and emerge into open air. These particles have a well-defined penetration depth which depends on the beam energy and is usually in the range 10 to 400 microns. Some of them interact with the nuclei of atoms in the surface, transmuting these to radioactive products, e.g. in steel: $Fe^{56}(p,n)\ Co^{56}$.

The resulting radioactivity can be monitored by a portable gamma-radiation detector, subsequently mounted in a reproducible position near the surface. The loss of material from the surface can be related to the decrease of radioactivity, allowing for radioactive decay. Alternatively, the lost material could be collected in the filter of a circulating fluid (e.g. oil) system, and one could monitor its increase in radioactivity.

The gamma rays used to monitor the surface may be detected through materials equivalent in thickness to 10cm of iron. Thus, having once activated the surface of a particular specimen, this may be replaced in its usual position and monitoring can be performed as required without further disassembly. The technique is attractive for on-line measurements and unusual geometries. Specific components can be selected for activation and monitoring. Where it is not possible to activate large plant components, a representative coupon can be activated, and installed in the plant. The sensitivity of the technique is about 1 percent of the depth of beam penetration, typically 0.1 to 4 microns. The levels of radioactivity are small and not hazardous, typically 10 microcuries.

TLA has had a large number of applications in the U.K. and U.S.A. over the last 10 years[1]. Wear has been investigated in engines (bearings, rings, valves, cylinders, and turbine blades), drilling equipment, cutting blades, gun barrels and missile nose cones. It is about to be extended to magnetic media such as computer discs and can be applied to corrosion monitoring in pipes and valves. Active layers can be produced in most of the common engineering materials, such as iron, copper, chromium, aluminium, and their alloys; and in plastics, ceramics and abrasives[2].

A novel application of TLA is under development currently at a pulp mill in New Zealand. Activated mild steel and stainless steel coupons have been installed in the extraction zone of a kraft pulp continuous digester to measure the erosion-corrosion rate of the 30mm steel walls. Initial results are encouraging and compare very favourably with previous NDT results obtained. The coupons are being monitored both through the pressure vessel wall and directly on the inside of the wall. This is the first time that TLA has been applied to such a massive pressure vessel (60m high x 6m diameter) and as corrosion rates are such a critical operating parameter it is necessary to know the metal loss to the nearest micrometre.



In Australasia the technique is available through the Auckland Industrial Development Division and the Institute of Nuclear Sciences of DSIR, from whom further information is available on request.

References:

1. J. Asher et al, "Experience of Plant Corrosion Monitoring by TLA", Paper 131, Corrosion 86, Houston (TX), USA, (1986)

2. G. Wallace, "Thin Layer Activation", "Industrial Corrosion Monitoring", Proceedings of Symposium, ACA New Zealand Branch (1986).

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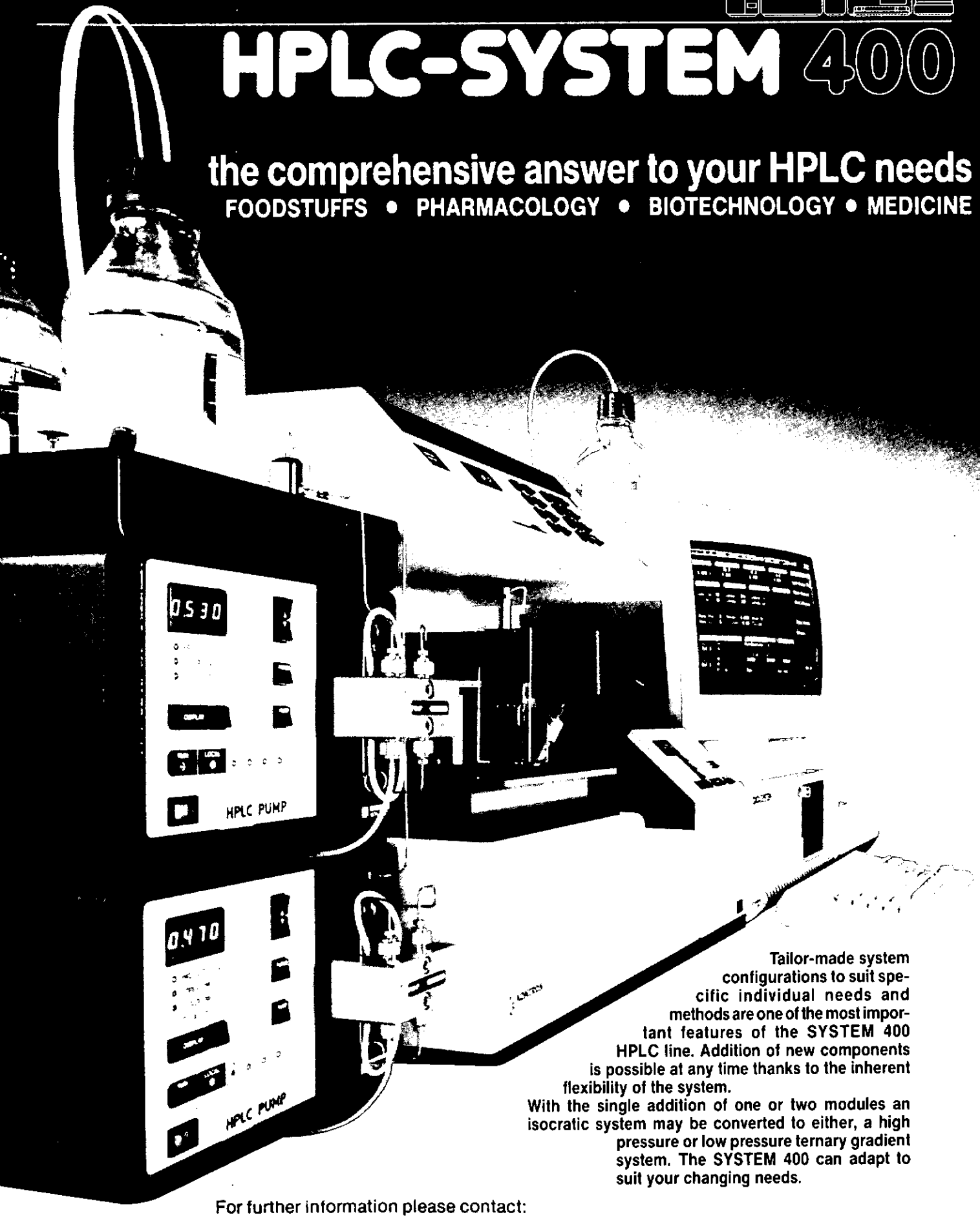

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1987 NZIC SALARY SURVEY

Wendy Singers, Chemistry Divn., DSIR, Wellington

There were 697 returns giving a response rate of 60.6%, lower than for 1986[1,2]. Of the 697 returns seven were excluded; two retired, three unemployed seeking work, one deceased, and one extremely late. Unfortunately through a misunderstanding between myself and those responsible for posting out the forms several boxes on the form were not drawn in. This did not seem to worry most respondents, but a few managed to miss the age question possibly through this. The quality of the returns was almost as poor as last year, most requiring some interpreting.

Because of the new climate of employment I was expecting a number of respondents to be employed on contract. However, only 10 were on contract, and a further seven were on part-time employment.

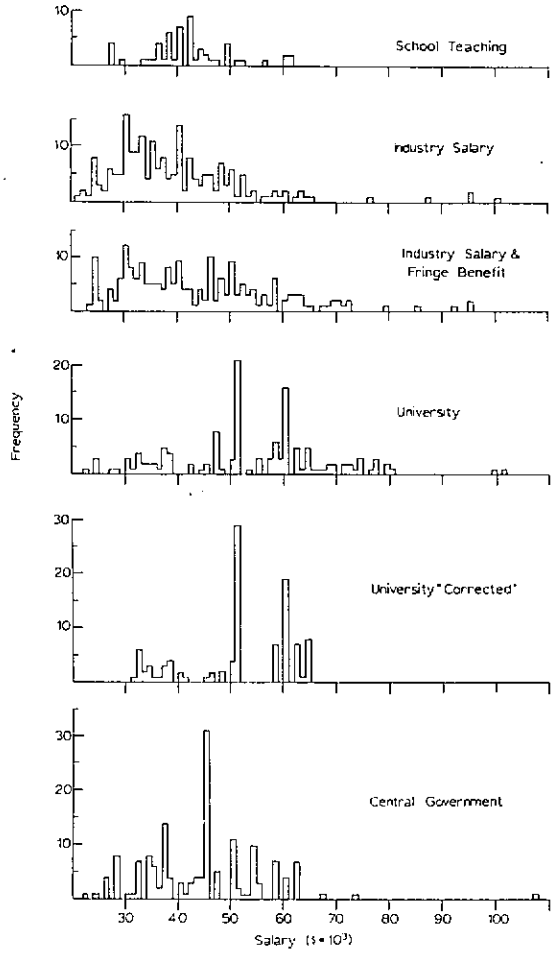

Figure 1: Salary histograms, by employment category.

Histograms of salaries for the employment categories with sufficient numbers are presented in Figure 1. For central government the labelled peaks correspond to the top of the peaks of the various grades in the Science Occupation Class, the highest peaks still being at the top of the grades 104 and 105, although the 104 peak has decreased and the 105 peak is even higher than for 1986. 1986 was Scientist grading year and the differences probably reflect the promotions effective at 1st April 1987. There were problems with the university histogram. One of the first university respondents pointed out to me that although university salary increases had been announced, they were not as yet being paid and that I would receive old salary figures. He was right. The pattern of the university histogram had changed quite a lot from last year, with extra peaks present in the Senior Lecturer salaries. Consequently I had to return to the raw data and convert salaries to the present scale. Luckily the majority of salaries, where given exactly, were unique to a particular time and so conversion was simple. I could not identify salaries below $30,000, possibly because these were technician salaries, and unfortunately I did not have Professorial salaries, only the range, so these could not be converted. 30 salaries were converted. The second university histogram labelled "corrected data" plots this converted data. The extra peak at $47,000 (which was the old top of Senior Lecturer scale) on the original histogram has now gone. The highest peak on the histogram which corresponds to the top of the Senior Lecturer scale has increased and it shows that almost all Senior Lecturers appear to be on the top of the grade. The later peaks corresponding to the steps through the Associate Professor and Reader scale are more obivious in the "corrected" histogram.

TABLE A: Percentage age distribution

	<32	32-40	41-50	>50
School Teaching	(10)13	(25)25	(33)31	(31)31
University	(10) 9	(12)16	(51)45	(27)30
Industry	(25)25	(40)38	(19)22	(17)16
Central Government	(16)15	(34)34	(37)34	(14)18

I have included the salary + fringe benefits histogram for the Industry group, excluding four values ($115, 122, 124, 149 × 10^3), which are well off the scale for this histogram. The salary only histogram also had a point excluded ($115 × 10^3). The shapes of the two industrial histograms are similar to those for 1986.

Once again, some of the differences are a result of age

TABLE B: Mean, Median, Minimum and Maximum Salaries
Note: Numbers in brackets are the 1986 figures.

			Mean	Median	Minimum	Maximum
School Teaching	S	55	42260	42000	27000	61541
		(50)	(38142	37000	22265	60000)
	S+F		42497	42200	27000	62100
			(38533	37028	22265	60000)
Teachers College	S	4	40547	39185	37500	46317
		(2)	(39875	39875	36750	43000)
	S+F		40697	39285	37900	46317
			(39875	39875	36750	43000)
University	S	138	53716	51700	22424	101750
		(133)	(50007	47000	19000	92500)
	S+F		54212	54000	22424	102750
			(50107	48900	19000	92500)
Technical Inst.	S	25	46655	46379	38370	79900
		(30)	(37286	37836	3600	72500)
	S+F		46718	46379	38470	81000
			(37504	37836	3600	76150)
Industry	S	204	39875	37000	21500	115010
		(207)	(35093	33000	17000	80000)
	S+F		45370	40850	23500	149400
			(39002	37000	17000	120800)
Central Govt.	S	159	44587	45475	22300	107000
		(165)	(41716	42500	21800	97300)
	S+F		44685	45475	22300	109000
			(41812	42500	21800	97800)
Local Government	S	17	38905	36158	26137	54500
		(20)	(35345	35693	23025	47450)
	S+F		43509	37788	26237	98500
			(36209	36693	23025	52450)
Research Assn.	S	42	44298	46500	20529	70400
		(54)	(40859	40350	17946	73750)
	S+F		45144	46750	20529	74500
			(43047	41860	17996	(38000)
Self Employed	S	13	46862	50000	15000	79338
		(12)	(37108	26000	10000	115493)
	S+F		66276	72000	17000	150000
			(42836	37975	10500	125993)
Hospital Serv.	S	8	41961	42329	30047	50611
		(8)	(36632	35001	17458	47300)
	S+F		41999	42329	30047	50611
			(36635	35011	17458	47300)
Other	S	20	44415	38500	20100	100000
		(22)	(35361	30300	9000	72536)
	S+F		50209	44500	20100	103000
			(40031	35000	9000	76600)

distribution differences. The percentage age distribution in a condensed form, that highlights the differences is presented in Table A. These differences are similar to last year's survey. There is still the large percentage of university staff in the 41-50 age group, 25% of this group are below 40 compared with 63% for industry. Table B gives the mean, median, minimum and maximum salaries for the various employment groups. "Corrected" means for the University group are S, S+F $54,486 and $54,999. Table C gives mean salaries for the broader age groups. I have included an extra line with "corrected" means for the University group. As you can see from this, the 50+ Group mean has not increased by as much as the 32-40 and the 41-50 values. This is probably because the majority of Professors fit into the 50+ group and their salaries were not corrected. For every Professorial salary that is wrong for age group 50+ the mean would increase by $150.

TABLE C. Mean Salaries by Agegroup
Note: Numbers in brackets are the 1986 figures.

		<32		32-40		41-50		>50	
		No.	Mean	No.	Mean	No.	Mean	No.	Mean
School Teaching	S	7	31930	14	38079	17	44647	17	47568
		(5	25949	13	32995	17	40157	16	42416)
	S+F		32480		38691		44683		47632
			(25949		33981		40501		42472)
Teachers College	S			1	37500	3	41562		
						(2	39875)		
	S+F				37900		41629		
							(39875)		
University	S	12	31792	22	42174	60	55063	40	65152
		(13	28859	16	38601	68	51434	36	60017)
	S corr		32042		43053		56073		65625
	S+F		31808		42237		55116		65308
			(28874		38601		51528		60204
Technical Inst.	S	1	40000	9	45341	9	46471	4	53731
		(1	42000	11	33623	12	40466	6	36854)
	S+F		40000		45352		46504		54006
			(42040		33690		40939		36871)
Industry	S	50	32089	76	38483	44	48108	32	44332
		(51	27678	82	34939	39	40718	35	39989)
	S+F		35176		43886		57541		48689
			(30731		38808		45653		44096)
Central Govt.	S	23	31544	52	40963	52	48497	28	54368
		(26	28651	55	38681	60	45813	23	53058)
	S+F		31553		40970		48595		54476
			(28902		38683		45841		53377)
Local Government	S	5	30390	7	42842	4	42658		
		(7	29216	9	37274	2	40655	2	42800)
	S+F		30850		52194		44136		
			(29261		38983		41355		42900)
Research Assn.	S	10	26939	14	44218	11	54853	6	54065
		(16	24970	17	40023	11	48395	10	59412)
	S+F		27209		45482		55849		54623
			(25048		41567		56314		59767)
Self Employed	S			4	40000	6	52890	2	42500
		(1	20000	5	25600	4	61373	2	25900)
	S+F				69500		65006		55500
			(28000		28129		71398		29900)
Hospital Serv.	S			3	37657	2	42329	3	46020
				(4	32115	1	35000	3	43200)
	S+F				37757		42329		46020
					(32115		35020		43200)
Other	S	3	29792	4	40175	6	45939	6	53028
		(6	22850	6	31500	4	56134	5	38391)
	S+F		34459		49600		54273		54428
			(24408		45327		56134		39543)

where S is Salary, S corr is "corrected" Salary, and S+F is Salary+Fringe Benefits

In Table D the maximum total fringe benefits, together with the number that claimed fringe benefits and the percentage that represents, is presented for each employment group. Also the list of what was claimed to make up this amount is given.

Table E presents a breakdown of the fringe benefits claimed. Empty fields signify that there were no allowances claimed in those categories.

Every year, before the survey is sent out, there is an attempt made to consult people in various occupational classes on the design, to improve it. Very little has been achieved by this. Many comments were received from respondents. Several people suggested questions we have already tried and abandoned as they did not add anything to the survey. It is however obvious that the design of the survey is no longer appropriate for certain groups, particularly the self-employed. We would appreciate communications from those affected, particularly the group of self-employed in Auckland. If groups could get together and draw up broad guidelines for changes, it would be much appreciated. Please post to either the author or NZIC Council members.

TABLE D.
Number, Percentage, Maximum value of fringe benefit and Items claimed for Maximum for each Employment Group.

	Number	Percent of group	Maximum	Fringe benefits claimed
School Teaching	13	24	3000	Housing Assistance
Teachers College	2	50	400	Transport Allowance
University	16	12	3500	Housing Assistance; Entertainment Allowance
Technical Institute	3	12	1100	Car; Telephone
Industry	188	92	85400	Car; Shares; Telephone; Acc.&Sick.,Life Insurance; Entertainment Allowance; Club Subscriptions; Low Interest Loan
Central Government	20	13	3300	Transport; Telephone; Free or Subsidised Goods
Local Government	11	65	50000*	Transport; Acc.&Sick.,Life Insurance
Research Association	17	40	5500	Car; Telephone; Life Insurance; Entertainment Allowance
Self Employed	11	85	100000	Car; Telephone; Profit Sharing; Shares; Life Insurance; Entertainment Allowance Club Subscriptions
Hospital Services	1	13	300	Club Subscriptions
Other	10	50	50000	Car; Telephone; Bonuses; Shares; Entertainment Allowance

*Note: Value seems excessively high for fringe benefits claimed. Could include value of insurance cover.

Acknowledgement

My thanks to my son Robert for his assistance in preparing this report.

References

1. W.A. Singers, Chem. in NZ, **50**, 138 (1986).
2. GENSTAT program suite; contributors: N.G. Avery et al, Statistics Department, Rothamsted Experimental Station, Harpenden, Herts, England.

TABLE E. Numbers with fringe benefits for each Employment Group.
Note: Numbers in brackets are the 1986 figures.

	Car	Transport	Company House	Housing Assistance
School Teaching	(2)	2	3(1)	2
Teachers College		1		
University	1	4		1
Technical Institute	1(2)	2		
Industry	116(115)	27	2(6)	7
Central Government	1	3		
Local Government	1(4)	7	1	
Research Association	5(7)	9		
Self Employed	10(8)	1	(3)	
Hospital Services	(3)			
Other	8(10)	1	(1)	1
TOTAL	143(151)	57	6(11)	11

	Telephone	Life Insurance	Acc.& Sick. Insurance	Other Insurance
School Teaching	5(5)	(1)	1	
Teachers College	1			
University	4	(1)		(2)
Technical Institute	(1)			
Industry	108(93)	44(28)	103(94)	4(15)
Central Government	12(11)	(1)	(2)	(1)
Local Government	3(4)	1	3(2)	1
Research Association	2(3)	3(1)	10(7)	1(1)
Self Employed	9(9)	4(2)	6(7)	1(2)
Other	7(6)	(1)	2(2)	
TOTAL	152(132)	52(35)	125(114)	7(21)

	Bonuses	Profit Sharing	Shares	Free or Subsidised Goods
Industry	42(35)	4	30	35
Central Government				2
Local Government	3(7)			
Research Association				1
Self Employed	1(1)	6	5	
Other	2(5)	3	2	
TOTAL	40(48)	13	37	38

	School, Tuition or Exam. Fees	Entertain. Allowance	Club Subscriptions	Other
School Teaching		2		(1)
University	3	4		4(7)
Technical Institute				1
Industry	20	52	62	7(27)
Central Government	2	1	1	1(3)
Local Government	1			1(2)
Research Association		3		(4)
Self Employed	1	8	4	1(2)
Hospital Services			1	
Other		4	2	(1)
TOTAL	27	74	70	15(47)

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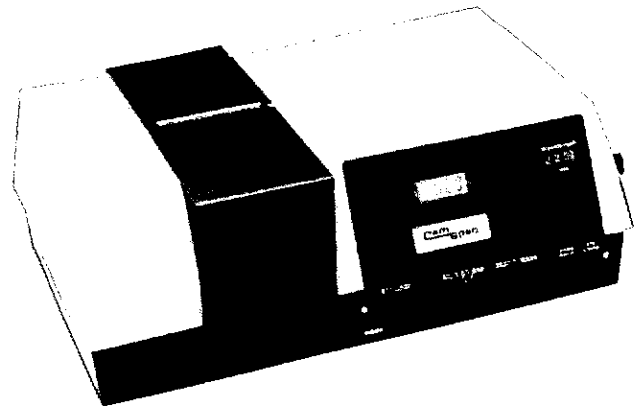

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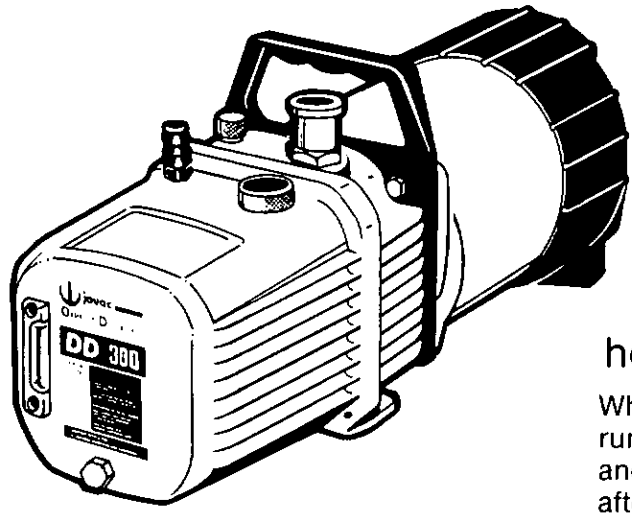

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Which Graduates Join NZIC?

Gordon Leary FNZIC

During the recent correspondence over grades of NZIC membership, Dr Powell commented (Chemistry in New Zealand, **51,** 53 (1987)) that "we lose more potential graduate members than technician members".

It would be useful to have exact information on where the chemistry graduates seek jobs these days and I have tried to estimate this by comparing the job distribution of members with the job market for chemists. I conclude that many, possibly a majority, of our chemistry graduates do not join NZIC. Those we lose appear predominantly to be working for industry or government.

NZIC Membership

Universities

The university calendars list the actual staff in each department, enabling the percentage membership to be calculated, as follows:

	NZIC members	Staff totals	% membership
Chemistry departments	110	130	85%
Biochemistry departments (excl. Massey)	15	40	38%
Other chemistry-oriented departments (e.g. Soil, Food, Chem. Eng. etc)	32	107	30%
	157	277	57%

Government Laboratories

The only government laboratory for which I have accurate information is Chemistry Division, DSIR. In 1987 95 of the Division's 150 scientists (who are almost all chemists) belonged to the Institute. The percentage membership is 63%.

Assuming that chemists at Chemistry Division are more likely to join NZIC than are chemists in other laboratories where other scientific disciplines are more important than chemistry, I suggest that perhaps 50% of chemistry graduates who work in government laboratories or research associations belong to NZIC.

Industry

The 1987 yearbook lists 380 members who work in industry (excluding those self-employed), but I do not know the total number of chemistry graduates who have industry jobs. I have tried to estimate the percentage NZIC membership among industry chemistry graduates from the data of Watson and Southward (Chemistry in New Zealand, **50,** 75 (1986)). The result is a very low figure which should give us some concern.

Watson and Southward surveyed the job advertisements for chemists over a year (1/3/84 to 1/3/85) and found that of 513 New Zealand-based jobs (excluding school teaching), 330 were in industry. Of the 330, 109 specified a need for a university degree, 146 asked for NZCS, and 75 were prepared to take a person with either qualifications. We can thus conclude that:

* The total number (380) of NZIC members who work in industry is about the same as the number (330) of industry jobs to be filled in one year.
* Between 109 and 184 of the 330 university positions were for university graduates. If all these joined the NZIC our present industry membership would double in about three years.
* At this rate, over a 40 year career, one would calculate that between 5% (380 + (40 x 184)) and 8% (380 + (40 x 109)) of chemistry graduates in industry belong to the Institute. Such an extrapolation may be widely inaccurate, but I suggest that no more than 15% of chemistry graduates in industry belong to NZIC.

Conclusion

The message that I take from this is that NZIC membership appeals mostly to academics. Chemistry graduates working on applied research are less likely to join and there is a huge pool of chemistry graduates in industry for the NZIC to attract.

The question is do chemistry graduates in industry lose an interest in chemistry or only in NZIC? Do we want them to join us, or are we content to stay with our smaller size of academically-oriented membership? It is a worry to me that even at Chemistry Division there are 56 chemists who don't see NZIC as sufficiently important to them to warrant paying the annual subscription. Perhaps the technician-science graduate membership battle has been the wrong war?

The NZIC — Does It Have a Future?

P.J Tree, MNZIC

It has recently come to my attention that I am not alone in feeling some dissatisfaction with the way that the NZIC seems to be headed at the present time. Rather than voting with my feet (i.e. resigning) as some members talk of doing, I have decided to put pen to paper and express my opinion on what I perceive to be the various roles of the Institute and how well the Institute currently fills these.

Thus I submit this as a discussion document. It is one member's personal view, and although I know many of the ideas are not new and have been expressed before, I think it is timely that they are once again brought before the membership. I urge all who are associated with the Institute in any capacity to read and thoughtfully consider the following.

I perceive the principal functions of the Institute as four-fold. I do not wish to imply that by listing these functions I rank them in any way. These functions, though disparate, are of equal importance.

1. A learned society: disseminating knowledge of advances in chemistry to its members, and providing a forum for the exchange of information and ideas.

2. A professional association: upholding standards by ensuring its members remain diligent and ethical in their practice of chemistry. Also ensuring that positions requiring a knowledge of chemistry are in fact filled by persons with adequate qualifications and experience.

3. A professional union: looking after the rights of its members in employment — salaries, conditions, safety, redundancy, etc.

4. A pressure group: improving the public image of chemistry and chemists generally. Ensuring the government knows the importance of chemistry for and within New Zealand society and thereby assisting them to formulate appropriate policy.

Currently the NZIC performs some of its roles far better than others.

1. NZIC, the learned society: this functions well; conferences, meetings, overseas speakers, specialist groups, etc.

2. NZIC, the professional association: not much has

happened here. Well yes, there are rules of conduct and ethics, but the title MNZIC is meaningless in the world of employers and business. Most trades and professions offer their membership protection against unqualified operators. For example: only a registered electrician can wire your home, or a registered plumber connect your sewerage. But anyone can manufacture or use hazardous chemicals, anyone can be responsible for the quality control of pharmaceuticals or processed foodstuffs.

3. NZIC, the professional union: scarcely touched. The salary survey is done faithfully every year, but there is no follow up. No research to establish what an appropriate salary bracket for a quality control analyst with an NZCS and five years experience *should* be. True, some of the membership have their salaries and conditions covered by other associations; for example, secondary school chemistry teachers by being members of PPTA. But there are many of our membership employed within industry who have no award or salary determining their protection. Surely it is our duty to assist such persons. (It may be that "market forces" and "user pays" government philosophies will force those members in formerly secure public sector and quasi-public sector positions to appreciate the importance of this function of the Institute).

4. NZIC, the pressure group: just beginning. In the last 18 months the Institute has begun to realise how low the public opinion of chemistry really is. And governments take notice of public opinion when formulating policy. This is an area where the Institute must take a more forward role.

The result of non-performance of some of the Institute's roles means that the NZIC starts to become irrelevant to the needs and requirements of chemists here and now. And while some members bicker incessantly about what may be, in reality, minor issues, their Institute gradually loses touch with the real world.

A major shake-up is needed, and soon, or the NZIC will fade away, becoming a gentlemen's club, an anachronism reminiscing on past glories.

My suggestions. Firstly, the four principal functions of the Institute as I see it are so diverse they cannot be tackled with justice by any *one* group or committee. So, set up separate committees to oversee these functions. Give them the financial independence and the executive power to really get to grips with the issues. The Council then becomes a body that can look at a broader perspective, as well as ensuring all functions are receiving adequate coverage.

Secondly, resolve the grades of membership issue as soon as possible. Remember that, as a professional association, membership grades must indicate one's *professional* ability, *not* one's academic qualification.

Thirdly, work towards genuine recognition of the titles FNZIC and MNZIC as professional qualifications. Assist those not covered by other associations or awards in achieving a salary and conditions commensurate with qualifications and experience.

Fourthly, encourage the branches to do more than just arrange monthly meetings. The best and most effective organisations are "bottom up" *not* "top down". Through the branches the ordinary membership must have direct access to all of the four functions of the Institute.

Fifthly, get out and promote chemistry before it is too late. Public perception of chemists and chemistry must be at an all time low.

Finally, food for thought... To which would you rather belong?

An organisation, membership $70 per annum, holding monthly meetings at which learned members spoke on various chemistry-related topics.

An organisation, membership $100 per annum, that, in addition to the above, improved your job prospects, helped you achieve a realistic salary, and was seen publicly to support and promote the aims of chemists generally.

Well? It is all up to you. Demand that your Institute get on its feet and face the real world.

The above comments were discussed by Council at its August meeting. As noted in Council News, a Marketing Officer has been appointed, and it is expected that this person will address the various points raised by Philip Tree. — Ed.

NATIONAL CHEMISTRY WEEK

On the afternoon of Sunday, 16 August, I nearly fell out of my armchair — twice! First, there was the voice of Brian Halton emitting from the TV, to announce the start of Professor Cadogan's address. Then about an hour later the continuity announcer advised that "that programme was presented as part of National Chemistry Week". Thereby, living proof that NCW was a reality — I heard it on the telly! Those of you who missed the Cadogan address are the poorer for it. Copies of the video are being sent to branches however, so it should eventually receive wider coverage.

Anyway, NCW has come and gone, and appears to have been a moderate success. **Dr Bob Bucat,** RACI-NZIC visiting speaker, addressed the various branches and other meetings of chemistry teachers. He spoke on two topics; "Decision Making Processes in Curriculum Development", and "The Elements of Chemistry: Earth, Air, Fire and Water". In the latter Dr Bucat described the philosophies and design behind the new chemical text "Elements of Chemistry" prepared for Australian high schools. Both presentations were most timely because of the current school curriculum review now being undertaken in New Zealand.

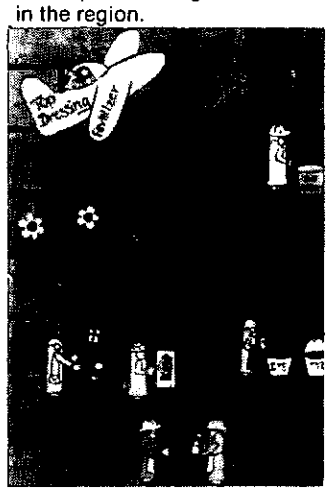
The NCW activities of two of the branches are described below, followed by a listing of the prizewinners in the various competitions. For information on the planning for future National Chemistry occasions, refer to Council News. — Ed.

Manawatu Branch

To co-ordinate local activities, the Manawatu Branch appointed a committee consisting of **Drs Andrew Brodie, Sylvia Rumball** and **Eric Ainscough** (Massey University), **Dave Newstead** (Dairy Research Institute) and **Cecil Johnson** (DSIR). The Week's activities were announced in a two-page article (with advertising) in the Evening Standard of Saturday 15 August, along with an Editorial by **Dr Ian Watson** (Massey University), and a short article in The Tribune of 16 August.

A "Meet A Chemist" programme was organised with Bennetts book shop, in Palmerston North. From 12.00 to 1.30pm each day throughout the week leading educationalists and industrial and research chemists were present in the shop to talk about the work of their organisations. Those participating in this activity were;
Dr Sylvia Rumball (Massey University) and **Dr Lawrie Creamer** (NZ Dairy Research Institute): "Chemistry of Milk."
Professor Geoff Malcolm (Massey University): "Beginners Experiments."
Professor Dick Batt (Massey University): "Chemistry of Alcohol."
Drs John Robertson and **David Greenwood** (Biotechnology Division, DSIR): "Chemistry of Insects."
Dr Richard Garland and **Mr Neil Blazey** (NZ Pharmaceuticals Ltd.): "Chemistry of Blood Clotting and Bile."

A steady stream of customers were entertained and informed of the wide range of chemical and biochemical research and development being undertaken in the region.



Poster: Maree Stark

During the Week, a special display was set up in the PDC Plaza, a large shopping complex in Palmerston North. Posters from the NZ Dairy Research Institute, Massey University and the Manawatu Polytechnic were on display, as well as those submitted by local students for the national Schools' Competition, organised by the Institute.

On Thursday 20 August, local high school students (6th and 7th form) attended a special lecture on Analytical Chemistry given by **Dr Robert Brooks** (Department of Chemistry and Biochemistry, Massey University) in the Marsden Lecture Theatre. A one hour laboratory course on the analysis of metal ions, using both wet chemistry and spectrophotometry, followed the lecture. Because of the numbers attending, morning and afternoon sessions were organised in which three laboratories were used. This was a most popular activity.

Canterbury

On 19 August **Professor Michael Hartshorn** presented the first public lecture of the week entitled "Chemistry, Chemists and the Nobel Prizes — A Chronicle of Progress." This was a well structured and presented lecture in which Professor Hartshorn briefly discussed Nobel's life and the fund which was established on his death to support the prizes. He then went on to discuss the development of three major fields in organic chemistry in which Nobel prizes in chemistry have been awarded over the years.

Dr Peter Harland (assisted by **John Harrison**) presented an entertainment/public lecture twice on 20 August. The entertainment entitled "Chemical Energy" was well suited to Dr Harland's field of research, the study of gas phase reactions. He introduced both sessions with an illustration of the generation of nitrogen atoms in the upper atmosphere and subsequent light emission produced on their recombination and reaction with other molecules. He then looked at a variety of other forms of energy produced by chemical reactions. This involved an impressive number (and volume) of explosive reactions which kept the audiences impressed and tamed. His sense of humour, choice of subject matter, and enthusiasm meant the lectures were very well received, although after two sessions, with three hours between each, Peter was somewhat exhausted at the end.

Competition Prizewinners

National Poster Competition: for pupils in Forms I, II, III and IV. The theme was "Chemistry at Work." Prizes were awarded on the basis of a clear statement of information, the ability to attract attention and evidence of artistic excellence.

From the thirty-one finalists selected by Branches, the following were selected by the National Judging Panel:
First equal ($100 each)
Craig Dick
Kings High School, Dunedin

Maree Starck
Fielding Agricultural High School

Third Prize ($25)
Megan Williams
Papanui High School, Christchurch.

National Photographic Competition: for both colour and monochrome prints with a clear message illustrating the role of Chemistry. The judges have awarded the following prizes:
Colour
First ($100) — Carl Blanchard, "Refractometry", Timaru Boys' High School

Monochrome
First ($100) — Matthew Mallet, "The Continuing Entanglement of Chemistry", Hutt Valley High School

Second ($50) — Glen Carter, "Hard Evidence — Concrete Proof that Chemistry Works", Rosehill College, Papkura

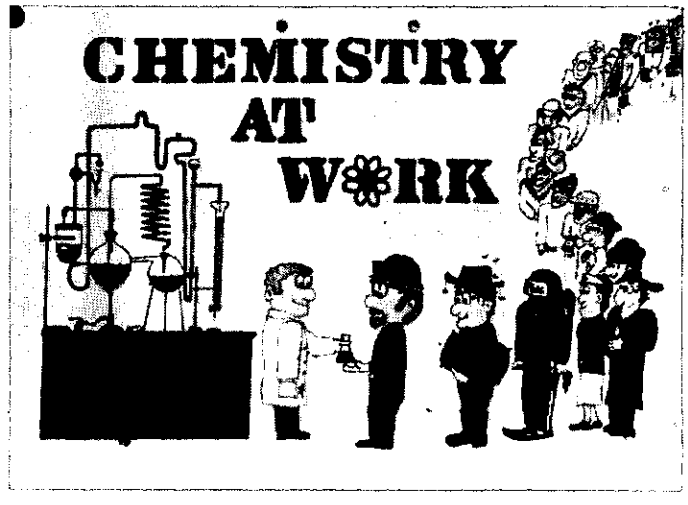
The judge considered visual impact, creative ability and technical quality in deciding prizewinners.

National Essay Competition: for 6th and 7th formers. The topic was "Chemistry — Friend or Foe?" Winning essays in branch competitions were considered by the National judges who have awarded the following prizes:
First prize —
Anna Stevenson, Samuel Marsden Collegiate School, Wellington

Second prize —
Shelley Williams, Whangarei Girls' High School

Third prize —
Tracy McSporran, Riccarton High School, Christchurch

The judges considered the quality of the ideas, including the use of data and examples, the mature use of language and the organisation of the material as criteria. They report that all of the essays were well presented.



Poster: Craig Dick

COUNCIL NEWS

The August meeting of Council was held in Auckland on the Saturday and Sunday preceding the annual Conference. Dr. B. Halton presided, Dr. S.J. deMora was present for the first time as Auckland Branch Delegate, and Dr. R.T. Gallagher attended as Waikato Delegate. Mrs N.E. Wignall attended as Acting Registrar, as Mr Hogan was on overseas leave.

Finance

A major item for discussion at the meeting was the current state of Institute finances. In the 1986/87 financial year the Institute accounts showed a deficit of $4,838, with an outstanding commitment to the Development Fund, and most reserves committed to the Chemical Education Trust and the Development Fund. A forecast for the current financial year prepared by the Registrar predicted an even greater deficit in the absence of remedial measures.

The main reasons for this situation are marked increases in costs (18% inflation compared to a 7.7% increase in the subscription for Members) and a significant number of Members with overdue subscriptions. The following measures have been proposed by Council in an attempt to address this situation:

A number of economies can be made in basic operating costs, and the overseas visitors fund. In addition it has been decided to defer payment of the 1987/88 levy to the Development Fund ($6 per Member).

Renewed efforts are to be made to encourage payment of subscriptions by those members in arrears. Mr Hitchings, as the new President, is to write to all such members, and branch committees will attempt to follow this up by direct contact where possible, and by tracking down those members who are *in communicado*. Members who decline to continue in their membership will be canvassed as to reasons why.

A revised "strike off" system will be introduced. In the past members in arrears have remained on the Institute books for two years or more before being struck off, and have continued to receive copies of the Journal, branch notices etc. throughout that time. In future strike-off will occur once a subscription is 12 months overdue (e.g. an unpaid sub. due 1 May 1988 will result in strike-off at the Council meeting in August 1989).

It is inevitable that Council will have to consider further increases in subscriptions at its next meeting in February 1988. Branches were urged to examine the relationship between Institute activities and current funding, so that appropriate decisions can be arrived at.

Recruitment

A continuing concern for Council is the lack of any major growth in Institute membership. The position of Marketing Officer has been established, and Mr Philip Best, Wellington Branch Delegate, was appointed to it. His task will be to consider ways of promoting the benefits of membership of the Institute, and to consider what additional benefits might usefully be introduced. Philip would welcome any suggestions from members in this regard along with any thoughts on a future "vision" for the Institute. (Mr P.G. Best, c/ P.O. Box 3087, Wellington).

In recent years significant efforts have been made in recruiting Student members of the Institute, and these have been moderately successful. However, in the short term this represents a drain on Institute funds as subscription income does not match the cost of servicing these members. It has been suggested that branches should consider targeting 1988 as the year for recruiting those fully qualified chemists who have so far eluded the "net.".

A new set of recruitment brochures has recently been produced, based on the model of our sister organisation across the Tasman, the RACI. Separate leaflets are available for Student, non-corporate, and corporate membership grades. The attractive multi-colour leaflets are a marked improvement on previous productions, and Council was most appreciative of the efforts of Dr John Rogers and the RACI, in arriving at this result. Copies of the leaflets are available through branch secretaries.

Office of the Registrar, General Secretary

One of the cost-saving measures proposed by the Registrar to assist with NZIC finances, was that he should forgo his honorarium. This was accepted with appreciation. At the same time there was before Council a proposal for changes in the conditions for the election of the General Secretary, such that the holder of that office should also receive an equivalent honorarium. This was obviously no longer appropriate, and the proposal was withdrawn. In appreciation of Mr Hogan's gesture and in acknowledgement of his many years of dedicated service, it was proposed that the Registrar's position be changed to that of Honorary Treasurer and that this should carry with it the status of a voting member of Council. In addition the office of General Secretary is also to be designated as "Honorary". Mr Hitchings was asked to prepare the appropriate rule changes for consideration by Council at its next meeting in February 1988.

Grades of Membership

As proposed earlier this year by Council, a ballot is to be held of all corporate members, on the issue of changes to the current structure of the non-corporate membership grades. The ballot will be a simple yes/no one, and the papers are to be posted to members by 5 October. Dr Llewellyn was asked to draw up the paper, and act as Returning Officer. The Editor is to act as Scrutineer. The results of the ballot will be reported back to Council at its meeting in February 1988.

National Chemistry Week

Mr Hitchings reported to Council on the events of National Chemistry Week which had been held earlier in August. For further details see elsewhere in this issue). After some discussion it was decided that the next National Chemistry occasion should take place in 1989, this should probably be concentrated on one day, rather than a week, and the event should be targeted at the 11 to 13-year-old age group. Dr Llewellyn was asked to initiate activities in this regard, and branches were asked to consider how they could best contribute.

Council expressed its appreciation of Mr Hitchings' efforts, and those other members throughout the country who provided invaluable assistance in the organisation of National Chemistry Week 1987.

Annual Conferences

Planning for the 1988 Annual Conference, to be held in Palmerston North, is now well under way, and an announcement appears elsewhere in this issue. The future of the Annual Conference was discussed briefly by Council, including a proposal that the event become a three-yearly one, alternating between the North and South Islands. This matter will be considered further at the next meeting of Council, and branches were urged to promote discus-

HONOURS AND AWARDS

Council is pleased to announce the following honours and awards:

ICI Prize: Assoc. Prof. P.S. Rutledge, University of Auckland.

Shell Prize for Industrial and Applied Chemistry: A.G. Charleston. N.Z. Fibreglass, Auckland (ex N.Z. Fertilizer Manufacturers' Research Assn.)

1988 NZIC-RACI Visiting Speaker Award: Dr. D.M. Bibby, Chemistry Divn, DSIR, Wellington.

Chemical Education Award: M.A. Perkins, Cambridge High School, Cambridge.

Student Paper Competition: Sean C. Smith, Canterbury University

Chemical Essay Prize: no award

Honorary Fellowship: The following members have been elected Honorary Fellows of the Institute: Prof. R.E.F. Mathews, Prof. J.F. Duncan.

ELECTION OF OFFICERS

The following were elected unopposed and take office on 1 September, 1987.

President: T.R. Hitchings

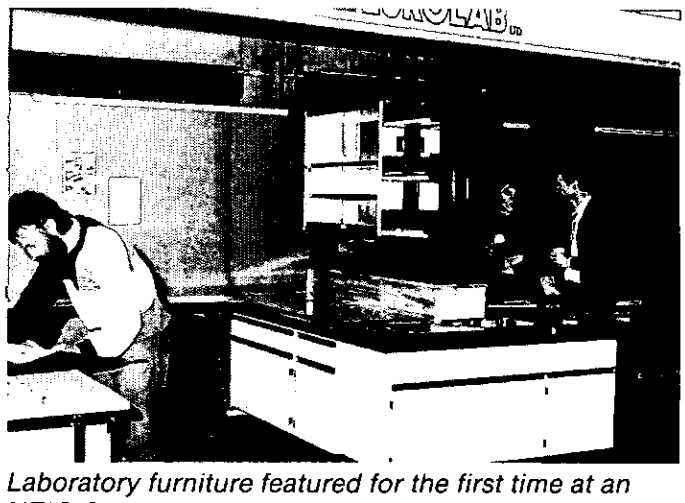
First Vice President: Dr. D.R. Llewellyn

Second Vice President: Dr. J.M. Waters

General Secretary: Dr. J. Rogers

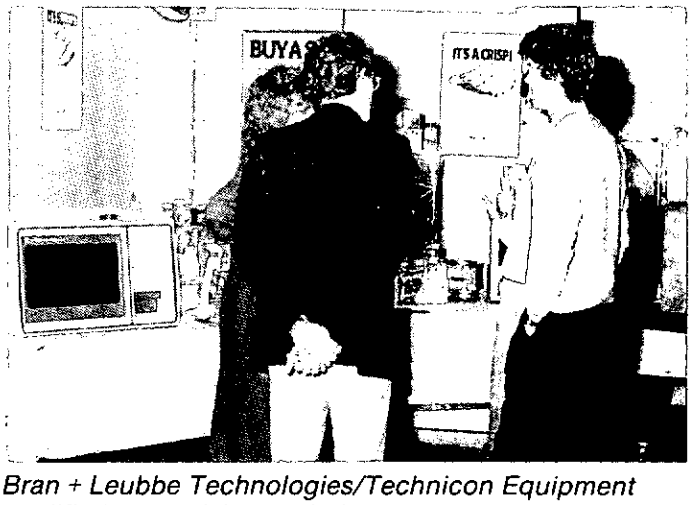
Council notes with pleasure that Dr Waters is the first woman to be elected to the office of Second Vice-President, in the history of the Institute.

Levinston Bros. display featured a wide range of chemical pumps from Wilden



Laboratory furniture featured for the first time at an NZIC Conference Trade Show. Eurolab Laboratories Ltd was the exhibitor

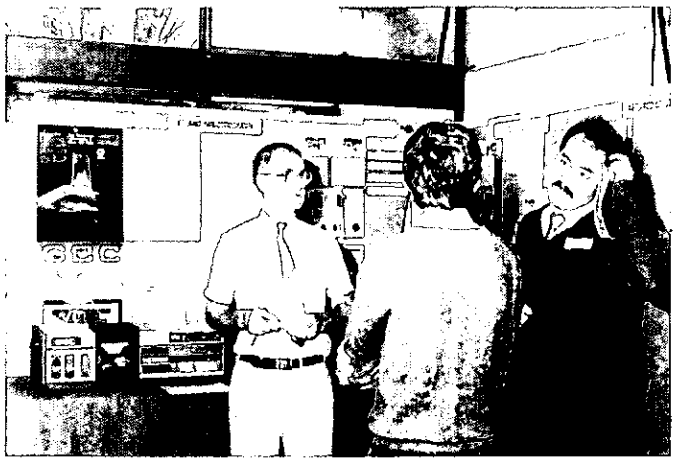
Rocklabs M.D. Ian Devereaux (left) had a party of thirty people with him at the C.I.T.F. Trades Fair Dinner



Bran + Leubbe Technologies/Technicon Equipment qualified every visitor to their stand and are confident of business from new contacts

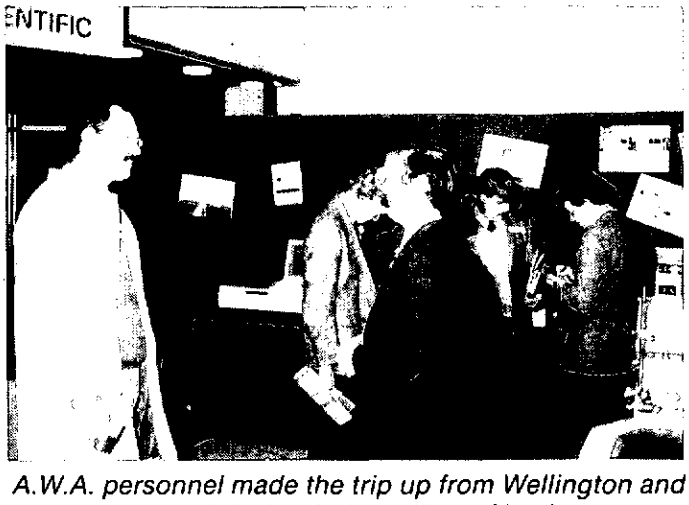
Charles Martin enlightens and entertains dinner guests on the eve of the first day of Conference. Tongue-in-cheek address was good for a laugh-a-minute

The Labsupply Pierce stand created interest, especially when the video was switched on!



Adavanced Analytical took the opportunity to promote their range of spectroscopy equipment

W.D. McGregor shared a stand with Ceramic Engineering. Both displayed items not seen before at a conference trade fair



A.W.A. personnel made the trip up from Wellington and seemed well satisfied with the calibre of business contacts

Representing Dionex from the U.S.A., Thomas Hyde Ltd shared a stand with Dynavac NZ Ltd on the mezzanine floor

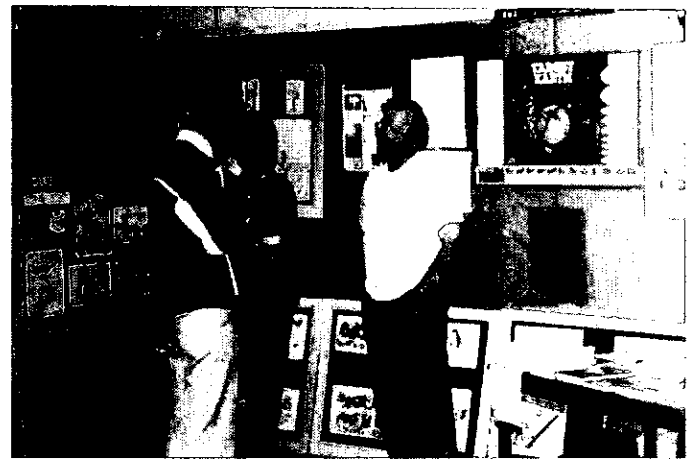
John Morris Scientific mounted a very sharp display and benefitted accordingly

Bio-Rad Pty made the trek across the Tasman to be represented at the Chemical Industries Trade Fair

Guest speaker Prof. Dick Batt (centre) spends time with other speakers and delegates at the Sheraton

Fume cupboards were displayed by Insapipe Industries Ltd.

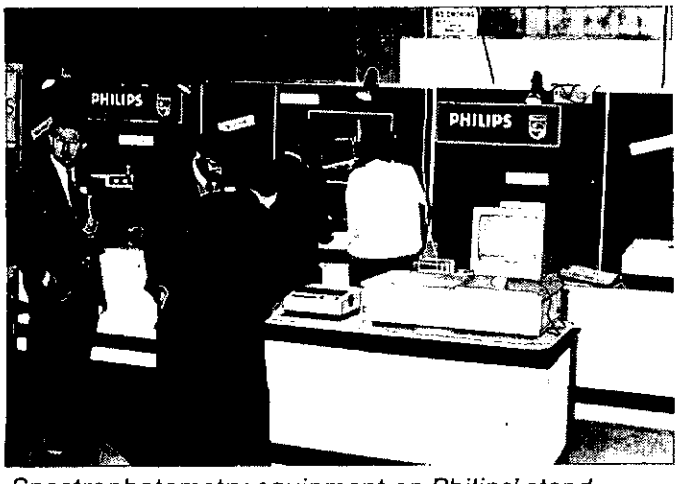
A steady stream of visitors to the Scientific Supplies/Ajax Chemicals stand kept staff on their toes



Scientists Against Nuclear Arms spread their message for a SANA world

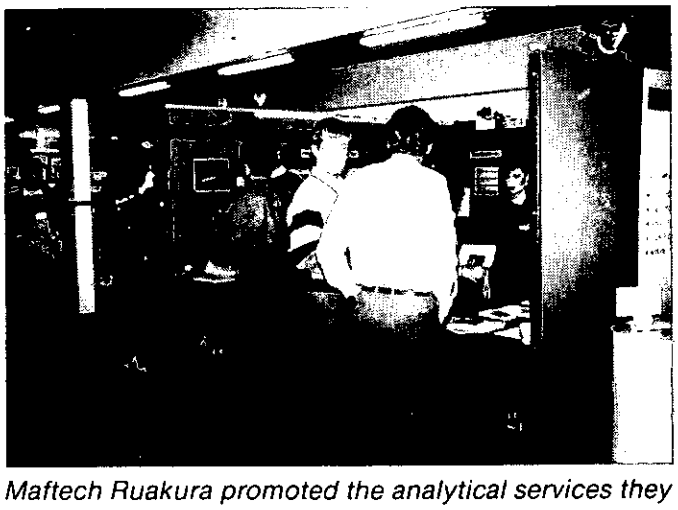
A.T.I.'s Chemistry Department took the opportunity to promote its educational courses and to show off its FTIR equipment

Watson Victor Ltd displayed a comprehensive display of weighing equipment



Spectrophotometry equipment on Philips' stand personally welcomed visitors to C.I.T.F.

B.D.H. Chemicals Ltd's display showed a little of all their products



Maftech Ruakura promoted the analytical services they offer industry

The team from Northrop Instruments were kept fairly busy throughout the trade fair

May & Baker (NZ) Ltd staff were kept busy on occasions

NDA Labware stand attracted its share of attention

COUNCIL NEWS

sion amongst their members in the meantime.

Council Committees

A number of changes to Council committees were confirmed. Mr Philip Best will replace Mr Raymond Hopgood on the Membership Committee, at the completion of the latter's term of office on 31/12/87. With the cessation of Dr Halton's term of office the Public Affairs and Science Policy Committee transfers to Manawatu Branch, and Dr Waters will take over as convener from 1/1/88. The Hazardous Chemicals Committee has been transferred to Canterbury Branch, with Drs M. Gray (convener), J.L. Love, and M.H.G. Munro, and Prof. R.B. Keey agreeing to act as members. Finally, the Publications Committee is to be transferred to Waikato Branch, with the convener and new members yet to be arranged.

B.W. Graham
Editor
September, 1987

Membership Changes August 1987

Honorary Fellows:

DUNCAN, James Francis, OBE, MSc(Mel) MA DPhil DSc(Oxon) MRSC FRACI FRSNZ.

MATHEWS, Richard Ellis Ford, MSc(NZ) PhD ScD(Cantab) FRS FRSNZ

Fellow:

FRANICH, Robert Arthur, MSc PhD(Auck). Forest Research Institute, Rotorua (Scientist).

Member:

CODDINGTON, Jan Marie, BSc(Hons) PhD(Monash). Chemistry Dept, University of Auckland (Lecturer).

DOBBS, Bruce Richard, MSc (Lincoln) PhD(Otago). Otago Medical School, Dunedin. (Scientific Officer).

EVANS, Christopher Anthony, MSc PhD(Auck). Stevens, Fitzmaurice & Partners Ltd. Auckland. (Chemist).

HOPE, Steven John, BSc. NZ Forest Products Ltd. Tokoroa. (Supervisor, Analytical Section).

McGHIE, Tony Kevin, BSc. Ruakura Soil & Plant Research Station. Hamilton. (Mass Spectrometer Technician).

NICHOLSON, Keith, BSc(Hons) (Sunderland) PhD(Strathclyde) MRSC C.Chem. University of Auckland. (Lecturer in Geochemistry).

STRUSZCZAK, Brian Edward, MSc PhD(Well). Morrisons Printing Inks & Machinery Ltd. (Senior Development Chemist).

WRIGHT, Jennifer Ann, B.A Pompallier College, Whangarei. (Chemistry Teacher).

Member (from Graduate):

BAXTER, Jennifer Anne, BSc. W. Grayson & Associates Ltd. Auckland. (Head, Chromatography Section).

CUTHBERTSON, Alison Macauley, MSc(Waikato). Chemistry Dept., University of Waikato. (D.Phil Student).

EDE, Richard Michael, MSc(Waikato). Chemistry Dept. University of Waikato. (D.Phil. Student).

DIBBLE, Ken Peter, BSc(Hons)(Otago). Chemical Cleaning Co. Ltd. Mt Maunganui. (Senior Chemist, R & D).

STEWART, Georgina Marjorie, MSc(Auck). Alphatech Systems Ltd. Auckland., (Product Specialist).

WHITELING, Stephen Charles, BSc(Hons)(Cantuar). NZ Forest Products Ltd. Tokoroa. (Pulp Mill Chemist).

Member (from Associate):

BRIGGS, Paul Murray, NZCS. Tablet Manufacturers Ltd Glenfield, Auckland. (Quality Control Manager).

Member (from Technician):

BLAIKIE, Donald James, NZCS. Cadbury Schweppes Hudson Ltd. Dunedin. (Quality Assurance Manager).

Associate:

LITTEN, Stephen Albert, NZCS. Wills Ltd., Petone (Lab. Supervisor).

NICHOLSON, Mrs Gillian Margaret, NZCS. Forest Research Institute, Rotorua (Technical Officer).

Graduate Member:

BHULA, Rajumati, BSc(Hons)-(Well). Chemistry Dept. Victoria University of Wellington. (PhD Student).

BURNS, Margaret Anne, BSc DipTchg. Pukekohe HS (Teacher)

CHAI, Christina Li Lin, BSc (Hons)(Cantuar). Research School of Chemistry, A.N.U. Canberra ACT. (PhD Student).

CLARK, Bruce Michael, MSc (Cantuar). Chemistry Dept. University of Canterbury. (PhD Student).

CLOSE, Elizabeth Ann, BSc. Chemistry Dept. University of Canterbury. (MSc Student).

COLLIER, Robert John, BSc (Hons)(Well). Chemistry Dept. Victoria University of Wellington. (PhD Student).

COLLIER, Wendy Ann, BSc. Chemistry Dept. Victoria University of Wellington. (Hons Student).

HARLEY, Michael Steane, BSc(Hons)(Cantuar). Reckitt & Coleman (NZ) Ltd., Auckland. (Technical Officer).

HAY, Rob Lachlan, BSc. Chemistry Dept., University of Canterbury (MSc Student).

JORDAN, Carol, BSc. Pukekohe HS. (Teacher Asst.)

MOCHAN, Murray David, B.Pharm. Central Institute of Technology, Upper Hutt. (Tutor in Pharmaceutics).

O'CONNELL, Michael James, BSc(Hons)(Cantuar). Chemistry Dept., University of Canterbury. (PhD Student).

SIES, Christiaan Wijbrand, BSc. Chemistry Dept., University of Canterbury. (Hons Student).

STRAWBRIDGE, Janet Mary, BSc(Hons)(Well). Shell Oil (NZ) Ltd. Petone. (Analytical Chemist).

TAYLOR, Jane Frances, BSc. Biotech. Divn., DSIR, Palmerston North. (Science Technician).

THOMSON, Alastair Hugh, BSc. St. Mary's College, Wellington. (Senior Chemistry Teacher).

Technician Member:

HAMILTON, Ian Wallace, NZCS. Wilsons NZ Portland Cement Co. Portland. (Senior Technician).

McLEAN, Lynne Mary, NZCS. Dominion Breweries Ltd. Auckland. (Laboratory Technician).

VOOGT, Cornelius Leonardus, NZCS. F.T. Wimble & Co. Ltd., Auckland. (Chief Chemist).

WILD, Kristine Lynette, NZCS. Scientific & General Consultants, Onehunga (Analyst).

Deaths:

D.S. Adcock, R.T. Learnan, D. Whillans (Auckland); Mrs E.M. Thomson (Otago).

Resignations:

B.E. Davies, A. Guersen, H.C. Green, Miss R.M. Tetteroo, A.R. Thakurdas, J.P. Williams, D.M. Wilson (Auckland).

R.F. Henzell, K.J. Lewis, D.E. Sheat (Waikato).

H.M. Gahagan, B.D. Jarvis, S.P. Ram (Manawatu).

C.A. Fraser, P.A. Hendra, I.E. Ogden, K.S. Raxworthy, M.F. Smith (Wellington).

J. Abrahamson, A. Brown, A.C. Marris (Canterbury).

A.C. Cottrell, R.G. Richardson (Overseas).

Life Membership

D.R. Ansley, G.A. Nicholls (Auckland).

Mrs H.E. Harvey, L.P. Chapman, J.R. Sewell (Wellington).

T.A. Mitchell (Canterbury).

C.W. Thompson (Otago).

THE JOHNSON REPORT

I don't know exactly how long Cecil Johnson has been Branch Editor in the Manawatu. He certainly pre-dates my involvement with the Journal by a good few years. Over the time I have known him there have always been two things of which I could be fairly certain — he will usually supply far more copy than anyone else, and it will invariably be late! Well, what's the odd deadline between friends anyway? In recent times Cecil appears to have been excelling himself, and has also branched out, with some of his articles on Institute activities appearing in the local papers as well. The following two articles deserve not to be submerged in the anonymous mass of Branch News.

— Bruce Graham

Education at the Crossroads

The theme of Vice-Chancellor **Dr Neil Waters'** recent graduation address at Massey University was the attitude of New Zealanders towards education. Dr Waters was Professor of Chemistry at Auckland University till 1983 when he was appointed Vice-Chancellor of Massey University.

"For too long in this country we have conformed to mediocrity. It is a good bet that you have yourselves been in classes where the eager student has been firmly put down by classmates, where no-one dared seem enthusiastic.

"In my lifetime we have fallen from having the third highest per capita income in the world to about the thirtieth, on a par with countries at which we once used to sneer and ask, "What else could you expect from such an ill-disciplined, garlic-chewing lot?"

"Our attitude towards education is archaic. The involvement of our young people in post-compulsory education is half that of Japan or the United States and our involvement in tertiary education is appalling. Meanwhile the global economy, of which we are a part, has become increasingly technology- and information-driven. We need a high-tech population, an educated population. Educated for the specific tasks of science and technology, educated for the tasks of financial management, educated for the task of gathering and assessing information, educated for the task of running, and working in, the new technological industries and, perhaps above all, educated for flexibility and adaptability.

"The sad thing is that we are such a capable people. We have imagination, we are innovative, we can get stuck in as KZ7 proved. We are unstoppable at doing our own thing, be it the holiday bach or re-roofing the garage at home, but we'll be damned if we'll give the boss an extra minute. We all say, knowingly, that the world doesn't owe us a living. My question is, so what are we doing about it?

"A recent survey shows that of every 100 students in the fifth form just 17 entered the seventh form and of these only four leave with enough mathematics and science in their academic background to proceed to serious technological tertiary study. Of the 100 fifth formers, 11 get a university degree, only four in science and technology. Of the rest five get other tertiary or trade-based technical qualifications; a total of nine out of 100 with any sort of science or technology competence. It cannot be said that we do not try hard in our universities. We have some very good teachers.

"Ask yourself, "In which areas are we in New Zealand internationally competitive?" The answer is, only two. In agriculture, thanks to a home-based effort in agricultural research and development, and secondly, in intellectual skills. With a world economy now technology-based, here we are producing four university technologists from every hundred fifth formers; and let us recall that not everyone gets to the fifth form.

"Let me make it clear that this does not mean that all of you graduating in accountancy, law and humanities are unloved and less worthy. Far from it! You are also an endangered species! Of the 100 fifth formers, you are just seven. Appalling!

"What makes me angry however, is the thought that at least half of you are probably innumerate and worse, proud of the fact. "I never understood mathematics", by which they mean arithmetic, you hear people say every day and they positively glow with pride that they know nothing about science. In 1982 a visiting English scientist working in the field of molecular genetics begged New Zealand to wake up and to appreciate the implications of the genetic revolution. Here we are, our economy dependent on biological processes, with most of us ignoring the fact that the whole basis of biology has been transformed. What do most of us know about molecular genetics even though two thirds of our export income is involved?

"My point, however, is that one of our few fundamental resources in this country is our skills and our know-how; and so we have 11 of every 100 fifth formers graduating from university with four trained in science and technology on which our future now depends. And worse is to come! Of all primary teacher trainees, just 5% specialise in mathematics and only 1% in science. Here is the very root of the problem. When our children are at their most receptive they fail to get exposure to the science and mathematics which they will need. Nor even, I suspect in many instances, to the history and the languages which they will find equally important.

"Why say all this to you? Because you are probably our last chance. You cannot be in it for the money because if you do not do a good job there will eventually be no money left in this country for you to have. You are in it to provide leadership, to look beyond the politics and the arguments to the reality, to make sure that as a country we address our strengths.

"I invite you to be part of a different breed of New Zealander. One who sees our preoccupation with personal rights, our 19th century attitudes towards industrial relations, the way we undervalue education and learning, the way we knock ability and success; I invite you to see these for what they are. The reactions of an unimaginative, self-indulgent, timid society. I invite you to raise your sights to the future and to act with courage, commitment and integrity as you carry us into the next century, if not as a perfect society, at least one with hope and determination."

Science and Technology Reviewed

The Manawatu Branch was honoured by a visit by **Sir David Beattie,** Chairman of the Ministerial Working Party on Science and Technology, on 29 June. Sir David expressed disappointment that little of the Report of his committee has been implemented by the Government.

In his talk he described the key recommendations contained in the Report. The only recommendation undertaken by the Government so far is the recently announced setting up of a high level Science and Technology Advisory Board.

The establishment of two Research Councils for Science and Technology and for Social Science, to distribute research funds was also suggested.

"If New Zealand is going to survive," said Sir David, "it must do better than its competitors and this will involve an expansion of knowledge-based industries, requiring more scientists and technologists. Also the population at large must be more scientifically and technically literate.

"There appears to be a complete mismatch between employers' requirements and the abilities of the unemployed. Universities and technical institutions have increased in quality and size over the last 20 years, but there are still problems.

"Research and development cannot be turned on and off like a tap. It takes 15 years to train a scientist and a technologist to be really effective. Today's projects require the training of several people to work together as a team."

He produced many newspaper articles and editorials as well as other publications, from New Zealand and overseas sources, that have recently appeared supporting the Committee's recommendations. Favourable comments have also been received from scientists and some MPs.

"Over the years there have been several reviews of science and technology, none of which have been actioned by the government of the day," observed Sir David. "Nobody complained to his Committee of the setting up of yet another one. Most people felt that this was probably the last chance that something could be done."

The appointment of a Science and Technology Minister without other responsibilities and suitably technically qualified personnel to the Boards of leading New Zealand companies were seen as important priorities by Sir David Beattie. Plans for the establishment of Science Parks in various cities to attract highly technological industries was an encouraging development.

"I will continue to press the case for the recommendations in our Report," concluded Sir David. "I believe that once this new advisory board gets appointed, it will have to recommend strongly to the Prime Minister of the day and his Cabinet, that the Research Councils be set up and that the funding proposals and other recommendations be implemented as soon as possible."

On completion of his address, a motion was proposed by **Dr Peter Robertson,** Director of the New Zealand Dairy Research Institute, endorsing the work of Sir David's Committee and deploring the lack of action on its recommendations by the Government. This motion was passed unanimously. It will be sent to the Government.

UNIVERSITY & TECHNICAL INSTITUTE NEWS

Auckland

Jim Metson was in Canada from May 5-13 at the University of Western Ontario with Surface Science Western. While there, he was looking at surface analytical research. He also gave a paper on SIMS Analysis of Geological Materials at the Scanning Electron Microscopy Conference.

Prof. Warren Roper returned recently from overseas. He spent a month visiting research groups in Canada, Britain, Germany and France. Prof. Roper also presented a paper at the ACS conference in Bellingham, Washington and attended a specialist Organo-metallic Symposium in Sheffield.

Prof. Charmian O'Connor has returned from a visit to Japan. While there she continued her collaborative studies on artificial membranes with Prof. Junzo Simamoto at Nagasaki University. **Dr Holga Tank;** UGC Post-doctoral Fellow from Berlin has also spent the first three months of his fellowship working in the Laboratory of Artificial Cell Technology at the Nagasaki University and is now working in collaborative work with Charmian O'Connor and **Bill Denny** at the University of Auckland.

Prof. O'Connor was also Visiting Professor at Tokushima University, where she spent a week lecturing to both graduate and non-graduate classes. She also attended the 1987 International Congress on Membranes and Membrane Processes in Tokyo and presented a paper.

ATI

Roger Whiting of ATI will be visiting Meadowbank College of TAFE, Sydney, from Sept 15-18 to look at the teaching of cosmetic courses there. While there he also hopes to look at courses for process workers, which may be applicable to the New Zealand situation.

Chemby Marketing and Kao Corporation have donated emulsifiers and two copies of "Surfactants a Comprehensive Guide" to Auckland Technical Institute. The emulsifiers are being used in teaching laboratories and the books are held in the ATI library. ATI would also like to announce the arrival of copies of "Harry's Cosmeticology" using monies donated by various companies, the Cosmetic and Toiletries Manufacturers Association and the New Zealand Society of Cosmetic Chemists.

On 29th April **Dr Ian Shearer** was appointed Dean of the Faculty of Science and Engineering at Auckland Technical Institute.

Cancer Research Lab.

Dr Gordon Rewcastle has recently returned to his position at the Cancer Research Laboratory at the Auckland Medical School after a years sabbatical leave in the Chemistry Department of the University of Florida in Gainesville. While there he worked with Professor Alan Katritzky, FRS on an investigation of new protecting groups for the lithiation of N-H heterocyclic compounds. A report on the results of this was presented to the NZIC conference in August. During his time in the US he also made visits to the Warner Lambert Co., in Ann Arbor, Michigan and to the Chemistry Department of Georgia State University in Atlanta, where he discussed the work of the Cancer Research Laboratory in Auckland.

The protein crystallography group at Massey University: Standing L to R: Mrs Heather Baker, Dr Bryan Anderson and Dr Ted Baker. Seated L to R: Dr Joyce Waters, Dr Sylvia Rumball and Dr Gill Norris.

Massey

Dr Roger Reeves has been awarded the Constantine Ctenas Award, given by the Academy of Athens for novel contributions to the knowledge of the geology of Greece. Since 1983 Dr Reeves has been involved in collaborative research on metal-accumulating plants with University of Athens geochemist Dr Akis Kelepertsis and Dr I Andrulakis of the Institute of Geology and Mineral Exploration in Salonica.

The work of the Protein Crystallography Group has achieved great prominence recently. After the determination of the complete structure of lactoferrin, the transferrin protein in human milk, the US Public Health Service (N.I.H.) has awarded the group $400,000 to continue the study of lactoferrin over the next three years. In addition, one of the group members, **Dr Ted Baker,** has been made a fellow of the Royal Society of New Zealand.

In other areas of protein chemistry, **Dr David Harding** has received a Medical Research Council grant of $187,000 to undertake research into a new approach to peptide synthesis. **Mr Stephen Love,** a Canterbury graduate, has joined Dr Harding to carry out his doctoral thesis in this area.

Dr John Ayres has developed an ion-exchange resin-based drug for use in the fight against cholesterol-related disease, leading to a $150,000 contract with the newly formed pharmaceutical company Pharmol Pacific Ltd. To further the development of other ion-exchange resins, **Dr Satendra Ram,** formerly with NZ Pharmaceuticals, has joined Dr Ayres' group as has **Ms Anne Santry,** a graduate of University College, Cork, Ireland, who is looking into chromatographic applications and analysis of the resins, a project funded by Waitaki International Marketing Ltd.

Dr Paul Buckley and **Dr Len Blackwell's** research into the role of Glucose Tolerance Factor in glucose metabolism has been given a boost with the visits of two of the leading overseas researchers in this area. **Professor Clint Elwood,** Professor of Biochemistry at New York State University, will be working in the Department until September and **Professor Eric Holdsworth,** who recently retired from the Chair of Biochemistry at the University of Tasmania, will be here until late July.

Drs Eric Ainscough, Andrew Brodie, Joyce Waters, Neil Waters and **Margaret Brimble,** and Miss **Jenny Gibson** attended the 8th National Convention of the Royal Australian Chemical Institute in Sydney to present papers on their research work. Miss Gibson, a Masterate student of Dr Brimble, will take up a position at NECAL Laboratory, Department of Health, Auckland in September.

Dr Gill Norris received an MRC Travel Grant to go to a Computing Workshop for X-ray Crystallographers held in Adelaide in August.

Mr William Shepherd has joined Dr Ted Baker to do a PhD on the structure of cytochrome-C oxidase. Mr Shepherd was a technician at Auckland University.

Victoria

Dr Brian Halton recently visited Japan where he gave lectures at Tokyo, Waseda, and Osaka Universities and attended the Pacifichem 89 planning meeting for a December 1989 Conference to be held in Hawaii. **Professor N Curtis, Dr D Weatherburn** and **Rajumati Bhula** have returned from a visit to Japan and China where they attended the 12th International Conference on Macrocyclic Chemistry at Hiroshima and the 25th International Conference in Coordination Chemistry. Professor Curtis gave a plenary lecture at the Hiroshima meeting.

Canterbury

In July **Dr Peter Steel** attended the 3rd International Conference on the chemistry of the Platinum Group Metals and visited universities in England and France, and **Dr Peter Harland** attended the 11th International symposium on Molecular Beams at Edinburgh University and the 5th International Swarm Seminar at Birmingham University. **Professor Merle Battiste** (University of Florida) is visiting the department for 3 months as an Erskine fellow.

Otago

Associate Professor Jim Simpson and **Dr Barrie Peake** attended the August RACI Convention in Sydney. **Dr Christine Headford,** formerly a Ph.D student under Professor Warren Roper at Auckland, has returned to New Zealand from postdoctoral research with Professor Michael Elliot at Colorado State University. She has taken up a postdoctoral position with Professor Brian Robinson and Associate Professor Jim Simpson on organometalic catalysis.

BRANCH NEWS

Presidential Address

The annual Presidential tour of branches (and sub-branches) was made by **Dr Halton** during May, June and July. The title of his Address was "Synthetic Molecules: Pushing Nature to the Limit". The following report of the Manawatu Branch meeting is provided by **Cecil Johnson.**

Dr Halton addressed the meeting on his studies of unusual "strained" compounds having cyclopropane rings fused onto aromatic structures. Some of the compounds that his group has produced are brightly coloured, are fluorescent or have unusual properties. One compound smells very strongly of sulphur (like burning rubber) but it contains only carbon and hydrogen atoms. At a meeting in the Department of Chemistry and Biochemistry at Massey University on 10 June, Dr Halton gave further details of the preparations of these unusual compounds. He showed how calculations from theoretical chemistry can be used to estimate the stability of these compounds.

Visit of Professor Ruzicka

During May the Auckland, Waikato and Manawatu branches were visited by **Professor Jaromir Ruzicka,** Professor of Analytical Chemistry at the Technical University of Denmark, an NZIC-sponsored visitor. Professor Ruzicka is a world authority on flow injection analysis, an analytical method based on the injection of a liquid sample into a carrier stream containing the reagent(s). Professor Ruzicka described recent developments in instrumentation and applications of this method of analysis. The principal use of this method at the present time is for the serial analysis of large numbers of samples. This is because in a well-designed analyser, the processing time after injection for each sample is very small. Professor Ruzicka expressed the view that many more uses will be found for instruments utilising the flow injection analysis principle, with applications being developed in all areas of chemical research.

Auckland

On May 25 the Auckland Branch had a meeting with Dominion Breweries which was attended by 25 members. The meeting was arranged by **Stuart Campbell** and **John Dunbar** who gave a talk on Beer Making and Associated Instrumentation. Then followed an extensive tour and sampling.

Manawatu

Dr Brain Halton gave his Presidential Address to the Branch on 9 June. He first presented prizes, donated by the Branch, to two students who were awarded top marks in their final BSc year at Massey University. **Jacqueline Whalley,** who received the chemistry prize, is completing her final year of BSc honours course studying the preparation of compounds related to polyether antibiotics. **Kee Huat Ng,** a student from Malaysia who received the biochemistry prize, is studying proteolytic enzymes of dairy starters for her MSc. "It is most pleasing that both of these prizes are being presented to women", said **Dr Joyce Waters,** the Manawatu Branch Chairperson.

The Branch presented 4 prizes to the best entrants with a chemical theme in the Manawatu Science Fair, held at the Conference Centre during 20-23 June. The Intermediate Level Prize went to **Susie York** for her entry "Winemaking at Home". The 1st Secondary Level Prize went to **Dean Richards** and **Clinton Hercock** for their entry entitled "Molecules". Second equal was **James Watt** for his presentation of "Vitamin C Analysis" and **Lillian Ng** for her display of "Enzyme Protease". Many of these displays received prizes from other sources, such as the Bennett's Book Shop (one of the sponsors of the Fair) prize for best presentation which went to Susie York and the NZ Institute of Food Science prize which was awarded to James Watt. Lillian Ng also won 2nd prize for her section, a special Kiwanis (the Fair's organisers) prize, the NZ Agricultural Science Association's prize and the DSIR Biological Division's prize. Thus these exhibits, especially that of Lillian Ng, were of very high quality.

Wellington

The August meeting was one of the Branch activities for National Chemistry Week. **Dr B Halton** in his last branch meeting as president presented a prize to **Anna Stevenson** of Samuel Marsden Collegiate for her winning essay "Chemistry — Friend or Foe", and to **Mathew Mallet** of Hutt Valley High School for his winning entry in the Monochrome Photography Competition. Dr Halton also awarded a prize to **Christopher Double** of Rongotai College who won The Wellington Branch Analytical Competition.

Otago

National Chemistry Week activities resulted in a good response to the poster, photographic and chemical essay competitions. Among the 10 entries for the national competitions, the poster of **Craig Dick** of Kings High School was judged first equal. The annual Otago Branch analytical chemistry competition for secondary school pupils involved titrametric analysis of samples of sodium carbonate. **Jodi Miller** of Waitaki Girls High School was this year's winner.

The Otago Science Fair held from 4th to 10th August, attracted 465 entries, largely from Intermediate, and junior classes of secondary schools. Concern was expressed at the decline of interest in physical science projects from the junior to the senior sections. Nominations for the New Zealand Science Fair are "The Mystery of the Black Pearl" by **Graeme Jarvis** and **Vernon Trainor** and "Rhythms and Oscillations" by **James Palmer** and **John Crowe.** Both entries are from Otago Boys' High School.

GOVT DEPTS AND RESEARCH INSTITUTES

New Water Quality Centre for MOWD, Hamilton

Work has begun on a large new laboratory and office block at the University of Waikato. The two-storey building is to house the Water Quality Centre, a section of the Ministry of Works and Development.

The 900 square metre building will provide offices and laboratories for forty scientists and technicians employed by the Centre. Two biology laboratories, a chemistry and a special purposes laboratory will be provided in the building designed by **Geoffrey Mardon,** senior architect with the architectural division of the MoWD. The building is valued at $1.5 million and will be built by Metcalfe Construction of Hamilton, builders of the University of Waikato's Thermophile Laboratory.

Siting of the building on University land will continue the links already established between the University of Waikato and the Water Quality Centre. These links are of mutual benefit to the University and the Centre. They provide opportunities for scientific cooperation in sharing research, library and laboratory facilities.

The Water Quality Centre was established to research and investigate specific problems with rivers, lakes and coastal waters for the National Water and Soil Conservation Authority. The aim in all of the Centre's work is to promote the wise use of water. Under the new user pays philosophy adopted by Government, the Centre also provides a consulting service to clients, such as catchment authorities, government departments and developers, on a wide range of environmental problems.

Chemistry Division, DSIR, Gracefield

Ken Markham attended the International Symposium on Flavonoids in Medicine and Biology in Strasbourg in early September. Ken also welcomed **Dr Adrian Franke** from the University of Freiburg, a recipient of an award from the Deutsche Forschungsgemeinschaft, who will spend at least one year with Ken working on flavonoid chemistry. **Lawrence Porter** gave an invited paper at a symposium on 'Adhesives from Renewable Resources' which was held in conjunction with the 194th ACS National Meeting at New Orleans in the first week of September.

Don Hannah attended the 'Dioxin '87 Conference' at the Universtiy of Nevada at Las Vegas in October. **John Toucher** also attended and then proceeded to the Canadian Dept of Health and Welfare laboratory in Ottawa, where he will spend 3 months working on dioxin analysis with Dr J J Ryan.

Roger Newman returned from study leave at Oxford in mid-August after visits to NMR laboratories in North America. **Doug Sheppard** returned soon after Roger, from 3 months visit to the Centre des Faibles Radioactivites at Gif sur Yvette. Doug studied volcanic plume monitoring techniques.

Visitors to the laboratory have included **Professor John Weil,** University of Saskatchewan, who spent 5 weeks working with **Craig Tennant** and the PEL ESR group. While Professor Weil was at Gracefield a two day symposium on 6/7 July was held on magnetic spin resonance in the solid state. The meeting attracted 21 papers.

Continued on next page

CONFERENCES

1988 Combined Annual Conference of the NZIC and NZBS

23-26 August, 1988
Palmerston North Teachers College and Massey University

Planning for the 1988 Conference is well underway. The Conference will emphasise specialist group activities and as well include more general sessions in areas of national and topical interest.

Because of the expansion of Massey University's Extramural Programme the venue will be at the Palmerston North Teachers College with some accommodation in local motels. However, it is hoped to have the opening ceremony followed by the Vice-Chancellor's Buffet at the University.

Sessions will cover all aspects of chemistry and biochemistry, including: analytical chemistry, animal and plant biochemistry, enzymology, food science, industrial chemistry, inorganic chemistry, instrumentation, molecular biology, pharmaceuticals, physical chemistry, protein structure and function, organic chemistry and separation science.

The Conference Chairman is Dr Andrew Brodie, Massey University, and the Conference Secretary is Mr Mark Pritchard, Grasslands Division, DSIR, Palmerston North, ph (063) 68-019.

Water Conference 1988

Organised by the Institution of Professional Engineers and the RSNZ, the Water Conference 1988 will be held at the University of Otago 15-17 August, 1988. The theme of the conference is "Water in Society — Policy and Practice." For further information contact:

The Conference Secretary,
Water Conference '88,
University of Otago,
PO Box 56, Dunedin.

Company News

Helen Jemson has returned from British Columbia and is now working with Sci Med.

John Fowler of Analabs has left to travel overseas.

L'Oreal of Paris have closed their manufacturing plant in New Zealand. In future their products will be imported.

On 26th June Beechams NZ Ltd closed down part of their New Zealand operation. Reckitt and Colman have taken over responsibility for manufacturing and marketing most of the over the counter Beechams' Products. This is part of a world-wide rationalization of the two companies' activities. The Beechams products produced in New Zealand in future will be manufactured in Reckitt and Colman's plant.

Wilton Instruments Division of Salmond Smith Biolab Ltd a BE in Chemical and Process Engineering and will be involved in sales of Edwards High Vacuum Products, Hach Process Analyzers and Tubidimeters, and Teledyne Analytical Instruments, Gas Analyzers and Combustion Monitoring announce the appointment of **Geoffrey Stewart** as Sales Engineer, Industrial Products. Geoffrey has Instruments for Industry.

Govt. Depts. Cont. from previous page

Another visitor is **Dr Christoph Heinrich** from the Bureau of Mineral Resources, Canberra, who is spending 6 months at CD working with **Terry Seward** on high temperature metal complexes.

CD also hosted an HP MSD-users course on 4/5 August. It was run by **Dr Ian Eckhard** of the Australian Analytical Laboratories in Sydney, who is also an HP consultant. The course was attended by 12 users from CD (Gracefield and Auckland), VUW, MAF (Wallaceville), and IWD (New Plymouth).

Watch this space for news of one of the three VG 70 250S mass spectrometers reported in the last issue of 'Chemistry in NZ.'

Chemistry Division, Auckland

Peter Boniface has joined DSIR in the drugs and toxicology section following a period of research overseas.

Sue Nolan has returned from Calgary, Alberta where she was looking at sports drug testing at Foothills Hospital. She has also visited several other institutions in the same field. Sue will be Project Leader for the drug testing that DSIR expects to be doing for the Commonwealth Games.

New Zealand Association

The New Zealand Association of Consulting Laboratories is a recent addition to the New Zealand consultants' scene. With a current membership of twenty four laboratories, the Association arose out of a need to front up to issues of common concern to its various members, and in particular the effects of the Government user-pays policy on competition in the consulting field. Since its formation members of the Association have spoken out on a number of occasions against what they see as unfair competition from Government-funded laboratories.

But there is more to the Association than merely acting as yet another pressure group. The scope of its activities are reflected in the objectives, as stated in its formal Constitution:

i) to develop professional ethics and standards of excellence amongst members
ii) to promote the use of consultant laboratories
iii) to provide an annual forum for members
iv) to provide a united front for discussions and negotiations with DSIR, TELARC, etc.

One particular benefit of membership is the referral system, whereby members will attempt to direct a potential client to fellow members of the Association in situations where they are unable to provide the required service themselves. To assist in this, the Association has produced a directory of membership and services which lists the various work areas, services, and specialised items of equipment available in each laboratory.

Membership of the Association is available on a laboratory, rather than an individual basis, and is achieved by application or invitation, and election by a majority of members. Member laboratories must be privately owned and offer their services to the general public, and derive the majority of their income from this activity. The services can include consulting, testing, advisory and laboratory work, and income can include royalties from inventions or patents.

The range of laboratory activities envisaged currently includes chemical, microbiological, physical and electrical testing. This may however, be

# of Consulting Laboratories

extended by agreement at any AGM of the Association. Members are required to provide a voting representative to attend each AGM, the business of which includes the setting of membership fees, election of officers and other procedural matters.

The Principal or Principals of member laboratories are required to be appropriately qualified and belong to an appropriate professional body. Member laboratories may be censured or expelled if a majority of members at an AGM considers that they have controvened the Code of Ethics or the Rules of Membership. The former covers such matters as 'promoting the dignity, standing and reputation of all members', not engaging in work of an illegal nature, fairness to clients, methods of receiving work and competition with other consultants, and the setting of fees.

A listing of all current members of the Association appears below. Advertisements for many of the member laboratories are also featured on the accompanying pages. For further information on membership of the Association, its activities, or those of its member laboratories contact the Secretary, John Liddle, Analytical Services, Private Bag, Cambridge, or the Publicity Officer, Dennis Karl, Scientific & General, P.O. Box 13-129, Onehunga, Auckland

Bruce Graham

LIST OF MEMBERS & CONTACTS

Alpha Biologicals, PO Box 38-213, Howick, AUCKLAND. (contact **Geoffrey Hill**) Tel (09) 534-4424.

Analytical Research Laboratories PO Box 989 NAPIER (contact **Alan Limmer**) Tel (070) 56 807

Analytical Services Private Bag CAMBRIDGE (contact **John Liddle**) Tel (071) 274 409 Fax (071) 274 495

Allan Aspell & Associates Constellation Drive Mairangi Bay AUCKLAND (contact **Allan Aspell**) Tel (09) 478 2962

Cawthron Institute PO Box 175 NELSON (contact **Alan Cooke**) Tel (054) 82 319

Chemical Service Laboratories PO Box 13033 Johnsonville WELLINGTON (contact **Murray Friar**) Tel (04) 787 039

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W Grayson & Associates PO Box 12 545 Penrose AUCKLAND (contact **Bill Grayson**) Tel (09) 590 329 Fax (09) 599 044

Hamilton Analytical Laboratories PO Box 4136 HAMILTON EAST (contact **Mike Lowe**) Tel (071) 395 143 Fax (071—393 590

R J Hill Laboratories PO Box 4048 HAMILTON EAST (contact **Roger Hill**) Tel (071) 80 277

Horticultural Research Laboratories PO Box 63 097 Papatoetoe South AUCKLAND (contact **John Thompson**) Tel (09) 274 8873

Metallurgical Services PO Box 44 AUCKLAND (contact **Clive Jennings**) Tel (09) 294 8431

Metallurgical & Industrial Consultants PO Box 2346 WELLINGTON (contact **Derek Wilkinson**) Tel (04) 858 422

Mooyman & Hornby Laboratories PO Box 21 188 CHRISTCHURCH (contact **Norman Hornby**) Tel (03) 792 644

NZ Hydroponics PO Box 949 TAURANGA (contact **Helen Greenaway**) Tel (075) 80 849

Hamilton Medical Laboratories PO Box 52 HAMILTON (contact **Brian Lineham**) Tel (071) 80 599

Scientific & General PO Box 13 219 Onehunga AUCKLAND (contact **Dennis Karl**) Tel (09) 642 593

Scientific Analytical PO Box 1355 DUNEDIN (contact **Warren Bryson**) Tel (024) 772 204

Shanahan Scientific Services PO Box 49 048 Mt Roskill AUCKLAND 4 (contact **Rory Shanahan**) Tel (09) 673 149

Sorenson Laboratories PO Box 43 122 Mangere AUCKLAND (contact **Torban Sorenson**) Tel (09) 275 1459

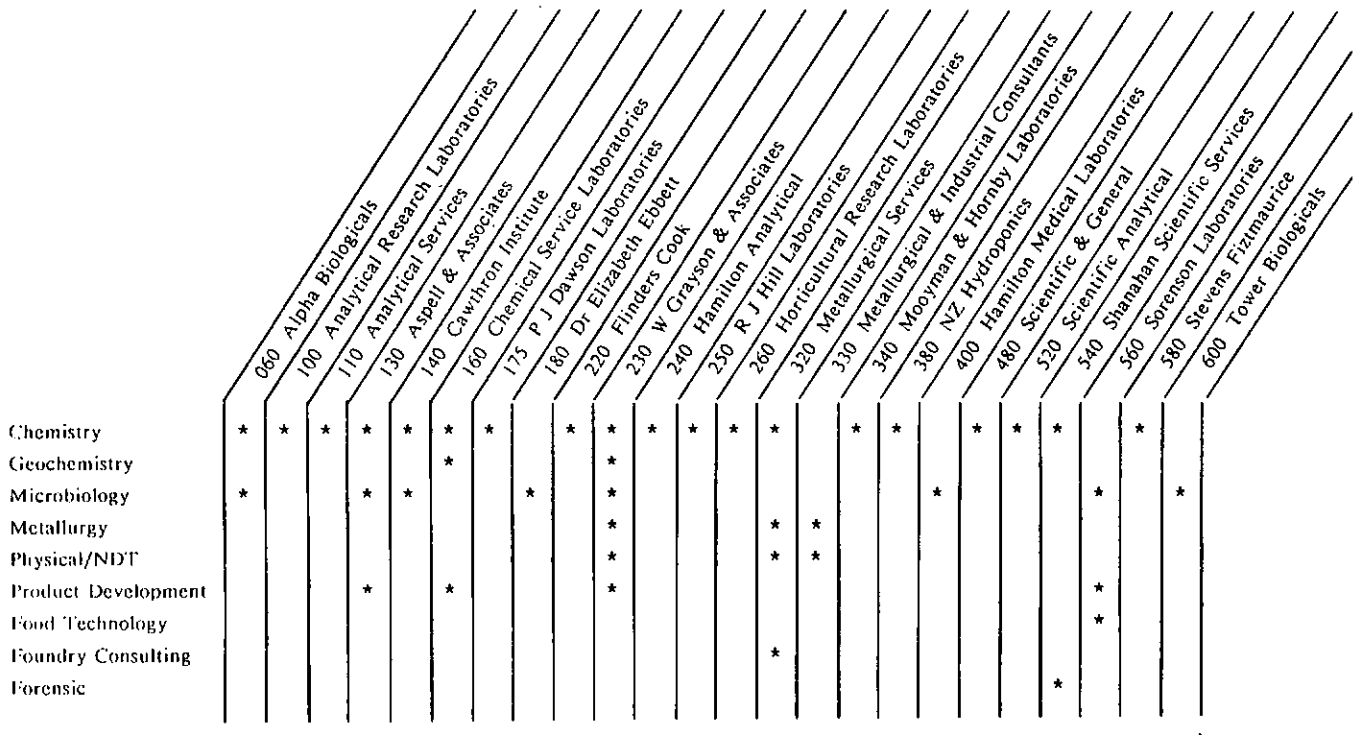
Steven Fitzmaurice & Partners Ltd PO Box 9437 AUCKLAND 1 (contact **Chris Evans**) Tel (09) 544 721

Tower Biologicals PO Box 25 091 CHRISTCHURCH (contact **Laurie Treadgold**) Tel (03) 50 624

New Zealand Association of Consulting Laboratories

SECRETARY/TREASURER C/O 85 QUEEN ST CAMBRIDGE TELEPHONE (071) 274409. FAX (071) 274495 TELEX NZ 61181

GENERAL CLASSES OF ANALYSIS/TESTING



New Zealand Association of Consulting Laboratories

SPECIALIST AREAS OF ANALYSIS/TESTING:

(refer previous table for code numbers)

Bold* = TELARC Registered in this field of analysis

Analytical Chemistry: General	100, 110, 130, 140, 160, 220, 230*, 240, 250, 260, 380, 480, 520, 580
Biocides	130, 180
Biotechnology	140, 580
Blood Alcohol	100*, 220, 230*, 540
Bulk Liquid Superintendence	220
Clinical	240
Coal Analysis	160
Corrosion Consulting	220, 230, 330, 580
Cosmetics	130, 480
Drug	140*, 160, 230, 400*
Electrical	240
Environmental Monitoring	140*, 220, 230, 250, 520, 580
Fermentation	140
Food	100*, 130, 140, 160, 220, 230, 480, 520, 580
Forensic	130, 540,
Gas	175
Geochemical	160, 230
Leaf Tissue	100, 110*, 140, 240, 250, 260, 340, 380, 520, 580
Marine Microbiology	130, 140, 230
Meat & Bone Meals	130, 220, 480
Medical	400*
Metallurgical	160, 220, 230, 320, 330, 520
Metallurgical Physical	320, 33
Microbiological	60*, 130, 140*, 160, 180, 230*, 400, 560*, 600*
Mycotoxins	130, 175, 180
Nutrients/Hydroponics	100, 110*, 130, 230, 250, 260, 340, 380, 400, 520, 580
Paint	160, 220, 230
Pesticide Residue	100*, 140, 175
Petrochemical	220
Petrochemical Products	160, 175, 220, 480
Pharmaceutical	130, 140*, 160, 175, 220, 230, 480
Physical: Combustion	140
Soil	100, 110*, 140, 230, 250, 260, 340, 380, 400, 520, 580
Tallow	60, 160, 220, 480
Toxic Metals: Earthenware	130*, 220, 230*
Veterinary	240, 400*
Vitamins	130, 175
Water	100, 110, 130, 140*, 160, 220, 230, 240, 250, 260, 340, 380, 400, 520, 580*
Water Treatment/Consultancy	580
Wood & Wood Products	140*, 160, 230*

PRODUCT NEWS

Best-Selling pH Meter In The World

There are very few companies that are able to produce a pH electrode incorporating a temperature sensor. But even the few don't have the technology to display the temperature for the fear of being proved wrong. For us this isn't a problem. HI 8414 is an optimal pH meter as well as being an excellent thermometer with a response time lower than two minutes, and an accuracy of 0.4°C. This exceptional innovation comes with the latest technology in splash-proof membrane keyboard, automatic temperature compensation and display indications for pH, °C and low-battery warning.

The compact all-in-one HI 8414 is specially tailored for the professional. You no longer have to worry about 2 electrodes and multiple cables getting in the way. You don't have to sacrifice ATC precision for convenience by leaving behind the cumbersome temperature probe.

For further information please circle no. 17 on reader reply card.

Clavies Biohazard Autoclave Gloves

The soft, pliable all cotton Clavies gloves are heat resistant up to 230°C. The gloves are terry-cloth knit and are washable. Excellent for handling hot objects out of the autoclave or oven, they give superior protection in the laboratory, school or industry and replace harmful asbestos gloves. Bright orange color keeps gloves visable.

The gloves are available in two sizes, with either a 13cm or 18cm length gauntlet.

For further information please circle no. 18 on reader reply card.

New 1987 Alcatel Vacuum Products Handbook

Alcatel's new 179 page updated "products vacuum" handbook is now available.

The range of products listed and comprehensively described include: direct drive mechanical vacuum pumps from 75 to 3,330L/min (standard, hermetically sealed for dangerous gases, chemical models for corrosive gases, CP for plasma etching applications). Roots pumps from 250 to 33,000m^3/hour and pumping stations. Also described are oil diffusion pumps for laboratory and industrial applications and low rotational turbomolecular pumps (which can be mounted in any position and are totally field serviceable).

The catalogue also lists vacuum gauges, vacuum fittings, oils and other accessories required for a total vacuum system.

The handbook is available free of charge from: John Morris Scientific Ltd., Unit 2/101 Diana Drive, Glenfield, Auckland, P.O. Box 6348, Wellesley Street, Auckland 1. Telephone (09) 444-5836. Telex NZ 63193.

For further information please circle no. 19 on reader reply card.

Automatic Water Stills

The Fistreem range of automatic water stills provides a choice of models offering 4 or 8 litres/hr single-distilled output or 4 litres/hr double-distilled. All models can be used with an optional interface kit allowing connection to virtually any pretreated water supply, thereby effectively eliminating all periodic cleaning procedures.

All Fistreem water stills are fully enclosed in metal cases with tinted acrylic front covers. Advanced safety features include full protection in the event of water supply failure or overheating. Highest quality borosilicate glass is used throughout which, with the silica sheathed heaters, ensures the highest quality pyrogen-free distillate.

Both operation and maintenance have been greatly simplified. Periodic cleaning requires no dismantling. Fully automatic operation allows unattended filling of reservoirs and overnight operation.

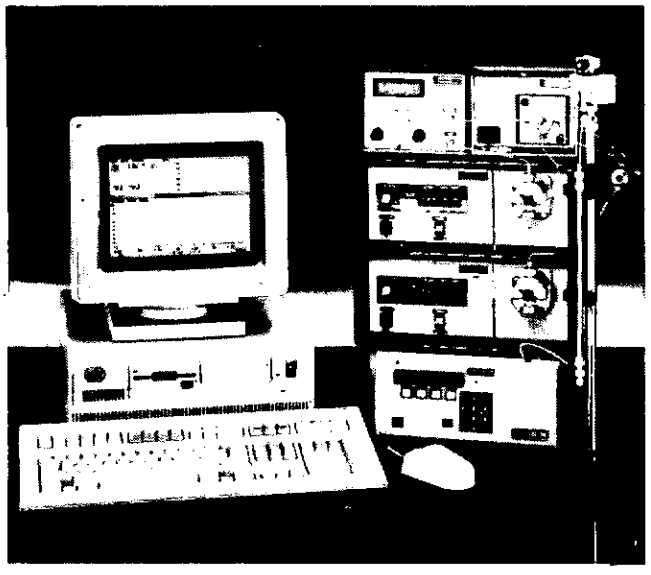
Optional accessories include a matching 35 litre capacity reservoir tank, pretreated water feed interface kits, safety tray and bench mounting plinth. All stills may be bench or wall mounted.

For further information please circle no. 20 on reader reply card.

"Odo-Clave" Deodorant Discs

For neutralizing odors in autoclaving biohazard bags. Biohazard waste material, when heated in an autoclave, creates a foul odor. To alleviate this unpleasant condition, a deodorant disc is placed into the biohazard bag prior to autoclaving. The disc is a pad impregnated with a deodorant specially designed to be released under autoclave temperatures. The special chemical neutralizes the odors, rather than simply marking them. Discs are 38mm in diameter, and are easy to handle since there is no liquid to spill. Discs are packed 10 to a cellophane bag, 100 discs per box, 10 boxes to a case.

PRODUCT NEWS



HPLC System Controller Software

Gilson Medical Electronics, Inc., announces new HPLC system control software compatible with the recently-unveiled IBM Personal System/2™ (Model 30, 50, 60 and 80), the IBM® PC AT™ and the Tandy 3000 HD (AT-compatible) computers. A new, free disk which demonstrates the software's system control capabilities is available for each of these computers.

The Gilson 714 HPLC System Controller Software offers the user control of as many as four Gilson pumps and of peripherals such as auto-injectors and UV monitors. It affords researchers access to on-screen, real-time chromatograms and extensive analysis of up to four data channels. The user can apply various parameters to each channel to optimize data re-analysis.

Gilson's adoption of the Microsoft™ Windows® operating environment demonstrates its commitment to the *de facto* industry standard. MS-Windows includes a broad range of other functions such as word processing and graphics programs and is central to the OS/2 operating system now under development.

The complete line of modular Gilson HPLC systems is designed for flexibility and customization. Eight system categories offer choices based on sample quantity (analytical or preparative), mode of mobile phase delivery (isocratic or gradient) and mode of injection (manual or automatic).

The HPLC System Controller is available as part of an integrated software/hardware package or as a software-only addition to an existing computer system. Gilson's integrated systems are shipped fully configured for simple assembly and quick start-up.

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

The New Path in Capillary Column Technology

SGE presents the AQ5-Ultrabore Series, 0.53mm ID Ultrabore™ aluminium clad capillary columns.

At the Eighth International Symposium on Capillary Chromatography in Riva del Garda, Italy, during May this year, SGE released its range of aluminium clad fused silica capillary columns for gas chromatography. The new columns are to be known as the AQ series.

The new process of protecting the fused silica material with a coating of aluminium was developed over several years by SGE. The metal coating is a superior barrier to moisture and mechanical damage than the conventional polyimide coating that has been used until now. With the metal coating, much greater strength of the capillary tubing has been achieved and the likelihood of spontaneous breakage has been reduced. The improvement allows the 0.53mm ID fused silica columns to be coiled to 150mm diameter without risk of fracture, rather than the more usual 200mm diameter. The smaller coil size allows the columns to be used with greater ease in gas chromatographs with limited oven space.

In addition, the aluminium coating is stable to temperatures far in excess of the 370°C limit imposed by the polyimide coating on conventional fused silica columns.

The AQ5 columns are available in the full range of SGE's proven BP series of cross linked and surface bonded phases. Each column is individually tested to the highest standards. The SGE columns are now available in New Zealand, through their distributor, Alltech New Zealand, from whom full details, including an illustrated technical brochure, are available.

For further information please circle no. 16 on reader reply card.

J & W Scientific Announce Specialty Columns for "Benchtop" Mass Spectrometers

Chromatographic theory clearly shows that the best way to decrease analysis time is to decrease column diameter. Decreasing column diameter will also increase column efficiency, for h (height equivalent of a theoretical plate) is proportional to 1/dc. For example, a 25m x 0.18mm I.D. DB-1 column will generate in excess of 100,000 theoretical plates using hydrogen carrier gas at 40 cm/sec. Whenever the analyst has such an excess of efficiency, analysis times can be reduced by: (1) using short columns; (2) operating at linear gas velocities significantly above optimum, and (3) elevating column temperature.

Decreasing column diameter has the added effect of reducing the volumetric flow through the column at practical gas velocities. *Thus these small diameter columns are ideally suited for use with so-called "benchtop" mass spectrometers.* Column flows of 0.5 mL/min. (the column flow using helium at 30 cm/sec) are well within the pumping capacity of the vacuum system... secondary collisions are eliminated.. meaningful spectral data is obtained.

The complete spectrum of J & W stationary phases is available. *All are cross-linked and surface-bonded,* providing unmatched column stability and durability. These columns should not be confused with the difficult-to-use 100 micron I.D. "Microbore" columns. A J & W "high speed" column uses the same ferrules as our "industry standard" 0.25 mm I.D. column and is compatible with any modern gas chromatograph or GC/MS system. Film thickness has been adjusted for each stationery phase to maximise column capacity without compromising column efficiency.

J & W Scientific products are sold exclusively in New Zealand by Sci-Med (NZ) Ltd.

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

UV/VIS Spectral Libraries for HPLC

Now the Hewlett-Packard HPLC ChemStation will automatically search through a library of UV-spectra in order to confirm the identity of a compound. Previously it was necessary to make individual visual comparisons between the unknown peak and the spectra obtained from standards.

Using the HP 1040M diode-array detection system with the revised ChemStation software, you can select a peak within a chromatogram and then specify a retention-time "window" and a library file. The program then instigates a search of the library for the ten best matches with the unknown peak. The first match is overlaid with the spectrum of the unknown peak and the match factor is displayed on the screen. The names and match factors of the other possibilities are tabulated in order of match factor. The spectra can be overlaid with the unknown peak, and the individual peaks annotated.

For each peak the report includes information on retention time, peak purity and identity match factor and the name of the best match from the library. The impure peaks are flagged with an asterik.

The library search can be made with original spectra as well as after mathematical manipulations such as derivation, smoothing and background subtraction. Existing libraries can be edited and extended and new ones created.

For automated routine analysis, the library search program can be customized with MACRO programs.

For further information please circle 4 on reader reply card.

Northrop Instruments & Systems Limited Introduces QuickRes Peak Resolving Software for HPLC.

Chromatographic separation is only a means to an end. The objective of HPLC analysis is to identify and quantitate components in a mixture. A problem occurs when two or more components coelute as a single fused peak set. QuickRes offers a revolutionary solution to this problem by mathematically resolving an impure peak into its components. The program then displays both the pure spectra and the individual profiles that have not been fully resolved by the chromatographic system.

QuickRes automatically flags impure peaks, determines the number of components, can identify the components and allows for quantitation of each component.

PRODUCT NEWS

QuickRes works without prior knowledge of spectra, peak shape or retention index. Because achieving optimal column resolution is no longer a requirement, time spent on both methods development and routine analysis can be slashed. Many routine analyses can be handled in a fraction of the usual time. Isocratic runs can replace gradient runs. Less column switching is required. Isolation and purification can be improved to target fraction collection.

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

A New Low-cost, High Performance ICP Emission Spectrometer from Perkin-Elmer

Perkin-Elmer's new Plasma 40 inductively coupled plasma emission spectrometer offers users a low cost, benchtop instrument for high performance sequential ICP analysis. An integrated system controlled by an external IBM PC series (compatible) computer, the Plasma 40 employs a built-in, free running RF generator with no moving parts in the generator, assuring high reliability. Organic solvents may be sampled easily with the flip of a single switch. The plasma load coil is cooled with the same gas used for the plasma, eliminating the need for auxiliary water or gas cooling systems. Plasma 40 also incorporates Perkin-Elmer's proven, corrosion resistant demountable torch.

Also facilitating use of the system are Plasma 40's high-resolution graphics display, extensive use of prompting, and incorporation of artificial intelligence for functions such as selection of background correction points. Report generation is included in the software. Plasma 40's data files can be imported easily into many commercially available database and spreadsheet programmes to generate customised laboratory reports.

Perkin-Elmer is fully supported throughout New Zealand by Sci-Med (NZ) Ltd.

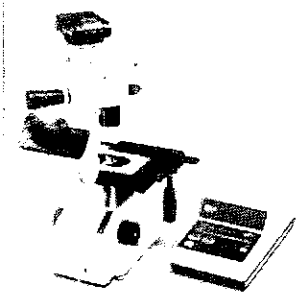
For further information please circle no. 9 on reader reply card.

Versatile Inverted Microscope

The Nikon TMS-F inverted Microscope is even more versatile than its predecessor — the TMS — with the inclusion of a photo-micrography facility. The TMS-F features a trinocular head with a phototube that accepts a wide variety of photography equipment, including CCTV cameras for video monitoring.

It provides clearer images because the optical path uses only one reflecting surface and Nikon's proven CF lenses. The powerful 6v-20W halogen lamp keeps the image bright, even in the 40X phase contrast mode.

Its sturdy, low-profile design makes it easier to work on specimens, and is especially effective for tissue cultures and clinical inspections. It features a sensitive, single focusing knob for easy operation.



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

Don't Let Sample Preparation Mess Up Your Results.

Imprecise sample preparation is the primary cause of faulty results in laboratory analysis. Over the years Tecator has developed equipment for accurate sample preparation to minimize these problems. The company has now published a brochure comprising the entire sample preparation range available. This includes data on the complete digestion program covering digestors for Kjeldahl, heavy metals and COD analyses; a time/temperature controller; fume exhaust systems; exhaust scrubber; digestion tubes, and catalyst tablets. It also includes information about the two sample mills Cyclotec and Cemotec as well as the Shaking Water Bath and the Analytical Balance.

Tecator are represented in New Zealand by Wiltons.

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

Philips Analytical Extends Spectrometry Software Range

LAB40 — a data processing software option from Philips Analytical — now provides a number of additional result treatment possibilities for the company's range of x-ray and optical emission spectrometers.

The package comprises four modules: for computer-computer transmission, customised reporting, quality control and cost-optimised charge correction.

It enables the output of stand-alone instruments to be presented in various application or user-specific formats. In addition, the transmission facility allows the transfer of data to a remote computer for operations such as archiving, management reporting and financial administration.

LAB40 runs on DEC computers employing the same operating systems as the Philips X40 (P/OS, VMS, Micro VMS) and ES40 (RSX, Micro RSX) software for XRF and OES, respectively.

Another new addition is a version of the X40 analytical package for Philips P3100 Series personal computers and other IBM-compatibles using the MS DOS operating system. Suitable for both PW1404 sequential and PW1606 simultaneous spectrometers, this incorporates all the powerful features previously available for DEC-based installations. In particular, it permits the use of Philips' unique theoretical 'alphas' for matrix correction, which greatly facilitates setting-up procedures and routine recalibration.

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

Tests Endorse Fume Hood Safety

There is a rapidly growing popularity for the use of non-ducting fume hoods in laboratory and industrial situations for the removal of gases, vapours and particles.

Over 15 years of manufacturing experience has led to the development of a system which provides almost absolute filtering efficiency. Examples of such efficiency are now available upon request in an independent test report. The efficiency is due to the performance of the catalytic reaction molecular filter, the ability of which permits the discharge of air purer than air normally circulating in many laboratories.

The tests have been carried out investigating the following areas:

Air flow capacity.
Filtration efficiency.
Filter Life.
Noise level.

Particular attention has been given to safety features which provide protection to Captair users. For example:

The three section doors (Model 4007) are equipped with a system which prevents back flow of contaminated air. In each of the two working positions of the door, the user has face and chest protection from splashes and vapours. All electrical components are mounted on the outside panel of the filter enclosure, removed from possible exposure to corrosive or flammable gases. The highest safety standards are complied with for all electrical components. Again for safety reasons, acrylic plate has been selected for the clear panels. In case of explosion, the laboratory technician will be protected by this unbreakable screen.

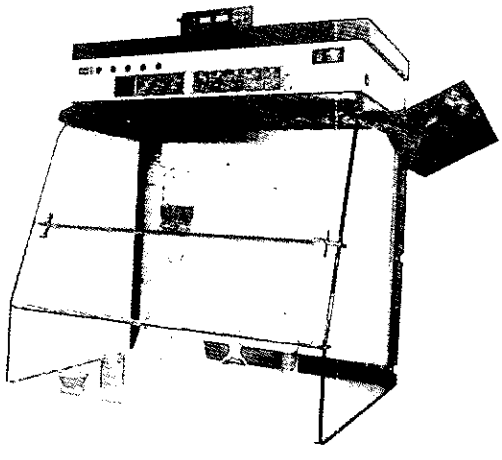
The efficiency of the filters remain at their highest level throughout their lifetime and all filters have an automatic detector to advise the pending saturation of the filter shortly before this occurs.

In addition, an electronic and audible alarm is offered. This is activated by solvents only.

The advantages of immediate, no cost installation, mobility (since units only require electricity to be operable), plus the general high level of safety and utility have resulted in over 25,000 units now being in use all over the world.

Full technical details are available from Kempthorne Medical Supplies Ltd, P.O. Box 1234, Auckland.

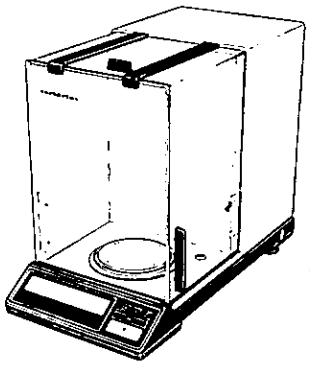
For further information please circle no. 13 on reader reply card.



PRODUCT NEWS

Automatic Transition from the Semimicro to the Macro Range

With the new electronic model R 200 D, Sartorius is introducing a combined semi-micro/macro balance (0...42 g/42...205 g; readable to 0.01 and 0.1 mg, respectively) featuring a particular user benefit: the transition from the fine range to the macro range is automatic.



Before you start to weigh, there is no way of always knowing whether the capacity of the fine range will be sufficient for the tare and the sample, especially if you are compounding several ingredients of a formula. Whenever the fine range is exceeded, the R 200 D simply lets you continue weighing in, without the inconvenience of having to start the procedure all over again. This eliminates time-consuming backtracking that can also run into quite a bit of money when expensive substances are weighed.

Another feature: for frequent weighing up to 30/40 g when macro accuracy is more than sufficient, the balance can be manually switched to the macro range. This lets you utilise the shorter stabilisation time afforded by the macro range.

The new balance is ruggedly built and features vibration filters that would be out of the question in mechanical balances. Moreover, it offers the option of electronic processing of weight data. To put it in a nutshell, the R 200 D is an easy-to-use analytical balance with all-round capabilities for both weighing in and final weighing, determining the weights of small samples in lightweight tare containers with semimicro accuracy and larger samples in heavier tare containers with macro accuracy.

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

PRODUCT NEWS

Atomic Absorption Data Station

GBC Scientific Equipment Pty Ltd has released a new Atomic Absorption Data Station incorporating its own OMNICOLOUR Applications Management Software package, available from Advanced Electronics Ltd.

The Data Station has a full colour display and the OMNICOLOUR software includes graphics display of calibration curves and analytical signals, storage of methods and results, display of cookbook conditions and comprehensive report generation.

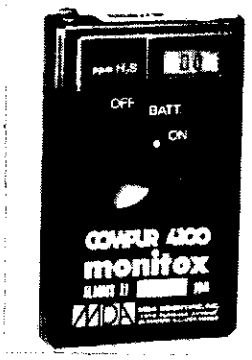
The Data Station provides control of the GBC 902 or 903 Atomic Absorption Spectrophotometers, System 2000 Graphite Furnace and F.S. 1000 Autosampler. The OMNICOLOUR software is compatible with the IBM PC and IBM XT and may be purchased separately.

For further information please circle no. 1 on reader reply card.

Toxic Gas Monitors Protect Petrochem Workers

A line of personal and fixed toxic gas monitors, designed to protect employees during all phases of the oil production and refining processes is now available from Carl Zeiss. Capable of detecting gases such as hydrogen sulfide and hydrogen fluoride well below hazardous levels, the Monitox Personal Alarm and Statox Multipoint Monitor offer fast reliable exposure protection in a wide variety of petrochemical applications.

The Monitox, designed to be worn by refinery maintenance personnel and rig employees, fits in a shirt pocket and sounds an audible alarm whenever hazardous H_2S concentrations are encountered. Available with



or without a digital concentration display, the Monitox operates for up to 2000 hours on a single replacable battery.

The Statox Multipoint Monitor, one of several Compur fixed H_2S detection systems, is a continuously self-checking system designed for totally unattended operation. As such, it is ideal for remote applications such as pumping station monitoring, where visits by operating and maintenance personnel are frequent.

For further information please circle no. 2 on reader reply card.

New Mettler Precision Balances of the PM Series

Mettler's new PM balances can do practically anything one can ask of a high-resolution precision balance. The new generation of balances comprises nine different models covering a readability span of 0.001 to 0.1 grams and weighing ranges between 0-100 grams and 0-4000 grams. Included, of course, are two Mettler Delta-Range models with the displaceable fine range that frequently eliminates the need to use a second balance.

Most striking feature of PM precision is a new type of graphic display, the Mettler Delta-Trac. It tells the user at a glance just how much of the weighing range is used and how much is still available. For plus-minus checkweighing chores, it shows the deviations from target weight with the correct sign.

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

NOTICE

HPLC School

The Chromatography Group of the NZIC and Auckland Technical Institute will run a HPLC school at Auckland Technical Institute from November 3-5 inclusive. The school will have the same format as previous schools run at Waikato Technical Institute, ie lectures on the topics of HPLC systems, chromatographic theory, stationary phases (columns), mobile phases (solvents), detection systems, quantitation and sample preparation, each followed by a practical session on the lecture topic. There will be extensive 'hands-on' experience with a number of different instruments. Although the lectures cover most types of HPLC the practicals will be confined to reversed-phase systems with UV detection.

For further information contact Dianne Webster, P.O. Box 872, Auckland. Phone (09) 795-780 ext. 797.

FINNIGAN OFFER POWERFUL NEW BENCH-TOP INSTRUMENTS FOR GC/MS AND MASS DETECTION

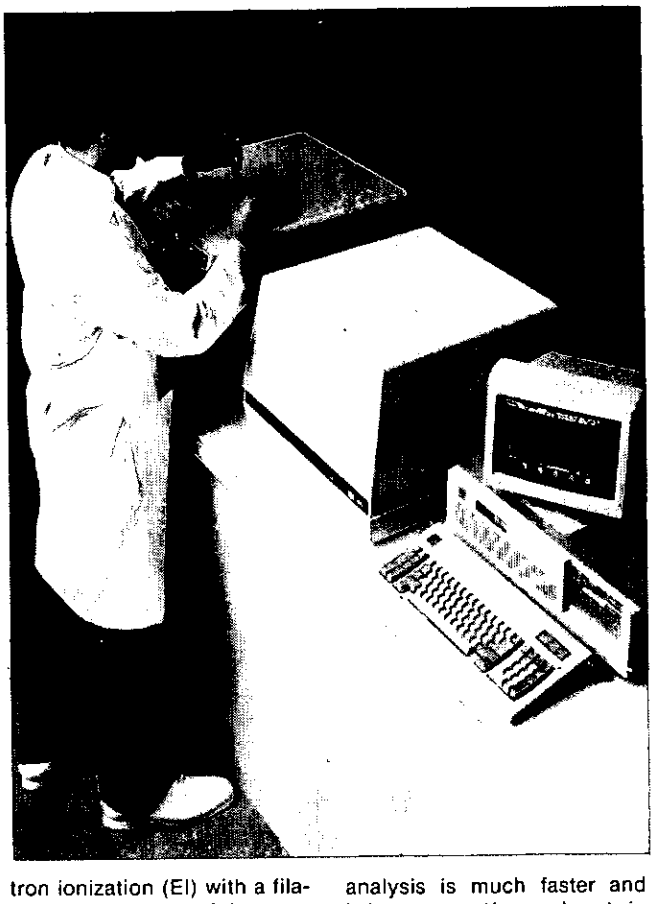
The 800 Series Ion Trap Detector from Finnigan MAT offers new levels of sensitivity, specificity, and dynamic range not available from other mass selective detectors. The ITD™ produces a chromatogram and mass spectra during a GC analysis, providing both retention-time and mass-spectral data for quantitative and qualitative analyses. Tasks that once required multiple runs with different columns and specific detectors can now be done with a single injection.

The Ion Trap Detector provides detection at picogram levels while scanning the full mass range throughout the GC run. In contrast, competitive detectors must limit their measurement to a few selected ions at these low sample concentrations, sacrificing the specificity of a full mass spectrum for the required sensitivity. With the complete spectrum, the ITD's powerful library search program can match an unknown spectrum in seconds. Furthermore, the ITD's large dynamic range allows quantitative analysis over a wide concentration range.

These dramatic achievements in sensitivity and dynamic range result from the Automatic Gain Control (AGC) software that continuously adjusts the ITD's operating parameters. At very low sample concentrations, the ionization time is lengthened to produce more signal while at high sample concentrations, it is shortened to extend linear response. The AGC algorithm makes these adjustments automatically during every scan in a GC run.

The ITD is readily interfaced to any capillary gas chromatograph via an open split interface built into the transfer line. This interface maintains the end of the column at atmospheric pressure, ensuring chromatographic integrity and allowing direct comparison of retention times from conventional GC detectors. Alternatively, the column may be inserted through the transfer line directly into the ITD when a direct sample introduction path is required.

The sample is ionized inside the ITD by conventional electron ionization (EI) with a filament. Any portion of the mass range can be scanned, or up to 16 mass windows characteristic of the sample of interest can be monitored. Chemical ionization (CI) is also available on the ITD, providing soft ionization capability for molecular weight confirmation. In addition, a selection of CI reagent gases gives an added measure of specificity for solving difficult analytical problems.



The IBM Personal Computer XT or AT is used both for control of the ITD and for acquisition of data. Data handling programs allow the analyst to move freely from one display to another, quickly producing qualitative and quantitative reports tailored to the user's needs. As a result, sample analysis is much faster and laboratory throughput is increased.

The Finnigan MAT INCOS 50 quadrupole mass spectrometer redefines performance expectations for benchtop GC/MS systems. The INCOS 50 has all the capabilities of traditional full-size research-grade systems, yet it fits easily on a bench top. It is designed for high throughput laboratories that requires unimpeachable analytical results. Because it can communicate with all major laboratory information management systems, the INCOS 50 is a valuable addition to laboratories where high sample loads make data management and the transfer of analytical information a high priority.

The versatile GC/MS transfer line allows the INCOS 50 to be used with both the popular Hewlett-Packard 5890 and Varian 3400. The INCOS 50 provides complete data system control of the GC and accessories such as an autosampler and liquid sample concentrator. The INCOS 50 can be used with capillary, wide bore, and packed columns.

The INCOS 50 mass spectrometer is designed to grow with the needs of the individual laboratory. It performs electron ionization or chemical ionization with positive or negative detection. It also accepts desorption or other solids probes. The feedback temperature-controlled ion source ensures stable quantitative and qualitative data; the twin 4 kV conversion dynodes give outstanding high mass sensitivity.

Productivity is built into the INCOS 50. Two high speed processors in the mass spectrometer itself handle instrument control, thus freeing the data system for high speed foreground data acquisition and background data processing from either one or two terminals.

The data system uses the industry-standard Incos™ applications software with new microcomputer hardware. Users already familiar with Incos can operate the INCOS 50 data system with little or no additional training. Pop-down command menus help novices learn to operate the system quickly.

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

Water Analysis

The number of analytical determinations in the water industry is rapidly increasing. Consequently the need for fast and accurate water analysers is growing as well.

The latest issue of *In Focus*, the Tecator in-house magazine, presents the Tecator product range for automated analysis in water.

In various articles you will become acquainted with:

— the FIAstar® system, a versatile analyser for routine determinations of ions such as NO_3, PO_4, Cl, Fe, Al, etc.

— the Aquatec® system, a dedicated water analyser for automated analysis of NO_2, NO_3, PO_4 and NH_4. It can also be used as a traditional flow-through spectrophotometer.

— the Ion Analysis System, a purpose-built ion chromatography system for "multi-channel" capacity.

— system for the analysis of chemical oxygen demand (COD).

— automated Kjeldahl systems for routine measurements of total nitrogen in water samples.

Additional comprehensive articles will be of interest to anyone working in a water laboratory.

Send for your free copy today.

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

Transform your HPLC
WITH DETECTORS FROM HEWLETT PACKARD

HP1040M DIODE ARRAY DETECTOR

There's an easy way to exploit the full potential of any Liquid Chromatograph in your laboratory. Add the HP 1040M diode-array detection system. You get high sensitivity UV/VIS detection plus spectral acquisition without stopped-flow. As your sample elutes the diode-array detector measures absorbance at all wavelengths between 190 and 600nm simultaneously. You have a 3-D matrix of analytical information at your disposal; absorbance over wavelength and time. The ChemStation gives you complete control over this data so that in a single run you can –

- confirm peak identity and purity
- optimise the sensitivity and selectivity of your analytical method
- integrate any acquired or extracted signal (including external detectors)
- use optional QuickRes software to mathematically resolve fused peak sets into their component peaks. Each component can then be separately identified and quantified
- use optional colourview software to obtain a quick qualitative view of your sample.

A high speed computer and fast graphics make all this happen in a matter of seconds.

Not only is the HP ChemStation an interactive data editor but also an automatic one. Sequencing and MACRO programming allows the system to automatically acquire and process data from a series of sample runs each with a different method if required.

The modular concept of the HP ChemStation means that you can tailor a system to fit your exact needs.

HP 1046A PROGRAMMABLE FLUORESCENCE DETECTOR

Stay ahead in HPLC – obtain extra sensitivity and selectivity with programmed fluorescence detection. With the HP 1046A you time-programme detector parameters for the optimal detection of each peak. To utilize fully the luminescence of each compound you can time-programme the excitation wavelength as well as the emission wavelength. You choose the best wavelength pair for each peak. The result – outstanding selectivity and sensitivity.

The 1046A can also be interfaced to the HP ChemStation providing you with workstation control over all 1046A parameters, stop flow scanning of excitation and emission wavelengths, acquisition and evaluation of fluorescence signals and spectra.

The HP1046A can be connected to any HPLC system and has a low dispersion cell to permit use with microbore HPLC Systems also.

For further information please circle no. 31 on reader reply card.

HP 1037A REFRACTIVE INDEX DETECTOR

In HPLC analyses, universal response to all solutes makes refractive index detection the ideal choice for certain compounds. The sensitivity of the HP 1037A Refractive Index Detector enables you to measure concentrations of such compounds down to the nanogram range.

The major reason for the sensitivity of the HP1037A is the temperature stability of its optical system and flow related components.

The HP1037A can easily be connected to any HPLC system and is easy to operate.

For more information on the HPLC Detectors, send this coupon

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