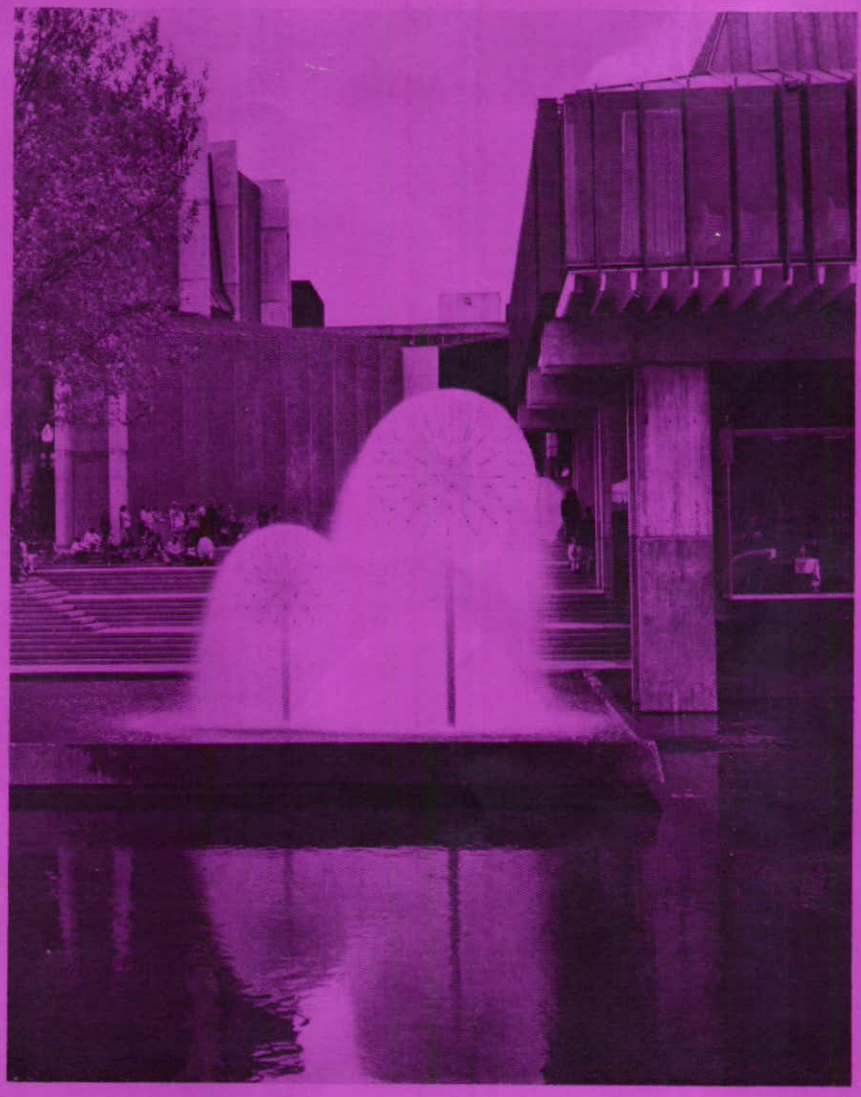
chemistry in new zealand



conference issue

august 1973


VISIT US AT
CONFERENCE '76
MILLIPORE®
varian instruments
CECIL INSTRUMENTS
Sartorius
Jobling
Gallenkamp
AJAX CHEMICALS LTD
PHOTOVOLT
MSE
LTONS

AUGUST 1973

VOLUME 37 NUMBER 4

chemistry in new zealand

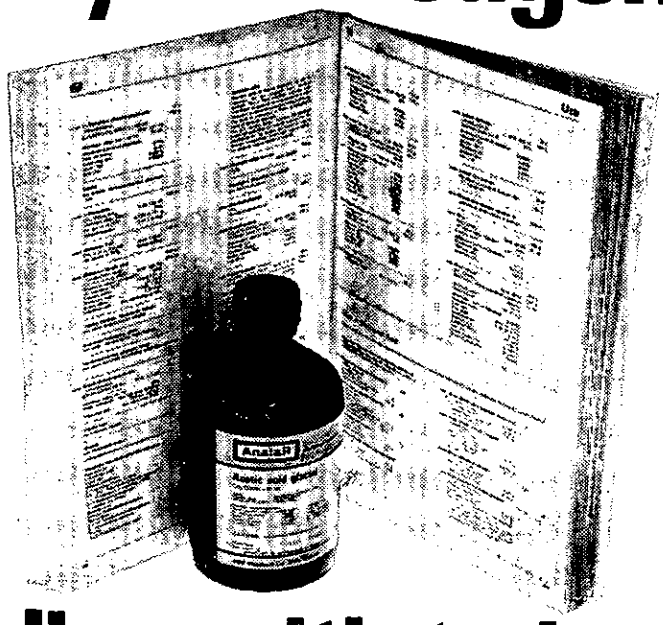
Journal of the New Zealand Institute of Chemistry

Printed by David F. Jones Ltd.,
Wellington.

ANZA **AUDITED CIRCULATION**
OCTOBER 1972 1343.

Cover Ferrier Fountain, Town Hall Complex, Christchurch. *(Photo by courtesy of N.Z. Industrial Design Council).*

BDH AnalaR analytical reagents



in line with today's advances in analytical chemistry

Increasingly exacting demands of modern lab. techniques. The advances in analytical chemistry. This means that specifications for AnalaR reagents are now more stringent than ever. More extensive than ever. In the light of manufacturing experience and these advances, many additional tests have been included. The results of several years' work revising and improving analytical procedures.

Order your copy of 'AnalaR Standards for Laboratory Chemicals' from BDH. It contains full details of the new standards covering the complete range of 308 reagents.

BDH

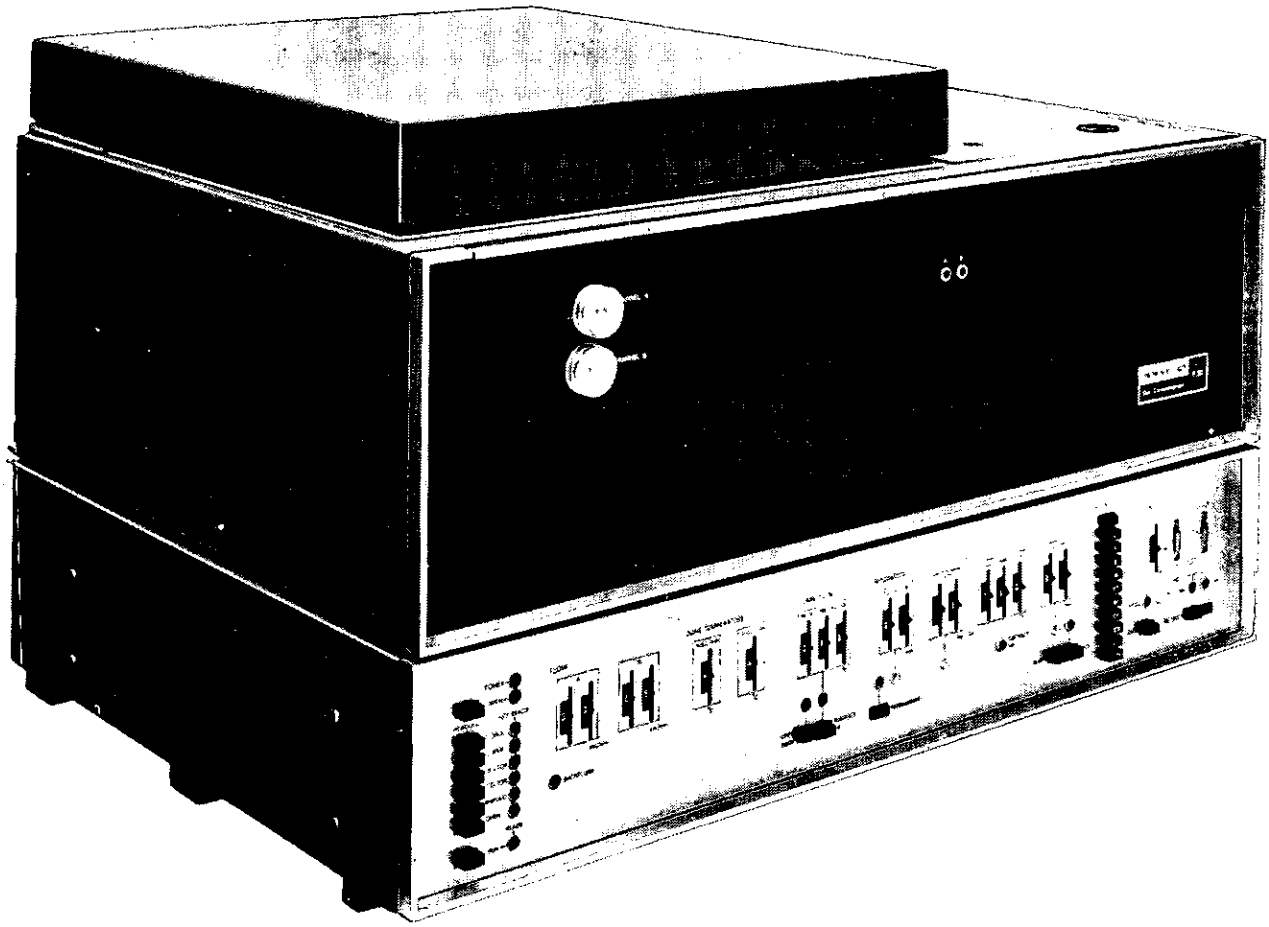
BDH NEW ZEALAND LIMITED,
P.O. Box 624, Palmerston North.

Leading world manufacturers of lab. chemicals.

For fullest information Contact Mr. H. R. Cooper, C/- Smith Bio-Lab, Phone 483-039, Auckland: Miss P. Coxhead, Phone 44-105, Wellington, Principal Distributors, Smith Bio-Lab, Ltd., Auckland, Wellington, Christchurch.

1945/4

PERKIN-ELMER



Perkin-Elmer F. 30 Gas Chromatograph

We can't be more precise and it's not for want of trying.

Despite all efforts, improvements to the Model F30 are difficult to make, because it's far ahead of its time.

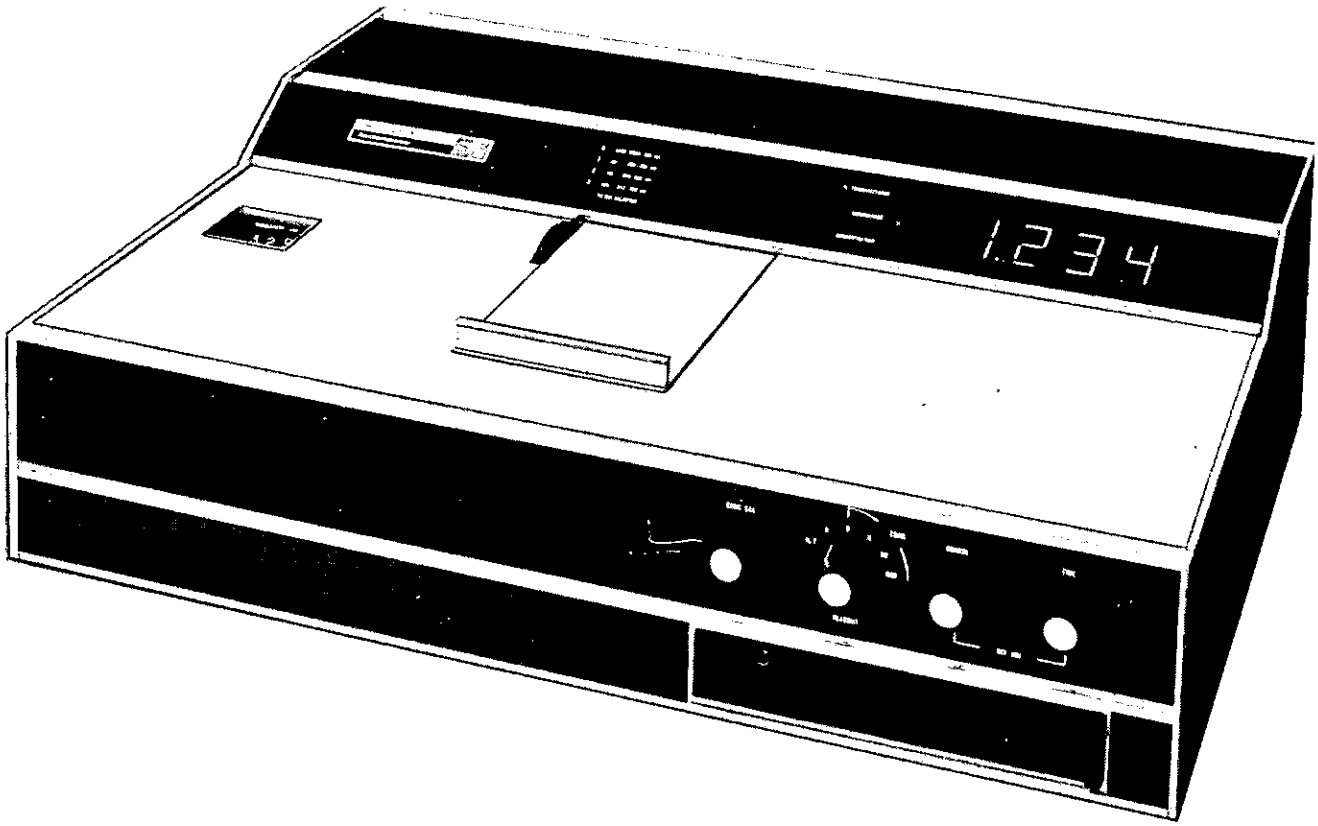
Even the test of hooking it up to a data handling system (Perkin-Elmer's own PEP-1 which can handle up to 8 F30's) and automatic sampler showed up no shortcomings – even in unattended operation.

After all, what more would you expect from a chromatograph with digital controls for precise resettability, thermostatted electronics and pneumatics to ensure stability, a carrier gas 'make up' system to optimise sensitivity, and electronic flow sensors for easier operation. Perhaps you would expect a high price, but we think you'll be surprised.

For further information contact:
Fletcher Health & Science
P.O. Box 303, Auckland. Phone 31-449

Fletcher
HEALTH+SCIENCE
A division of the Fletcher Industries Limited.

PERKIN-ELMER



Perkin-Elmer Model 55 Digital UV-VIS Spectrophotometer

The Digital UV-VIS workhorse you've wanted for years!

The Model 55, new from Perkin-Elmer, is a top performer, with excellent accuracy and reliability for 'workhorse' duty in every lab.

With four-figure digital readout, the Model 55 UV-VIS has been specifically designed to meet the need for a versatile, high-performance grating instrument, with a range of 200 to 800 nm, at a moderate price. Also available is the VIS only model with a range of 325 to 800 nm.

Both versions are particularly suited to a wide range of quality control, general analytical and clinical work, (including enzyme analysis) and pollution control.

Even over long periods, automatic sampling with Model 55 produces consistently reliable results. Its stability – less than 0.005 A drift in eight hours – coupled with response time of less than one second to 98% of final value, ensures fast accurate analyses.

For further information contact:
Fletcher Health & Science
P.O. Box 303, Auckland. Phone 31-449

Fletcher
HEALTH+SCIENCE
A division of the Fletcher Industries Limited.

Conference 1973

Welcome to Christchurch

In recent years the closest approach of the Institute Conference to Christchurch occurred as long ago as 1962, when the Conference was held at Lincoln College. It was therefore particularly pleasing to learn that, in its next orbit, Conference would pass through Christchurch between August 20th and 24th of this year. Possibly those at mission control were influenced by the knowledge that this is the University of Canterbury's centennial year, but whatever the reason, we warmly welcome you to Christchurch and wish you an enjoyable and informative time at Conference.

The conference theme is to be "The Chemist and New Zealand Resources", with symposia on Wool, Forest Products, Pastoral Food Products, and Mineral-based Industries. A review session will feature Dr. I. K. Walker and Professor B. J. Ross, while the official Guest Lecturer will be Professor R. L. Wain, F.R.S., of the University of London, who will speak about "Plants, Hormones and Agriculture". Another New Zealand raw material — probably the most important one — will be discussed in a full day's symposium organised for school teachers, and in addition to the teachers' meeting there will be special sessions for the analytical, biochemistry, electrochemistry, inorganic and organic groups.

Apart from the purely chemical attractions of Christchurch at this time, we are also staging a number of interesting exhibitions and happenings. Special attractions outside Conference include a Town Hall (complete with fountains), a new police station (just complete), a new postal centre (foundations only), an air terminal (undergoing modification), the University at Ilam (more than half finished), the Commonwealth Games complex (on the last lap), Cathedral Square (in a state of dynamic equilibrium), and a Centennial Pool (the remains may be inspected). Those rare visitors who tire easily at chemistry sessions are cordially invited to supervise, in an amateur capacity, any of these local examples of the country's building boom. We look forward to seeing you.

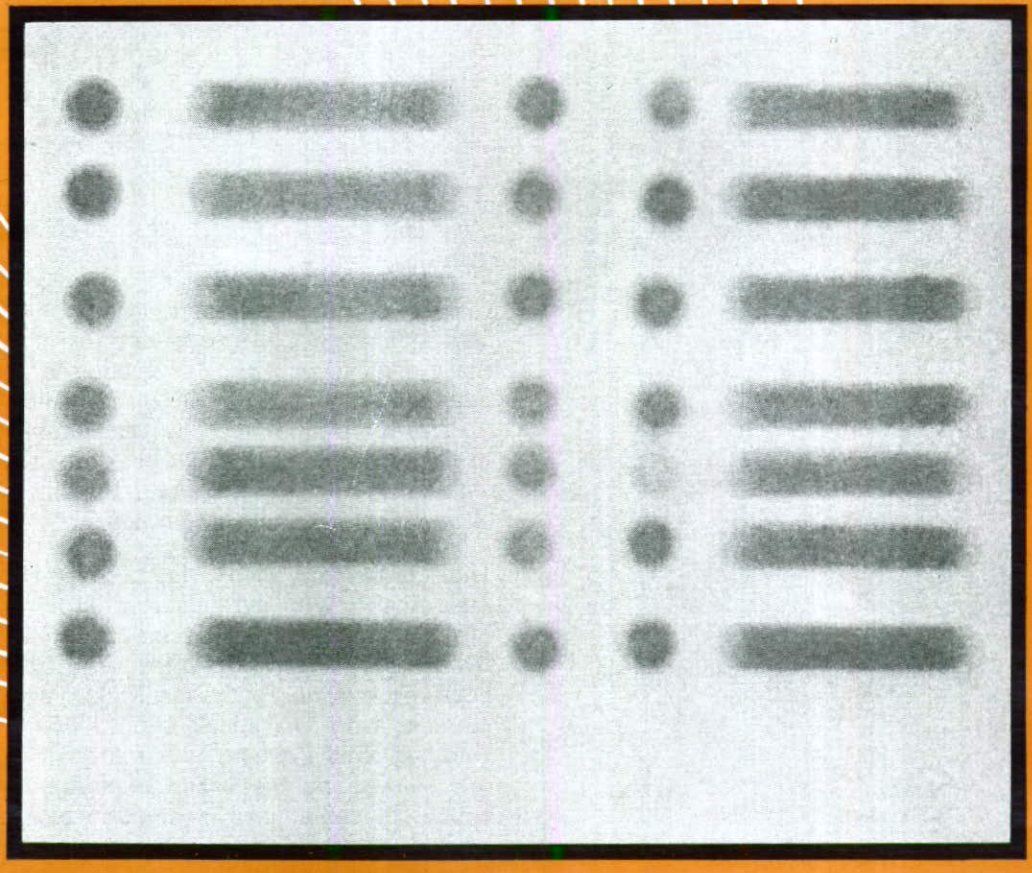
J. VAUGHAN,

Conference Chairman.

Reagents

MERCK

TLC Ready-for-use preparations



TLC Pre-coated plates

TLC Aluminium sheets
TLC Aluminium rolls
TLC Plastic sheets

Special advantages:
Improved resolution with silica gel layers
Short running times
High abrasion-resistance
Homogeneous layers
Sheets: Flexibility and ease of cutting

Please ask for our brochures.

Supplies through:
Townson & Mercer (N. Z.) Pty. Ltd., 2 Morgan Street, Auckland
Townson & Mercer (N. Z.) Pty. Ltd., 120 Madras Street, Christchurch
Townson & Mercer (N. Z.) Pty. Ltd., Cnr. Udy and Hutt Road, Petone/Wellington

378-ENZ

E. Merck, Darmstadt Germany

PROGRAMME 1973 N.Z.I.C. CONFERENCE, UNIVERSITY OF CANTERBURY

Monday, 20 August	Tuesday, 21 August	Wednesday, 22 August	Thursday, 23 August
Specialist Meetings and Organisers	10.30-11.00 a.m. Opening Ceremony, Hon. C. J. Moyle, Minister of Science	9.00-10.30 a.m. Forest Products Symposium (Dr. A. F. Wilson, Chairman)	9.00-10.30 a.m. Mineral Industry Symposium (Dr. A. J. Ellis, Chairman)
Analytical 2.00-5.30 p.m. (Prof. A. D. Campbell, O.U.)	11.00-11.30 TEA	10.30-11.00 a.m. TEA	10.30-11.00 a.m. TEA
Biochemistry 9.00 a.m.-5.30 p.m., 7.30-9.30 p.m., continued on Tues. 2.00-5.30 p.m. (Dr. B. A. Tapper, D.S.I.R., Palmerston North)	11.30-12.30 p.m. Packer Memorial Lecturer: (Prof. J. Vaughan)	11.00-12.30 p.m. Forest Products Symposium (contd.)	11.00-12.30 p.m. Mineral Industry Symposium (contd.)
	12.30-2.00 p.m. LUNCH	12.30-2.00 p.m. LUNCH	12.30-2.00 p.m. LUNCH
Electrochemistry 2.00-5.30 p.m. (Prof. G. A. Wright, A.U.)	2.00-3.30 p.m. Wool Symposium (Dr. W. S. Simpson, Chairman)	2.00-3.30 p.m. Pastoral Food Products Symposium (Dr. W. A. McGillivray, Chairman)	2.00-3.00 p.m. Technical Summary (Dr. I. K. Walker)
Inorganic 11.30 a.m.-5.30 p.m. (Dr. J. E. Fergusson, U.C.)	3.40-4.00 p.m. TEA	3.40-4.00 p.m. TEA	3.00-3.30 p.m. TEA
Organic 9.50 a.m.-5.40 p.m. (Dr. G. J. Wright, U.C.)	4.00-5.30 p.m. Wool Symposium (contd.)	3.30-5.30 p.m. Food Products Symposium (Contd.)	3.30-4.30 p.m. Economic Summary (Prof. B. J. Ross)
Teachers 9.00 a.m.-5.30 p.m. (Mr. R. H. Hickford, U.C.)			4.30-5.30 p.m. NZIC Annual General Meeting
Student papers will be incorporated in the specialist meetings 2.00-5.30 p.m.	5.45 p.m. "Meat Buffet"	5.45 p.m. "Meat Buffet"	5.45 p.m. "Meat Buffet"
Special Annual General Meetings 7.30 p.m.	8.15 p.m. Guest Lecturer: (Prof. R. L. Wain, F.R.S., Wye College, U.K.)	7.30 p.m. Presidential Address (Prof. R. E. Corbett)	7.30 p.m. Conference Dinner and Presentation of Corday-Morgan Medal

Conference Highlights

Guest Lecturers

Professor R. L. Wain, C.B.E., D.Sc., F.R.S.

Professor Wain obtained his first degree (B.Sc. First Class Honours in Chemistry) from the University of Sheffield in 1932 and Ph.D. from the same University in 1935. He received D.Sc. from the University of London in 1948 and the Honorary degree of D.Agric. Sci. from the University of Ghent, Belgium in 1963. Numerous medals and awards have been received by Professor Wain for his work.

He was elected Fellow of the Royal Society in 1960 and in 1968 he was appointed by the Queen to be a Commander of the Most Excellent Order of the British Empire (C.B.E.). He is a member of Council and past Vice-President of the Royal Institute of Chemistry. He is also a member of the East African Natural Resources Research Council.

His present appointment is that of Professor at Wye College in the University of London, and Director of the Agricultural Research Council Unit on Plant Growth Substances and Systemic Fungicides.

Professor Wain is visiting New Zealand as a Commonwealth Prestige Fellow and will be centred at Lincoln College.

He has a formidable reputation in plant growth substance research, both from an agronomic and biochemical point of view. A number of selective herbicides now used in world agriculture were discovered by him and his research group. He is a brilliant lecturer on a wide range of subjects, and has made substantial contributions to the study of the prevention of food spoilage in under-developed countries.

Professor R. O. C. Norman

Professor Norman was educated at Balliol College, Oxford, working for the D.Phil. there under the supervision of Professor W. A. Waters.

After a year in the United States he was appointed Lecturer in Organic Chemistry in the Dyson Perrins Laboratory and Fellow of Merton College, Oxford. In 1965 he moved to the University of York as Professor of Chemistry, in a University that was then being founded.

Professor F. Gibson

Professor Gibson obtained his first degree (B.Sc. Melb.) after working in the Universities of Queensland and Melbourne majoring in Microbiology and Biochemistry. Until 1952 he was an Australian National University Scholar at Oxford working with Professor D. D. Woods. After obtaining his D.Phil. he returned to the School of Microbiology in Melbourne where he was later appointed Professor of Chemical Microbiology. In 1967 he was appointed to his present position of Professor and Head of the Biochemistry Department, John Curtin School of Medical Research, Australian National University. He is a Fellow of the Australian Academy of Science.

Professor Gibson's main research interests have been the application of the techniques of biochemical genetics to the biosynthesis of aromatic amino acids and vitamins in the enteric bacteria, particularly *E. coli*, and more recently to the structure and function of certain bacterial iron-binding compounds and bacterial respiration. The current activities of his research group are concerned with the biosynthesis of ubiquinone and menaquinone, the structure and function of iron-binding compounds excreted by enteric bacteria, and the use of biochemical genetics to study the problems of electron transport and oxidative phosphorylation.

Guest Lectures

Professor R. L. Wain F.R.S., from Wye College, University of London will deliver the Conference Guest Lecture on Tuesday evening. He will speak on "Plants, Hormones and Agriculture".

Professor F. Gibson from the John Curtin School of Medical Research in Canberra, will address the Biochemistry Group on Tuesday afternoon. The Biochemical section of the NZIC and the New Zealand Biochemical Society are holding a joint meeting during the first two days of the Conference.

Professor R. O. C. Norman from the University of York will lecture on Monday morning on the topic "Introducing Organic Chemistry", which will cover the content, approach, and presentation of organic chemistry, particularly at the secondary school level.

Other Highlights

The Packer Memorial Lecture will be delivered on Tuesday morning by Professor J. Vaughan.

The Presidential Address will be delivered by Professor R. E. Corbett on Wednesday evening at 7.30 p.m.

On behalf of the Chemical Society (London), Professor S. N. Slater will present the Corday-Morgan Medal to Professor L. F. Phillips at the Conference Dinner.

Symposia

The theme at the conference is "The Chemist and New Zealand Resources" and will be considered in four symposia. In addition a technical summary session will be introduced by Dr. I. K. Walker, Assistant Director-General of DSIR.

An economic summary session will be introduced by Professor B. J. Ross of the Agricultural Economics and Marketing Department at Lincoln College.

Conference Sessions

Specialist Group Programmes

Analytical Chemistry

(Organiser: Professor A. D. Campbell, University of Otago)

Titles of Papers

Electrochemical determination of ethyl alcohol in alveolar air
R. D. Reeves, A. R. Stowell, and K. G. Gouchman, *Massey University.*

Storage, preservation, and analysis of water samples for nitrate and phosphorus
G. D. Stevenson, *Chemistry Division DSIR.*

The role of X-ray spectroscopy in process control of an aluminium smelter
I. C. Norrish, *N.Z. Aluminium Smelter Ltd.*

The role of anodic stripping voltammetry in environmental studies
D. P. Hubbard, *University of Otago.*

A survey of methods used, and results obtained for estriol determination in New Zealand
M. Lever and S. M. Peace, *Green Lane Hospital.*

Biochemistry

(Organiser: Dr. B. A. Tapper, DSIR Palmerston North)
Guest Lecturer: Professor F. Gibson, Department of Biochemistry, John Curtin School of Medical Research, Canberra.

Titles of Papers

Metabolism of polyadenylate containing RNA of polyribosomes from rat liver and hepatoma
J. W. Tweedie* and H. C. Pitot, *Massey University.*

Nucleic acid metabolism in cultured synovial cells
D. B. Myers* and D. G. Palmer, *University of Otago.*

The structure of casein micelles
G. P. Berry* and L. K. Creamer, *Deary Research Institute.*

Intracellular denaturation of unstable haemoglobin variants
C. C. Winterbourn, *Christchurch Hospital.*

The alpha chain of rat haemoglobin
C. G. Chua* and R. W. Carrell, *Christchurch Hospital.*

Proposed molecular basis for alpha-1-antitrypsin deficiency
O. F. Bell* and R. W. Carrell, *Christchurch Hospital.*

Interaction of the contractile proteins of muscle
C. L. Davey*, *Meat Industry Research Institute.*

Some properties of the succinate dehydrogenase of fungi
V. Boonsaeng*, M. G. Shepherd and P. A. Sullivan, *University of Otago.*

Intracellular protein turnover in thermophilic and mesophilic fungi
H. M. Miller* and M. G. Shepherd, *University of Otago.*

Laser light-scattering from biological macromolecules
R. Geddes*, J. D. Harvey and P. R. Wills, *University of Auckland.*

The effects of temperature-induced membrane phase changes on the kinetics of protein synthesis by cytoplasmic and mitochondrial ribosomes
N. R. Towers, *Ruakura Animal Research Station.*

Preparation of membrane fractions from sheep heart
M. R. Grigor, *University of Otago.*

Preparative gel electrophoresis of T5 messenger RNA
M. P. Bodger* and M. G. Smith, *University of Otago.*

The use of affinity chromatography for the purification of synthetic analogs of acyl carrier protein
W. S. Hancock, *Massey University.*

The use of circular dichroism for the study of ligand binding to proteins
Student Paper
J. E. Reeve, *Victoria University.*

Studies on the mechanism of action of an experimental anti-tumour drug
Student Paper
W. R. Wilson, *University of Auckland.*

The properties of a fructose diphosphate-requiring L(+)-lactate dehydrogenase from *Streptococcus lactis* C.10
Student Paper
V. Crow, *Massey University.*

The mechanism of transcriptional control in a eukaryote
Student Paper
A. Kootstra, *University of Otago.*

The separation of phenolic acids and flavonoids by thin-layer electrophoresis
J. R. L. Walker, *University of Canterbury.*

Applications of aroylhydrazines and aroylhydrazones in biochemical analysis
M. Lever, *Green Lane Hospital.*

Triglyceride structures in bovine milk fat
M. Taylor and J. C. Hawke*, *Massey University.*

Properties of lipoprotein lipase from bovine mammary gland
G. B. Deane and D. R. Husbands*, *Massey University.*

The biosynthesis of cyanogenic glucosides in higher plants
K. J. F. Farnden*, M. A. Rosen and E. E. Conn, *University of Otago and the University of California, Davis.*

Glycogen metabolism and degradation
R. Geddes*, K. B. Rapson and G. O. Stratton, *University of Auckland.*

Deacidification of wine with *Schizosaccharomyces pombe*
D. E. G. Sheat, *Ruakura Soil Research Institute.*

Glucose fermentation by *Bacteroides ruminicola*
D. O. Mountfort*, M. R. Howlett and A. M. Robertson, *University of Auckland.*

The kinetics of L-lactate oxidase
J. M. Sheat*, G. C. Wait, M. G. Shepherd and P. A. Sullivan, *University of Otago.*

Properties of apolactate oxidase from *Mycobacterium smegmatis*
Choong Yee Soon* and P. A. Sullivan, *University of Otago.*
Reserve Paper

Enzymatic methylation of tryptamines in the human
B. Bhikharidas*, I. Hood and R. Mann, *University of Auckland.*
Reserve Paper

Chemical Education

(Organiser: R. H. Hickford, University of Canterbury)
Guest Lecturer: Professor R. O. C. Norman, University of York.

Titles of Papers

Biochemistry and its organic foundations
D. E. Wright, *Ruakura Animal Research Station.*

Introducing organic chemistry
Prof. R. O. C. Norman, *University of York.*

Wood pulp
A. F. Wilson, *N.Z. Forest Products Ltd.*

Terpenes
E. Dansted, *Ivan Watkins Dow Ltd.*

Fats
S. G. Brooker, *Abels Ltd.—Auckland.*

Oil
A. A. Turner, *Shell Oil N.Z. Ltd.—Wellington.*

Electrochemistry

(Organiser: Professor G. A. Wright, University of Auckland)

Titles of Papers

High temperature aqueous electrolyte concentration cells
D. D. Macdonald, *Victoria University.*

Electrode kinetics and electrodeposition of aluminium in diethyl ether solution
W. B. Earl* and E. B. Goodwin, *University of Canterbury.*

The Electrical Conductivity of Molten Organic Salts as a Function of Temperature and Pressure
R. J. Speedy and A. F. M. Barton*, *Victoria University.*

Electrical Conductivity of High Temperature Aqueous KCl Solutions
S. K. Fellows, S. I. Smedley* and J. W. Tomlinson, *Victoria University.*

Electrocrystallisation of thallium halide films
R. B. Williamson and G. A. Wright*, *University of Auckland.*

Gas Chromatography

(Organiser: Dr. P. G. Robinson, University of Auckland)

Titles of Papers

Programmed temperature gas chromatography of petroleum products
B. E. Jackson, *Chemistry Division DSIR.*

Steroid analysis by gas chromatography: medical applications
M. G. Metcalf, *Christchurch Medical Unit.*

Fatty acid analysis — A review
P. G. Robinson, *University of Auckland.*

Capillary column chromatography
J. A. Jabkiewicz, *Forest Research Institute.*

A novel method of analysis for oxalic acid
H. Young, *Plant Diseases Division DSIR.*

The application of GLC to morbid toxicology
P. Nelson, *Chemical Division DSIR.*

Inorganic

(Organiser: Dr. J. E. Fergusson, University of Canterbury)

Titles of Papers

The effect of solvent on reactions of dicobaltoctacarbonyl and the cobalt tetracarbonyl anion with chlorosilanes and related compounds
P. H. Crozier, B. K. Nicholson*, B. H. Robinson and J. Simpson, *University of Otago.*

Tertiary phosphine and arsine chalcogenide derivatives of the group VI metal carbonyls
E. W. Anscough, A. M. Brodie, A. R. Furness, E. N. Baker, and B. R. Reay, *Massey University.*

Some new thermochromic chlorocuprates (II)
D. W. Smith, *University of Waikato.*

Some further results in the study of the tritium labelling reaction of hydrocarbons on the surface of gamma-irradiated silica gel
A. L. Odell, *University of Auckland.*

Some reactions of C_2N_2 and NO in hydrogen flames
J. Mulvihill, *University of Canterbury.*
Student Paper

Polysilyl derivatives of pentacarbonyl manganese
B. K. Nicholson and J. Simpson*, *University of Otago.*

NMR studies of the configurations and conformations of some nickel (II) complexes of tetra-aza macrocycles
N. F. Curtis, *Victoria University.*

Bonding in nickelthiourea complexes
R. W. Olliff, *University of Auckland.*

The single-crystal electronic and electron spin resonance spectra of catena-μ-bis (1, 2-diphenylphosphinyl) ethane-dichloro copper (II)
B. J. Hathaway and P. G. Hodgson*, *University of Canterbury.*

The use of nuclear and electronic resonance scattering methods to determine the site positions of impurity atoms in crystal lattices
J. H. Johnston and J. F. Duncan, *Victoria University.*

The use of model compounds to study aspects of the structure and bonding of biological copper
T. N. Walters, *University of Auckland.*

Co-ordination of unsaturated fluorocarbons to transition metalse-structural aspects
J. Browning, R. C. Countryman and B. R. Penfold, *University of Canterbury.*

Organic

(Organiser: Dr. G. J. Wright, University of Canterbury)

Titles of Papers

A study of acetate participation in acyclic epoxide systems
J. M. Coxon, M. P. Hartshorn and W. H. Swallow*, *Chemistry Division DSIR.*

Cyclopropane protonation
J. M. Coxon* and M. A. Battiste, *University of Canterbury.*

Substitution and rearrangement reactions of azoles
M. R. Grimmett, *University of Otago.*

Expoxidation of 3α, 5-cyclo-5α-androst-6-en-17-one
R. C. Cambie, *University of Auckland.*

Triterpene acids of *Neopanax arboreum*
B. F. Bowden, *University of Auckland.*

The analysis of cannabinols in the blood
N. K. McCallum, *Chemistry Division DSIR.:*

Metabolism of maize kernels during dry storage
Students Paper
M. Vickers, *University of Waikato.*

The reaction of 1, 4-quinones and quinone imines with secondary diazo compounds; the structure of alleged cyclo-propa-arenes
B. Halton, *Victoria University.*

The reactions of DDT and analogous compounds with various bases in various solvents
Review Lecture
D. J. McLennan, *University of Auckland.*

A new naphthalene tetrachloride
G. W. Burton, P. B. de la Mare* and M. Wade, *University of Auckland.*

Mass spectra of some diterpene acetals
P. D. Woodgate, *University of Auckland.*

Thallium (I) in syntheses
P. S. Rutledge, *University of Auckland.*

Conference Symposia

Abstracts of Papers

WOOL

General Review of the Wool Industry

W. S. Simpson
Wool Research Organisation

Wool ranks among New Zealand's export products, but only 3 percent is consumed in local manufacturing. Our wool is distinct in type from most other national clips, but is nevertheless very diverse in length, diameter, colour, etc. A major rationalisation of the marketing of wool is emerging as a pressing necessity. R and D related to wool problems is largely sponsored by grower countries through IWS channels sited close to manufacturing and consumption centres. Problems peculiar to N.Z. wool products and processing industries and some basic research are carried out by WRONZ staff.

In physical and chemical terms wool is complex, but considerable progress has been made in defining its structure, reactivity and the potential for modifying its performance. By virtue of the relatively high costs of production and processing, wool must largely be sold in high-priced goods, and the R and D and marketing objectives must continue the search for new attractive or unique products which can command a premium price. An important aspect of this work is addition of new properties to wool to satisfy specialised markets as they emerge.

Flame-resistant articles are one typical example. Luxury carpets, the woolly sheepskin market, baby and medical care lambskins do not compete directly with products from other fibres. Interest is growing in wool as a filtering material in industrial uses, mopping up oil spills, and in cigarettes. Better use of waste wools and by-products such as wool wax can also improve the economics of wool usage. Important fundamental problems remain to be solved to improve certain products, and some of these will be discussed.

Technology of the Woolscouring Industry

R. G. Stewart
Wool Research Organisation

The woolscouring industry in New Zealand has grown rapidly in the last seven years to the point where a substantial proportion of our wool is exported in the scoured state. The reasons for this rapid growth are complex but include the fact that the New Zealand operation is carried on in an efficient manner with modern equipment, and also that overseas users of our wools are often happy to have us deal with the pollution problems associated with scouring.

After a brief description of the equipment used and the material removed from the wool during scouring, the paper describes some of the problems arising from the nature of the effluent produced and the by products which may be extracted prior to or during effluent treatment. Mention is also made of the other wet processes which may be carried out on wool concomitant with the scouring step. Further work to widen the scope of possible treatments would do much to encourage growth in the export of scoured rather than greasy wool, to the benefit of the New Zealand economy.

Chemistry of Wool Wax

I. L. Weatherall
Wool Research Organisation

Greasy wool contains 5-15 percent by weight of wool wax. Only a small proportion of the available wax is recovered in New Zealand. That fraction of the wax which is recovered from aqueous scour liquors is known as wool grease and has many end uses, the major ones being as a lubricant additive and in the cosmetic industry. For this latter use the wool grease is converted to lanolin by refining it to modify a number of properties.

The reaction of wool grease with alkali is carried out on a large scale industrially in order to convert the esters of which the wool wax is composed into the constituent fatty acids and alcohols.

The mixed acids have not been completely characterised but have been shown to contain n-acids, iso-acids, anteiso-acids and two groups of α-hydroxy acids.

The alcohol fraction contains both aliphatic and polycyclic alcohols. The former group contains n-alcohols, iso-alcohols, anteiso-alcohols and two groups of alkane—1, 2-diols. The polycyclic alcohols are represented mainly by cholesterol, lanosterol and a number of related compounds. The mixed alcohols from wool grease are of commercial value in the cosmetic industry; however, because of the complexity of the mixture, the development of economically viable methods for the isolation of pure steroidal components remains difficult.

The chemical studies on wool wax being carried out at the Wool Research Organisation are directed towards confirming and extending earlier work in order to provide the information necessary for improvements in the economic recovery of the wax and its more valuable components.

Colouration and Bleaching of Wool

J. L. Hoare
Wool Research Organisation

The visible reflectance of ordinary unmodified wool is much lower, particularly in the violet-blue region, than that of polyacrylo-nitrile or other similar synthetic fibres. Wool therefore is duller and yellower, which reduces the attractiveness of undyed and dyed textiles produced from it.

Moreover, the incipient yellowness of wool is often increased substantially during growth or as a result of modification by dry heat, steam or sunlight during processing or use. The synthetic fibres on the other hand are comparatively inert chemically and show much less tendency to yellow. Also they can be effectively whitened by impregnation with optical brighteners which fluoresce in the violet-blue region. Optical brightening of wool is less effective due to quenching of the fluorescence and inducement of yellowing as a consequence of photo-oxidation.

Assuming wool can be stabilised by chemical modification it is doubtful whether the treatment would be economical or that the virtues of warmth, handle, etc., would remain substantially unimpaired. Hence wool will probably always compare unfavourably in some respects with the synthetics as a substrate for dyeing. However, the affinity wool has for a wide range of dyestuffs remains a strong point. Furthermore, progress is being made towards improving the colour performance of wool in specific areas.

Promising avenues include—

(i) application of extremely light-fast pigment dyes within a thin surface layer of polymer for curtains and upholstery

(ii) mild photo-bleaching of wool using blue light and selected reducing agents

(iii) optimisation of rapid, continuous and inexpensive bleaching treatments

(iv) development of dyeing techniques to inhibit yellowing and facilitate the production of fast, bright shades.

Sheepskin Technology and Sliping

G. W. Vivian
Leather and Shoe Research Association

The technology, the limitations and advantages of the traditional sulphide/lime paint method for depilation of wool skins are outlined and discussed. Current LASRA work shows that the normal time delay between painting and pulling of approximately 16 hours can be reduced to 2 hours. Conditions for this rapid processing are outlined. Some ideas are put forward on possible future developments in the fellmongering industry.

The rapid growth of the wool skin tanning industry, its products and how these are affected by the types of skins available to the industry are discussed. Products meeting specifications drawn up by the N.Z. Wool Board and LASRA for tanned wool skins can be labelled with the Wool Mark.

Flameproofing of Wool

P. E. Ingham
Wool Research Organisation

Although, in comparison with other textile fibres, wool is not generally regarded as flammable, the increasing severity of consumer safety legislation in many countries requires flameproofing treatments for wool in some particular end uses.

The commercially used flameproofing treatments, based on mordanting wool with transition metal salts, are effective, easy to apply and inexpensive compared to treatments for cotton and most synthetic fibres. Wool pyrolysis studies have indicated that flame retardants function by catalytically altering the thermal decomposition pathway to produce volatiles of lower flammability.

Polymer Modification of Wool

A. J. McKinnon
Wool Research Organisation

Among the possible types of chemical modification which might be applied to wool are those involving the use of polymers. In the case of New Zealand crossbred wools for carpet applications, modification by internal polymer deposits through a wool-specific in situ addition polymerisation offers particular benefits in reducing fibre costs for a given standard of carpet performance. A process which achieves this has been developed by Wool Research Organisations' personnel, in collaboration with the IWS. It is carried out in a conventional dyeing machine concurrently with dyeing, thereby producing maximum economy. Polymer add-ons in the region of 50 percent are employed, and the usual polymer is a 4 : 1 styrene-butyl acrylate copolymer which possesses the optimum combination of fibre properties for processing, end-use performance, and cost. Such a polymer costs about 38c/kg compared with about 200c/kg currently for carpet wool blends, and extensive carpet testing has shown that this added polymer performs equally as well as wool in many constructions. Certain specific performance features may also be feasible and the attainment of these is being investigated.

Our favoured process involves a complicated chemical initiation step, the details of which are currently still obscure. Some aspects of the initiation, as well as the final distribution of the polymer in the fibre and its effect on fibre properties, will be discussed.

PASTORAL FOOD PRODUCTION

In this symposium pastoral food products have been interpreted as meaning dairy products and meat products. An attempt has been made to briefly review these two industries, both their present status and prospects for the future; to indicate the involvement of chemistry, chemical engineering and biochemistry at the research, development and application levels; and to demonstrate by a few specific examples, the interplay of fundamental and applied research in the development and expansion of these industries.

Dairy Products Today and Tomorrow

W. A. McGillivray
Dairy Research Institute

This paper briefly outlines the present status of the New Zealand dairy industry, and indicates likely trends for the future. The dairy industry has gone through a remarkable change over recent years, and is likely to change at an even greater rate in the future as it meets the challenge of changing markets and market requirements.

The most significant recent changes have been associated with the development of specialty products, each tailored to the requirements of particular customers. This has been particularly apparent in the milk powder and milk protein fields, but the same emphasis is now extending to other dairy products, particularly the predominantly fat-based products. These changes require the application of a high level of scientific and technological skills, spanning a wide range of different scientific disciplines, but particularly involving chemists, biochemists and chemical engineers. The New Zealand dairy industry is particularly well organised to adjust to changing markets and customer requirements, but to obtain the full benefit of this flexibility requires, to a rapidly increasing extent, the involvement of scientifically-trained personnel at all levels from the manufacturing floor to the marketplace.

The Future of Meat as a Universal Food

N. H. Law
Meat Industry Research Institute

Interactions of Milk Proteins

L. K. Creamer
Dairy Research Institute

The proteins of milk fall into two major classes; the caseins and the whey proteins. The caseins, which account for 75 percent of the protein, are normally aggregated into micelles. The interactions leading to micelle formation are only partially understood but are known to be very dependent on the protein environment. The whey proteins are globular and exist as monomers or dimers. They are held in their native configuration by covalent disulphide bonds and they do not change their structure with minor changes in the environment. However they are sensitive to heat and they denature irreversibly with the disulphide bonds now linking different protein molecules together. One of the micelle components, κ-casein, can react with the whey proteins in this manner, and this reaction is of particular significance in the dairy process industry.

Accelerated Glycolysis in Muscle Through Electrical Stimulation

B. B. Chrystall
Meat Industry Research Institute

Anaerobic glycolysis in muscle can be accelerated by electrically stimulating the muscle. Massive stimulation hastens rigor mortis and thereby allows earlier chilling and freezing without problems of cold shortening. The degree of acceleration is determined by current and time relationships.

Electrical stimulation of lamb carcasses has been carried out "on line" without difficulty. By stimulating on the bleeding rail, the carcass passes into rigor as dressing continues. There are no problems during dressing if current-time variables are chosen so that the carcass becomes stiff 40 minutes after death.

The tenderness of early frozen electrically stimulated lamb, after one month's frozen storage, is comparable with that from a normally conditioned carcass.

Application of Protein Chemistry to the Development of a New Product

W. B. Sanderson
Dairy Research Institute

A fundamental knowledge of the nature and behaviour of milk proteins is essential in the development of new products.

The relative heat sensitivity of the whey proteins can be used in producing a number of new protein products which have a high nutritive value and a range of "functional" properties. When skim milk is heated to a relatively high temperature, the whey proteins denature and are consequently co-precipitated with the casein when the milk is either acidified to the iso-electric point of the casein or treated with calcium chloride. The co-precipitated material can then be washed and dried. By adding whey to skim milk prior to processing, the ratio of whey proteins to casein in the final produce can be increased.

Without further processing such co-precipitates are relatively insoluble. They can, however, be modified by the addition of various alkalies or complex phosphates to produce material which is soluble or dispersible to a varying degree depending on the processing conditions used.

Future Protein Industries

R. D. Batt
Massey University

The main chemical resources presently of economic value in New Zealand are the biological compounds in our major exports of meat, wool, cheese, butter and forest products. Proteins represent approximately 50 percent of the total dry weight and more of the total value of these exports. The refining of proteins from biological raw materials is a limited industrial activity in New Zealand, and is confined almost entirely to casein, rennin and gelatin production. Some large and expanding industries have been established overseas based on protein isolations and purifications and it would seem logical to promote the development of similar industries in New Zealand. An example of such an activity, often quoted, is insulin production. Other possibilities will be discussed.

However, although suggestions for such industries are numerous and often obvious, a major problem in establishing such industries would be the supply of the scientific and technical manpower to develop and operate the industrial processes. The training of science graduates specifically in the fields of protein chemistry and biochemistry has been a major theme at Massey University and some aspects of these training programmes will be described.

A By-Product Industry

N. H. Clarke
Massey University

Pasture as a Direct Source of Food Products

E. L. Hove
Applied Biochemistry Division, DSIR

Fresh green pasture grass contains all the nutrients known to be needed by Man with the possible exception of vitamin B_{12}. Profiles of the nutrient densities of green leaves of common plant species show a nearly perfectly balanced food, abundant in essential amino acids, lipids, vitamins, macro-elements and trace-elements. Permanent pastures of the world produce nutrients equivalent to the annual needs of 40 times the present world population. New Zealand's pastures alone produced protein and other nutrients in 1971 equivalent to the needs of over 1,700 million people! Pastures yield two or five times more dry matter and protein than do other crops at about 10 percent of the unit cost. If only men could, like King Nebuchadnezzer in the Book of Daniel, eat grass!

A challenge to food chemists to produce fibre-free and safe human-food products from green leaves was first clearly stated by T. B. Osborne et al. *(J. Biol. Chem. 49*:63) in 1921. These innovators prepared protein concentrate by treating lucerne juice with ethanol. The filtered and washed precipitate had half the protein of the original plant; it was colourless and was not denatured so that its functional properties were retained.

In a second process developed by N. W. Pirie the protein from grass juice is precipitated with steam at 80°F. The filtered, washed and dried product retains chlorophyll-derived pigments with their dangerous photosensitising properties. The denatured protein has lost its functional properties, lessening its usefulness in human foods. Our Division in DSIR has a pilot plant at Lincoln where Dr. Russell Allison is perfecting techniques to produce quantities of this green protein concentrate for animal-feed purposes.

In a third procedure, which I am developing, a large rotary mower will blow shredded pasture clippings directly into a tanker of isopropanol. This solvent removes water, pigments and fat. The protein from the dry, colourless, bulky, pulped grass is extracted in warm alkali without denaturing, precipitated with acid and filtered; or alternatively the alkaline solution of the grass protein can be forced through orifices into an acid bath to produce threads of grass protein in the way now used to produce spun soy protein for the simulated meat industry overseas. The "Hoveprocess" has several advantages. It eliminates autolytic changes since only a few minutes separates harvesting from the stable dry state; it eliminates the costly pressing of grass and handling of the unstable juice. The treatment of the dry, discoloured grass is patterned on the successful process for soy-protein isolate, and the product retains functional properties that are vitally important in the food industry.

Protein foods for man can be produced from green pastures as first suggested by Osborne 52 years ago. The cost will be high, and certainly not less than $3/kg (the cost of spun soy-protein isolate) even though the production cost of the raw protein from green grass is only 3c/kg. A high level of chemical technology will be required for ultimate development, but in the far future man will probably eat processed grass in large quantities.

FOREST PRODUCTS SYMPOSIUM—

The Present State of the Industry

A. F. Wilson
N.Z. Forest Products Limited

This paper will summarise the processes now used to make pulp and paper in New Zealand. Details of current production capacities and outputs of pulp, paper and by-products will be given.

The paper will emphasise the important contribution that chemists and chemical engineers have made to this industry. Most of the senior production and technical management positions are held by chemists or chemical engineers, and the industry looks for a continuing supply of these graduates from the university system. Examples will be given of the types of work being done by graduates in the industry.

While there are many chemistry graduates working in the industry, very few of them are members of the New Zealand Institute of Chemistry. This is a reflection of the geographical separation of the major mills from the cities in which Institute branches exist and of the fact that the industry's graduates have their own strong technical association, Appita, The Australian and New Zealand Pulp and Paper Industry Technical Association. Hence there is a need for better contact with Institute members, particularly

university-based members who may be working on projects related to the industry's interests.

The Bleaching of Kraft Pulps

R. J. Fergus
N.Z. Forest Products Limited

The bleaching of brown kraft pulps to high white pulps is a costly exercise requiring high capital investment in both bleach plant equipment and bleaching chemical generation plants.

Bleaching chemicals used include chlorine, sodium hypochlorite and chlorine dioxide.

Methods to generate these chemicals and the reactions of these chemicals with lignin are described. Current bleaching processes are discussed and new developments such as oxygen bleaching are briefly discussed.

By-Products Utilisation

G. J. Leary
Chemistry Division DSIR

A tree has a large number of chemical components. The principal one, cellulose (43% in *Pinus radiata)*, is used to make paper in the Kraft pulping process, and two others, tall oil (1%) and turpentine (1%) are isolated as by-products. Other components, bark (about 12%), lignin (25%) and hemicellulose (20%) are used to varying degrees in wood and paper products.

The composition, isolation and utilisation of tall oil, turpentine, bark, lignin and hemicelluloses are discussed. The value of New Zealand's different wood and paper products is assessed in terms of yield.

Effluent Disposal in the Forest Products Industry

W. J. Mitchell
Tasman Pulp and Paper Company Limited

Extensive effluent treatment facilities have been installed at New Zealand's two largest pulp and paper mills situated at Kinleith and Kawerau. The effluent resulting from the pulping, bleaching and papermaking processes has great volume and is high in oxygen demand. Some streams are highly coloured, others contain suspended solids, either fibrous or inorganic.

The effluent treatment system at Tasman Pulp and Paper Company's mill in Kawerau is designed to remove solids and reduce oxygen demand. It consists principally of a clarifier which removes solids, a settling basin where these solids are collected, and a series of mechanically aerated lagoons in which micro-organisms consume the readily assimilable dissolved organic substances before the effluent is discharged to the Tarawera River.

The treatment system at New Zealand Forests Products Kinleith Mills employs similar basic features but differs in some important details. Initially there is segregation of effluents of different types, so that only the solids containing effluents are sent to the clarifier, while the highly coloured effluents from kraft pulping and bleaching processes are sent to a ponding system. Much of this effluent, which has a high oxygen demand, soaks away in the porous limestone country. The remainder is treated in aeration lagoons before final discharge into an arm of Lake Maraetai.

Whilst these systems efficiently remove suspended solids and reduce the oxygen demand of the effluent to acceptable levels they do not remove the aesthetically objectionable colour. Both Companies have investigated means of doing this. At Tasman these investigations have included the use of

(1) activated carbon
(2) a proprietary polymeric absorbant
(3) treatment with burnt lime
(4) flocculation with aluminium sulphate.

All these treatments reduce colour, but having regard to the large volumes of effluent none is considered economically practicable.

Research Work : Forest Products

J. M. Uprichard
Forest Research Institute

The structure and chemistry of wood, and the scope of forest products research in New Zealand are described. Research work in the fields of wood chemistry and pulping chemistry, by government laboratories, the universities and industrial laboratories are reviewed. Topics discussed include the carbohydrates of *Pinus radiata* and *Nothofagus* species, extractives in these woods and some aspects of lignin chemistry. The extent of cooperation between research groups and future research areas is indicated.

Future Resources of the Forest Products Industry

Malcolm Conway
Deputy Director General of Forests

The present level of production in the forest products industry of New Zealand, and planned short term expansion, are governed by the rate of planting of exotic species 25 to 45 years ago. Exotic sawn timber production will increase substantially in the next two decades, but unless short pulpwood rotations are adopted no major pulp and paper development in new areas, based on exotic resources, is envisaged before 1990. Only untapped, indigenous, hardwood resources offer an opportunity for major expansion in the pulp and paper field before that date. Associated with increased, exotic sawn timber production will be increasing supplies of forest and mill residues suitable for reconstituted wood products or for export as chips.

The area of exotic forest has increased from 1.0 million acres in 1950 to 1.5 million acres in 1973. At current levels of planting 2.0 million acres will be established by the end of 1980, and 3.0 million acres is not an unrealistic estimate for the year 2000. Thus the raw material resources available in the period 1990 to 2025 will be sufficient to support several industrial plants of today's size and output. However, the availability of other resources may dictate the scale and timing of such developments. These include finance, associated capital works, power, water and skilled manpower.

The chemist has a wide and varied role to play in the establishment and utilisation of forest resources, beginning with site preparation, maintenance of soil fertility and pest and disease control. His field extends into preservative treatment of timber, development and use of adhesives, and improvements in paints and clear finishes. In the pulp and paper field his work is vital in increasing the yield of pulp, in chemical recovery, in the use of extractives, and in bleaching processes. His final contribution, more and more demanded of him, lies in the reduction, elimination or disposal of pollutants.

MINERALS

Chemistry in the Mineral-Based Industries : A Review

A. J. Ellis
Chemistry Division, DSIR

Chemistry is basic to the development of most mineral-based industries. Overseas techniques and information are not always directly applicable to New Zealand situations, and there is a need for our own resources of basic knowledge and research. However, successful basic research is only a first step to a successful mineral industry, and team work is important, involving scientist, mineral engineer,

industrialist and market researcher. To have a mixture of long-term basic research and product-orientated mineral investigations within an organisation has many benefits, as bright ideas have a financial significance only in the right setting. A motto of "market research first" may eliminate many projects and allow a more profitable re-allocation of limited man-power resources. Successes and problems encountered in a wide variety of New Zealand mineral-based projects are discussed under the headings of prospecting, asaying, separation procedures, chemical upgrading, processing, and effects on surroundings.

Imports, Exports and the Mineral Industry

I. D. Dick
Department of Mines

Current Research Problems in Mineral Development

T. Marshall
Chemistry Division, DSIR

Opportunities for and problems involved in mineral development are discussed from the viewpoint of companies interested in undertaking mineral exploration, production and marketing. Various phases of such exercises are discussed briefly in order to emphasise specific problems, examples of which are drawn from recent mineral development exercises in New Zealand. The main areas and types of research required to attack these problems for the national benefit of New Zealand are then summarised.

University Research Related to the Mineral Industry

J. F. Duncan
Victoria University

This paper will discuss the kinds of contributions which the universities can make to the development of the mineral industry in New Zealand with examples.

These contributions may be summarised under the following headings:

(a) Investigational work related to specific problems of immediate interest.
(b) Work in analytical chemistry designed to develop new methods of control and assay.
(c) Investigations of background topics related to developing industries.
(d) Stimulation of new possible industries arising out of university research per se.
(e) Use of development programmes designed to educate the students in the needs and ways of thinking of industry. These can be collaborative at the research level, or didatic on the undergraduate level.
(f) Consultative activities related to specific problems in industry.

The conditions under which these several types of operation may be successfully conducted will be highlighted using examples from the Chemistry Departments of several New Zealand Universities.

New Materials and Products for the Concrete Industry

R. A. Kennerley
Chemistry Division, DSIR

For major construction concrete offers advantages of low relative cost, availability, use of local materials, versatility and durability. However, certain of the properties of concrete, namely, strength to weight ratio, rate of strength gain, tensile strength, volume stability and resistance to cracking, are in need of improvement. Recent technical advances have resulted in the production of new materials, e.g. lightweight concretes, regulated-set cement, workability and set-controlling admixtures, fibre-reinforced concrete, polymer impregnated concrete and cements for shrinkage-compensating concrete or for self-stressing concrete. These have assisted in correcting the above deficiencies. While it may not be possible on economic grounds to manufacture all of these materials in New Zealand, they are all likely to be used here. Hence an understanding of their chemistry is necessary to enable them to be used efficiently with existing materials.

The growing demand for structural-grade lightweight concrete is likely to be met by the development of pumice concrete, and also by the possible production of lightweight aggregate by the heat treatment of shales and waste fly ash from coal-burning power stations. Chemical problems related to these processes and to the supply of fly ash and a moderate-heat portland cement will be discussed.

It is considered that there is scope for the development of calcium silicate products locally, but that in many cases the economics of production would be marginal.

Research for the Ceramics Industry

P. K. Foster
Pottery and Ceramics Research Association

The New Zealand ceramics industry and the development of its Research Association is outlined. The need for New Zealand research in materials and their processing is emphasised, together with the complementary nature of research in the Association, in individual companies and in universities. Many years of succesful research have led to diminishing demands for further research relevant to the processing of ceramic clays. The processing problems outstanding are described, and the important fields of research related to the application of ceramics are reviewed. The major advances by individual manufacturers are described.

Requirements fro Further Research in Iron and Steel Development

N. T. Evans
New Zealand Iron and Steel

New Raw Materials and New Products in the Fertiliser Industry

J. Rogers
New Zealand Fertiliser Manufacturers' Research Association

Since 1963 fertiliser use in New Zealand has increased by over a million tonnes per annum to a record level of more than two and a half million tonnes for the year ended 30 June 1973. There have been important changes in the sources of supply of the major plant nutrients S, P, and K. Christmas Island now supplies over 30 percent of the phosphate rock, usage of which now exceeds a million tonnes. Research on Christmas Island phosphates has been an international exercise and mention will be made of important contributions coming from U.S.A. and Australia as well as Chemistry Division, DSIR, and F.M.R.A. in New Zealand. In future phosphate rock may also be used by the fertiliser industry in New Zealand from Queensland and Chatham Rise deposits.

The expansion of New Zealand's capacity to manufacture superphosphate is expected to continue to be accompanied by increasing use of imported potassium and nitrogen fertilisers. Possible diversification will be discused into manufacture of other materials based on sulphuric acid, and phosphates other than the aluminium and copper sulphates currently made, as well as liquids, slow release products and recovery of flourine from effluents.

The impact on the environment of the increase in size of manufacturing units—a 650 tonnes per day sulphuric acid plant is expected to come on stream in 1975 at Napier—will be discussed together with other environmental effects of fertiliser which makes New Zealand green, such as erosion control.

Invitations

University Club, Wellington,
87 Customhouse Quay,
Wellington.
Phone 58-435,
P.O. Box 5046.

This club opened in 1971 offers members the facilities of a chartered club and a growing list of additional benefits. Facilities include bar, dining-room, lounge and showers.

Members of other University Clubs who are visiting Wellington are invited to use these facilities. The Club is close to the Railway Station, NAC terminal and the centre of the city.

NZIC members who live in Wellington are invited to join the Club. Please feel free to call on the Manager and ask him to show you around.

5th National Convention

The Royal Australian Chemical Institute

Canberra—20-23 May, 1974

The Fifth National Convention of the Institute will be held in Canberra from 20th to 23rd May, 1974. The venue for the Convention will be the Australian National University.

Plenary sessions at the Convention will be centred on the theme "Chemistry and the Community," and will be addressed by leading Australian chemists.

Professor A. E. Humphrey, of the University of Pennsylvania, who is a world authority on Biochemical Technology, has been specially invited to address the plenary sessions on "Use and Mis-use of Technology," which will relate to the causes and cures for pollution problems.

The programme will also include symposia and meetings of the Divisions of the Institute covering the several branches of chemistry. Divisions wil participate in discussion panels to be held during the plenary sessions, with the objective of defining targets for directing the role of chemistry in the community over the next decade .

RILEM/IUPAC MEETING

Prague, Czechoslovakia, September 18-21, 1973

Pore Structure and Properties of Materials

Australian Corrosion Association
NEW ZEALAND BRANCH (Inc.)

FIELDS OF INTEREST: Materials Science, Plastics Technology, Electrochemistry, Surface Coatings, Metallurgy, Electroplating, Cathodic Protection, Engineering Design and Construction.

The Corrosion Association is a technical society concerned with the corrosion and protection of materials of all types.

Scope of Activities

Corosion is defined as the degradation of materials by chemical or electrochemical reactions with the environment. The Corrosion Association takes a broad view of the corrosion field, and the following are some of the topics studied in recent years:

(a) Materials: metals, alloys, plastics, cement, concrete, stone, wood, paper and textiles.

(b) Corrosion types: general corrosion, differential aeration, crevice, galvanic, electrolytic, bacterial, pitting, cavitation, inpingement, stress-cracking, hydrogen embrittlement, atmospheric, marine, and other types of attack.

(c) Protection systems: electroplating, anodising, galvanising, metal spraying, painting, surface coatings, inhibitors, cathodic protection, etc.

Membership

The Corrision Association has 730 members throughout Australasia; 65 of these are members of the New Zealand Branch, which is based at Auckland but has members over the whole country. About half the members are companies or public authorities (Post Office, Railways, Navy, Harbour Bridge, etc.) with a special interest in the corrosion field.

Meetings

Monthly meetings are held on a variety of subjects related to corrosion science and engineering.

Publications

The Corrosion Association publishes a monthly journal, **Australasian Corrosion Engineering**, which contains technical papers and articles on corrosion and protection. In 1971 the journal contained seven technical papers and two notes originating from the New Zealand Branch. Many of these contained information about local corrosion problems.

In addition, the Corrosion Association publishes a Corrosion Directory, and a booklet on corrosion fundamentals for students. The association subscribes to international journals which are held in the Auckland Industrial Development Division, DSIR, library, and bibliographies of corrosion books are available.

New Members

Membership is open to all those interested or involved in corrosion technology. Application should be made to: The Secretary, Australasian Corrosion Association, P.O. Box 5961, Wellesley Street, Auckland.

THE NEW ZEALAND INSTITUTE OF CHEMISTRY (INC.)

BALANCE SHEET AS AT 30TH APRIL, 1973

1972 $				1972 $			
	CURRENT LIABILITIES				**CURRENT ASSETS:**		
105	Sundry Creditors	185.00		35	Petty Cash Funds	33.21	
178	Subscriptions Received in Advance	334.50		3804	Bank of New Zealand	1,912.42	
400	Royal Institute of Chem- Funds held in advance	400.00		930	Subscriptions in Arrears	1,146.00	
				274	Sundry Debtors	377.00	
				247	Publications on Hand	671.01	
				80	Advance — Conference	—	
(683)	**TOTAL CURRENT LIABILITIES:**		919.50	(5370)	**TOTAL CURRENT ASSETS::**		4,139.64
	SPECIAL FUNDS:				**TRUST FUND INVESTMENTS (AT COST):**		
140	Education Fund (School Bulletin)	140.00		93	Post Office Savings Bank	95.65	
181DR	Overseas Visitors Fund	373.70		1000	Hutt County Council, Redemption Loan	1,000.00	
				1500	Lyttelton Harbour Board Loan	1,500.00	
(41DR)			513.70	(2593)			2,595.65
	TRUST FUND:				**GENERAL FUND INVESTMENT:**		
2590	Balance 30/4/72	2,592.89		1000	North Canterbury Hospital Board Stock	1,000.00	
3	Plus interest credited	2.76		3000	Bank of New Zealand Ltd. — Term Deposit	5,000.00	
(2593)			2,595.65	(4000)			6,000.00
	ACCUMULATED FUNDS:				**FIXED ASSETS (AT COST):**		
7240	Balance 30/4/72	8,795.98			Office Equipment 317.80		
1556	Excess of Expenditure over Income for year	34.54			Less Depreciation 264.80		
(8796)			8,761.44	66		53.00	
					Addressograph Plates 62.35		
					Less Depreciation 60.35		
				2		2.00	
				(68)	**TOTAL FIXED ASSETS**		55.00
$12031			$12,790.29	$12031			$12790.29

We have audited the books of The New Zealand Institute Of Chemistry (Inc.) for the year ended 30th April 1973, and have received all the information and explanations we have required. In our opinion, according to the best of our information and the explanations given to us as shown by the books of account, the Balance Sheet, Income and Expenditure Account, and Trust Fund Account are properly drawn up so as to give a true and fair view of the state of the Institute's affairs as at 30th April, 1973.

SHANAHAN AND WINDER

Chartered Accountants

Members are reminded that exemption from payment of the annual subscription is available on application to Council to all members over 65 years and to those over 60 years who have retired and have paid at least 10 years subscription.

THE NEW ZEALAND INSTITUTE OF CHEMISTRY (INC.)

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH APRIL, 1973

1972 $	EXPENDITURE:			1972 $	INCOME:		
	Administration Expenses:			7367	Subscriptions — Annual		7,505.45
1218	Printing, Stationery, Postages, Tolls etc.	2,471.89			**Interest Received:**		
950	Salary, Registrar	1,200.00		228	Bank of New Zealand	264.84	
666	Travelling Expenses	929.54		192	Local Body Stock	191.88	
535	Honoraria (Less Proportion charged to Journal)	535.00		(420)			456.72
360	Branch Expenses Allowances	700.00		10	Donations		—
150	Audit Fees	165.00		120	Examination Fee		—
50	Donation — S.A.N.Z.	70.00		10	Net Proceeds Sundry Publications		401.10
20	Royal Society of New Zealand — Membership Fee	20.00		—	Excess of Expenditure over Income for Year		34.54
16	Depreciation	13.00					
—	Donation — N.Z. Institute of Engineers	50.00					
(3965)			6,154.43				
	PUBLICATIONS:						
4889	Cost of Journal	5,079.90					
1140	List of Members	—					
6029		5,079.90					
—3623	Less Revenue from Advertising	2,836.52					
(2406)			2,243.38				
1556	Excess of Income over Expenditure for Year		—				
$7927			$8,397.81	$7927			$8,397.81

OVERSEAS VISITORS TRAVELLING FUND

275	Balance, 30/4/72	180.92	548	Conference Profits		625.28
454	Travelling Expenses Paid During Year	70.66	181	Balance, 30/4/73		—
—	Balance, 30/4/73	373.70				
$729		$625.28	$729			$625.28

THE NEW ZEALAND INSTITUTE OF CHEMISTRY

(INCORPORATED)

Notice of Meeting

ANNUAL GENERAL MEETING

to be held at the University of Canterbury

Thursday, August 23, 1973, at 4.30 p.m.

D. J. Hogan

Acting General Secretary.

Points of View on Membership

Technician Membership and The Institute

Chemistry is both a science and a profession. At present election to corporate membership of the Institute publicly provides evidence of a chemist's right to be regarded as a professional. What this right may mean is open to various interpretations, just as the value an individual member will place upon the right may vary. Sufficient that from the beginning the Institute's standard of entry has been jealously guarded, and in consequence the professional standing of the membership is high.

We are now faced with a relatively new practitioner of chemistry — the well trained holder of a New Zealand Certificate in Science. Because of the nature and standard of the training, the holder is sought after for some work in preference to university graduates. It is proper that this should be so, the roles of the technician and the graduate are complementary, not equivalent.

The excellence and the market demand has led some to postulate an unlimited role for the technician in the future of the Institute. It is well to mark the actual level of subject treatment required by the New Zealand Certificate in Science. At the University of Canterbury it equates at best to no more than three first year subjects.

If in a particular area job equivalence appears to exist it is because one or the other technician or graduate is wrongly trained, wrongly placed.

In seeking to fulfil its role as the voice of New Zealand chemistry the Institute must beware that there is no weakening of its standing as a professional body. It is the stature, the wisdom, the expertise, the ethics of those who make and administer the rules that provide the yardstick by which the professional world judges the quality of the body corporate.

The constitution of the Institute is a subtle one; one which permits every member to mould the decisions of Council yet enables Council to govern unhampered by the strictures of annual general meetings. It is a constitution admirably suited to a scattered membership, and to an age in which meetings attract but a fraction of those entitled to attend.

For many members the frankly professional objects of the Institute are the ones that are of prime importance. Just as the possession of a degree attests the holder's academic ability, so does the possession of corporate membership attest the holder's professional ability and his standing amongst chemists. It is effectively a confirmation of the holder's right to practise the profession of chemistry, a right that is not lightly awarded and which is held only at the pleasure of Council.

Such an award is no better than the standing of the Council that confers it. If the Institute is to retain its professional stature it is essential that its Council remains a body of professionals. Currently membership is divided upon the extent to which technicians should participate in the affairs of the Institute.

Like the raw graduate the holder of a newly acquired certificate needs professional guidance and training. The Institute would be unwise to lose the chance of bringing the technicians under its aegis. The Institute would be just as unwise to risk erosion of its role as arbiter of professional ethics and standards. In seeking to assist the technician it must not become an institute of technicians.

At present technician numbers are relatively low but if the Certificate in Science is to achieve its purpose the technicians must outnumber the professionals. (In engineering the target ratio is set as high as four to one.) The suggestion that suitably qualified technician members should have full voting rights needs close scrutiny. Full voting rights can mean full control by the majority, and eventually the majority could be technicians.

Because of the disparity in training, qualifications and aims, I can see no justification for placing graduates and technicians in a common probationary grade.

I suggest that status is as important to the career technician as it is to the career graduate. If this is so, the Institute is the logical body to confer the status and set the standards. These standards need to recognise the specialist role of the technician chemist and they need to be as stringently set and as jealously guarded as the Institute's existing grades. The abbreviation Assoc. N.Z.I.C. should carry the same guarantee of a properly educated, properly trained technician as does M.N.Z.I.C. confirm the Institute's approval of a professional chemist.

The constitution of the Institute provides full opportunity for branch members to make Council aware of their views. There is nothing to prevent technicians transmitting their views to Council through the Branch Delegate.

However if the Institute is to retain its role as a professional organisation I think the majority of branch committee members, and all the administrative offices, from Branch Secretary to President must be chosen from the corporate membership.

For the technician member who seeks professional status the way is already open via Rule 9.3— a path which will be of increasing importance to those who initially lack the strict qualification for Graduate membership but the sum of whose experience fits them for corporate membership.

JOHN POLLARD

Technician Entry to N.Z.I.C.

With the approval of the President, this memo sets out the Membership Committee's belief that Council must first establish the objectives of the Institute and the criteria by which the various possible means of entry to N.Z.I.C. must be judged; some examples of the types of criteria in our minds are given.

The Need for Objectives and Criteria

It is vital that our first discussions and arguments, and subsequent agreements, are on these aspects. If we each apply different yardsticks to the same proposals, we could get in a terrible mess. The Membership Committee's concern is therefore that before proceeding to consideration of ways and means, Council should discuss and agree on the tapemeasure to use. We have to face up to the question "What sort of Institute do we want to have in the next ten years?" before we can consider how we might achieve it.

Branches are therefore urged to come to Council in August, having given due consideration to these matters.

Examples

What we mean can perhaps best be shown by the following, explanation and comment being given in parenthesis. These are suggested as a basis for discussion, addition, subtraction, amendment etc.

1. To maintain and protect the rights and status of the present members within the Institute. (This is our first duty. It does not mean that short term losses cannot be offset by longer term gains. But overall, the present membership must not lose).

2. To maintain and protect the democratic rights of corporate members. (At present, members ⇌ branch ⇌ Council is the route for expressing views, making proposals etc. It is rather crafty that Council has all the power — e.g. changing rules, — and AGM's have none. This ensures that the rank and file in all Branches can and should be consulted before decisions are taken. We spell this out because we believe it vital that alterations to Council — e.g. technician representation — should not substitute anything inferior to the present system).

3. To offer status and privileges to career technicians, and the professional members.

4. To recognise the complementary roles of technician and professional. (We include here our belief that any system (Institute or employment) should enable a first class technician to feel just as proud of being what he is as for a professional. They are **different**, and both necessary to the chemical world. It is the fact that they are generally on a lower salary, as well as being different, that makes it particularly difficult to combine the two into one organisation without feelings of class distinction. But the first objective above is overriding).

Membership Committee

J. S. Pollard
P. K. Foster
G. A. Wright.

Institute Composition

Branches have been asked by the Membership Committee to consider, before Council meets in August, what sort of Institute we want to have, fulfilling what sorts of functions.

The "hardy annual" in this sort of thing is "learned society" vs. "professional body". The former looks after branch meetings, conferences, specialist groups etc. The latter looks after membership, rules, professional standing etc.

It occurs to me that some analysis of Institute structure might help in understanding different viewpoints of different branches and in pointing out that the Institute consists of sub-groups with vastly different attitudes to the two broad classes of function given above.

As far as the latter is concerned, chemists in school and university teaching, in government, in research associations and in technical institutes are in a very different category from chemists in industry, in existing by and large in fair-sized groups with their own status system and having no cost of living salary battles to fight. There must tend to be corresponding indifference to the professional functions of the Institute, and greater interest in the learned society activities. The chemist in industry will be in the reverse isolated situation with reverse interests.

I thought it was therefore worth analysing the sample provided by the last (1971) salary survey, to give some estimate of the structure of the Institute by Branches and employment groups. In the following analysis of the 594 returns, branches are compared by comparing the ratio of industry numbers to the sum of those on Government salary scales of one sort or another.

Table 1. Numbers of members

	Industry	"Government"	Total	Industry / "Government"
Auckland	73	71	154	1.03
Hamilton	4	26	30	0.15
Palmerston North	4	47	51	0.09
Wellington	49	93	155	0.53
Christchurch	26	74	104	0.35
Dunedin	10	27	40	0.37
Other	40	19	60	2.10
	206	357	594	

The main comments I have are:

1. The information is based on a sample of about 2/3 of the active membership at the time.

2. The "Other" group would include those not employed in main centres e.g. a dairy factory in Waikikamukau. As would be expected this group has far the highest proportion of industry members. It would also have much the least chance of getting to meetings, sitting on Branch Committees etc.

3. The Branches are very different in membership structure as well as in size.

4. The "Industry" group is a substantial fraction of the membership.

P. K. Foster,
Salary Survey Committee.

Obituary

Maurice Fieldes

D.Sc., FRSNZ

Dr. Morice Fieldes, Director of the Soil Bureau, died suddenly at his home in Wellington on June 4. His passing is mourned by many colleagues and friends who will long miss him for his outstanding scientific and human qualities.

Morice Fieldes was born in Nelson in 1914 and was educated at Nelson College, winning Senior and University National Scholarships. He graduated with honours in physical chemistry from Canterbury in 1935. His D.Sc. was awarded in 1957 for research in clay mineralogy. In 1972 he was elected a Fellow of the Royal Society.

Dr. Fieldes spent 10 years in the Dominion Laboratory, then 2 years with Watson Victor Limited. He joined the Soil Bureau in 1948.

Since joining the Soil Bureau, Dr. Fieldes has written 50 scientific papers and made a major contribution to changing soil science from a largely interpretative study to one firmly based on physical and chemical measurements. Some of his papers were on instrumentation as he had introduced many new techniques for clay and soil studies. However, his main achievements are in clay mineralogy and the concepts he has evolved are fundamental to the understanding of New Zealand soils. The associated concepts of soil weathering are widely accepted throughout the world.

More recently he turned to the amorphous constituents of soils and his series of papers on allophane have been extremely influential, particularly in areas like Japan, Canada, the western United States and western South American where there has been volcanic activity.

Among his other interests were the application of research findings in agriculture, and work with graduate students as an honorary lecturer at the University. In 1956 he spent a year at Oxford University with an Underwood Fellowship and with the late Dr. R. K. Schofield developed ideas on mechanisms of reaction on active sites on soil colloids. In 1964 he was again overseas and was invited to join a NATO advanced study group in soils and engineering. He was a Consulting Editor to "Geoderma".

Dr. Fieldes was appointed Director of the Soil Bureau in 1966, his predecessors being Drs. L. I. Grange, N. H. Taylor and J. K. Dixon. As Director, he concentrated on improving standards of scientific work in the Bureau and maintaining it in the front line of world soil research.

Personally, he had continued the development of his constitutional approach to soil classification and has organised the laboratory services necessary to provide the definitive measurements required. He had also developed a field test for measuring amorphous clay constituents, including allophane. This has thrown new light on the complexity of soil mapping units and soil classification in New Zealand, and is being used by soil scientists in many countries.

Recently Dr. Fieldes has been developing a new approach to land-use planning through evaluation of catchment pressures. He recently discussed this at a meeting in Rome of the Working Party on Soils for the "Man and the Biosphere" Conference. While in Europe he also attended a special Council Meeting of the International Society of Soil Science where his experience in New Zealand proved valuable in the formulation of plans for the better use of soil science in national and international land planning.

In his scientific work and in the application of soil science to practical problems of land use and land planning, he has made a major contribution to the welfare of New Zealand.

BRANCH NEWS

Auckland

The Hon. C. J. Moyle, Minister of Science, addressed the Auckland Branch at a luncheon meeting held on 4 May—a summary of his speech is reported elsewhere in this Journal.

The development of the School of Medicine in Auckland has been of considerable benefit to chemists. Not only have chemists found employment there but also the school has provided a new source of excellent speakers for branch meetings and the interaction between chemists, biochemists and members of various medical subdisciplines. In each case where such a speaker has addressed the branch, the latest being Associate Professor W. R. McLeod, an excellent meeting has resulted.

The branch has been active in raising various issues at council meetings. The more notable being:—The plight of Dr. Levich, who has been denied his rights as a citizen and as a chemist; the change in membership structure (Associates are now called Members); and rules governing membership. The branch committee supports the view that those chemists qualifying for N.Z.C.S. should be admitted into the Institute—an issue which must be resolved within the next eighteen months.

Dr. P. Nelson reports that 108 people attended an excellent Food Chemistry Symposium held in May.

The 1974 Annual Conference of the Institute will be held in Auckland. This coincides with the Golden Jubilee of the Institute from its beginnings as the Auckland Chemical Society. One of the original members Mr. L. S. Spackman addressed the branch on "Biodegradability of Detergents" on August 7th.

Forthcoming Auckland Symposia are:

6 September—Corrosion in Steam Generating Systems—Australasian Corrosion Association—Mr. R. J. Anderson phone 74-730.

16 October—Gas Chromatography—Danish House—Dr. P. Nelson phone 379-987.

23, 24 October—Recycling of water, chemicals and other waste materials—Auckland Technical Institute—Mr J. G. Fletcher phone 34-899.

Auckland Courses

Modern methods of Chemical Analysis—A short refresher course for Teachers and Industrial Chemists.

9-12 a.m., Tuesdays 4th September to 9th October inclusive—Auckland Technical Institute—Mr. J. G. Fletcher phone 34-899.

1974—Food Science Course for N.Z.C.S. or university chemists will again be offered by the Auckland Technical Institute to provide tuition in Food Technology—Mr. R. B. Page phone 34-899.

Personal

Dr. G. A. Bowmaker attended a Varian E.S.R. equipment course at Otago University. The University of Auckland expects delivery of a Varian ES4 instrument later this year.

Mr. J. K. Johannesson attended the second Australasian Symposium on Analytical Chemistry held in Sydney during May.

Waikato

Waikato University

Two recent appointees to the Chemistry Department are—

Dr. Derek W. Smith, a lecturer in inorganic chemistry, who graduated B.Sc. at St. Andrews in 1965 and D.Phil. at Oxford in 1968. He was I.C.I. Research Fellow at Sheffield University during 1968-70 and a lecturer at this university 1970-72. His interests are structure and bonding in transition metal compounds especially of copper (II).

Dr. Peter C. Molan, a lecturer in biochemistry, who graduated B.Sc. at Cardiff 1965 and Ph.D. at Liverpool in 1968. After 1968 he was a lecturer at Liverpool Dental School teaching pre-clinical biochemistry and doing research on proteins in saliva, a continuation of his doctoral work on metabolism of bacteria in saliva.

Ruakura Agricultural Research Centre

Dr. Everitt Payne has been appointed Head of the Chemical Section, Ruakura Animal Research Station, upon the retirement of Mr. Norman Clare. His principal interests will be in the development of a hormone assay group and in lipid metabolism of farm animals. Dr. Payne received his B.Sc. (Hons) and Ph.D. in Biochemistry from the University of Queensland. Before being appointed to Ruakura he spent several years in the Biochemistry Branch, Animal Research Institute, Brisbane, Queensland where he was in charge of the Clinical Biochemistry section working on lipid metabolism of ruminants and on urea toxicity in ruminants.

Recent arrivals at the Nutrition Centre—

Mr. C. R. Parr, a technical officer with British Higher National Certificates in

both Applied Physics and Applied Biology, who is concerned with the operation of calorimeters.

Dr. Henry Ostrowski who was formerly a lecturer in animal nutrition in the University of Cracow and at the State Experimental Station, Lublin, Poland. He was particularly interested in the amino acid requirements of pigs, and with protein extraction from herbage. After a year at the Rowett Institute working on amino acid metabolism in stock he visited pilot scale plants for protein extraction from lucerne in Sweden, Denmark and Hungary before coming to Ruakura at the beginning of this year on a three year National Research Advisory Council Fellowship. He is continuing his interests in protein extraction from herbage.

Dr. George Mitchell is working with Dr. John Hutton on calcium metabolism of lactating cows. He is a Hayes-Fulbright Fellow from the University of Kentucky, Lexington who is primarily interested in the vitamin A needs of livestock.

Dr. Peter Hanratty has returned from three years with the Department of Animal Science at the University of California, Davis, where he worked with Professor Garrett studying the energy requirements of pregnant ewes for his Ph.D. He is now studying the effects of changing the date of lambing on the rate of gain of condition, and looking at the feasibility of lambing twice in one year or three times in two years.

At the Fertility Centre there has been considerable recent expansion. C.I.B.A.-Geigy has given $40,000 for three years to support research into the action of drugs to induce calving. With this grant 1700 sq. ft. of laboratory space has been built and a Research Fellowship at the University of Waikato created for a veterinarian to work with Dr. Bob Welch. Cattle and equipment have also been acquired from this grant.

The first Research Fellow is John Hunter, a graduate in veterinary science from the University of Queensland who was in practice in Cambridge (N.Z.) for five years and who is now studying hormonal changes in cows calving naturally and following injections of drugs.

Very recently the same company has given a further $2000 for studies on calcium in the blood of cows near to calving.

Associated with this work are—

Dr. A. J. Peterson, a First Class Honours graduate in zoology from the University of Canterbury who completed a Ph.D. at McDonald College, Montreal where he held a Commonwealth Scholarship. His doctoral studies were on oestrogens in poultry and he is now studying these hormones in cattle. He is a National Research Advisory Council Post-doctoral Fellow.

Dr. J. F. Smith, graduated B.Sc. and Ph.D. in agriculture at Sydney where he studied reproductive physiology. He then spent three years of post-doctoral study in the University of Western Australia where he was particularly interested in prostaglandins and oestrogens in reproduction of cattle and sheep. These interests are continued at Ruakura.

Alan Pearson is also a Canterbury graduate in zoology with an M.Sc. with Distinction. His interests here are in physiological indicators of stress and he is particularly concerned with adrenalin.

Susan Hudson is also working in the same general field of stress indicators although her main concern is with corticosteroids. She has a M.Ag.Sci. with Honours from Lincoln.

Also at the Fertility Centre but engaged in work with different emphasis and associated with Dr. Ronald Kilgour are Geoffrey and Leslie Syme, a husband and wife team who came here after doctoral studies in the Psychology Department of the University of Canterbury. Their present interest is in psycho-pharmacology.

Also concerned with animal hormones is R. J. Fairclough, who works in the Chemical Services Section with Dr. Everitt Payne, establishing a hormone measuring laboratory using protein-binding and immuno-radio-assay techniques for steroids, protein hormones and prostaglandins. Bob Fairclough graduated M.Sc. with Honours in Chemistry from Auckland and after a year on the staff of the Chemistry Department he worked for his Ph.D. with Professor Liggins in the Department of Obstetrics and Gynaecology of the National Women's Hospital developing techniques for measuring hormonal changes in pregnant sheep.

The Soil Chemistry Section

Dr. Eric Forbes has returned from post-graduate study in the University of Western Australia where he worked with Professor Quirk on the reactions of copper, cadmium, zinc and mercury with constituents of the soil clay fraction.

Dr. Mat. John stayed for four months while on sabbatical leave from British Columbia's Department of Agriculture. He came here from the University of Western Australia to study retention of selenate and selenite by New Zealand soils with Mr. Frank van der Elst and Dr. John Watkinson in a project investigating the use of selenised fertilisers as a means of preventing selenium deficiencies in stock. Dr. John's experience with heavy metal toxicities from industrial pollution was consulted during his stay.

Dr. S. Rajan, a National Research Advisory Council Fellow, who was associated with soil fertility studies in sugar cane in Hawaii, is studying the kinetics of phosphate fixation by soils.

Other recent appointees at Ruakura—

Dr. Pat Holland, who graduated B.Sc. (Hons) from Canterbury, gained his Ph.D. in radiation chemistry from Queen's University, Ontario, in 1970. He came to Ruakura in 1972 to study the movement and transformation of nitrogen in soils. More recently how-

ever he has been concerned with the acquisition, setting up and operating a gas-chromatogram / mass-spectro meter, in which field he has nine years' experience.

The GLC-MS which Pat Holland is using is a Varian-MAT CH-5, a high sensitivity instrument acquired partly with Golden Kiwi funds. It will be used in studies on insect attractants, flavours in wines and dairy products, fungal metabolites, plant toxins, and with N^{15} in work on soil and rumen nitrogen.

Dr. Max Sutton, who gained his B.Sc. (Hons), M.Sc. and Ph.D. at Leeds, joined the Spectrochemical Section in 1972. His Ph.D. was in flame chemistry with Dr. G. Dixon-Lewis. From Leeds he went to the University of Canterbury where he worked as a Post-doctoral Fellow with Professor Leon Phillips from 1966-68, studying atom-molecule reactions in a mass spectrometer/flow discharge system. In 1968 he went as a Research Associate to the Centre for Research in Experimental Space Science at York University in Toronto, and carried out upper atmosphere research with Professor H. I. Schiff. He went back to Britain in 1969 to Shell Research Limited, Chester, where he studied nitric oxide pollution problems, and he then returned to New Zealand to work with Eric Allan. Currently Max is investigating the chemical processes which occur in flames of importance in spectrochemical analysis work.

Manawatu

Professor R. E. Corbett, President of the N.Z.I.C., addressed the May meeting of the branch.

A branch meeting was recently held at New Plymouth. Dr. G. W. Butler, Director, Applied Biochemistry Division, DSIR, spoke on the "Non-Medical Use of Drugs". The meeting was most successful, enabling Palmerston North members to maintain contact with those from Taranaki.

Massey University

Recent visitors to the Department of Chemistry, Biochemistry and Biophysics have included Dr. L. G. Hepler, Chemistry Department, University of Letheridge, Alberta, Canada and Professor H. L. Kornberg, F.R.S., Department of Biochemistry, University of Leicester.

The department is sponsoring a "Winter Programme on Chemistry Teaching to Sixth and Seventh Forms". The first meeting was addressed by Mr. N. Halstead, Dannevirke High School, (The Integration of Organic Chemistry into the overall University Entrance Chemistry Syllabus) and Dr. A. M. Brodie, Massey University (From Prussian Blue to Ferrodoxin). Dr. R. T. Gallagher, Massey University, demonstated some organic experiments.

Dr. Magnus Pike, Manager, Glenochil Research Station, Distillers Co., Scotland, visited the Department of Food Technology. Dr. Pike is noted in the area of food science and nutrition. He spoke to the Food Technology Conference on "Food Health and Biochemistry".

N.Z. Leather and Shoe Research Association

The New Zealand Leather and Shoe Research Association (Inc.), has built new laboratories and pilot tannery on the DSIR Palmerston North campus. The move from the Gracefield Laboratory was completed recently.

The association, formed by the tanning industry in 1928, provides a number of services for its members. Research work embraces investigations into diseases affecting hides and skins, fellmongering and the preservation of hides and skins, the numerous processes involved in leather production, and some aspects of footwear.

A pilot plant for effluent treatment is being designed for the pilot tannery; investigations into fellmongery and tannery effluents will become an important part of the association's work.

The Director of the Association is Dr. G. W. Vivian. The staff of 15 will increase to 20, including 8 graduates, within two years. This staff, now working in the well sited and equipped laboratories, will have the expertise available at DSIR and at Massey University for the planning and carrying out of co-operative research projects of value to the association's members.

Applied Biochemistry Division, DSIR

Dr. J. Gooden has been appointed to work on the nutritional biochemistry of dietary lipids in ruminants and applications of this knowledge to the quality of ruminant products. Dr. Gooden has recently completed a Ph.D. at the University of Sydney where he examined the development of lipolytic enzyme activity in the newborn calf, and the mechanisms of fat absorption and lymph formation.

Dr. R. W. Bailey is spending 12 months at the University of Trier-Kaiserslautern, Western Germany, where he is working on some problems of biosynthesis of structural polysaccharides in plant cell walls. While in Europe he will also look at research being carried out on the utilisation of bark, sawdust and seaweed.

Dr. W. T. Jones is spending 15 months at the A.R.C. Unit of Animal Physiology, Babraham, where he will study protein foams and membrane properties in relation to the problem of bloat in cattle.

Other

Dr. K. R. Whittle has taken up a position as tutor at the Palmerston North Technical Institute. He recently gained his Ph.D. from Auckland University.

Wellington

Victoria University of Wellington—Biochemistry Department

Dr. H. D. Ellerton presented a paper at the Australian Biochemical Society annual conference held in Canberra from May 21 to 24.

Professor J. N. Smith left Wellington on 25th June for 3 months sabbatical leave in Britain. Whilst overseas, he will be attending the Ninth International Congress of Biochemistry being held in Stockholm, Sweden.

Chemistry Department

Professor C. Spangler, Northern Illinois University, who is interested in thermal rearrangements of organic compounds, is visiting the Department from August 1973—January 1974 to collaborate with Dr. Halton.

The Department was pleased to receive a visit from the Minister for Science on 26th May. Opporunity was taken to draw his attention to projects of specific significance in the New Zealand scene which are currently under investigation and to the Department's interest in assisting with research of applied character.

Institute prizes for 1972 have been awarded to Miss S. J. Byrne and Miss T. S. Chuah.

Otago

Meeting with the Vice-Chancellor

The June meeting of the Otago Branch was a social function held in the Staff Common Room at the University of Otago. Following dinner, the Vice-Chancellor of the University, Professor R. O. H. Irvine, gave a lecture entitled "The University of Otago—Prospects for the Future". About sixty members and wives attended.

Secondary School Lectures

About one hundred and fity secondary school sixth and seventh formers from the Dunedin area attended the first secondary school lecture this year which was given by Professor G. B. Peterson. The second given by Dr. B. Peake on July 13 entitled "Chemistry and the Moon" was supported by a film on the Apollo 13 mission. The final lecture will be given by Dr. R. G. Cunninghame who will discuss "The Artist's Palette—Colour in Inorganic Chemistry".

Chemistry Department, Otago University

Dr. D. P. Hubbard joined the staff of the Chemistry Department on May 21st as a lecturer in analytical/physical chemistry. Dr. Hubbard is a graduate of the University of Sheffield and has been on the staff of Sheffield Polytechnic since 1967, where he was a Senior Lecturer in Analytical Chemistry. His research interests are in inorganic analysis, principally in the areas of atomic absorption and fluorescence spectrometry and electroanalytical techniques.

Professor R. Ferrier, of Victoria University of Wellington visited the Chemistry Department in June. He gave a lecture entitled "The Wander Lust in Carbohydrate Chemistry".

Another university visitor in June was Dr. G. Rowmaker of the University of Auckland. His lecture was entitled "New Methods for the Analysis of Infrared Vibrations".

Professor P. W. West, Boyd Professor of Chemistry at Louisiana State University, Baton Rouge, gave a lecture in the Chemistry Department in June entitled "Analytical Methods for the Evaluation of Air and Water Quality". After the lecture members had an opportunity to discuss problems in pollution analysis with Professor West.

Open Days

The Departments of Chemistry and Biochemistry were open to the public on July 17th and 18th from 2-5 p.m. and 7-10 p.m. All advanced undergraduate teaching laboratories were open and functioning normally. Some special demonstrations were arranged in each laboratory, and Ph.D. and Part 3 students acted as guides for visitors.

May and Baker New Appointment

James F. Emerson has been appointed Auckland Fine Chemicals Representative of May & Baker (New Zealand) Limited.

Mr. Emerson, formerly a Senior Technician at Massey University, came to New Zealand eight years ago from Portland, Oregon, U.S.A. He is now resident in Auckland and is responsible for the promotion of May & Baker's Laboratory Chemical, Pharmaceutical Chemical, and Photographic Product ranges, in the northern half of the North Island. Mr. Emerson is 30 years of age, married with three children, and lists hunting, fishing, sailing, and the collection and restoration of antique furniture, as his recreational interests.

Report on the speech of Hon. C. J. Moyle, Minister of Science, to the Auckland Branch on May 4.

"The chemists today are tomorrow."

The Minister opened his speech with the statement: "I personally see the chemist as very much the man of tomorrow in New Zealand." He pointed out that New Zealand's primary exports depended very much on the chemist's expertise. Better chemistry would lead to labour saving on the farm and in the processing factory as well as the production of agricultural chemicals etc.

As a result of the increasing processing of our basic products and raw materials there would be increasing opportunities for chemists and chemical engineers who have three main roles in export industries: (a) As innovators of new processes that will give added value to New Zealand raw materials, (b) as adaptors of overseas processes to suit local raw materials and facilities and labour and (c) as controllers of the quality of export goods.

The Minister expressed the desire to see Universities play a bigger role in those areas where New Zealand can get greater productivity and added value from our raw materials and basic products. "It is my impression that the Universities tend to became academic cloisters," said the Minister, "intellectually if not physically remote from the community." He accused universities of expecting students to learn irrelevant information and chanelling creativity into "blind alleys."

The Minister suggested that more research contracts could be offered to universities by Government Departments and by industry, hold more conferences on special subjects and consider establishing more research units in universities to investigate problems of national importance. "We could make more use of university staff on the management committees of research associations and similar bodies," the Minister continued. He called for much greater reaction between Government departments and universities such as departmental scientists appointed as honorary lecturers at universities, to give a few lectures a year in their specialty; that Ph.D. students should do part of their research in department laboratories that have facitities etc. He acknowledged that this financial year the DSIR has contributed several thousand dollars each to the cost of the scanning electron microscope in the Department of Engineering at Auckland and to the cost of the electron probe in the Department of Geology, also at Auckland, and other contributions to other universities.

The Minister concluded by repeating the basic policy statement of the Labour Party on science and research in an election manifesto.

"Science and research resources are vital to the growth and development of New Zealand's economic, industrial and social progress. It is essential that the personnel in this field work in an environment which offers maximum opportunity to use their talents and, at the same time, to take their full share of the responsibility in the nation's development.

FOOTNOTE:

Professor P. B. D. de la Mare and Professor R. N. Brothers replied to the Minister's criticisms in the New Zealand Herald.

Auckland branch chairman Mr. K. Hopgood is Chairman of an Auckland Manufacturers Association, DSIR, Auckland Technical Institute, University of Auckland Liaison Committee, which is considering methods of better relations between these organisations. Committee members include: Mr. A. C. Kennett, Mr. O. H. Keys, Professor R. F. Meyer and Mr. J. G. Fletcher.

BOOK REVIEWS

Nature in the Balance—H. F. Hartman, N. Norman, A. Trippett and D. E. Weiss. Heinemann Educational, Australia 1972, 96 pages, hard cover $3.50 (Aust.), soft cover $1.95 (Aust.).

"The river Rhine, it is well known,
Doth wash your city of Cologne:
But tell me, Nymphs, what power devine
Shall henceforth wash the River Rhine?"

The authors of this magnificent little book began with this quotation from Coleridge.

The polemical literature of pollution, begun by Rachael Carson, has now assumed such proportions that another book at the popular level might well be expected to offer chemists little except more irritation. Writers, especially from the biological sciences, and journalists, have found it easy to point out the disastrous consequences ensuing from present population trends. Chemists, generally well aware not only of this but also of the demands made for improved technology can be forgiven for showing exasperation at much of the comment made on conservation issues.

This book was written by a committee of the Victorian branch of the Royal Australian Chemical Institute. This is not a textbook on environmental science, but it touches a wide range of scientific topics to show the scope of ecological, historical, economic, technical, and social considerations upon which any practical programme for pollution control must be based.

In their introduction the authors state—

"What is pollution? What is conservation? What is ecology? Why are they important?

To answer these apparently simple questions we have to consider some deeper ones: what are the natural processes on which life on this planet depends? How and why are we interfering with the natural balance? Without this understanding, we run the risk of complaining to the wrong people about the wrong things, of not noticing the real causes or even the real problems. We may also fail to take advantage of the technological weapons already available to us in our fight to protect the environment."

The book is divided into five parts. The first of these deals with the major transportation systems, water and air, and how biological nutrients are cycled. Food chains are explained and the concentration effect they have on pesticides.

Part Two contains the accelerating needs for food, fuels, raw materials and recreational facilities demanded by an exploding population.

Wastes from domestic sources, agriculture, industry, erosion and the ensuing problems form the substance of the third part.

Part Four discusses man's technological control of pollution. In particular the elimination of smoke, the problem of car exhausts, controlling heat pollution, the disposal of solid wastes, and the treatment of sewage are considered in some detail.

The final part deals with the consequences for man when his environment is modified. The effect of waste gases in the atmosphere on climate and public health are examined. Less obvious health problems, such as radiation and noise and the addition of nutrients to waterways and oceans, are outlined. In the final section the crucial and complex part played by human factors is opened up for discussion.

It is a major responsibility of chemists to state such problems in terms that laymen can understand and to comment on the effectiveness of technical solutions which may be suggested. This is what the book does particularly well.

Excellent photographs, an abundance of good but simple graphic material and diagrams from Australian sources easy to relate to New Zealand situations make this book of primary value to any chemist who may be involved in presentation of conservation principles to a general audience. The language is unemotional but compelling.

Teachers will find it highly relevant to the Forms III-V Science prescription and the reading level is within this range.

It is a pleasure to congratulate the Victorian branch of R.A.C.I. and the authors on performing a public service whose importance it would be hard to exaggerate.

T. R. Hitchings

Copies of the soft cover edition will be available shortly through the Registrar at about $2.20 to allow for postage.

Orders should be sent to him as soon as possible.

Silicon Chemistry and Applications—by C. A. Pearce. The Chemical Society, London, Monographs for Teachers No: 20, 1972, 74 pages. $2.00 (N.Z.).

This monograph is a brief, but good coverage of the chemistry of silicon, especially that relating to industrial applications. The book is both readable and well illustrated.

There are eight chapters covering the aspects; silicon in the periodic classification, elemental silicon, ferrosilicon and metal silicides, silicon carbide and silicon nitride, silica and silicon monoxide. The silicates, silicon halides and alkoxides and silicones and silylating agents.

The first chapter contains a concise and worthwhile survey of the reasons why the chemistries of silicon and carbon differ. However, it is worth recalling that the differences are not unique to this pair of elements, but are typical of the differences between the elements of the first and second short periods.

In the remaining chapters, the author has successfully blended the chemical and industrial aspects of silicon chemistry. Therefore, as a source of information on the relevance of silicon to the world we live in, and on the background chemistry, the monograph is recommended to teachers of chemistry at all levels.

J. E. Ferguson

UNIVERSITY OF OTAGO
DUNEDIN, NEW ZEALAND
ASSISTANT LECTURER IN INORGANIC CHEMISTRY

Applications are invited for the position of Assistant Lecturer in Inorganic Chemistry in the Department of Chemistry. Appointment will initially be for a period of one year.

Applicants should hold a Ph.D. degree or be about to complete a Ph.D. degree. The successful applicant will be expected to assist with the teaching of inorganic chemistry.

Salary Scales—

Assistance Lecturer — $4089-$5181 per annum.

Salary scales are subject to both triennial review and cost-of-living adjustments.

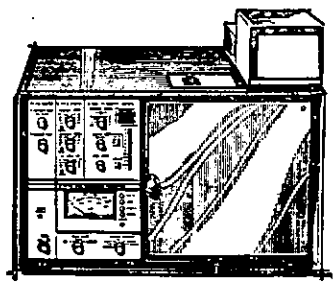
Further particulars are available from the undersigned:

Applications close on 1 SEPTEMBER, 1973.

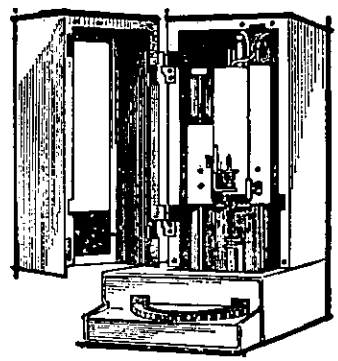
J. W. Hayward,
REGISTRAR.

---

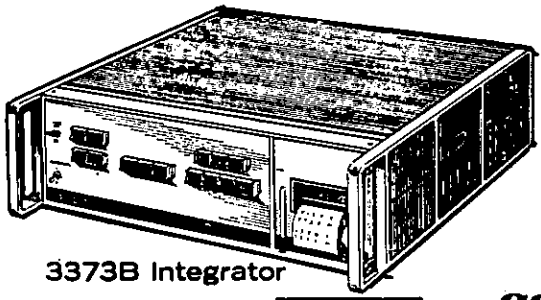
the Hewlett-Packard gas chromatography convenience equation



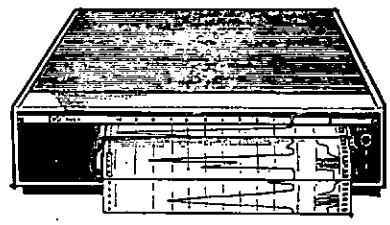
5700 Series GC



7671A Automatic Sampler



3373B Integrator



7123B Strip Chart Recorder

= **complete automated gas chromatography**

HEWLETT hp PACKARD

Dental and Medical Supply Co Ltd. Auckland, Wellington, Christchurch, Dunedin. 138A

Staff appointments

Shell offers employment to men and women with degrees in Chemistry, Civil or Mechanical Engineering, Agricultural Science, Commerce and Mathematics. There are also a few opportunities for graduates in other subjects, e.g. Economics, Law or Arts.

The Shell Group of companies, which operates in more than 100 countries, is engaged in New Zealand and throughout the world in the oil and chemical industries. Rapid development in both these industries requires competent and imaginative staff.

POSITIONS AVAILABLE

Most graduates will initially be employed in Wellington. Each will be appointed to a position best suited to his qualifications, talents and interests and will follow a planned programme to enable him to make best use of his knowledge and ability.

Employment with Shell is accepted as qualifying for corporate membership of professional Institutions or Societies.

CHEMISTS will begin in the Central Laboratory in Wellington on product development and testing, technical service, and the supervision of quality control; they may also be employed in chemicals marketing.

ENGINEERS are responsible for the design, development, construction and maintenance of oil storage facilities, processing plants, buildings, pipelines and road tankers.

AGRICULTURAL SCIENCE graduates are appointed to the Shell agricultural trade organisation, which is responsible for the development and marketing of petroleum products and chemicals for farming.

COMMERCE graduates are employed primarily in Finance, where the responsibilities include quarterly accounts, treasury, taxation, credit, investment, audit, payroll, costing, budgets and management accounting.

Shell operates an IBM 370/135 computer which provides opportunities for graduates with the necessary aptitude for systems analysis, programming, operations research etc.

Graduates are also employed in Marketing and Distribution.

ADVANCEMENT

As well as specialising initially in work for which he is qualified the graduate will be trained to take a comprehensive view of Shell activities to prepare him for more responsible work.

Shell Oil New Zealand Limited is staffed by New Zealanders, of whom the most able may be eligible for promotion to senior positions overseas. With individual recognition, supervision and guidance each graduate is encouraged to progress towards the most senior position he is capable of filling. His own efforts towards self development may be aided in several ways, including overseas training for the most promising men. Promotion is on merit and from within the Company.

SALARIES

Recognition of graduate qualifications is given in commencing salaries. It is Shell's policy to offer salaries and conditions of employment (including retirement benefits) at least comparable to those offered by other large firms.

ENQUIRIES

More detailed information is available in the booklet "SHELL GRADUATES". Copies of this booklet are available from Universities or Shell Oil New Zealand Limited.

Interviews can be arranged to suit any students who may be interested.

Enquiries should be addressed to:

The Personnel Services Manager, Shell Oil New Zealand Limited,
Shell House, The Terrace, P.O. Box 2091, Wellington.
Telephone: 45-060


WILTONS
FOR
● PRECISION
● ANALYTICAL
● ELECTRONIC
● MICRO AND SEMIMICRO
● SEDIMENTATION
sartorius
BALANCES
02
01
00
0
Tara
max 1600 g
AUCKLAND
WELLINGTON
CHRISTCHURCH
DUNEDIN

Whatever you require, in laboratory equipment and supplies, Phone Smith-Biolab NOW!

Auckland 483-039
Wellington 58-964
Christchurch 30-662

PROMOTIONAL RELEASE

COLE PARMER • MASTERFLEX® • TUBING PUMPS

New add-on heads

Flow ranges 0.1-272, 000ml/hour

New explosion proof model

Interchangeable heads

Ability to be used with — Tygon, Viton and Silicone tubing.

The Masterflex Pump set has been designed and assembled to fulfill virtually any peristallic pump requirement. It includes the Variable Speed Controller and Pump Drive, together with four sizes of Standard Masterflex Pump heads.

Pumping rates up to 2280 mls per minute are available in four ranges —

1.8-36m/min. 24-480ml/min. 50-1000ml/min. and 114-2280ml/min.

PRICE: $420

DEMONSTRATIONS CAN BE ARRANGED ON REQUEST.

SMITH-BIOLAB

PRODUCT NEWS

GRANT WATER BATHS

We have just received copies of Grant's 1973 Catalogue, a copy of which may be yours on request. If you are not already familiar with Grant, the following is just a small section from their range — Thermostatic Controlled Water Baths with either bimetal thermostat, all electronic thermistor controller, contact thermometer and solid state switch.
Shaking baths 0-100°C.
Low temperature baths −30 to +70°C.
High temperature baths 50 to 300°C.
Thermostatic Circulators SC10 +20 to +80°C.
LC10 −10 to +50°C.

JAMES A. JOBLING

James A. Jobling offer a wide range of glassware, and we are proud to offer these from stock:
Pyrex: borosilicate glassware.
Emil: volumetric glassware.
Quickfit: jointed glassware.

The 1973 Jobling catalogue and price list are available on request. We are also sole New Zealand Agents for Jobling's "Q-Rig" — laboratory scaffolding.

This scaffolding has universal application. We will be happy to send you detailed information.

REMEMBER—contact SMITH-BIOLAB for all your JOBLING glassware—always available from stock.

'marford' Water Still

This standard automatic still has the following features:—
3 Models—All standard components.
Capacities— 4 pint per hour
7 pint per hour
12 pint per hour.

Automatic balance cutoff switch for water supply failure.
Continuous bleed off to minimise scale deposits on boiler liner.
Two year guarantee.
Available ex-stock.

PRICE: $200.00

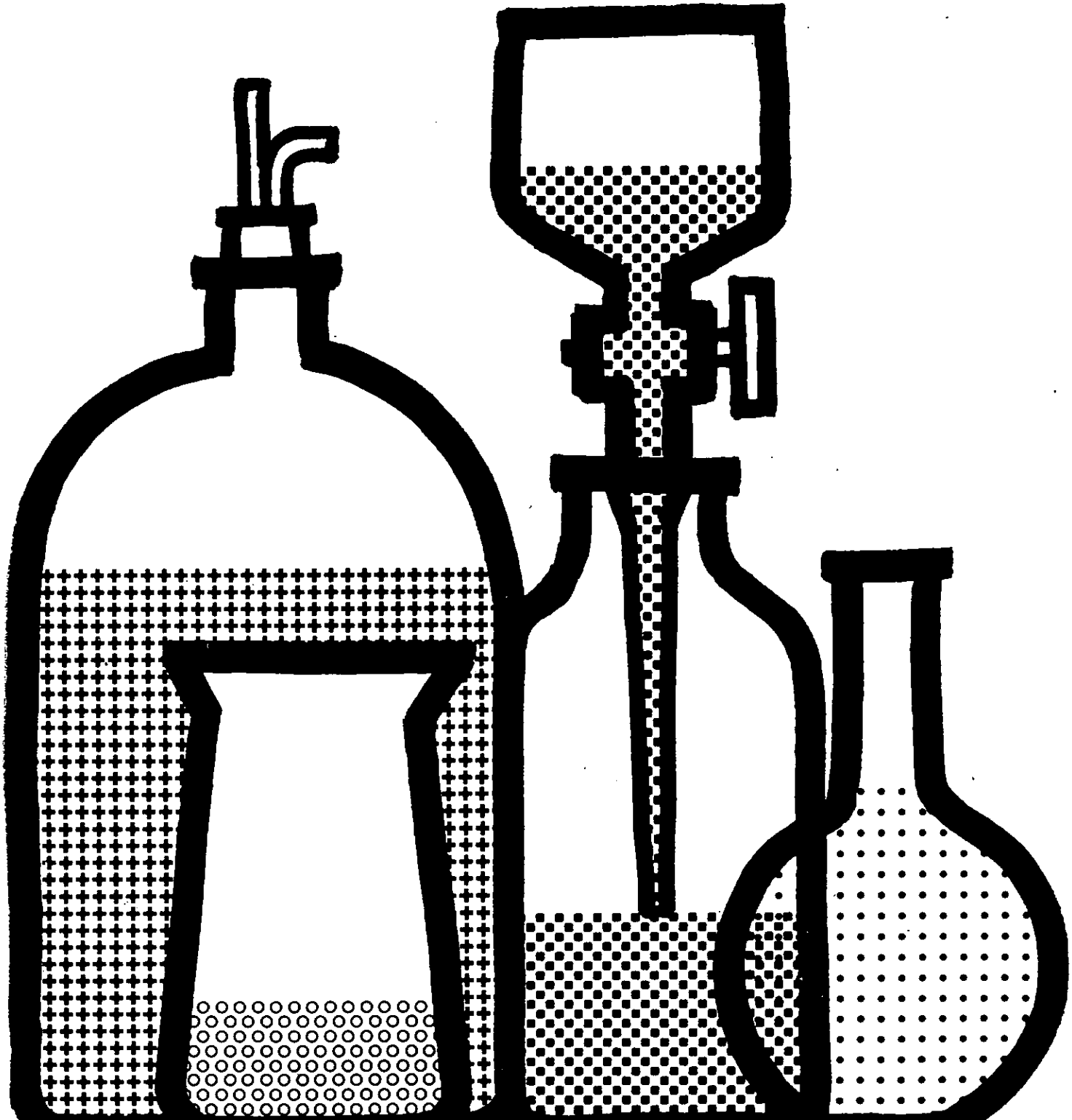
SMITH-BIOLAB LTD
PO Box 36007 Auckland 9 New Zealand

Unilab Laboratory reagents

Univar Analytical reagents

Your guarantee of quality in the laboratory

Ajax Chemicals Limited.
New Zealand Distributors:
Townson & Mercer (NZ) Limited,
Geo W. Wilton & Co Limited.



special gases and gas mixtures now available from NZIG

To meet the increasing demand for high purity gases and special gas mixtures, NZIG have established an Analytical Services Department to supply, analyse and prepare special gases and gas mixtures.

Some of the specialised applications for the vast range of gases available from NZIG include—inert atmospheres, gas chromatography, atomic absorption and laser gases; gas mixtures for biological atmospheres, process control, air pollution study and medical mixtures.

Now virtually every gas or gas mixture in varying grades or purities can be obtained from NZIG or, if not available locally, can be readily imported from associated companies overseas.

New Zealand Industrial Gases Limited

Hutt Park Road, Lower Hutt.

For further detailed information send coupon today.

THE MANAGER,
SPECIAL GASES DIVISION,
NEW ZEALAND INDUSTRIAL GASES LIMITED,
P.O. BOX 30-337 LOWER HUTT,

Please send me your free full colour literature on special gases and gas mixtures

NAME _____

POSITION _____

COMPANY _____

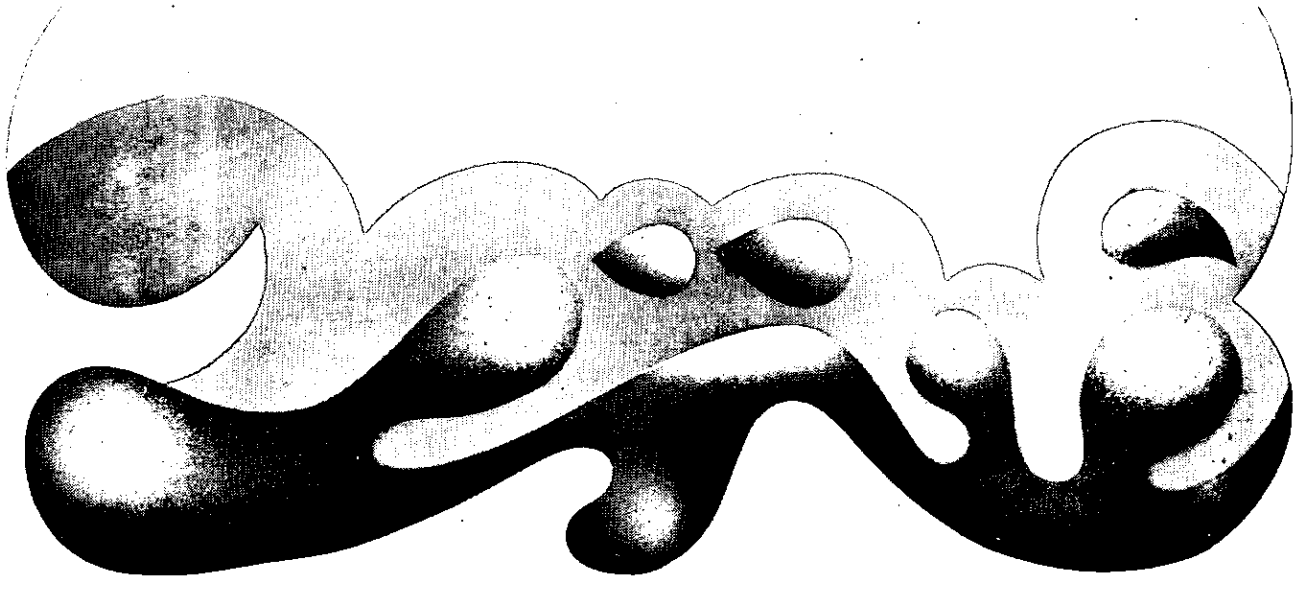
ADDRESS _____

_____

_____

NZIG meets the many demands of industry today

5055



New from Watson Victor

LKB GRADIENT MIXER
CUT IT OUT!

FOR ANY TYPE OF GRADIENT – that is all you have to do when you program the LKB ULTROGRAD gradient mixer. A pair of scissors is all you need to cut the gradient profile for exactly the type of gradient you require. Our technician has just cut three, and he now indicates that he will use the one in the scanning window. When he has set the scanning rate and the duration of the run, he will switch on and the ULTROGRAD will take over – automatically producing the gradient. He can program any type of gradient you like to name, from as many as three liquids at once. With an optional level sensor, you can also monitor absorbance levels in an eluate and automatically vary the gradient to provide greater separation of eluted components.

WatVic **Sole Agents**

WATSON VICTOR LTD.

Auckland : Wellington : Christchurch : Dunedin