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Chemistry Yearbook

Produced by the publishers of 'Chemistry in New Zealand', official journal of the NZ Institute of Chemistry.



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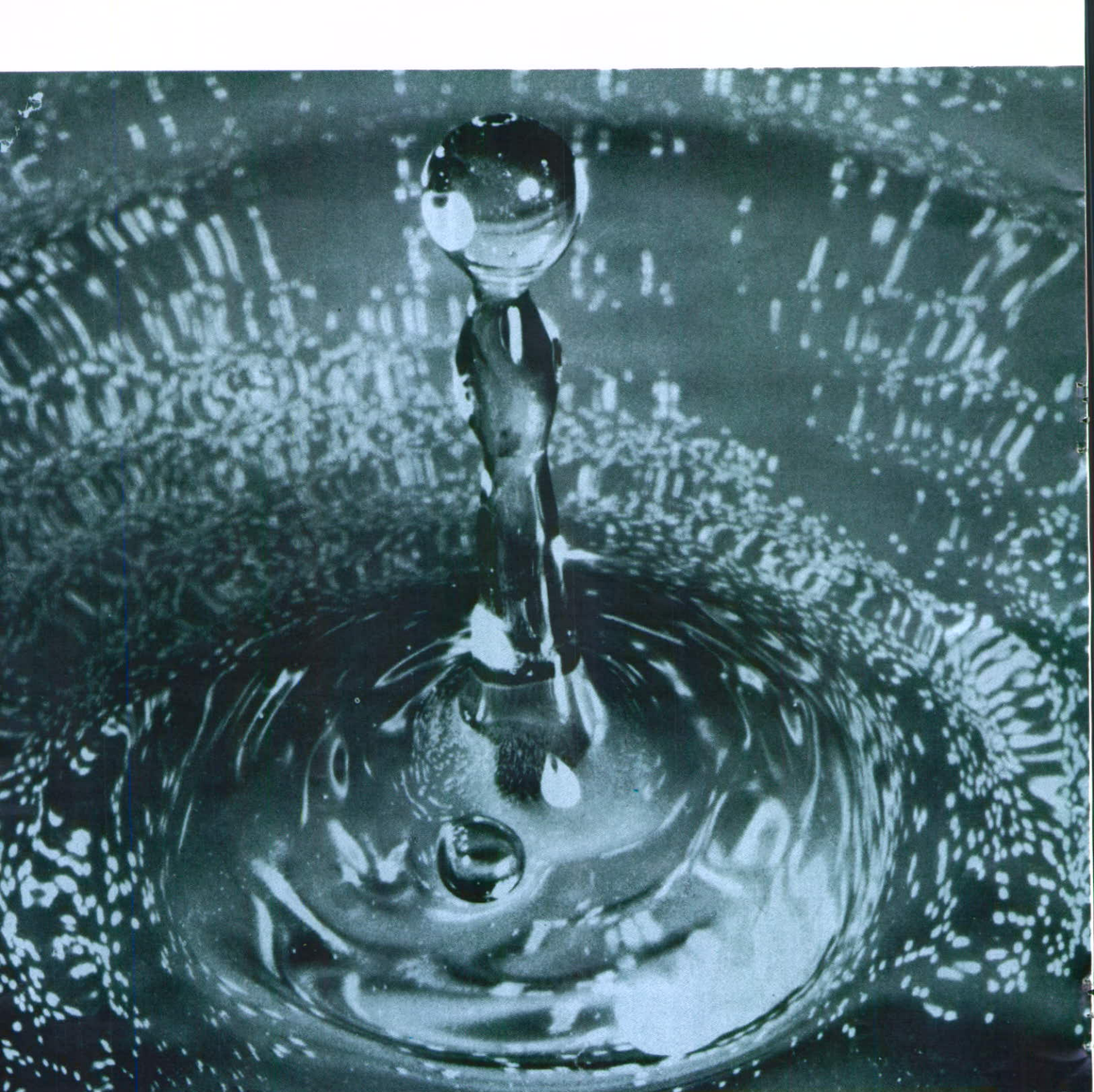
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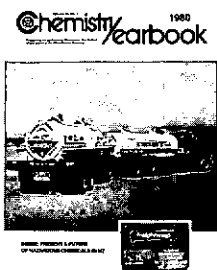
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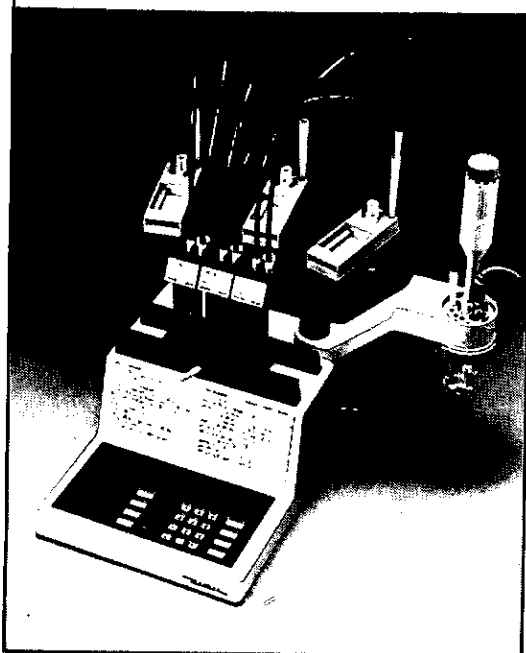
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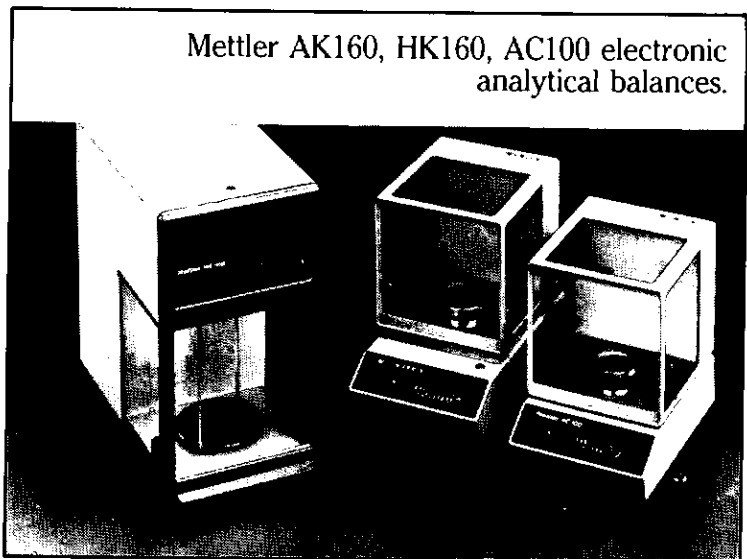
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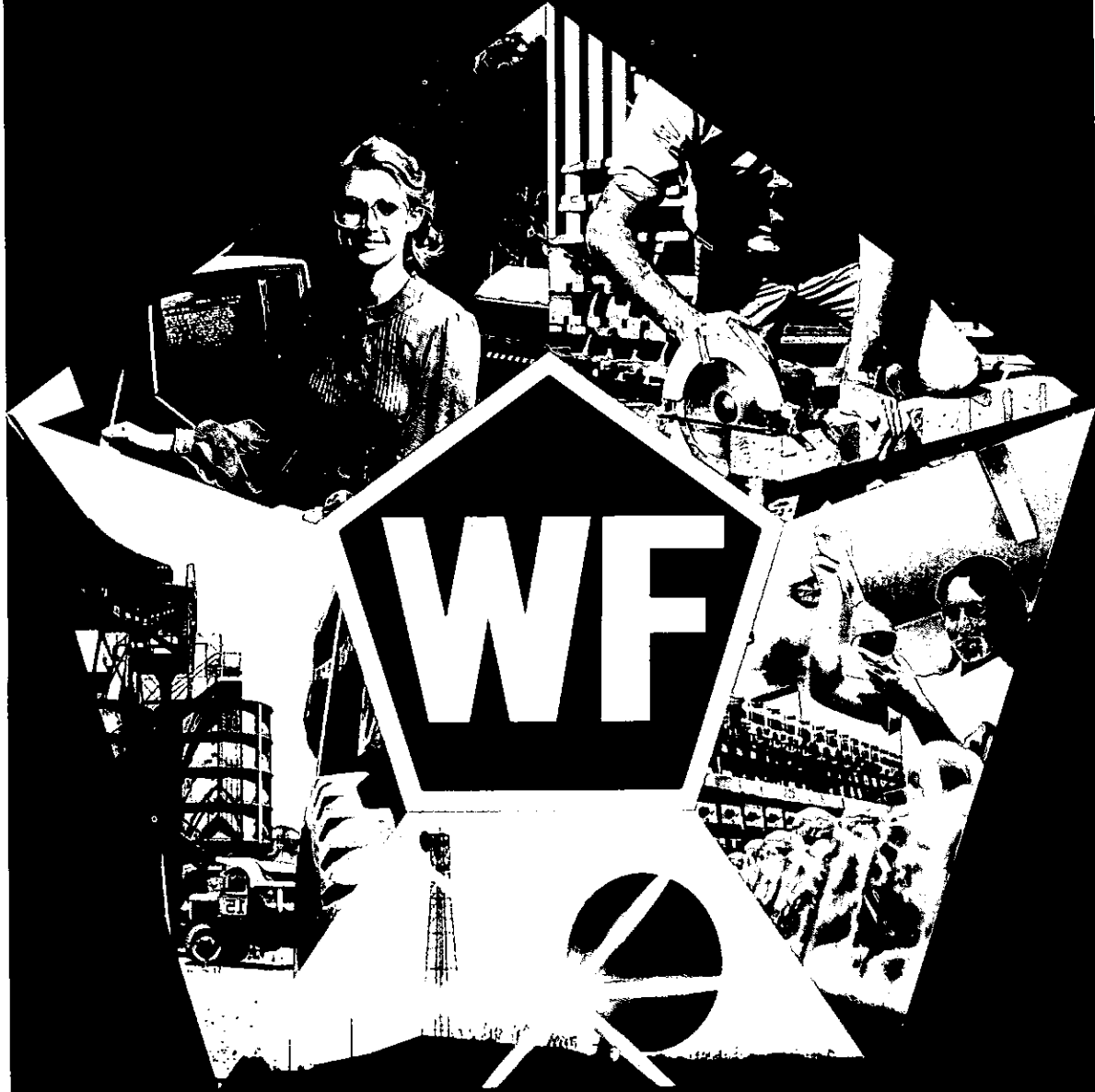
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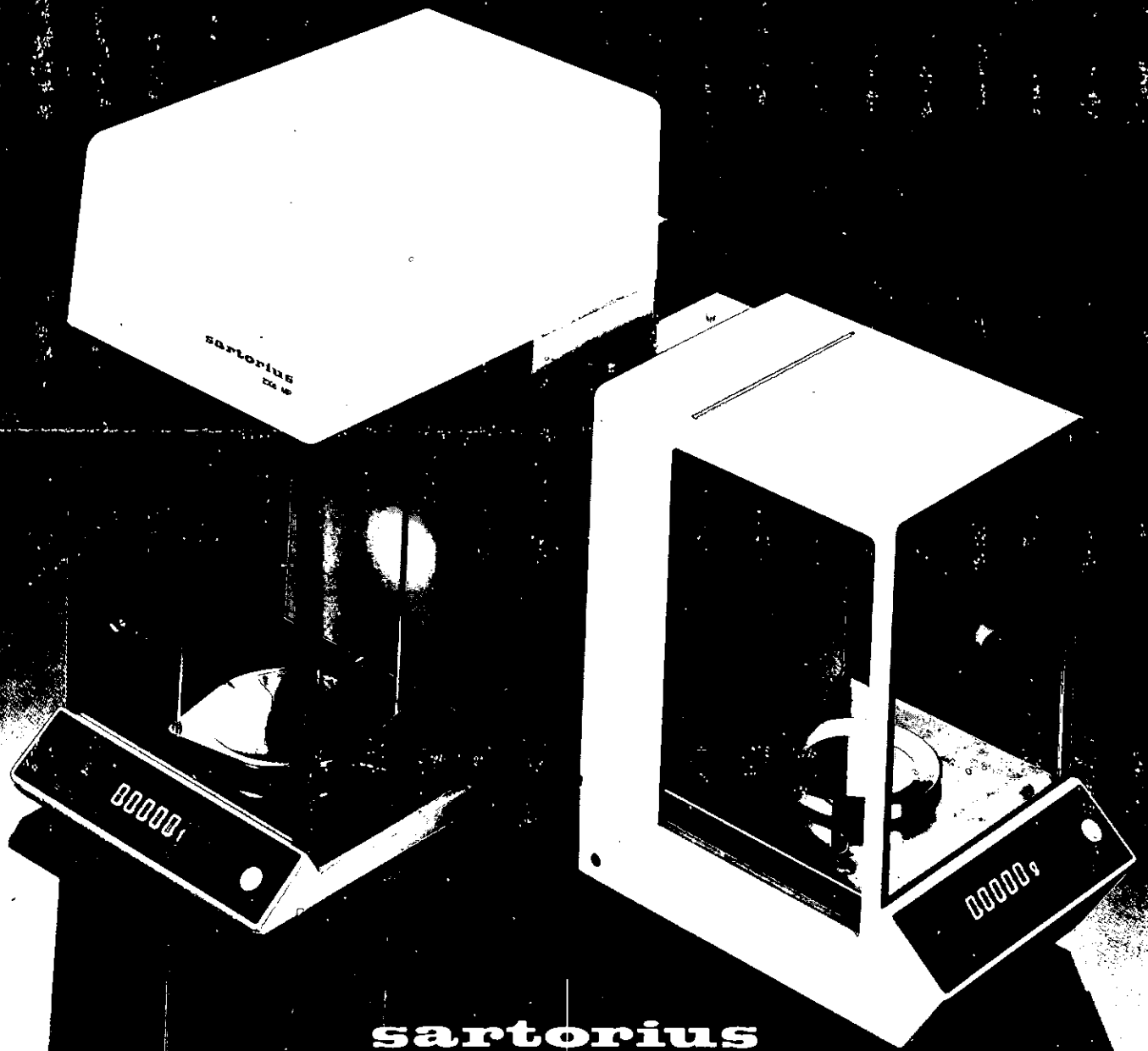
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FREIGHTWAYS BULK SERVICES LTD. Bulkway.

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Chemistry in New Zealand

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NZ INDUSTRIAL GASES LTD. Fumigas, Insectigas, NZIG/Matheson, Pestigas, Sterigas 27.

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BRAND NAMES

WARBURTON FRANKI LTD. Beckman, Bendix, Contron, Chyo, Elgar, ESI, Gould, Fisher, Heathkit, Hitachi, Horiba, Heath, Int'l Rectifier, Keithley, Micro-Electronics, Multimeters, Omega, Perkin-Elmer, Rikadenki, Paratronics, Nashua, Sefram, Sanwa, Sekonic, Shugart, SGS, SMS, Tabai, Tally Shugart, Teccor, Soar, Vickers, Validyne, Weston.

WATSON VICTOR LTD. Altex, Aminco, A H Thomas, Andrex, Beckman, Baldwin, Baird & Tatlock, Barr & Stroud, Buchi, Buehler, Branson, Casella, Carbolite, Channel, Diano, Endecott, Gow-Mac, GCA/Precision, Kimble, Hamilton, Foss, IEC, Isopad, Krautkramer, LKB, Mettler, Minerva, Medcalf, Nalge, Nicolet, Nikon, Orion, Parr, Pharmacia, Plasma-Therm, Qualtex, RAC, Radiometer, Rank, Rank-Hilger, Sauter, Shandon, Schleicher & Schuell, Soiltest, Sorvall, Spectra-Physics, TSK.

WILTON SCIENTIFIC LTD. Airflow Developments, Ajax Chemicals, Anicon, AOT, Alnor Oy, American Optical, Balteau, BDH, Buchler, Biomarine, Brookfield, Camag, Cecil, Cecil Turner, Contherm, Corning, Difco, Edwards, Endecotts, ESI Nuclear, Electro-Physik, Electrothermal, Elga, Decon, Forma, Fiska, Gallenkamp, Haake, Hettich, HNU, Hach, ICN, ISCO, J J Lloyd, Kipp & Zonan, Kyowa, Kurz, Knauer, Lufft, Lightpath, Littlemore, Miele, Merck, MSE, Metrohm, Mantra, MRI, Nova Sina, Ohaus,

EXPORTERS

ABELS LTD. Fats, margarines, oils, Pacific Is. SE Asia.

AHI MINERALS LTD. Whittings. S. Pacific.

ANAC LTD. Geophysical equipt. Australia, USA. Electromagnets, nuclear magnetic resonance equipt., spectrometer accessories. Worldwide.

AUCKLAND VALVE & FITTING CO. LTD. Engineering componentry, gas panels, gauges, pipe, fittings. Australia, Pacific Is., Papua/New Guinea, Tahiti.

BASF NEW ZEALAND LTD.

BAYER NEW ZEALAND LTD.

CED DISTRIBUTORS LTD. Computer hardware. Australia, USA.

CHEMBY MARKETING LTD.

CHEMIPLAS AGENCIES LTD.

CIBA-GEIGY (NZ) LTD. Dyestuffs, Fiji.

GAMLEN CHEMICAL CO. NZ LTD. Solvent emulsifier cleaners, water deionisers, purifiers, sterilisers, softeners. Fiji.

ICI NZ LTD. Adhesives, glues, hardeners, resins. Fiji.

LABSUPPLY PIERCE (NZ) LTD. Meters. Australia, S. Pacific, Papua/New Guinea.

LENNARD TUCK & CO.

MERCER, J & SONS LTD. Autoclaves. Australia, Pacific Basin.

Osmonics, Reichert, Sartorius, Sierra, Sigma, SGE, RDP, Selby, Sigmamotor, SAI, Sheen, Teledyne, Tintometer, Thermax Syn., TPS, Varian, Unisonics, Whatman, Zone Devices.

NEILL, CROPPER & CO LTD.

NZ FASTENERS LTD. Stainless steel equipt.

PLASFAB INSTALLATIONS (1977) LTD.

Air pollution equipt. Pacific Is.

PROCESSED CHEMICALS INDUSTRIES LTD. Lab. equipt. Worldwide.

ROCKLABS. Lab. equipt. Worldwide.

SMITH-BIOLAB LTD. Biochemicals, chemicals, equipt. Pacific Is., Australia, Asia.

TELTERM INSTRUMENTS LTD. Gauges, indicators, recorders, Australia, SE Asia, S. Pacific.

INSTANT CROSS-REFERENCE INDEX

(The companies listed below are also referred to on the pages nominated.)

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 Gamlen 5, 7, 9, 11, 13, 15, 16, 18, 21
 ICI 5, 7, 11, 13, 15, 16, 18
 L/B Pierce 5, 7, 11, 13, 15, 16, 18, 21
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 N Cropper 5, 7, 9, 11, 13, 15, 16, 18, 21
 NZ Fasteners 5, 7, 11, 15, 18, 21
 PlASFAB 5, 7, 9, 11, 13, 16, 18, 21
 Prochem 5, 7, 11, 15, 16, 21
 Rocklabs 5, 7, 11, 13, 16, 18
 S. Biolab 5, 7, 11, 13, 15, 16, 18, 21
 Teltherm 7, 9, 11, 13, 15, 16, 18, 21
 W Frankl 7, 9, 13, 15, 16, 18, 21
 W Victor 7, 9, 13, 15, 16, 18, 21
 Wilton 7, 9, 13, 15, 16, 18, 21

SYNTHETIC RESINS

IN ADDITION TO OUR OWN WIDE RANGE OF SYNTHETIC RESINS, TITAN CHEMICALS LTD MANUFACTURES UNDER LICENCE RESINS FOR:

ASHLAND CHEMICAL COMPANY OF U. S. A.

CARGILL CHEMICAL PRODUCTS DIVISION OF U. S. A.

JORDAN CHEMICAL WORKS LTD. OF AUSTRALIA.

Titan Chemicals Ltd is also the New Zealand sales agent for the above companies as well as: **MAGIE BROS OIL CO. U.S.A., MEGGITT LIMITED, AUSTRALIA., SCM ORGANIC CHEMICALS LTD, U.S.A., SHEREX CHEMICAL CO. INC. U.S.A., SUDARSHAN CHEMICAL INDUSTRIES LTD, INDIA AND TROY CHEMICAL CORPORATION, U.S.A.**

Listed below is the full range of Trade Names with which Titan Chemicals Ltd. is associated either as a manufacturer or sales agent.

Acrosyn
 Admerol
 Admex
 Adogen
 Adol
 Ardex
 Ardol
 Arochem
 Arofene
 Aroflat
 Aroflint
 Arolox
 Aroplax
 Aroplax
 Arosel
 Arosurf

Arothane
 Arothix
 Cargill
 Chemopol
 Chemrez
 Distal
 Dryfol
 Episol
 Eposyn
 Glidco
 Hydrofol
 Iso-Cure
 Iso-Jordosol
 Jordacite
 Jordacryl
 Jordanol

Jordapent
 Jordathane
 Jordathix
 Jordithix
 Jordit
 Jordoflat
 Jordopol
 Jordosil
 Jordosol
 Linogel
 Magie Oil
 Maglesol
 Megamine
 Megathane
 Metasol
 Oximin
 Pep-set

Primarex
 Soyagel
 Soyfol
 Starfol
 Sudarshan
 Syllat
 Sylvachem
 Sylvaros
 Sylvatac
 Sylvatal
 Talkkyd
 TI-RES
 Trimol
 Tritinox
 Troychem
 Troykyd

Troymax
 Troysan
 Troythix
 Uresol
 Var
 Varamide
 Varifoam
 Varifos
 Varine
 Varion
 Variquat
 Varisoft
 Varonic
 Varox
 Var Sulf
 Veg Acid
 Zymol



TITAN Chemicals Limited

147 Neilson Street, P.O. Box 13-222 Onehunga, Auckland 6, New Zealand
 Telegrams: 'CHEMOPLAST' Telex: NZ2793 Telephone 662-079

PRODUCTS

ACIDS

BASF
Bayer
Chemby
Freightways
Gamlen
ICI
KMS
L/S Pierce
NDA
N. Cropper
Plasfab
Smith Biolab
Wilton

ADHESIVES, GLUES, HARDENERS

BASF
Bayer
CIBA
Dow Corning
ICI
N. Cropper

AIR POLLUTION EQUIPT.

Advcd. Electronics
KMS
N. Cropper

Niro
Northrop
Plasfab
Smith Biolab
Teltherm
Watson Victor
Wilton

ALCOHOLS, POLYVINYL

BASF
Chemby
Hoechst
W. Franki

ANALYSERS

Gas
Advcd. Electronics
N. Cropper
Northrop
Sci-Med
Teltherm
W. Franki
W. Victor

Liquid

Advcd. Electronics
N. Cropper
Sci-Med
W. Victor
Wilton

Metallurgical

Advcd. Electronics
N. Cropper
Sci-Med
W. Victor

Other

ANAC (Polarographic)
N. Cropper (GC/MS/DS)
Sci-Med (Automated)

ASSAY EQUIPT.

Rocklabs

ATTENUATORS

W. Franki

AUTOCLAVES

Industrial

Mercer

Laboratory

Teltherm

W. Victor

Wilton

BALANCES

W. Franki

Analytical

KMS

L/S Pierce

Northrop

Sci-Med

W. Victor

Wilton

Geophysical

W. Victor

BIOCHEMICALS

BASF NZ

Bayer NZ

Chemby

Hoechst

KMS

L/S Pierce

S. Biolab

Terry

CALCULATORS

CED

Northrop

CALORIMETERS

Sci-Med

Laboratory

Sci-Med

W. Franki

W. Victor

Wilton

CENTRIFUGES

KMS

L/S Pierce

MacEwans

NDA

Northrop

Sci-Med

S. Biolab

W. Victor

Wilton

CHEMICALS

Laboratory

BASF NZ

Bayer NZ

Hoechst

ICI

KMS

L/S Pierce

NDA

S. Biolab

Terry

Wilton

Other

ANAC (Chromatography)

BASF NZ (Industrial)

Chemiplas (Industrial)

CIBA (Textile)

GAF (Raw materials,

Industrial)

Gamlen (Lab. saving,

water treatment)

ICI (Industrial)

L/S Pierce

MacEwans (Clarification

reagents)

Steetley (Tech. grade)

Terry (Industrial)

CHROMATOGRAPH EQUIPT.

KMS

L. Tuck

N. Cropper

Northrop

Sci-Med

S. Biolab

W. Franki

W. Victor

Wilton

CHROMATOGRAPHS

GC/MS

Advcd. Electronics

N. Cropper

Northrop

Sci-Med

W. Franki

Wilton

Gas/Liquid

Advcd. Electronics

Ak. Valve & Fitting

Northrop

Sci-Med

W. Franki

W. Victor

Wilton

HP Liquid

Advcd Electronics

ANAC

Ak. Valve & Fitting

L. Tuck

N. Cropper

Sci-Med

W. Franki

W. Victor

Wilton

Ion

Advcd. Electronics

Sci-Med

CLEANERS

Contact

Steetley

Hand

Gamlen

Steetley

Industrial

Bayer NZ

Gamlen

KMS

L/S Pierce

NDA

S. Biolab

Steetley

Solvent

Bayer NZ

CIBA

Gamlen

ICI

Ultrasonic

L/S Pierce

COLORIMETERS

Advcd. Electronics

KMS

L/S Pierce

Sci-Med

S. Biolab

W. Franki

Wilton

COLOURANTS

BASF NZ

Bayer NZ

CIBA

Hoechst

ICI

N. Cropper

COMPUTERS, SYSTEMS

Northrop

Analog

Northrop

Digital

CED

Sci-Med

Other

Advcd. Electronics (Colour)

COMPUTER EQUIPT.

CED

Northrop

Sci-Med

Teltherm

W. Franki

COMPUTER HARDWARE

CED

Northrop

Sci-Med

Teltherm

W. Franki

COMPUTER SOFTWARE

BASF NZ

CED

Sci-Med

CULTURE MEDIA

L/S Pierce

NDA

S. Biolab

Wilton

INSTANT CROSS-REFERENCE INDEX

(The companies listed below are also referred to on the pages nominated)

Advcd Elect 5, 7, 11, 15, 16, 18, 21
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CED 5, 7, 11, 12, 16
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GAF 5, 11, 15, 16, 18
Gamlen 5, 7, 9, 11, 12, 15, 16, 18, 21
Hoechst 5, 7, 11, 15, 16, 18, 21
ICI 5, 7, 11, 12, 15, 16, 18
KMS 5, 11, 15, 16, 18
L/S Pierce 5, 7, 11, 12, 15, 16, 18, 21
L Tuck 5, 7, 9, 11, 12, 15, 16, 18, 21

MacEwans 5, 7, 11, 15, 16, 18, 21
Mercer 5, 7, 11, 12, 15, 21
NDA 5, 7, 11, 15, 18
N Cropper 5, 7, 9, 11, 12, 15, 16, 18, 21
Northrop 5, 7, 11, 15, 16, 18, 21
Plasfab 5, 7, 9, 11, 12, 16, 18, 21
Rocklabs 5, 7, 11, 12, 16, 18
Sci-Med 5, 7, 9, 11, 15, 16, 18, 21

S. Biolab 5, 7, 11, 12, 15, 16, 18, 21
Steetley 5, 9, 11, 15, 16, 18
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W Franki 7, 9, 12, 15, 16, 18, 21
W Victor 7, 9, 12, 15, 16, 18, 21
Wilton 7, 9, 12, 15, 16, 18, 21



**Allied
Chemical**

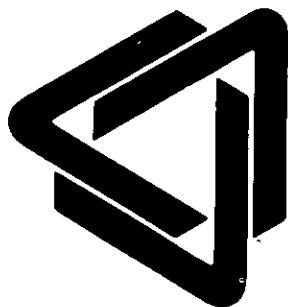


**A name you
can trust.**

**Materials you
can trust.**

**Service you
can rely on.**

**Supply you can
bank on.**



**Allied
Chemical**

(N.Z.) LTD,

Telephone 771-313, P.O. Box 39-189, Auckland West.

CAPRON

TYPE 6 NYLON

CAPRAN

CAST NYLON 6 FILM



A-C POLYETHYLENE
...the essential ingredient

PAXON

HIGH DENSITY POLYETHYLENE

HALAR

E-CTFE FLUOROPOLYMER

PRODUCTS

DATA SYSTEMS/MS

N. Cropper
Northrop
Sci-Med
Teltherm
W. Victor

DETERGENTS

BASF NZ
Bayer NZ
Chemby
ICI

KMS
L/S Pierce
N. Cropper
S. Biolab
Steetley
Terry

DISPERSANTS

BASF NZ
Bayer NZ
Chemby
Chemiplus
Gamlen
ICI

Terry

DYES

BASF NZ
Bayer NZ
Chemby
ICI

KMS
N. Cropper
Steetley

DYESTUFFS

BASF NZ
Bayer NZ
Chemby
CIBA
Hoechst
ICI

Steetley

EMULSIFIERS

BASF NZ
Bayer NZ
Chemby
GAF
Hoechst
ICI

S. Biolab
Steetley
Terry

ELECTROLYTIC

CONDUCTIVITY

APPARATUS

Advcd. Electronics
KMS
Northrop
Sci-Med
W. Franki
W. Victor

ENGINEERING COMPONENTRY

Ak. Valve & Fitting
Chemby
NZ Fasteners
W. Franki

ENZYMES

BASF NZ
Chemby
ICI
KMS
L/S Pierce
S. Biolab
Steetley

EVAPORATORS

L/S Pierce
Niro
S. Biolab
W. Victor
Wilton

FATS

Confectionery

Abels

Terry

Cooking

Abels

Other

Abels (Frying)
Terry (Specialty)

FILLERS, WHITINGS

AHI Minerals

BASF NZ

Bayer NZ

ICI

L. Tuck

N. Cropper

FILTERS, SEPARATORS

Ak. Valve & Fitting

KMS

L. Tuck

Sci-Med

S. Biolab

W. Victor

Wilton

FILTRATION EQUIPT.

GAF

Gamlen

L/S Pierce

L. Tuck

MacEwans

Mercer

NDA

Niro

Prochem

Techspan

W. Victor

Wilton

FLAVOUR ENHANCERS

BASF NZ

Bayer NZ

Chemby

Terry

FLAVOURS

BASF NZ

Bayer NZ

N. Cropper

Steetley

Terry

FLOW MEASURING INST. & SYSTEMS

Advcd Electronics
(U/sonic open channel)

L/S Pierce

L. Tuck

MacEwans

(Rotary piston meters)

S. Biolab (Rotameters)

W. Franki

W. Victor (Air)

Wilton (Liquid)

FLUIDS, PENETRATING

BASF NZ

Gamlen

FOOD ACIDULANTS

BASF NZ

Bayer NZ

Chemby

Steetley

Terry

FURNACES, LABORATORY

L/S Pierce

Northrop

GAS MIXTURES

Chemiplas

NZIG

Sci-Med

GAS PANELS

Ak. Valve & Fitting

L/S Pierce

GAUGES

NZIG

Pressure

Ak. Valve & Fitting

Teltherm

W. Franki

W. Victor

Temperature

Ak. Glass

Teltherm

W. Victor

Tension

W. Franki

Other

Ak. Glass (Hydrometers)

Teltherm (Altitude, vac.,

Compound,

Absolute Pressure)

GEO PHYSICAL EQUIPT.

ANAC

Northrop

W. Victor

HEAT EXCHANGERS

MacEwans

Niro

HEATERS,

INSTRUMENTATION

L/S Pierce

Electric

S. Biolab

Wilton

HUMECTANTS

BASF NZ

Bayer NZ

Chemby

N. Cropper

Steetley

Terry

HUMIDITY SYSTEMS

L/S Pierce

S. Biolab

W. Franki

W. Victor

INDICATORS

Sci-Med

Dew Point

W. Victor

Humidity

KMS

Sci-Med

Teltherm

W. Victor

Wilton

Liquid Level

Teltherm

Pressure

Sci-Med

Teltherm

W. Franki

W. Victor

Wilton

Specific Gravity

Ak. Glass Co.

NDA

W. Victor

Temperature

Ak. Glass Co

KMS

L/S Pierce

Northrop

Sci-Med

Teltherm

W. Victor

Other

BASF NZ (Silica gels)

NDA

I-R SPECTROPHOTOMETER

CELLS

Advcd. Electronics

KMS

L/S Pierce

Sci-Med

S. Biolab

Sprott (Servicing)

W. Franki

W. Victor

Wilton

INJECTORS

L/S Pierce

N. Cropper

Sci-Med

W. Franki

INTEGRATORS

Advcd. Electronics

ANAC

N. Cropper

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W Franki 7, 9, 12, 13, 16, 18, 21
W Victor 7, 9, 12, 13, 16, 18, 21
Wilton 7, 9, 12, 13, 16, 18, 21

PRODUCTS

Northrop
 Sci-Med
 W. Franki
 W. Victor
 Wilton
INSTALLATIONS, STORAGE
 F'ways Bulk Svcs.
INSTRUMENTS,
ANALYTICAL
 ANAC
 L/S Pierce
 N. Cropper
 Northrop
 Sci-Med
 S. Biolab
 W. Franki
 W. Victor
 Wilton
ISOTOPIC ANALYSIS/MS
 Advcd. Electronics
 Sci-Med
 W. Franki
LAB. EQUIPT.
 Ak. Valve & Fitting
 Chemby
 Gamlen
 KMS
 L/S Pierce
 NZIG
 Plasfab
 Prochem
 Rocklabs
 S. Biolab
 Terry
 W. Victor
 Wilton
LAB. FURNITURE
 L/S Pierce
LAB. GLASSWARE
 Ak. Glass Co
 KMS
 L/S Pierce
 NDA
 S. Biolab
 Teltherm
 W. Victor
 Wilton
LAB. INSTRUMENTS
 Ak. Glass Co
 KMS
 L/S Pierce
 Northrop
 Sci-Med
 S. Biolab
 Terry
 W. Franki
 Wilton
LAB. WARE
 Ak. Glass Co
 KMS
 L/S Pierce

S. Biolab
 W. Victor
LEAK INDICATORS
 Ak. Valve & Fitting
 L/S Pierce
 N. Cropper
LUBRICANTS
 CiBA
 Dow Corning
 GAF
 N. Cropper
 Steetley
MAGNETOMETERS
 W. Victor
 Wilton
MAGNETS
 Electro
 ANAC
MARGARINES
 Abels
MASTERBATCHES
 BASF NZ
 Bayer NZ
 CiBA
 Hoechst
 N. Cropper
MEASUREMENTS, COLOUR
& GLOSS
 Advcd. Electronics
 W. Victor
MEMORIES, COMPUTER
Bubble memory
 Northrop
Disk (hard)
 CED
 W. Franki
Disketts (floppy)
 CED
 Teltherm
 W. Franki
Semiconductor systems
 Northrop
 W. Franki
Tape (cassette)
 Teltherm
METERS
Carbon dioxide
 KMS
 Sci-Med
 Teltherm
 W. Franki
 W. Victor
 Wilton
Flow
 Advcd Electronics
 L. Tuck
 MacEwans
 Sci-Med
 Teltherm
 W. Franki
Gas
 Teltherm
 W. Franki
Ion selective
 KMS
 L/S Pierce

Sci-Med
 W. Victor
 Wilton
pH
 KMS
 L/S Pierce
 L. Tuck
 Northrop
 Sci-Med
 S. Biolab
 W. Franki
 W. Victor
 Wilton
Tension
 Sci-Med
Temperature
 Ak. Glass Co.
 L/S Pierce
 L. Tuck
 NDA
 Sci-Med
 S. Biolab
 Teltherm
 W. Franki
 Wilton
Water
 Sci-Med
 Teltherm
Other
 KMS (Conductivity)
 L. Tuck (Conductivity)
 S. Biolab (Conductivity)
 W. Franki
 Wilton (Moisture)
MICROPROCESSORS
Control systems
 CED
 Northrop
 Sci-Med
 Teltherm
 W. Franki
MICROSCOPES
 ANAC
 L/S Pierce
 Northrop
 Sci-Med
 S. Biolab
 W. Franki
 W. Victor
 Wilton
MONOCHROMATORS
 Advcd. Electronics
 Sci-Med
 W. Victor
MONITORS
Organic Carbon
 Advcd. Electronics
 Sci-Med
 W. Victor
Water Quality
 Sci-Med
 W. Victor
 Wilton
Other
 Sci-Med
 Wilton (Gas)

NITROGEN
DETERMINATION EQUIPT.
 Advcd. Electronics
 L/S Pierce
 Sci-Med
 W. Franki
 W. Victor
NUCLEAR MAGNETIC
RESONANCE EQUIPT.
 Advcd. Electronics
 ANAC
 Sci-Med
 W. Franki
 W. Victor
 Wilton
OILS
Cooking
 Abels
Edible
 Abels
Vegetable
 Abels
 BASF NZ
 N. Cropper
 Terry
Marine
 Steetley
OPTICAL FIBRES
 Northrop
 W. Franki
 W. Victor
 Wilton
OVENS
Laboratory
 KMS
 N. Cropper
 S. Biolab
 Teltherm
 W. Victor
 Wilton
PAINTS, PIGMENTS
 BASF NZ
 Bayer NZ
 Chemby
 Chemiplas
 CiBA
 Dow Corning
 Hoechst
 ICI
 N. Cropper
PETROLEUM BASED
PRODUCTS
 BASF NZ
 Bayer NZ
 Gamlen
PHOSPHATE
 BASF NZ
 Bayer NZ
 ICI
 N. Cropper
 Steetley
 Terry
PIPE, FITTINGS
 Ak. Valve & Fitting
 L/S Pierce
 MacEwans

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 CiBA 5, 7, 11, 12, 13, 18
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 F'ways BS 5, 9, 11, 13, 18
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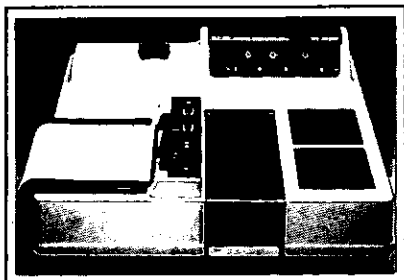


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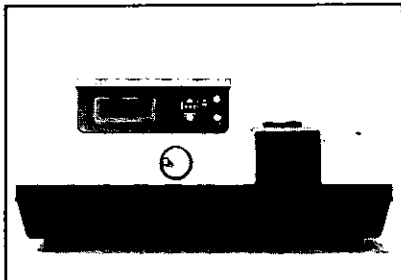
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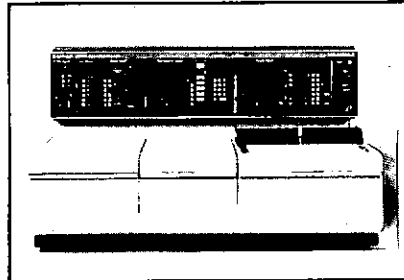
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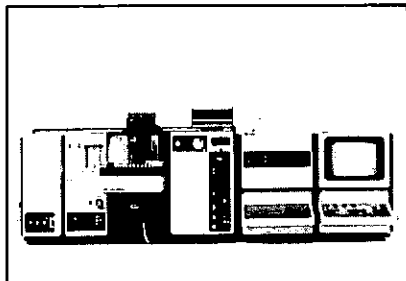
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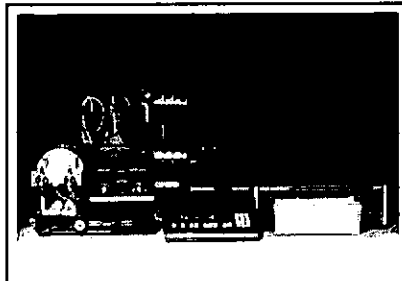
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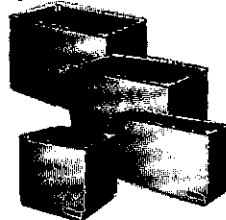
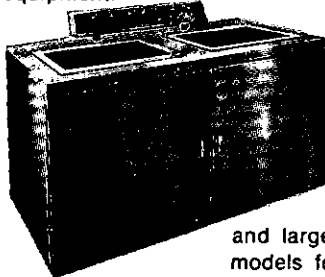
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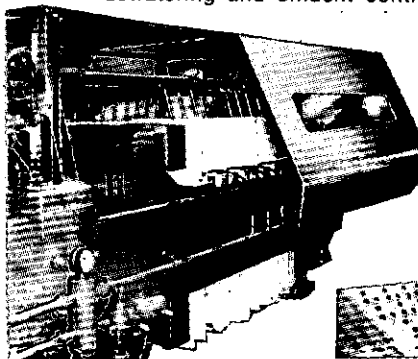


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The NZ National Poisons And Hazardous Chemicals Information Centre

W.A. TEMPLE, National Hazardous Chemicals Information Centre, Dunedin.

The first Poisons Information Centre was established in Leeds, Yorkshire, General Infirmary in 1949, designed in the first instance to assist in cases of poisoning with household substances such as detergents and disinfectants. At that time no data were available as to the toxicity of these substances other than those which could be obtained through the manufacturer, if and when the latter could be contacted. Now there is general recognition of such units and Poisons Centres for information have been set up throughout the world.

The National Poisons Information Centre (NPIC) in NZ was established in December, 1964, under the joint auspices of the Department of Pharmacology and Pharmacy of the Medical School and the Otago Hospital Board, with Prof E.G. McQueen as Honorary Director. It was designed to provide information on a national basis concerning toxicity, probable signs and symptoms and to advise on preferred or necessary treatment in acute poisoning incidents. The system is operated through the staff of the Accident and Emergency Department of Dunedin Hospital and is accessible for 24 hours a day by telephone from anywhere in NZ. It is based on a manual filing system with a "windmill" index which refer to data sheets held in drawers of filing cabinets. The data sheets are extensively cross-indexed for synonyms and trade names and presently number about 15,000.

The centre is furnished by the Department of Health with lists of all new drugs being marketed, and by the Agricultural Chemicals Board with all newly registered agricultural chemicals. Business firms throughout the country have cooperated by making available lists of their products and composition details and are continually supplying the Centre with new information. As well as these sources, NPIC draws upon articles appearing in periodicals and journals and possesses an extensive collection of reference material on matters pertaining to poisonings. The introduction by the NZ Post Office of their OASIS service has meant that NZPIC now has access to overseas data banks which considerably extends the scope of data collection.

A record of all enquiries is kept and an annual report is produced each year. This also allows case histories to be followed up, particularly for preparations and materials where toxicity data and poisoning experience are scarce, or conversely where a material is well known to represent a serious hazard. In this manner the information held is supplemented with reports of actual clinical experience. A duplicate index and files are held in the Medical School where the NPIC is located in the Department of

Pharmacology and these provide a useful backup facility for use during busy times at the Hospital, for general and public enquiries to the Centre and to allow maintenance and updating to the system.

Over the past 15 years the enquiries handled by the Centre have risen from 330 in the first year to 1912 in 1979. Such a centre has been shown to be amply justifiable in terms of possible saving of life and relief of suffering and patient care. Much of the uncertainty and anxiety of poisoning incidents may be alleviated by having accurate information readily available.

Therapeutic substances account for the greatest number of calls to the centre, generally about one third of the total, with household commodities being the second most frequent cause. Cleaners and detergents occupy a large number of this latter class of compounds; however this most serious effects in this category often result from solvents, either as deliberate inhalation of fumes for "kicks" or from siphoning accidents. Last year, a young man died on his 21st birthday as a result of inhaling paint thinners.

Herbicides and insecticides constitute the greatest number of enquiries of the third largest category of calls, agricultural chemicals. Among herbicides, paraquat remains the most important cause of morbidity and mortality. It claimed the life of a distinguished medical practitioner as a result of a tragic accident of the classical character, involving the transfer of paraquat to an unauthorised container (vermouth bottle).

A case of carbamate insecticide poisoning (methomyl) was caused by mixing the powder in the draught of a helicopter's rotor blades while the motor idled.

Of the number of enquiries related to cosmetics, about 90% usually involve children and include perfumes, hair lotions, hair dyes, nail polishes, hardeners and removers and lipsticks. A 10 year old who sniffed a handful of "Bionic Woman Crazy Foam Bath Salts" foam complained briefly of unsteadiness and double vision. Rather surprisingly, three adult males (20 years of age) had a party with hair shampoo which contains propylene glycol and subsequently required eliminative measures.

A Japanese fisherman ingested 1½ bottles of hair lotion, a tin of rubber cement and up to 50ml of an ammonia solution. He suffered no ill effects apart from a low serum potassium and a slightly sloughy mouth.

The category of plants often presents some intriguing situations. Among these was an interesting case of a yachtsman visiting Great Barrier Island, who while there, consumed a small amount of a root thought to be an edible taro. This had

been boiled for about 1½ hours. The person affected had ingested one mouthful only and this resulted in immediate intense pain followed by profuse salivation, numbness, and inability to speak, swallow or cough. The owner of the yacht contacted Prof McQueen directly from the island, described his friend's symptoms and gave a description of the vegetable. With the assistance of the Botany Department at Otago University, Prof McQueen was able to identify the root and advise on the appropriate medical treatment.

Another interesting episode involved a young aircraft pilot who suffered convulsions. If they had been caused by epilepsy which was suggested by some doctors, his career as a pilot would have come to a sudden halt. The boy's mother suspected it might have been honey poisoning so she wrote to the NPIC. She mentioned that her son and a friend raided a hive in the bush while hunting. A few hours later he began to vomit. The boy was ill in hospital for several days. In reply to her correspondence Prof McQueen explained that the poisoning was due to contamination of the honey with the toxin tutin from tutu.

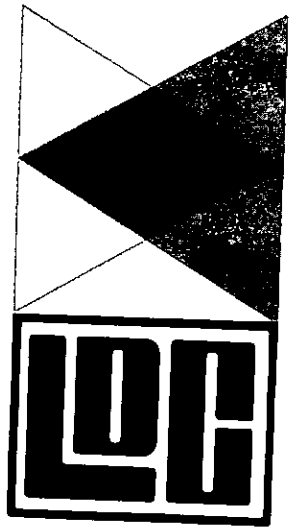
Tutin was also responsible for the poisoning of three young forestry workers who brewed up a concoction of tutu leaves and "Milo" to provide a "trip". Needless to say, the experience proved to be of a somewhat different nature than they had anticipated.

Other fairly commonly encountered poisoning instances of people seeking "trips" involve the plant *Datura* and the mushroom *Amanita muscaria*. The former plant has been responsible for alarming hallucinations, often involving spiders, as seems to be characteristic of poisoning with anticholinergics of all kinds. *Amanita muscaria* produces the rather predictable cholinergic effects including vomiting and diarrhoea which, when viewed along with the effects derived from concoctions of *datura* would seem to be the type of experience to be avoided rather than sought after.

The extraordinary proclivity of some children to ingest even the most overtly inedible substances continues to be a source of wonder. Substances encountered include a small bottle of alluvial gold, fibreglass bats (presumably due to the "candyfloss" appearance), the end of a stick of gelignite, fire crackers, billiards chalk, golf ball centres, cigarette butts, fire-lighters, batteries and many more.

Among substances encountered in the industrial environment, welding fumes have featured on several occasions. Workers have also complained concerning fumes from solvents — methylene chloride, ketones, alcohols and petroleum distillates. An industrial accident in which chlorine was liberated led to respiratory distress in five men even though the exposure was for a minute or two only. Fumes from pyrolysis of polymers affected firemen fighting fires in factory premises, shops or warehouses containing polymeric fabrics or chemical intermediates.

One somewhat amusing incident involving a person who had somehow managed to tip a relatively large quantity of a 50% solution of glutaraldehyde over

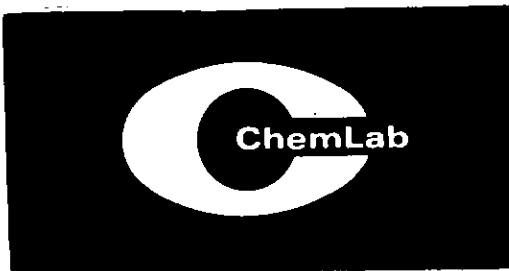
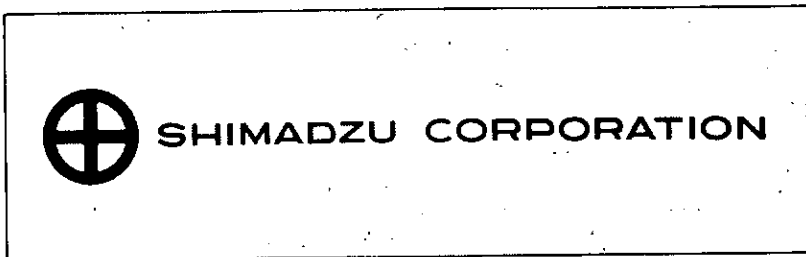


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Poisons Centre (Cont)

himself. Upon phoning the Centre for information about the possible adverse effects of this episode he was somewhat dumbfounded when Prof McQueen mentioned to him that, glutaraldehyde was commonly employed as an embalming fluid!

The transport and storage of hazardous and reactive substances present many problems which may result in the exposure of personnel directly involved to a variety of toxic agents.

Hazards associated with the transportation of chemicals were highlighted in February, 1973, during the so-called "Parnell Incident" when drums of an organophosphorus cotton defoliant, known as merphos, had been damaged during a storm at sea and although bound for Australia, were offloaded at Auckland because they were leaking. The drums were taken to two storage areas in Parnell for holding overnight. Spontaneous hydrolysis of the defoliant in the presence of moisture released noxious fumes of the volatile butyl mercaptan which by morning was beginning to alarm local residents and other people in the near vicinity. Emergency services were alerted, a state of civil emergency declared and a large part of Parnell was evacuated.

Identification of the material raised toxicity problems due to similarity of the name merphos with another compound "Murphos", a brand name under which parathion, a very toxic organophosphorus compound with cholinesterase inhibiting properties, had been marketed in NZ. Before the "Parnell Incident" was over more than 600 people were seen in the Auckland Hospital Accident and Emergency Department. Many received atropine and treatment as for an organophosphate poisoning which causes cholinesterase inhibition. However, in no case was there any reduction of blood cholinesterase levels.

The material was eventually identified as tributyl phosphorotrithionite — a formulation which does not have cholinesterase inhibition properties, although up to 10% of an analogue DEF which does cause cholinesterase inhibition may be present as a by-product of manufacture.

A commission of inquiry was set up to investigate the incident and recommended that consideration be given to the establishment of a Centre which would provide a 24-hour service to assist in identifying the nature and extent of hazards from spillages, leaks and fires involving chemicals.

After discussion with the Department of Scientific and Industrial Research and Department of Health, it was decided that the most practical way in which this could be achieved was to relate it to the National Poisons Information Centre. Following the appointment of a suitably qualified scientific officer work was initiated early in 1976 in collaboration with the DSIR on the compilation of a data file. A list of chemicals was obtained by circularising all manufacturers in NZ for details of chemicals used or stored. Initially the DSIR supplied the chemical details and the toxicity data were compiled in Dunedin. Nowadays, however, all data are

compiled in Dunedin and chemical details are checked by Prof Campbell of the Chemistry Department of Otago University. Information on more than 4,000 chemical substances is now on file and is constantly being updated and expanded with new information as it comes to hand. The data is presented in a "free flow" text and includes chemical name, synonyms, a description of the chemical's appearance, the immediate health hazard that it presents to persons exposed to it, whether protective equipment is needed to handle it and suggested management procedures in the event of fires or spillages involving the compound.

The files reached an operational state in August, 1979, and the National Hazardous Chemicals Information Centre (NHCIC) "went public". Since then numerous enquiries have been dealt with. These have principally related to handling precautions or disposal of chemicals, e.g. disposal of a drum of ageing calcium hypochlorite and the disposal of a bottle of acetaldehyde which had violently erupted in a school laboratory. Spillages following transportation mishaps required elucidation in several instances. Damage to plastic pails of an organophosphorus compound contaminated a load of dried apricots; drums of sheep dip containing rotenone and cresylic acid were prevented from entering a watercourse which ran through an eel factory. A large container of an organophosphorus insecticide spilt over an office carpet and the fate there required to be decided. (It had to be destroyed). Advice has been sought on appropriate safety measures involving the use of a

wide variety of chemical substances from both industry and private individuals.

In the event of a spillage or fire involving hazardous chemicals, the National Hazardous Chemicals Information Centre can be contacted anytime by telephoning Dunedin Hospital (024) 740-999. It is helpful if the following information is readily available:

- (1) Name of substance (Trade name or chemical composition)
- (2) Manufacturer or agent and use of material
- (3) Form of substance (e.g. powder, liquid, granules, gas)
- (4) Scale of incident (estimate of amount spilt, size of fire etc.)
- (5) Person's name making the enquiry and telephone number.

Enquiries of a more general nature may be addressed to the Director, NHCIC, or of the NPIC at Box 913, Dunedin.

In the event of a poisoning incident the National Poisons Information Centre can be contacted through the same Dunedin number (024) 740-999. Again, it is helpful if the following information is readily available for the staff handling the calls:

- (1) Name of material or preparation
- (2) Manufacturer and the use of the material to assist identification
- (3) Maximum amount likely to have been ingested
- (4) Age of the "patient"
- (5) When was substance ingested?
- (6) Symptoms
- (7) Person's name making enquiries and telephone number.

The Work Of The Hazardous Chemicals Committee

Following the unfortunate events of the Parnell Civil Defence Emergency in February 1973 when 200 litre drums containing a chemical with the trade name 'Merphos' were damaged in transit, the Auckland Branch of NZIC decided to take a far greater part in any consultation about hazardous chemicals.

A sub-committee of the Branch called the Hazardous Chemicals Committee was formed and held its first meeting in 1974.

In its early life the sub-committee prepared statements on the 'Parnell fumes incident' and later, the 'Vinyl chloride problem' and by April 1975 were able to organise a very successful symposium called 'Hazards with Chemicals' which was held at the University of Auckland (over 200 attended).

The 'Parnell Emergency' had brought attention to a number of defects in the safe handling of chemicals in this country with particular emphasis on their identification, packaging, labelling, safe storage and transport.

Most of the recommendations made by NZIC supported those made in the 'Report of the Commission of Inquiry' after Parnell. Submissions made at the 'Hazards with Chemicals' symposium were sent to the Minister of Internal Affairs (now Labour Department) and re-

emphasised the need for hazardous chemical disposal areas, legislation for the enforcement of recommendations and the setting up of a National Dangerous Goods Centre.

In support of these recommendations the sub-committee indicated that problems of labelling and transport could be handled by committees of the Standards Association of NZ and when such committees had been convened by SANZ at the end of 1977 NZIC gained representation at the 'Labelling of Hazardous Materials' and the 'Containment of Hazardous Substances for Multimodal Transports' committees in June 1978.

These activities coincided with the formation in August 1978 of the Hazardous Chemicals Sub-Committee of NZIC based on the Auckland Branch sub-committee but enlarged to include corresponding members in all other branches.

At this stage the functions of the committee were becoming more apparent and its responsibilities could be summarised as follows:—

1. To assist in the identification of chemicals and notify their hazardous properties as required
2. To provide information on the safe handling and disposal of hazardous chemicals.
3. To support the issue of Legislation, Standards and Codes of Practice which educate and control the

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suppliers, handlers and users of hazardous chemicals.

4. To comment on existing and proposed legislation concerned with hazardous chemicals.
5. To maintain liaison with the National Hazardous Chemicals Information Centre.
6. To publicise the value of hazardous chemicals to society while ensuring that they be kept under strict control.

In addition, the committee serves NZIC and its members by keeping up-to-date with world trends in hazardous chemicals information, retrieval of information, reports on disasters and chemical disposal techniques.

During the last year our committee has been very active commenting on Bills, draft regulations and draft standards for SANZ. These include:—

- The Toxic Substances Act 1979.
- The Pesticides Act, 1979.
- The Dangerous Goods (Class 2 - Gases) Regulations 1980.
- Government Railways Amendment Bill
- The 6th draft of the Toxic Substances Regulations 19
- Draft Standard "Transportation Labels for Hazardous Substances" (due for publication in November 1980.)
- Draft Standards "Containment of Hazardous Substances for Multimodal Transport"
 - Part 1 — Large Containers,
 - Part 2 — Small Containers.

A recommendation of the Committee earlier in the year for the introduction of a legally controlled "Registration of Trade Names of Hazardous Chemicals in NZ" appears to have evoked response in the right quarter by the recent publication of a "Feasibility Study of a Hazardous Substances Register" produced for the Department of Health and State Services Commission.

Wherever the opportunity has arisen our committee has brought attention to the often forgotten dangers of hazardous chemicals polluting water resources and, in the area of education, demonstrations of the hazardous nature of some chemicals have been given to the Driver Support Training Committee and news media.

There is little doubt that the activities of the NZIC in the sphere of hazardous chemicals are getting well known in official circles as is demonstrated by the willingness of the authorities to forward Bills and draft regulations to us for comment and for SANZ to accept our representation on their committees.

However, there is still much to be done by NZIC in disseminating the expert knowledge of its members about hazardous chemicals for the benefit of the public and also to protect itself against the often ill-informed criticism of chemicals.

**Hazardous Chemicals Committee
Auckland
D. Oglvie
R.H. Hopgood
A.C. Kennett (Chairman)**

Guide To The Literature Of Chemical Safety

HANDBOOK OF REACTIVE CHEMICAL HAZARDS, L. Bretherick 2nd edn. Butterworth & Co. (Publishers) Ltd. 1979.

The following is an attempt to provide a reasonable list of useful sources suitable to the needs of the chemical safety practitioner.

(Absence of a book from this list does not imply inferiority).

HAZARDS IN THE CHEMICAL LABORATORY, edited by G.D. Muir, 2nd edn. London: The Chemical Society 1977.

For laboratories requiring general information on the principles of safe working, safety planning, fire protection, first aid, safety in hospital biochemical laboratories and radiological protection, this excellent book will answer most of their problems. This book has one additional important feature: an easy to read section covering all the commonly found hazardous gases, reagents and solvents. The toxic effects of these compounds, immediate first aid procedures, fire risk and disposal notes described in this section are invaluable in case of accidents. The protective plastic binding of the book is a very thoughtful innovation being well suited to its intended environment.

Since publication in 1975, "Bretherick" has become established as a classic reference work on safety for chemical industry, academic research and teaching laboratories. This book is the most comprehensive attempt yet made to collect and classify the vast amount of scattered information covering hazards from violent interaction or decomposition of chemicals in the laboratory or industrial situations. This new addition has been updated and extended with over 2,000 new entries including 150 group hazard items. In addition, the structural formula of each chemical is now given to bring out the relationship between hazard and structure, and an overview chapter relates the fundamental causes of reactive hazards to the examples of each type in the text.

The author has also added an alphabetical index of chemical names and synonyms to supplement the existing classification of formulae (in order of empirical formulae) and a glossary of specialised words used in the text. Properties of highly flammable gases and liquids have been consolidated into a separate appendix.

REGISTRY OF THE TOXIC EFFECTS OF CHEMICAL SUBSTANCES NIOSH, U.S. Department of Health, Education, and Welfare, 1978 edn. 2 vols.

The current edition of the Registry of toxic effects of chemical substances contains more than 80,000 listings of chemical substances. About 22,000 are names of different chemicals with qualifying toxic dose information and over 60,000 consist of synonyms and codes which have been acquired from published literature, cooperating industries and individuals and the American Chemical Society. The purpose of the registry is to provide basic information on the known toxic and biological effects of chemical substances for use by employers, employees and all concerned with the safe handling of chemicals.

FIRE PROTECTION GUIDE ON HAZARDOUS MATERIALS, 7th edn., National Fire Protection Association; Boston; 1978.

This book consists of four main sections. The first section consists of a flash point index of some 8,800 trade name liquids listed alphabetically. Unfortunately this section is really only of benefit to the American reader since the majority of the products listed are only available in the USA. The second section lists the fire hazard properties of more than 1,300 flammable liquids, gases and volatile solids. The third section deals with hazardous chemical data such as fire, explosion and toxicity hazards for 416 chemicals. The final section consists of a manual of hazardous chemical reactions which includes data for some 3,550 mixtures of two or more chemicals reported to be potentially dangerous in that they may cause fire, explosions, or detonations at ordinary or moderately elevated temperatures. The relatively low cost and wealth of data contained in this work make this a very useful book to have available particularly to fire services personnel and to others with responsibility for protection of life and property.

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS. N. Irving Sax, 5th edn. New York: Van Nostrand Reinhold, 1979.

This book consists of 12 sections dealing with many aspects of industrial safety including such items as industrial fire protection, radiation hazards, health hazards of solid waste treatment and industrial noise. Its most useful section consists of a comprehensive list of chemicals (nearly 16,000) and their properties and toxic ratings. The book is designed specifically to expedite the retrieval of hazard information by categorising the data into three main headings. The first is general information about the listed substances such as their synonyms, description, formula and physical constants. Secondly, there is a hazard analysis which included a toxic hazard rating or paragraph on toxicological data; a fire hazard rating, an explosion and disaster hazard rating — this last to give some idea of the hazards

produced when quantities of the material concerned are involved in a fire or flood or explosion. The third category of information includes a reference to the countermeasures that may be taken to mitigate the effects of using any of the given materials.

Because data on tolerable limits and Threshold Limit Values (TLVs) is subject to fairly frequent change, the updating of Sax is considered to be important. New in this 5th edition is a complete reprinting of the American Conference of Governmental Industrial Hygienists (ACGIH) TLVs together with the proposed changes.

This is an American book and the sections on Chemical Substances Legislation and Labelling and Identification of Hazardous Materials is confusing in the NZ context.

However, bearing this limitation in mind, the book remains an extremely valuable reference work for every occupational health and safety practitioner.

TOXIC AND HAZARDOUS INDUSTRIAL CHEMICALS SAFETY MANUAL FOR HANDLING AND DISPOSAL WITH TOXICITY DATA, The International Technical Information Institute, Japan, 1975.

This book provides information about the properties, usage hazards, handling, storage, emergency measures on over 700 chemical substances. Although the information concerned with the management procedures for spills and leaks is somewhat more suited to a laboratory environment, the majority of data presented are useful to a broad spectrum of people engaged in the chemical profession.

HAZARDOUS CHEMICALS, A MANUAL FOR SCHOOLS AND COLLEGES, Schools Science Equipment Research Centre, Oliver & Boyd, 1979.

This manual consists of an alphabetical collection of loose leaves, each page carrying information on properties, hazards, incompatibility data, handling, storage, disposal, spillage and first aid treatment of many typical chemical substances used in schools and colleges.

General rules for safety in the laboratory are outlined in the introduction. Anyone familiar with G.D. Muir's "Hazards in the Chemical Laboratory" will notice a close resemblance in style and indeed there is an acknowledgement to Muir with several other authors at the beginning of the manual.

According to the introduction the choice of nomenclature adopted follows ASE recommendations (whatever they may be) and chemicals are placed alphabetically according to this system. This can prove to be very frustrating unless one is fully acquainted with this system and the authors could well have done better by providing a conventional index at the rear of the book referring to numbered pages. They do provide an alphabetical list of alternative or traditional names but this is located immediately after the introduction and rather easily missed. In all other respects however, this book is rather well done.

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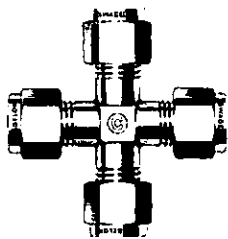
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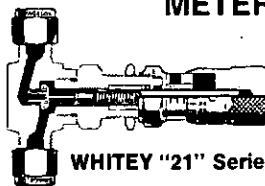
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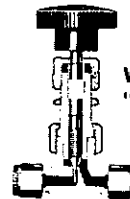
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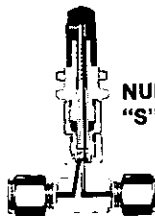
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Safety Literature (Cont)

SAFETY IN LABORATORIES BOOKLET. Ciba-Geigy Ltd. (Free on request)

This useful booklet prepared by Ciba-Geigy is intended to form the basis of a general code of practice for laboratory safety and the rules are designed as a guide for the safe operation of chemical and other processes carried out in the laboratory. The sections are divided into general conduct, housekeeping, hygiene, protective clothing and laboratory technique. Specific laboratory techniques and procedures, fire prevention, chemical hazards, toxicity and first aid are all covered in this booklet in which humorous illustrations are used throughout.

INDUSTRIAL HYGIENE AND TOXICOLOGY. G.S. PATTY (ed) 2nd revised edn., Vol II Toxicology D.W. FASSETT and D.D. IRISH, (eds.) Interscience publishers, 1963.

This book is a ready, practical reference for persons interested in or responsible for safeguarding of others working with the chemical elements and compounds used in industry today. The work consists of a series of chapters (nearly 1500 pages in all) dealing with the source, uses, properties, industrial exposures, methods of detection and determination and physiological responses for many elements and groups of the periodic table, organic and inorganic substances, and concludes with a chapter on the recognition and control of potential exposure in industry.

EFFECT OF EXPOSURE TO TOXIC GASES — FIRST AID AND MEDICAL TREATMENT W.A. Braker and A.L. Mossman. Matheson Gas Products, East Rutherford, New Jersey, 1970.

For laboratories who may handle any toxic gases, Braker and Mossman's manual on the effects of exposure to toxic gases is an essential item for the bookshelf.

THE ENCYCLOPEDIA OF OCCUPATIONAL HEALTH AND SAFETY Vol. 1 A-K, Vol. 2 L-Z. Geneva. International Labour Office, 1971.

This work of reference provides a comprehensive list of problems arranged in alphabetical order, dealing with working environments, toxic substances and their properties, together with known data on safety and health measures, that can be used to protect workers from exposure and/or treat exposed persons from any ill effect due to their work. This encyclopaedia is useful in providing information on the best methods of monitoring the working environment and discusses the acceptable levels of substances that may be found there.

HANDBOOK OF LABORATORY SAFETY N.V. Steere (ed.), 2nd edn. Chemical Rubber Co., Cleveland, Ohio, 1971.

This book provides an extensive coverage of aspects of laboratory safety. Over 600 pages are devoted to such facets
Chemistry in New Zealand

as protective equipment, ventilation, fire hazards, radiation hazards, biological hazards and laboratory design and equipment. The remainder of the book lists fire and health data for 1000 chemicals. A great many people have contributed to the preparation of this book resulting in a well balanced and extremely useful presentation of information suitable for inclusion in any collection of books concerned with safety.

SPILLAGES OF HAZARDOUS CHEMICALS (WALL CHART) BDH Ltd.

This chart is crowded with information dealing with immediate action following a chemical accident. It is difficult to read if not displayed at eye level, but its redeeming feature is that vital information, such as vapour hazards, flammability, flash point, TLV's and management procedures for spillages is carefully colour coded for quick reference.

HANDBOOK OF POISONING. R.H. Dreisbach, 9th edn. Los Altos, Calif. Lange, 1977.

This pocket-sized book covers problems in the field of acute poisoning which might occur in a laboratory or industrial environment. Clear precise information is given of the clinical features and treatment required for all common laboratory and industrial poisons. A copy of this should be kept by a university or industrial safety officer for reference.

JOURNAL OF CHEMICAL EDUCATION. Published by the American Chemical Society.

This journal includes a monthly column entitled "Safety in the Chemical Laboratory". The topics covered range widely over the field and this journal is a valuable aid to keeping up to date in safety matters.

CHEMICAL SAFETY SUMMARY issued by the Chemical Industrial Safety and Health Council of the Chemical Industries Association.

The Chemical Safety Summary is produced quarterly and includes brief accounts of accidents, safety innovations, short reviews, updating of LTV data, abstracts and information about training aids. A ready priority for all chemists who are involved in chemical safety.

TOXICITY AND METABOLISM OF INDUSTRIAL SOLVENTS, E. Browning, Elsevier Publishing Company — 1965.

The main purpose of this book is to make available a comprehensive account of the nature, uses and potential and actual toxicity of well-known and lesser-known solvents used in chemistry, as judged from animal experiments and human experience. While perhaps of more use to toxicologists and members of the medical profession it is well worth taking the time to read some of the accounts of acute and chronic poisoning resulting from exposure to industrial solvents; this leaves the reader with a feeling of renewed awareness and respect for the many solvents that chemists

handle in the daily course of their occupation.

THRESHOLD LIMIT VALUES 1980 Available from the NZ Department of Health.

A small booklet listing the current (1979) threshold limit values (TLV's) adopted by the American Conference of Governmental Industrial Hygienists. Although the TLV's adopted are not specifically recognised by any legislation in NZ, they are used by the Health Department as a standard by which to assess whether or not a factory or business premises complies with the requirements of Section 56 of the Factories Act, or Clause 9, or the First Schedule to the Shops and Offices Act, whichever is appropriate.

LABORATORY SAFETY FOR GENERAL AND MICROBIOLOGICAL LABORATORIES Occupational Health Series No. 13. Issued by the NZ Department of Health.

A very useful booklet which contains basic safety notes for both general and microbiological laboratories. This booklet also contains recommendations for laboratory workers handling carcinogenic chemicals. The Government Printer has unfortunately chosen to present this work on green paper with orange print which makes it very difficult to read under fluorescent light. Hopefully they will correct this in the second printing. Highly recommended for distribution to both teaching and research institutions.

PLASTICS. Occupational Health Series No. 11. Issued by the NZ Department of Health.

Another in the series of very useful safety booklets produced by the Occupational Health and Toxicology Branch of the Division of Public Health, Department of Health. This booklet discusses the nature of plastics and general occupational hazards, then goes on to list the various groups of plastics and gives notes on their uses, toxic and fire hazards and precautions associated with their usage.

A limited number of further copies of the 1980 Chemistry Yearbook are available at \$10 per copy. Send your remittance to: Tricom Publications Ltd., P.O. Box 8669, Auckland. Orders accepted on a "first come, first served" basis.

TELARC Registered Laboratories

The Testing Laboratory Registration Council of NZ (TELARC) is a corporate body established by Act of Parliament in 1972 to organise an accreditation programme for testing laboratories.

The Council's programme is entirely voluntary and provides for the registration of testing laboratories working in any field of science or technology which can demonstrate that they comply with currently accepted standards of good laboratory practice and management.

Laboratory registration brings benefits to both laboratories and their users. The laboratory receives advice and encouragement in raising its standards and recognition of its expertise. The laboratory user has the assurance of reliable and accurate testing.

In addition to its primary objective, the Council provides a mechanism for the general upgrading of testing laboratories by promoting the knowledge,

development and practice of good laboratory management. TELARC also acts as a focus for information on subjects of interest and concern to laboratory personnel and users of laboratory services.

Laboratories which apply for registration receive a formal assessment. This takes the form of a comprehensive independent technical audit of the laboratory's facilities and procedures.

The principle is that of a peer group assessment and the laboratory is evaluated in terms of the current state of the art within its particular scientific discipline or technology.

Registration by TELARC is an acknowledgement of a laboratory's expertise and a formal recognition that the laboratory is capable of working to a high standard of performance.

Registration is not obtained, nor is it retained, without a commitment on the

part of the laboratory to always work in accordance with this high standard.

Details of a registered laboratory's terms of registration are published in the TELARC Directory. These details include the name, address and telephone number of the laboratory and a full schedule of the specific tests for which registration is held. The Directory is widely circulated and serves as a comprehensive catalogue of testing services of assessed competence.

Registration does not constitute a blanket approval of all of a laboratory's operations. It is granted only for those specific tests in which a laboratory has demonstrated its expertise and for which it is fully equipped. Some laboratories may achieve registration for a wide range of tests in several fields of testing but it is more usual for registration to be limited to a small group of tests that are performed on a regular basis.

The following is a list of those laboratories currently holding TELARC registration. Details of the specific tests for which registration has been granted can be obtained from the TELARC Directory of Registered Laboratories copies of which may be purchased from TELARC. Terms of registration of individual laboratories can also be obtained on enquiry.

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Hayes' Metal Refineries Ltd
Hitchins Research Laboratories Ltd
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MOD, Defence Scientific Estab.
MWD, Trentham Wastewater Treatment School
Nestle Co (NZ) Ltd
NZ Aluminium Smelters Ltd
NZ Dairy Research Inst.
NZ Farmers Fertilizer Co Ltd
NZ Pottery and Ceramics Research Assoc.
NZ Steel Ltd
Palmerston North City Corp.
Shell Manufacturing NZ Ltd
Southland Catchment Board
T.J. Spratt & Associates
Waikato Hospital
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CONFERENCE CHECKLIST

Further details of any of these gatherings can be obtained from **Associate-Prof. Stuart Rutledge**, Chemistry Dept, University of Auckland, who is Secretary of the National Committee for Chemistry.

February

8-10: Manila, Philippines: 2nd Conference on Chemical Engineering in Resource Development and Conservation.

8-12: Terrigal, NSW: RACI Colloid and Surface Chemistry Division 2nd Australian Congress.

15-19: Melbourne: 2nd Australian Thermodynamics Conference.

16-20: Sydney: 5th International Conference on Ion Beam Analysis.

17-22: Canberra: RACI Physical Chemistry Division International Conference on Thermodynamics.

March

4-7: Barcelona: Symposium on Chemical Indices and Mechanisms of Organ-directed Toxicity.

7-14: Sydney: Australian 7th International Symposium on the Forensic Sciences.

16-21: Canberra: International Symposium on Interaction of Particles in Colloidal Suspension.

April

6-10: Rotorua: 35th Annual Conference of APPITA.

7-9: Guildford, England: Royal Society of Chemistry Annual Congress.

13-17: Srinagar, India: International Conference on the Applications of the Mossbauer Effect.

23-25: Kuala Lumpur: First FACS Regional Seminar on Priorities in Chemistry in Development of Asia.

26-May 1: Singapore: 1st Asian and Pacific Chemistry Congress.

May

6-8: The Hague: 4th International Conference on Electrostatics.

7-9: Perth, WA: International Symposium on Copper in Soils and Plants.

11-14: Blackheath, NSW: 12th Australian Polymer Symposium.

11-15: Brisbane: 51st ANZAAS Congress.

13-15: Bathurst, NSW: RACI Chemical Education Division Conference.

18-21: Queenstown: 10th RACI COMO Division Conference.

21-25: Perth, WA: 4th International Symposium on Trace Element Metabolism in Man and Animals.

25-27: Groningen, Netherlands: 3rd International Symposium on Relations between Homogeneous and Heterogeneous Catalysis.

June

9-12: Stockholm: 'Ekmandays' International Symposium on Wood and Pulping Chemistry.

July

5-10: Jerusalem: 4th International Conference on Surface and Colloid Science.

6-9: Strasbourg, France: 27th International Symposium on Macromolecules.

12-17: Exeter, England: 5th International Meeting on nmr Spectroscopy.

13-17: Durham, England: International Symposium on Advances in Polymer Characterisation.

19-24: Sydney: Annual Conference of the Australian Institute of Mining and Metallurgy.

19-24: Bristol, England: International Conference on the Chemistry of the Platinum Metals.

20-23: Oxford: 7th International Symposium on Synthesis in Organic Chemistry.

26-31: Liverpool, England: 6th International Symposium on Carotenoids.

August

2-6: Fort Collins, Texas: International Symposium on Organometallic Chemistry Directed to Organic Synthesis.

9-14: Toronto: 10th International Conference on Organometallic Chemistry.

16-22: Vancouver: 28th IUPAC Congress.

20-21: Helsinki: Symposium on the Harmonisation of Collaborative Analytical Studies.

23-28: Auckland: NZIC:NZBS Golden Jubilee Conference.

23-28: Helsinki: Euroanalysis IV.

23-28: Canberra: RACI 6th Analytical Chemistry Division Symposium.

23-28: Graz, Austria: 8th International Congress of Heterocyclic Chemistry.

Aug 30-Sept 4: Christchurch: Chemeca 81
Aug 30-Sept 4: Jerusalem: 4th International Symposium on the Chemistry of Non-benzenoid Aromatic Compounds.

October

Perth, WA: 31st Annual Conference RACI Cereal Chemistry Division.

1-7: Moscow: International Symposium on Chemical Physics.

4-9: Montreal: 2nd World Congress of Chemical Engineering.

1982

February

9-12: Manila: Chemical Research to meet the World's Expanding Food Needs.

March

23-27: Brighton, England: International Symposium on the Safe Use of Solvents.

May

Sydney: 52nd ANZAAS Congress.

23-28: Palmerston North: International Symposium on Dietary Fibre in Human and Animal Nutrition.

June 28-July 2: Prague: World Cereal and Bread Congress.

July

12-16: Amherst, USA: IUPAC Macromolecular Symposium.

August

Dunedin: NZIC Conference.

13th Australian Spectroscopy Conference

15-21: Perth, WA: International Bio-chemical Congress.

22-27: Tokyo: 4th IUPAC Conference on Organic Synthesis.

23-27: Canberra: RACI 7th National Convention.

Aug 30-Sept 3: Vienna: 9th International Mass Spectrometry Conference.

September

6-9: Bath, England: 4th European Symposium on Chemical-Structural-Biological Activity: Quantitative Approaches.

October

Malaysia: 1st FACS Chemical Congress.

1983

May: Perth, WA: 53rd ANZAAS Congress.

August: NZIC Conference.

August: Adelaide: RACI 7th Analytical Chemistry Division Symposium.

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NZIC PRIZES

Entries for the following Institute prizes must be received by the Registrar, Box 1926, Christchurch, by April 30, 1981. Details are as follows:

ICI Prize for Excellence In Research

This prize of \$500 and a medallion has been donated by ICI (New Zealand) Ltd. The conditions of the award are:

1. The prize shall be awarded to a member of the Institute who, in the Council's opinion, has made some contribution to some branch of chemical science, the contribution to be judged by research work actually published during the 5 years immediately preceding April 30 in the year of the award.
2. Applications by members, or nominations, which may be submitted by Branch Committees or by individual members, must be accompanied by copies of papers presented in support of the entry. The Council itself may nominate for the award.
3. A nomination or application, once made, shall stand for 5 years, but material which fails to satisfy Clause 1 shall automatically be deleted, and additional material may be presented at any time.
4. If in the opinion of the Council there is no candidate of sufficient merit, the Council may refrain from making the award.

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5. The prize shall be presented at the Annual Conference of the Institute or at a meeting of the Branch to which the prize-winner belongs.

6. A member to whom the prize has been awarded shall not be eligible for renomination.

Student Essay Prize

The NZIC shall offer annually a prize for an essay or review on a chemical topic. Conditions of the award are:

1. The prize shall be open to anyone who has not attained the age of 25 years before April 30 in the year of the contest, whether a member of the Institute or not. (Note: Entries from students will be welcomed.)
2. The entry shall be not longer than 5000 words.
3. The entry shall be in a form suitable for publication and the Institute shall have the right to publish the winning entry.
4. Applications, in completed form, must be received by the Registrar not later than April 30 in the year of the contest.
5. The entries shall be judged by a Committee of examiners set up by Council for the purpose. The President of the Institute and the Editor of the Journal shall be ex-officio members of this Committee.
6. The award shall be made by the Council after consideration of the report of the Committee of examiners, and the presentation of the prize shall be made, whenever possible, at the Annual Conference of the Institute.
7. No award shall be made if, in the opinion of the Committee of examiners, there is no entry of a sufficiently high standard of merit.
8. The value of the prize shall be such sum as the Council may from time to time determine, and the prize shall be spent on books or instruments to the satisfaction of the Council. (Note: The value of the prize is at present \$50.)

Shell Industrial Chemistry Prize

1. This prize, which recognises meritorious achievement in the field of industrial chemistry, is awarded annually.
2. Valued at \$200 and restricted to financial members of the NZIC of any membership grade, it can be awarded to an individual or shared between 2 or more members.
3. Applications should include a written statement of the industrial chemistry activities or achievements of the candidate, and their significance in terms of improved technology, new products or other benefits to a company, industry or the community. Supporting documents and publications may be submitted with the application and will be held to be confidential to the assessors. If possible the value of the work should be attested by an accompanying statement from the manager, directors, or head of the organisation. There is no limit on the period of time over which the work was done.
4. Applications for the prize may be made by individual members, or nominations may be made by Branch Committees or by corporate members of the Institute.

5. Two or three assessors will be appointed by the NZIC to consider the applications and make recommendations. The final decision on the award will be made by the Council, which reserves the right to make no award in the absence of a suitable candidate.

(Recipients of the prize have been Dr R. Garland, NZ Pharmaceuticals Ltd., Palmerston North (1978), M.B. Rands, AFFCO Ltd., Auckland (1979) and Dr H.P. Rothbaum, Chemistry Division, DSIR (1980). It was previously sponsored by ICI Tasman Vaccine Ltd.)

Easterfield Medal (next award 1982).

1. The medal shall be awarded to chemists within NZ in recognition of the quality and originality of their research work.
2. Candidates must be under the age of 35 years by April 30, 1982.
3. The award will be open to all chemists whether or not they are members of the Royal Society of Chemistry or the NZIC.
4. The major portion of the candidate's research work submitted must have been done in NZ.
5. No person may be awarded the Easterfield Medal more than once.
6. The successful candidate will be required to deliver a lecture on the subject of the research at the NZIC Annual Conference, or on some other suitable occasion.
7. The medal shall be awarded biennially and presented to the successful candidate on the occasion of the lecture.
8. The Selection Committee reserves the right to make no award in any year if the standard of work submitted is not of sufficient merit.
9. Expenses necessarily incurred by the Medallist in connection with the lecture's presentation will be defrayed.
10. Applications by or on behalf of candidates for the award must be made to the Registrar of the NZIC not later than April 30, 1982 and must be fully supported by all relevant papers (either published or unpublished).

NOTES TO AUTHORS

The Editor is always pleased to receive offers of papers for publication. The Journal aims to publish material of particular relevance to NZ chemistry but also welcomes any original chemical work, including more general scientific essays or reviews. Topical comment may take the form of a letter to the Editor.

Presentation

Authors should present their material in a concise, clear, natural style. They are urged to observe the high standards expected of a professional publication.

Manuscripts

The original and two copies of the manuscript should be typed double-spaced on A4 paper with wide margins. The left-hand margin should be not less than 40mm. All pages of the manuscript must be numbered consecutively including those containing references, tables and captions to illustrations, which are to be placed after the text.

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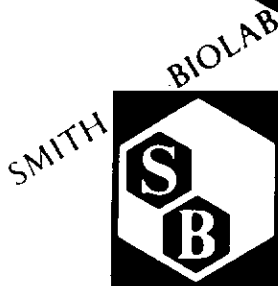
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Footnotes within the text should be used only when essential. Normally a system of references (see below) should be used. In the few instances where footnotes may be required they should be placed within horizontal rules immediately under the lines to which they refer.

References to the literature must be by unparenthesized superscript numerals in the order in which they are first mentioned and must be assembled in numerical order on a separate sheet at the end of the paper. The order given should be

AUTHOR (initials first); JOURNAL: VOLUME: PAGE NUMBER and YEAR. Journal abbreviations should follow those set out in Chemical Abstracts, e.g. R.S. Hull, *J. Chem. Phys.*, 63, 1141, (1975). References to books should give the author (with initials), title, publishers, year

published and page number, e.g. F.A. Cotton and G. Wilkinson, *Basic Inorganic Chemistry*, John Wiley & Sons Inc., New York, 1976, p379.

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Where possible mathematical expressions and chemical formulae should be in normal typescript. Other material should be in a form suitable for photo-reduction.

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Diagrams & Structural formulae These should be submitted in such a form as to permit direct photo-reproduction. To that end stencils should be used wherever appropriate and lettering should be of such a size as to remain easily legible after the material has been reduced to either an 85mm column or a 175mm page. Black ink must be used on boards, drawing or tracing paper, or plastic sheet. For convenience in reduction diagrams should not normally exceed 420 x 600mm² (i.e. A2 size). The originals and two copies of all diagrams and structural formulae are required. Their approximate position in

the text should be indicated in the margin. All diagrams should be numbered in series and a typed list of captions provided.

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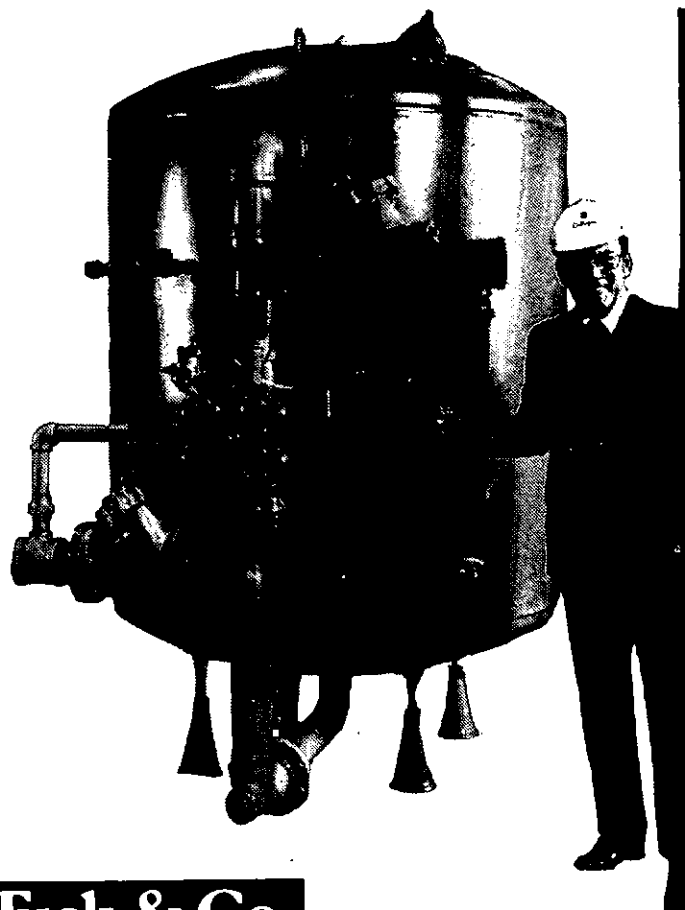
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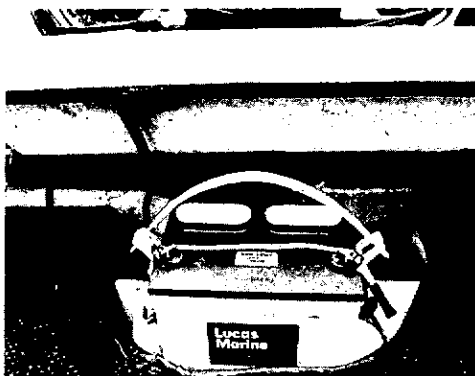
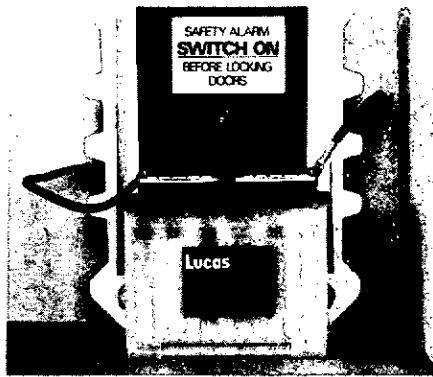


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Alternative Uses For The Liquid Scintillation Counter In Analytical Techniques

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SUMMARY

The use of the liquid scintillation counter in a range of roles well outside its normal radioactivity measuring function is briefly described. The applications cover the quantification of colorimetric and UV absorption techniques, monitoring rates of particle sedimentation and enzyme reactions and the provision of a quick, simple alternative to quantitative thin layer chromatogram scanning. Comparable or even better results can be achieved than from the methodology normally used.

In liquid scintillation counting, the organic-based scintillants have always accounted for a considerable proportion of the total cost of sample presentation. In recent years, this situation has been severely aggravated by escalating costs of chemicals and the introduction of sophisticated and automated equipment allowing a considerable expansion in the throughput of samples. Among more recent developments to offset this situation has been the introduction of the miniature scintillation vial (total volume approximately 4ml) to economise in the use of scintillation fluid. Where extensive use is made of such vials it is necessary to provide matched sets of miniature standards appropriate to the prevailing quench conditions. To this end, the construction of standards contained in sealed miniature glass vials of similar dimensions to those of the counting vial which could be screwed into the conventional 20ml scintillation vial has been shown to provide permanent reference sources for quench correction over an extensive range of conditions^{1,2}. In addition, the highly accurate and constant light sources provided by the sealed miniature standards have applications to quantitative analytical

Dr. Raymond Noble is a member of the Biochemistry Department at the Hannah Research Institute, where his main research interests are in aspects of lipid metabolism in the ruminant animal. His principal interest over recent years has been concerned with aspects of lipid metabolism, in particular that of the polyunsaturated fatty acids, during pregnancy and the relationship between the mother and its foetus. He has been responsible for the recent establishment of the Institute's isotope section which provides complete β and γ counting facilities together with a wide range of associated analytical equipment and techniques. A significant part of his recent interests has therefore included the application of the liquid scintillation counter to analytical techniques. Dr. Noble is married with four children.

techniques other than that of merely determining absolute quantities of radioactivity^{3,4}. Thus the attenuation between rates of photon emission from the sealed source and photon detection by the photomultiplier system caused by the introduction of interfering substances into the annular space between the outer vial and the sealed miniature standard may readily be used for the quantification of substrate.

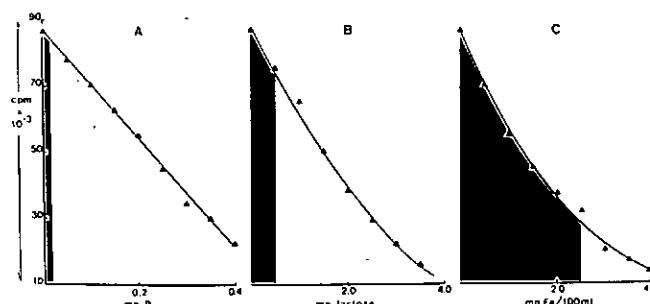


Fig. 1 Net counts per minute from the miniature liquid scintillation ^{14}C standards versus substrate concentrations (A) phosphorus, (B) lactose, (C) iron.

■ range of substrate concentrations able to be accommodated within 0.8 absorbance units of the spectrophotometer.

1. Colorimetric determinations

Sealed miniature glass standards, length 42.0mm, i.d. 10.0mm and each containing 1×10^5 disintegrations per minute of ^{14}C -cholesterol (Radiochemical Centre, Amersham, England) dissolved in 2.5ml of organic scintillant, were constructed from glass tubing and designed to fit centrally into the standard 20ml scintillation vial by insertion into a moulded plastic support sealed on to a standard polyethylene cap. Quantification in the visual range was assessed by using a wide range of coloured standards of known substrate concentration and comparing the results with values obtained on a Pye-Unicam SP500 spectrophotometer, the accurate usable range of which was considered to be up to 0.8 absorbance units. Analytical methods were used that gave as their end products colours from the extremities and approximately mid-range of the visual spectrum: blue-phosphomolybdate complex for phosphorus determination⁵; yellow-lactosozone complex for lactose determination⁶; red 2:2'-dipyridyl complex for iron determination⁷. Figure 1 shows the standard curves of net counts per minute versus substrate concentrations obtained by the liquid scintillation counter technique, together with the comparative range of substrate concentrations that could be accommodated within the 0-0.8 absorbance units of the spectrophotometer. The range of substrate concentrations that could be determined accurately by the liquid scintillation counter technique in all cases greatly exceeded that accommodated within the 0.8 absorbance units of the spectrophotometer. Thus in the case of the phosphorus determination, the range of concentrations that could be determined by the scintillation counter exceeded by some forty-fold that which could be accommodated on the spectrophotometer. Indeed, with all three methods, the concentrations of substrate accurately determined by the scintillation counter exceeded the upper level of substrate chosen. By substitution of the ^{14}C cholesterol standards with a ^3H -containing source, the shape of the standard curve could be suitably altered although the range of substrate concentrations accommodated was significantly reduced⁴.

In addition to the advantages that accrue from the wide dynamic range e.g. the reduced necessity for large scale dilution of substrate and therefore the ability to indulge in

methodological simplification⁸, the use of the liquid scintillation counter system possesses many other advantages over that of the spectrophotometer. There is no doubt that the accumulation of individually observed events rather than the reliance on an overall measurement of an average current change gives, in common with all radioactivity measuring processes, very high levels of accuracy and reproducibility; this can be enhanced simply through increasing the content of the radioactive material, thereby intensifying the available light source. Furthermore, the use of a ¹⁴C source with a half-life of 5.6 x 10³ years ensures the provision of a light source virtually unaffected by time and the intensity of which can be readily checked.

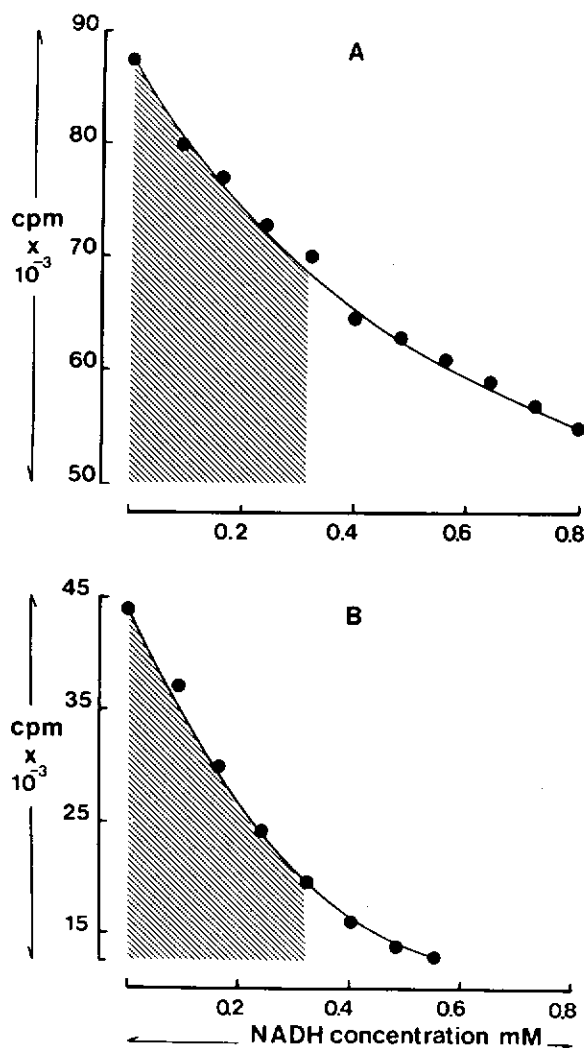


Fig. 2 Net counts per minute from miniature liquid scintillation standards versus concentration of NADH. (A) miniature vials containing ¹⁴C, (B) miniature vials containing ³H. □ range of NADH concentrations able to be accommodated within 0.8 absorbance units of the spectrophotometer.

2. UV absorption

Although the suggested use of the liquid scintillation does not allow for the choice of discrete wavelengths to match particular sets of conditions, limited changes in the wavelength emission can be achieved by a suitable choice of scintillation solute/solvent mixture. A combination that has an emission wavelength in the range 350-380nm permits a more close match to the absorption maxima of NADH and NADPH, the production of which are widely Chemistry in New Zealand

coupled to enzymic and biological reactions. As can be seen from Figure 2, the precision of calibration curves relating net counts per minute to concentration of NADH obtained from the scintillation counter using miniature vials containing either ¹⁴C or ³H standards in p-terphenyl (wavelength emission peak 360nm) was equal to or better than that achieved using the spectrophotometer.

3. Scale of work

In many circumstances, relatively large volumes of substrate used above may not be available. Under these conditions, suitable modification of the method can be undertaken to accommodate smaller volumes of solution. The system has been scaled down by the construction of a very much smaller probe (length 40.0mm, i.d. 4.5mm) inserted into a miniature glass vial, of similar dimensions to that which previously held the standard labelled sources, fixed centrally to the base of a standard glass vial. A similar relationship to that obtained on the larger scale between reagent concentration and scintillation source was observed.

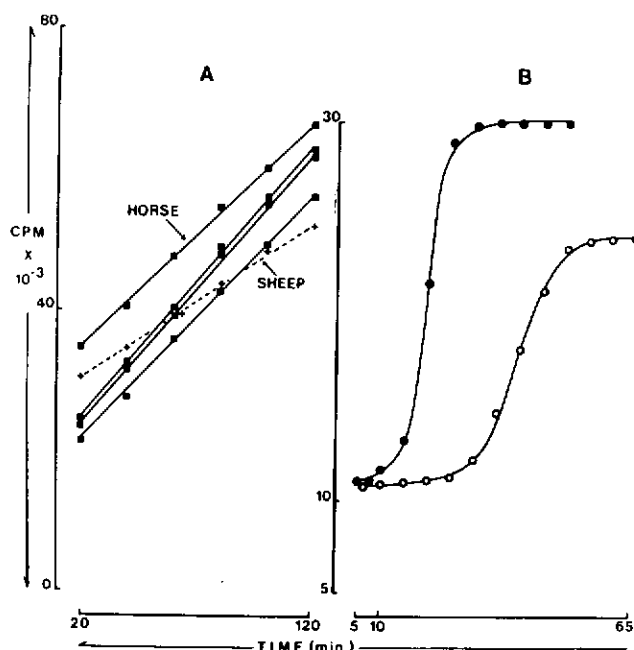


Fig. 3 Net counts per minute from miniature ¹⁴C liquid scintillation standards versus time during (A) sedimentation of erythrocytes, (B) enzymatic hydrolysis of triglyceride emulsion using two levels of enzyme concentration.

4. Other areas of quantification

The technique can be applied to many other general laboratory analytical problems which rely upon quantification through changes in colour or opacity of a medium. In particular, it can be applied to situations in which there is a requirement to monitor substrate changes as they occur *in situ* by using the outer chamber as the reaction vessel. Two examples only are given. Figure 3a shows the capacity of the technique to monitor the differential rates of sedimentation of erythrocytes by observing the changes in count rate observed over consecutive periods of time. Its application to this commonly-used but simple measure, usually accomplished by conventional visual means⁹, is indicative of the technique's potential in aspects of particulate quantification. Figure 3b shows the application to the measurement of tissue lipase activity. A buffered emulsion of triglyceride substrate was introduced into the outer vial. Immediately following the addition of the enzyme to the substrate and mixing, the miniature standard was inserted and the whole counted for consecutive periods of time. Enzyme action was then monitored through the observed increases in the count rate resulting from the substrate clearing.

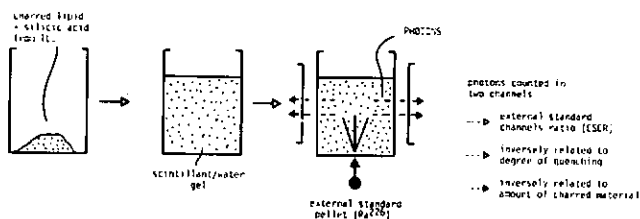


Fig. 4 Procedure for quantification of charred lipid bands from thin layer plates.

Scintillation Counter (Cont)

5. Lipid analysis

Charring and subsequent densitometry of the darkened areas following the separation of lipid classes by thin layer chromatography is a commonly-used method for the quantification of lipid classes, but it is one that is fraught with difficulties. As an alternative to the normal densitometric thin layer plate scanner, a technique has recently been devised that enables the liquid scintillation counter to be used for the quantification of lipid classes following their charring *in situ* on thin layer plates. Although based on the principle described above, i.e. the harnessing of quenching to provide a useful quantitative measure, changes in the technique were necessary due to the nature of the materials involved in thin layer chromatographic analysis. The procedure^{10, 11} involves the use of the external standard ²²⁶Ra source of the liquid scintillation counter rather than the miniature standard insert and is diagrammatically presented in Figure 4. Lipid classes were separated into small discrete bands or spots by conventional thin layer chromatography. Following development of charring by means of spraying with a solution of 3% (w/v) cupric acetate in 8% (w/v) orthophosphoric acid and heating in a forced-draught oven at 180°C, the darkened areas associated with the separated lipid classes were scraped off the plate and suspended in a scintillation gel. The amount of quenching due to the presence of the charred lipids was then determined by counting each sample in the external standard channels ratio mode of the liquid scintillation counter. By applying the external standard channels ratio thus obtained to a series of previously derived curves of

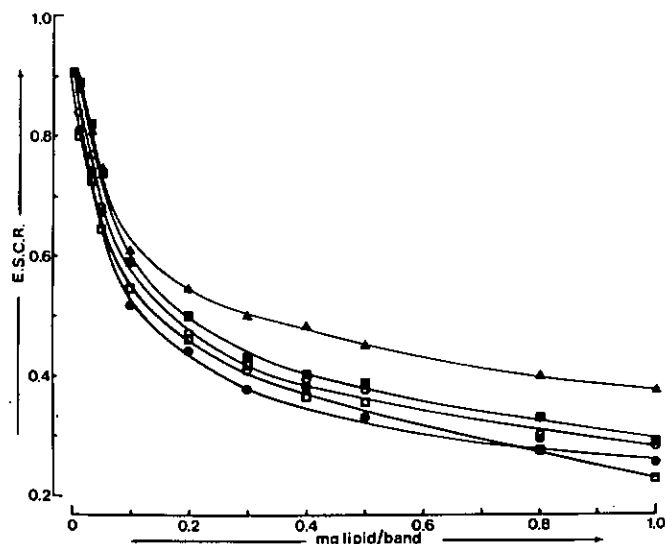


Fig. 5 Calibration curves relating the external standard channels ratio to concentration of lipid.

- cholesterol ester
- ▲ free fatty acid
- phospholipid
- triglyceride
- free cholesterol

concentration lipid versus external standard channels ratio, a measure of the concentration of lipid in each band or spot was obtained. Figure 5 shows a series of standard curves derived from some of the major common lipid classes. Providing experimental conditions were maintained constant, frequent alteration to the curves was unnecessary. Reproducibility and accuracy of all the standard curves were very high (S.E.M. ± 2 per cent) and the concentration of any particular lipid compound able to be accurately determined varied from 0.01 to 1.0mg, a concentration range that more than covered the concentrations of individual lipid classes that could be separated on a conventional thin layer plate. Furthermore, where radioactively-labelled lipids are being analysed, once the lipid mass determination has been made, a reproducible and efficient sample count can be obtained by switching to a suitable choice of normal counting, thereby enabling the determination of specific activity in a single step¹².

6. Conclusions

In most research establishments, a liquid scintillation counter of some degree of sophistication is almost certain to be found. However, their use tends to be intermittent and in many establishments there can be periods when the instruments are idle. The ability to use a liquid scintillation counter as a quantifying spectrophotometric system for the accurate measure of biological reactants as demonstrated above gives an added dimension to the use of the instrument within the laboratory, extending it into areas of quantification well outside those with which the instrument is normally associated. Furthermore, with the present state of the art in scintillation spectrometry, full advantage can be taken of all the automatic sample and data handling facilities. By indulging in a re-assessment of the role of these expensive instruments through the use of their sensitive light detecting abilities for alternative uses, their cost effectiveness may be considerably enhanced.

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