

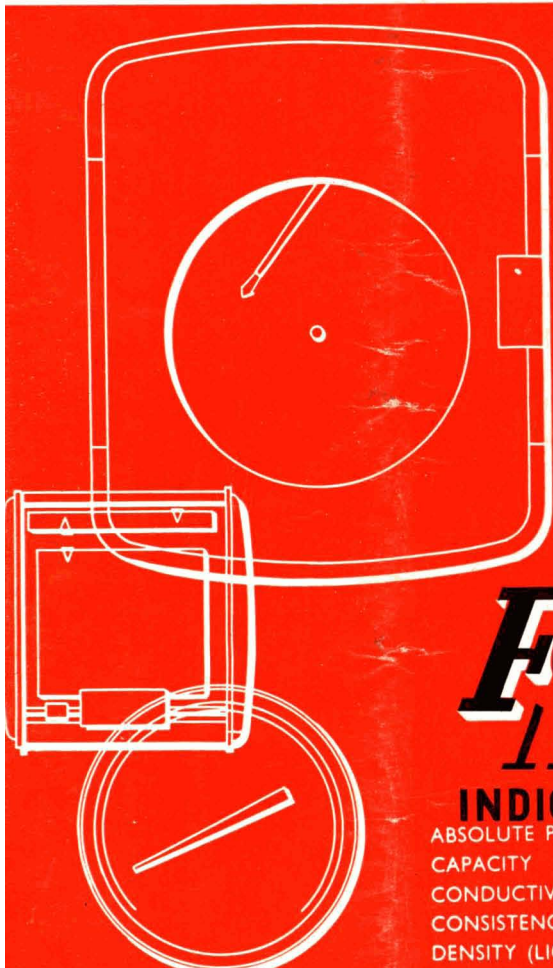
# The Chemical Age

VOL. LXXVI No. 1945

20 October 1956

**CHEMICAL  
PLANT &  
EQUIPMENT**

(See page 133)



## <sup>T</sup> **FOXBORO** *Instruments*

**INDICATE · RECORD · CONTROL**

ABSOLUTE PRESSURE	LIQUID LEVEL	SPECIFIC GRAVITY
CAPACITY	MOISTURE	SPEED
CONDUCTIVITY	MOTION	TEMPERATURE
CONSISTENCY	MOTOR LOAD	TENSION
DENSITY (LIQUID)	pH	THICKNESS
DEWPOINT	PNEUMATIC LOADING	TORQUE
DI-ELECTRIC CONSTANT	POSITION	VACUUM
DIFFERENTIAL PRESSURE	PRESSURE	VISCOSITY
FLOW	REDOX POTENTIAL	VOLTAGE
FORCE	RELATIVE HUMIDITY	WEIGHT
HUMIDITY	RESISTANCE	and other Variables

**FOXBORO-YOXALL LIMITED**  
LOMBARD ROAD · MERTON · LONDON S.W.19.

# Continuous Dewatering

*Another Problem*

**SOLVED BY THE DYNOCONE  
SOLID BOWL CENTRIFUGE**

**PROBLEM**

To separate hexamine crystals from hexamine magma, containing 46% solids, 54% liquor by weight at 150°F.  
To effectively wash the separated crystals free of mother liquor.

To obtain hexamine crystals —

- A. With a moisture content not more than 2% by weight, and *with no crystal degradation.*
- B. Effluent consisting of mother liquor plus wash water, the latter not exceeding mother liquor by 25%.

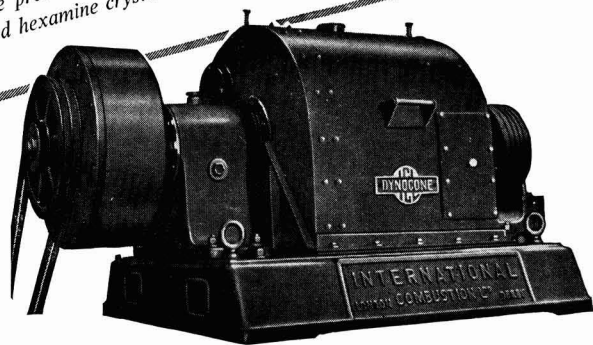
*All these conditions were successfully met, with a feed rate producing a minimum of 1500 lbs. of separated hexamine crystals per hour.*

SOLVED BY

# DYNOCONE

*Continuous Centrifuge*

INTERNATIONAL COMBUSTION PRODUCTS LIMITED



BENZOIC ACID  
BENZYL ANILINE  
BENZYL ALCOHOL  
BENZYL CHLORIDE  
BENZYL CYANIDE

When it comes  
to 'know-how'

we  
also  
are proud  
of our skill...

**BUSH**

FINE CHEMICAL MANUFACTURERS



W. J. BUSH & CO. LTD. LONDON · E 8 · ENGLAND

# INDEX TO ADVERTISERS

The first figures refer to advertisement in The Chemical Age Year Book, the second to the current issue

Page	Page	Page	Page	Page	Page
283	A.P.V. Co., Ltd., The	Spine	British Resin Products Ltd.	250	Dowling Lime & Stone Co., Ltd., The
216	Acalor (1948) Ltd.	155	372 British Railway Traffic & Electric Co., Ltd.	—	Dring & Page Ltd.
277	Accrington Brick & Tile Co., Ltd., The	—	256 British Rotothem Co. Ltd. The	—	258 Drummond Patents Ltd.
229	Adequate Weighers Ltd.	—	166 British Steam Specialties Ltd.	—	257 Dryden, T., Ltd.
270	Aimer Products Ltd.	—	236 British Tar Products Ltd.	—	280 E.C.D., Ltd.
158	Albany Engineering Co. Ltd. The	—	—	—	Edison Swan Electric Co., Ltd.
294	Alcock (Peroxide) Ltd.	—	292 British Titan Products Co., Ltd.	—	259 Electrothermal Engineering Ltd.
—	Alexander, Herbert, & Co., Ltd.	—	180 Broadbent, Thomas, & Sons, Ltd.	—	B/Mk. Elliott, H. J., Ltd.
—	Alginate Industries Ltd.	—	191 Brooks & Walker Ltd.	—	211 Elliott Brothers (London) Ltd.
178	Allen, Edgar, & Co., Ltd.	—	209 Brotherhood, Peter, Ltd.	107	230 English Glass Co., Ltd., The
370	Alumina Co., Ltd., The	155	232 Brotherton & Co., Ltd.	—	G/Cd. Erinoid Ltd.
366	Amalgamated Oxides (1939) Ltd.	—	—	—	296 Evered & Co., Ltd.
186	Angel, H. Reeve, & Co., Ltd.	—	214 Browns Foundry Co., Ltd.	—	Ewart, M. D., & Co., Ltd.
—	Armour & Co., Ltd.	—	260 Brush Design Group, The	—	288 Farnell Carbons Ltd.
G/Cd.	Ashmore, Benson, Pease & Co.	—	274 Bryan Donkin Co., Ltd., The	—	Fawcett Finney Ltd.
386	Audley Engineering Co., Ltd.	—	290 Buell (1952) Ltd.	—	228 Feltham, Walter H., & Son Ltd.
146	Autometric Pumps Ltd.	—	273 Burnett & Rolfe Ltd.	117	230 Ferris, J. & E., Ltd.
190	B. A. Holland Engineering Co., Ltd., The	—	—	85	264 Film Cooling Towers (1925) Ltd.
—	B.X. Plastics Ltd.	119	213 Butterfield, W. P., Ltd.	—	211 Fisher Governor & Co., Ltd.
295	Baird & Tatlock (London) Ltd.	—	—	88	159 Foster Instrument Co., Ltd.
171	Baker Perkins Ltd.	92	—	—	227 Foxboro-Yoxall Ltd.
350	Baker Platinum Division, Engelhard Industries Ltd.	—	—	153	Fraser, W. J., & Co., Ltd.
225	Balfour, Henry, & Co.	—	364 Calder Vale Glassworks Ltd.	182	314 Fuller's Earth Union Ltd., The
222	Barclay Kellett & Co., Ltd.	—	264 Callow, F. E. (Engineers) Ltd.	—	182 Gallenkamp, A., & Co., Ltd.
215	Bennett, Sons & Shears Ltd.	—	—	—	Geigy Co., Ltd., The
G/Cd.	Berk, F. W., & Co., Ltd.	—	207 Chemical Workers' Union, The	101	276 Geigy Pharmaceutical Co., Ltd.
282	Beryllium & Copper Alloys (Safety Tools) Ltd.	—	354 Chemicals & Feeds Ltd.	—	General Electric Co., Ltd.
263	Blundell & Crompton Ltd.	—	275 Chemitrade Ltd.	—	243 Grazebrook, M. & W., Ltd.
148	Borax Consolidated Ltd.	—	297 Chesterfield Tube Co., Ltd., The	—	226 Greeff, R. W., & Co., Ltd.
237	Borax & Chemicals Ltd.	—	297 Ciech Ltd.	113	222 Grindley & Co., Ltd.
236	Boulton, William, Ltd.	—	248 Cinema Television Ltd.	—	240 Haller & Phillips Ltd.
230	Bowmans Chemicals Ltd.	—	244 Clark, T. C., & Co., Ltd.	cov. iii	266 Hanovia Lamps
290	Braby, Fredk., & Co., Ltd.	111	173 Clayton Dyestuffs Co. Ltd. The	—	218 Harris (Lostock Gramal) Ltd.
231	Brambrig & Co., Ltd.	—	176 Clayton, Son & Co., Ltd.	—	258 Haworth, F. (A.R.C.) Ltd.
252	Brannan, S., & Sons, Ltd.	—	—	104	161 Hearson, Charles, & Co., Ltd.
211	Bristol's Instrument Co., Ltd.	—	183 Clydesdale Chemical Co. Ltd. The	—	220 Herbert, Alfred, Ltd.
—	British Acheson Electrodes Ltd.	—	238 Cole, R. H., & Co., Ltd.	—	Holmes, W. C., & Co., Ltd.
232	British Arca Regulators Ltd.	—	196 Cole & Wilson Ltd.	—	194 Honeywill & Stein Ltd.
268	British Assoc. of Chemists The	—	356 Collins Improved Firebars Ltd.	153	279 Hopkin & Williams Ltd.
—	British Carbo Norit Union Ltd.	102	Comet Pump & Eng. Co. Ltd. The	—	4 Huntington, Heberlein & Co. Ltd.
—	British Ceca Co., Ltd., The	—	—	108	I.C.I. Limited, Billingham
292	British Chrome & Chemicals Ltd. (London)	—	256 Costain-John Brown Ltd.	—	I.C.I. Plastics—Fluon.
254	British Chrome & Chemicals Ltd. (Lancs)	—	—	154	122 Imperial Chemical Industries Ltd.
—	British Drug Houses Ltd., The	149	169 Cromil & Piercy Ltd.	—	157 Imperial Smelting Corporation (Sales) Ltd.
—	British Electrical Development Association	—	254 Cruickshank, R., Ltd.	—	International Combustion Group
—	British Geon Limited	91	254 Cyclops Engineering Co. Ltd. The	—	Isopad Ltd.
8	British Industrial Solvents	—	298 Danks of Netherton Ltd.	—	278 Jackson, Henry (Liverpool) Ltd.
234 & 235	British Laboratory Ware Association Ltd.	—	238 Davey, Paxman & Co., Ltd.	—	382 Jackson, J. G., & Crockatt Ltd.
233	British Labour Pump Co., Ltd.	—	330 Dawson, McDonald & Dawson Ltd.	—	185 Jenkins, Robert, & Co., Ltd.
239	British Lead Mills Ltd.	—	—	—	187 Jenkinson, W. G., Ltd.
—	—	—	177 Dia Chemieausruesting	110, 114, 120, 155	3 Jobling, James A., & Co., Ltd.
—	—	—	248 Dorr-Oliver Co., Ltd.	—	210 Johnson, G. T., & Co., Ltd.
—	—	—	—	—	206 Johnsons of Hendon Ltd.

[continued on page 88]

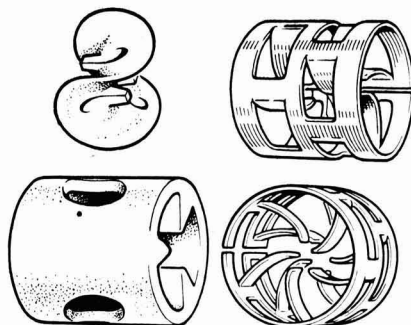
- SLOT - WALL RINGS (IN METAL)
- WIRBELSTROM RINGS (IN CERAMIC)
- SUPER BERL SADDLES

These are the newest Tower Packings having higher through-put rates and lower pressure drops and are specially suitable for vacuum applications

WEINREB & RANDALL LTD.

Telephone: MUSeum 3213

70 NEW OXFORD STREET, LONDON, W.C.1.





*Still in the Middle Ages?*

*Or well-briefed on Epikote Resins*

*for structural protection?*

Today, in many industries where high humidity, solvent action, or acid and alkaline fumes cause severe structural corrosion, Epikote Resin based coatings are bringing enduring protection to plant and equipment. The more severe

the conditions, the more do these new Shell resins reveal their protective merits! Many surface coatings manufacturers make Epikote Resin based formulations. Keep up-to-date on these important developments.

**Epikote Resins** defy corrosion as never before!



SHELL CHEMICAL COMPANY LIMITED, 105/109 Strand, London, W.C.2. Tel: TEMple Bar 4455

"EPIKOTE" is a Registered Trade Mark.

# INDEX TO ADVERTISERS

The first figures refer to advertisement in The Chemical Age Year Book, the second to the current issue

Page	Page	Page	Page	Page	Page
201	—	Mond Nickel Co., Ltd., The	—	Simon, Richard, & Sons, Ltd.	—
216	—	Monsanto Chemicals Ltd.	—	Southern Instruments Computer Division	—
266	—	Moore, W. & E., Ltd.	—	Soyozhimexport (Moscow)	105
—	196	Moritz Chemical Engineering Co., Ltd.	—	Spencer Chapman & Messel Ltd.	110
2	—	Morgan Crucible Co., Ltd., The	90	Spesco (Developments) Ltd.	—
284	—	Murphy, G. L., Ltd.	—	Stabilag Co., Ltd., The	—
403	88	National Enamels Ltd.	—	Stanton Instruments Ltd.	404
—	—	Neckar Water Softener Co. Ltd.	114	Staveley Iron & Chemical Co. Ltd.	—
160	—	Nederlandsche Verkoopkantoor Voor Chemische Producten N.V.	—	Steel, J. M., & Co., Ltd.	208
288	—	Nederlandse Emballage Onderneming Gebr. de Wilde N.V.	206	Stockdale Engineering Co., Ltd.	194
267	—	Negretti & Zambra Ltd.	262	Stonehouse Paper & Bags Mills Streamline Filters Ltd.	—
193 & 269	—	New Metals & Chemicals Ltd.	164 & 165	Sturge, John & E., Ltd.	94
202	—	Nicolson, W. B. (Scientific Instruments) Ltd.	271	Sutcliffe Speakman & Co., Ltd.	245
198	—	Nordac Ltd.	175	Taylor Rustless Fittings Co. Ltd.	118
192	—	North Thames Gas Board	299	Tenaplas Sales Ltd.	174
221	—	Northern Malleable Foundry Co., Ltd., The	204	Thermal Syndicate Ltd., The	116
—	152	Northey Rotary Compressors Ltd.	102	Thermix Industries Ltd.	324
204	—	Northide Ltd.	103	Thomason, W., & Sons Ltd.	153
—	—	Palfrey, William, Ltd.	—	Thompson, John (Dudley) Ltd.	—
—	—	Paper Goods Manufacturing Co., Ltd.	—	Thorium Ltd.	—
—	116	Pascall Engineering Co. Ltd. The	120	Todd Bros. (St. Helens & Widnes) Ltd.	—
—	—	Paterson Engineering Co. Ltd. The	124	Towers, J. W., & Co., Ltd.	219
376	—	Peabody Ltd.	203	Trent Valve Co., Ltd.	191
300	—	Penhryn Quarries Ltd.	—	Tungstone Products Ltd.	286
—	104	Permutit Co., Ltd., The	310 & 338	Unifloc Ltd.	293
284	—	Pott, Cassels & Williamson	334	United Coke & Chemicals Co. Ltd.	109
—	118	Powell Duffryn Carbon Products Ltd.	124	United Filters & Engineering Ltd.	172
—	—	G/Cd. Power-Gas Corporation, Ltd. The	112	W.E.X. Traders Ltd.	244
199	—	Press at Coombelands, Ltd., The	259	Walker Extract & Chemical Co. Ltd.	291
—	98	Price Stutfield & Co., Ltd.	170	Wallach Bros. Ltd.	—
380	100	Prodorite Ltd.	—	Waller, George, & Son Ltd.	184
263	—	Production Chemicals (Rochdale) Ltd.	320	Walley, A. L.	246
192	—	Pyrethrum Board of Kenya	—	Wallis, Charles, & Sons (Sacks) Ltd.	190
162	—	Q.V.F. Ltd.	97	Ward, Thos. W., Ltd.	99
330	—	Reads Ltd.	287	Watford Chemical Co., Ltd.	200
168	—	Richmond Welding Co., Ltd.	—	Watson, Laidlaw & Co., Ltd.	188
—	—	Robinson, F., & Co., Ltd.	—	Webb, William A., Ltd.	344
—	89	Rose, Downs & Thompson Ltd.	G/Cd.	Weinreb & Randall Ltd.	86
228	—	Rotometer Manufacturing Co. Ltd.	208	Wells, A. C., & Co., Ltd.	195
—	—	St. Helens Cable & Rubber Co. Ltd.	362	Wengers Ltd.	224
198	154	Sandiacre Screw Co., Ltd., The	249	Whitaker, B., & Sons Ltd.	218
—	—	Scientific Glass-Blowing Co. The	210	Widnes Foundry & Engineering Co., Ltd.	285
261	—	Shaw Petrie Ltd.	115	Wilkinson Rubber Linatex Ltd.	241
—	—	Shawinigan Ltd.	286	Willcox, W. H., & Co., Ltd.	223
260	—	Shell Chemical Co., Ltd.	340	Wilson, Edward, & Son Ltd.	214
253	—	Siebe, Gorman & Co., Ltd.	247	Winn & Coales Ltd.	189
—	—	Sigmund Pumps Ltd.	360	Wood, Harold, & Sons Ltd.	212
—	—	—	—	Worcester Royal Porcelain Co., Ltd., The	246
—	—	—	—	Worthington-Simpson Ltd.	153
—	—	—	—	Wynn (Valves) Ltd.	96
—	—	—	—	Yorkshire Tar Distillers Ltd.	—
—	—	—	—	Zeal, G. H., Ltd.	98

Now Ready ————— Volumes 1 & 2 —————

## Chemical Engineering Practice

A set of twelve volumes, plus index volume.  
General Editor: HERBERT W. CREMER, C.B.E.

This comprehensive work on Chemical Engineering as an integrated whole has been published to serve as a link between Physics, Chemistry and Engineering, to their better use in process industries. *Price 95s. per volume.*

Descriptive leaflets, listing the contents of Volumes 1-2 together with the subject groups of all forthcoming volumes, available on request

**BUTTERWORTHS SCIENTIFIC PUBLICATIONS**  
88 Kingsway, London, W.C.2

## KEEBUSH

Keebush is an acid-resisting constructional material used for the construction of tanks, pumps, pipes, valves, fans, etc. It is completely inert to most commercial acids; is unaffected by temperatures up to 130°C; possesses a relatively high mechanical strength, and is unaffected by thermal shock. It is being used in most industries where acids are also being used. Write for particulars to—

## KESTNER'S

5 Grosvenor Gardens, London, S.W.1

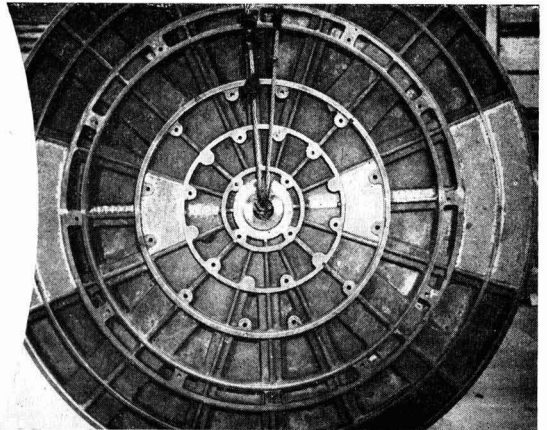
# REPAIRS ON SITE



•  
**NO  
DISMANTLING**

# COLD REPAIRS

•  
**NO  
REASSEMBLING**



• **ENQUIRIES  
TO:—**

## **METALOCK (BRITAIN) LTD.**

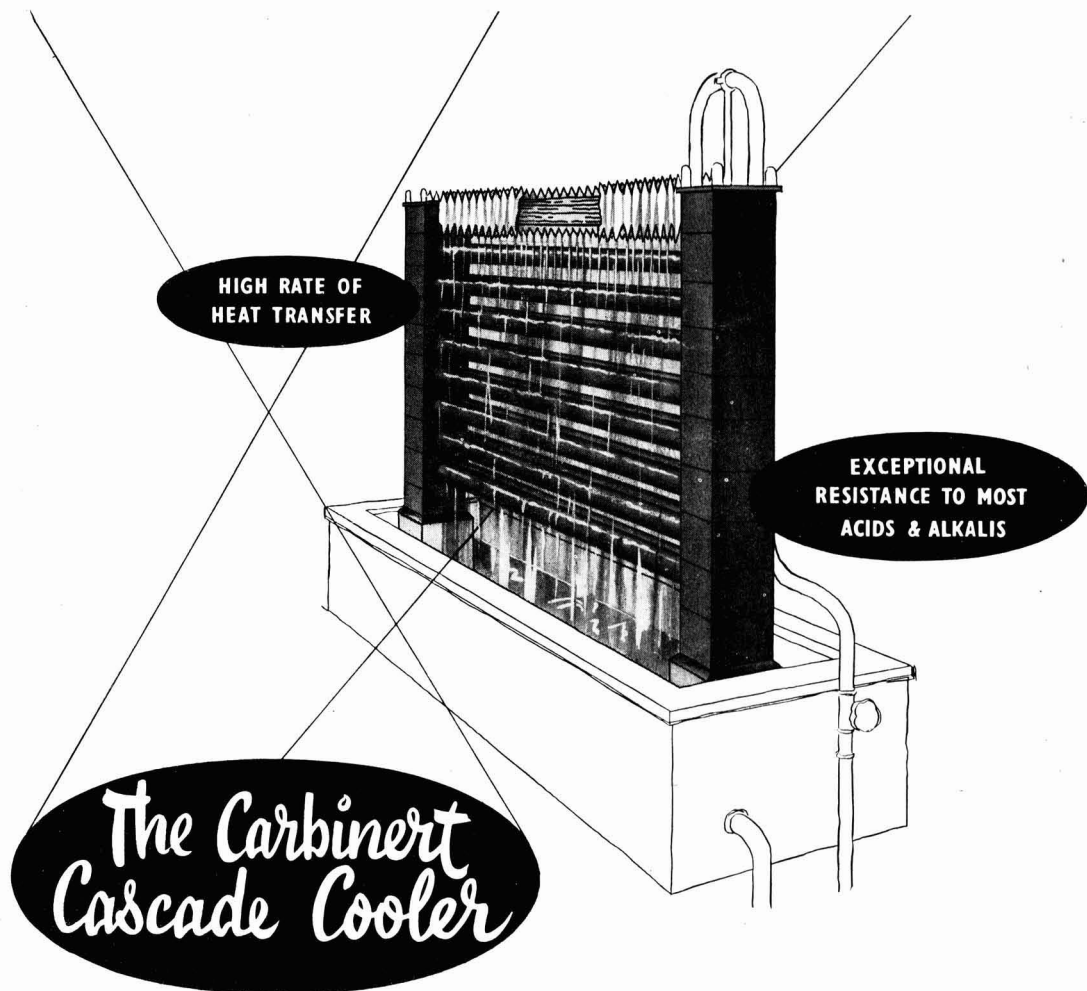
**GRAND BUILDINGS · TRAFALGAR SQ · LONDON W.C.2**

Tel : WHIttehall 8902/5

Cables : MetloKcast, Rand, London

---

---



**CARBINERT** (IMPERVIOUS GRAPHITE) FOR THE CHEMICAL AND PROCESS ENGINEER

The Cascade Cooler is constructed entirely from CARBINERT standard components, and is being adopted on an increasing scale throughout the Chemical and Process Industries for cooling corrosive liquids and gases. It has proved particularly useful for cooling hydrochloric acid and wet or dry chlorine. The unique properties of CARBINERT bring to the chemical engineer a material whose widening scope of application offers vast potentialities.

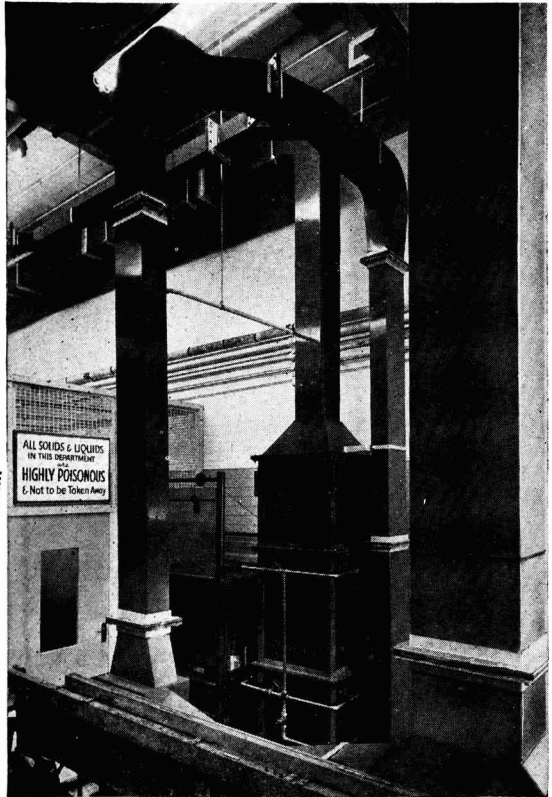
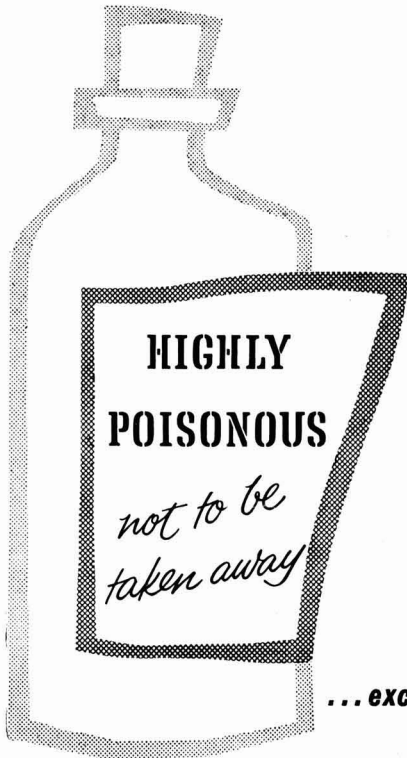
*Our Engineers will be pleased to discuss the application of CARBINERT to your particular need.*

THE **MORGAN CRUCIBLE** COMPANY LIMITED





Absorption Towers and ducting made with Cobex sheet by Turner & Brown Ltd., and installed at the Blackburn factory of Mullards Ltd. Cobex rigid vinyl sheet by BX Plastics Ltd.



... except in Absorption Towers made with rigid

# GEON PVC

Specially designed for the elimination of corrosive acid fumes, the "Turbro" Absorption Tower, with associated ducting, is one of many important applications for rigid Geon PVC in the chemical industry.

The advantages of this versatile material are clear—

**Long Life**  
Rigid Geon PVC withstands attack by most chemicals.

**Ease of construction**  
Rigid Geon PVC is dimensionally stable... lends itself to precision engineering. Tough rigid sheets are softened by heat, shaped on formers, cooled and joined by hot-air welding.

**Maintenance reduced**  
As colours run right "through" the sheet, there is no need for painting or any other surface treatment.

For further information about Geon PVC please write for descriptive booklet No. 113.

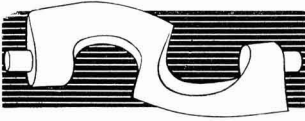


'Geon' is a reg'd trade mark

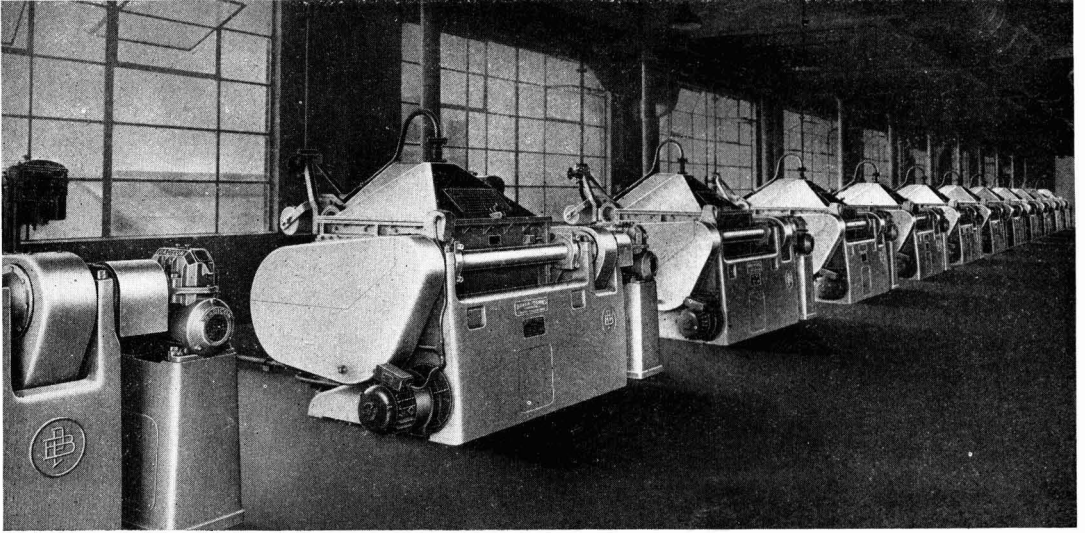
## BRITISH GEON LIMITED

Sales and Technical Service

DEVONSHIRE HOUSE PICCADILLY LONDON W1 TELEPHONE: MAYFAIR 8867



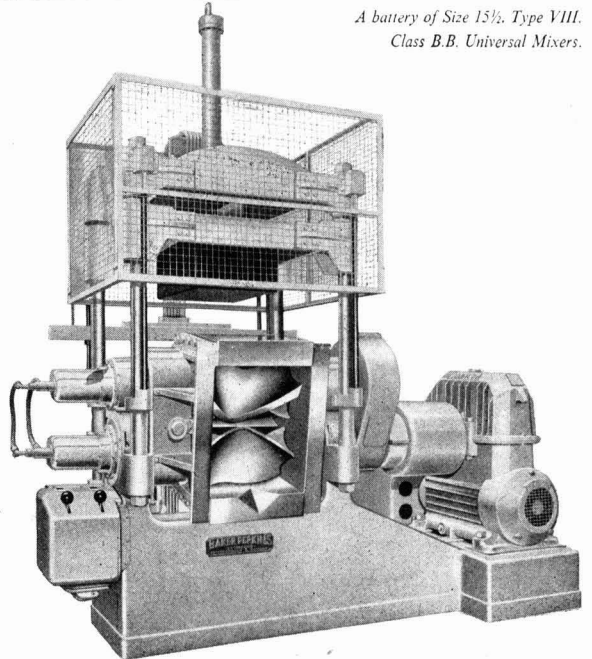
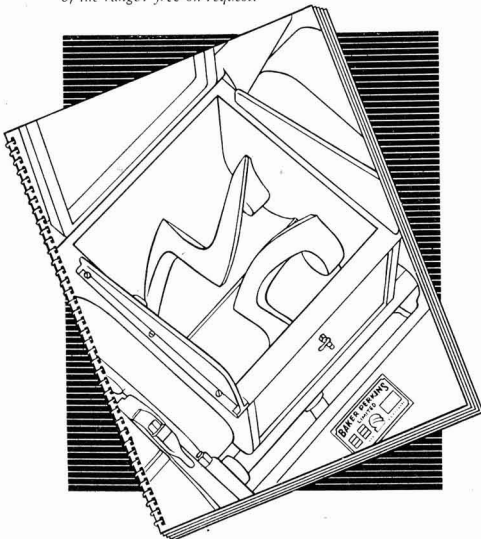
# UNIVERSAL MIXING MACHINES



Whatever your mixing requirements may be Baker Perkins can offer you authoritative and objective guidance, deriving from 75 years experience in the vast field in which mixing forms part of industrial processes. They advise on familiar problems and experiment to solve new ones equally without fee or obligation.

*A battery of Size 15½, Type VIII,  
Class B.B. Universal Mixers.*

★ This booklet illustrates and describes Universal Mixing Machines in types, sizes and capacities characteristic of the range. free on request.




*Size 12 Universal Heavy Duty  
Mixer for Rubber and Plastics.  
Capacity per mix 9 Imp. gallons.  
H.P. 40.*

*Fully jacketed for temperature  
control and with pressure ram  
actuated hydraulically or pneu-  
matically as preferred.*

**BAKER PERKINS**  
*Engineers*

WESTWOOD WORKS - PETERBOROUGH



Disc for displaying PIRELLI TYRES  
produced by The K. R. Webb Company, Painswick, Glos.

*Erinoic*

**Styrene Copolymer Sheeting**

**for vacuum forming** 

ERINOIC LIMITED · STROUD · GLOS.

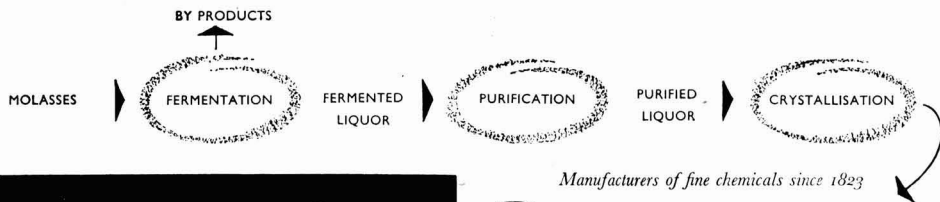
FINE CITRIC ACID IN THE MAKING



# Running a Temperature

No use telling our new artist that pictures are a primitive form of expression which gave way to symbols, alphabets and written language. Just mention a phrase and he makes a visual interpretation of it—usually the wrong one. The high temperature we had in mind gives no cause for alarm, but it is in fact essential at a certain stage in the production of Sturge citric acid. It occurs when spores of *Aspergillus Niger* are sown in molasses.

As the spores feed on the raw material and form a mould, considerable heat is generated. After several days, when the conversion to acid is complete, the solution undergoes several stages of refining before emerging as the pure citric acid for which Sturge is famous throughout the world.



*Manufacturers of fine chemicals since 1823*

**CITRIC ACID BP**

**CITRIC ACID ANHYDROUS**

**ACETONE**

**ISOPROPYL ALCOHOL**

**n-BUTANOL**

*Availability:*

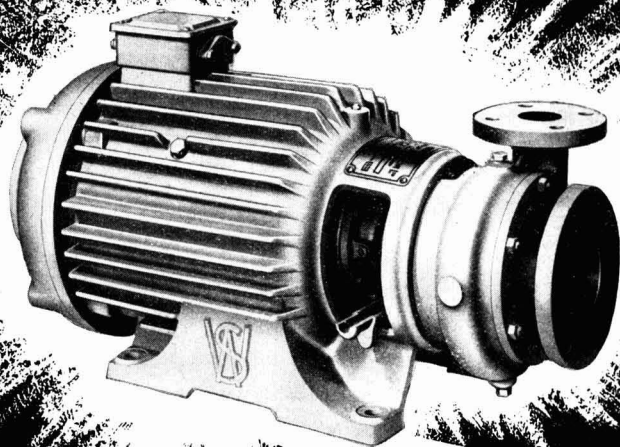
These high quality chemicals, manufactured at Billingham from propylene produced in the oil-cracking plant at Wilton, are available in road tank-wagons and drums. Stocks are maintained at convenient distribution centres for prompt delivery to all parts of the country.

*For further information, consult:*

**IMPERIAL CHEMICAL INDUSTRIES LTD.**

**LONDON, S.W.1.**





## put it to the test!

These new pumps open up an extensive range of acids, alkalis and slurries to economical pumping. They are constructed in 18/8/3 Stainless Steel for mildly corrosive liquids or in WORTHITE, a super-resistance alloy steel enabling Sulphuric Acid to be pumped with negligible corrosion loss. Also, there is the added advantage of easy interchangeability of the Stuffing Box Packing with two types of Mechanical Seal to suit different processes — plus the embodiment of the well-known Worthington-Simpson "Monobloc" construction which means few parts, lower costs, less wear and easier installation.

### MONOBLOC CONSTRUCTION

with all affected parts in

18/8/3

### STAINLESS STEEL

for mildly corrosive liquids  
or where contamination and  
discolouration of the liquid  
must be avoided

WRITE FOR SPECIMEN  
1/4" DISCS AND TEST  
THESE MATERIALS  
UNDER YOUR OWN  
SITE CONDITIONS

### ALSO AVAILABLE IN 'WORTHITE'

a new alloy steel with exceptional resistance  
to many acids, alkalis and slurries



# WORTHINGTON - SIMPSON

## CHEMICAL PUMPS

A WIDE RANGE AVAILABLE

WORTHINGTON-SIMPSON LIMITED NEWARK NOTTS

# INDUSTRIAL PLANT IN GLASS

**Q**

**QUICKLY FITTED**

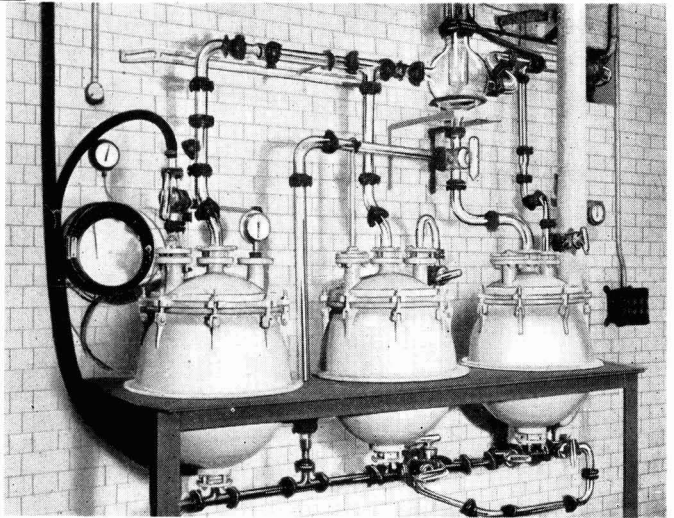
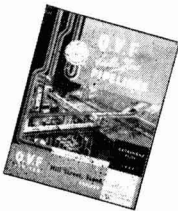
**V**

**VISIBLE IN OPERATION**

**F**

**FREE FROM CORROSION**

Our new 24-page Brochure gives full details of "Visible Flow" Industrial Glass Pipeline and Fittings in standard sizes now available.



(Photo by courtesy of British Drug Houses, London)

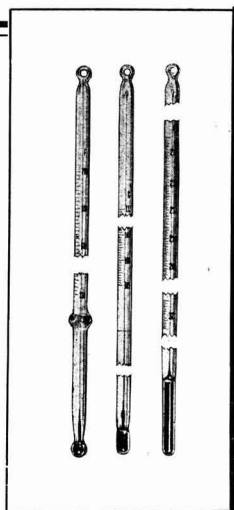
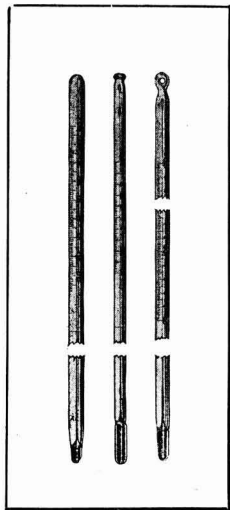


"Visible Flow" Glass Pipeline connecting glass-lined reaction vessels used for the manufacture of Pharmaceuticals.

**Q.V.F. Limited • Mill St. • Stone • Staffs**

Telephone: STONE 511

**THE CHEMICAL ENGINEERS IN GLASS**



**ZECOL**  
REGD. TRADE MARK

THERMOMETERS



CHEMICAL THERMOMETERS



HYDROMETERS

'PHONE  
LIBERTY  
2283-6

**G. H. ZEAL LTD.**

'GRAMS  
ZEALDOM  
SOUHPHONE  
LONDON

**LOMBARD RD., MORDEN RD., MERTON, LONDON S.W.19**

**MANESTY**

**TABLET MAKING  
MACHINERY**

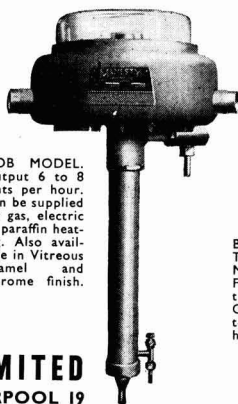
MANESTY TABLET MACHINES are known throughout the world for their rugged construction and the precision with which they are made. Models include tablet machines from the small hand and SPI bench models to the large multi-punch machines and rotary tablet machines capable of giving outputs in the region of 100,000 per hour. Tablets up to 2½ inch diameter can be produced.

The MANESTY AUTOMATIC WATER STILLS are continuous in operation and models are available with outputs from 2 pints to 50 gallons per hour, with heating by steam, gas, electricity or paraffin.

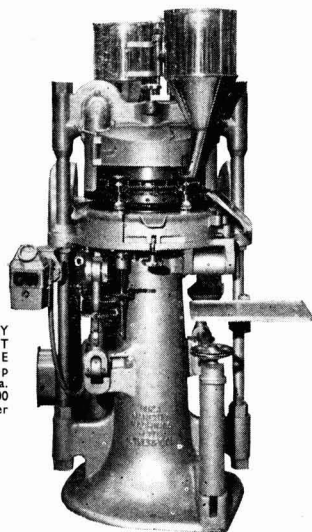
Fully illustrated and detailed leaflets available on request.

AND AUTOMATIC  
WATER STILLS

OOB MODEL.  
Output 6 to 8  
pints per hour.  
Can be supplied  
for gas, electric  
or paraffin heat-  
ing. Also avail-  
able in Vitreous  
Enamel and  
Chrome finish.



BB3A ROTARY  
TABLET  
MACHINE  
For tablets up  
to 1" and 1½ dia.  
Output 78,000  
to 95,000 per  
hour.



**MANESTY MACHINES LIMITED**

6 EVANS ROAD • SPEKE • LIVERPOOL 19

Tel: HUNTS CROSS 1972 • Grams: MANESTY LIVERPOOL 19

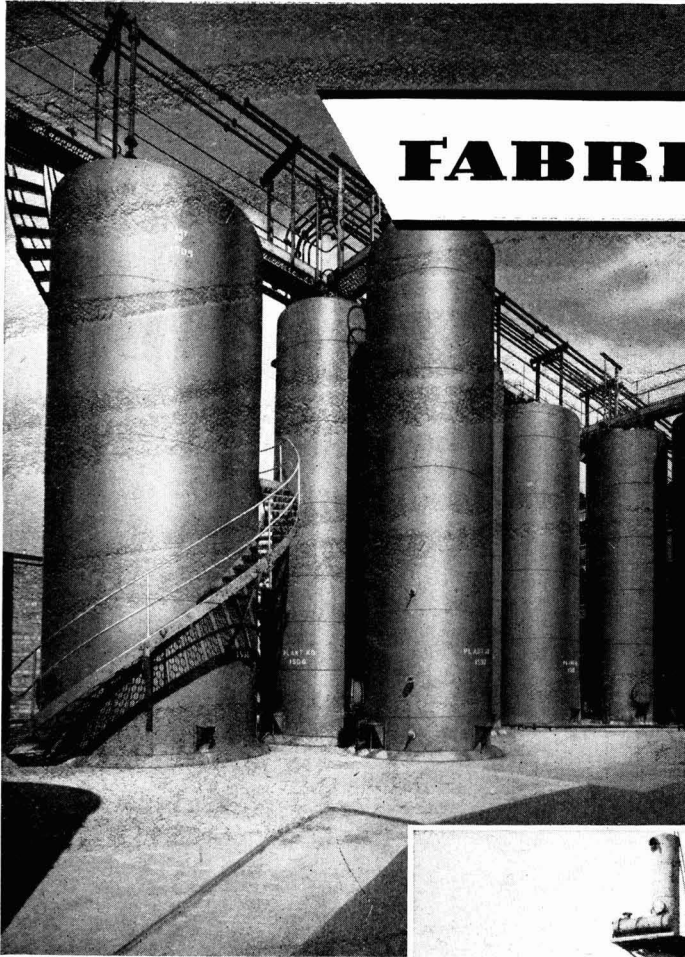
COATING PANS • MIXERS • PUNCHES & DIES • GRANULATORS • DRYING OVENS



# FABRICATION

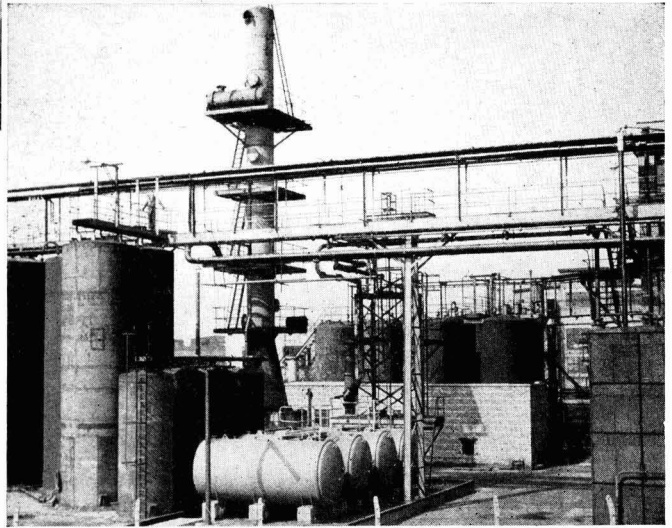
*for the*  
**CHEMICAL  
 INDUSTRY**

In the making of plant and equipment in cast iron and fabricated steel, Widnes Foundry and Engineering Co. Ltd., have served the industry for over a hundred years.



(above) Part of a battery of twelve mild steel storage tanks—the largest (of which there are four) being 12 ft. in diameter and 30 ft. high.

(right) Mild steel fractionating column, complete with condenser and battery in storage tanks; part of the plant supplied to Ashburton Chemical Works Ltd., a member of the Geigy Group of Companies.



'Times' photograph

ESTABLISHED 1841

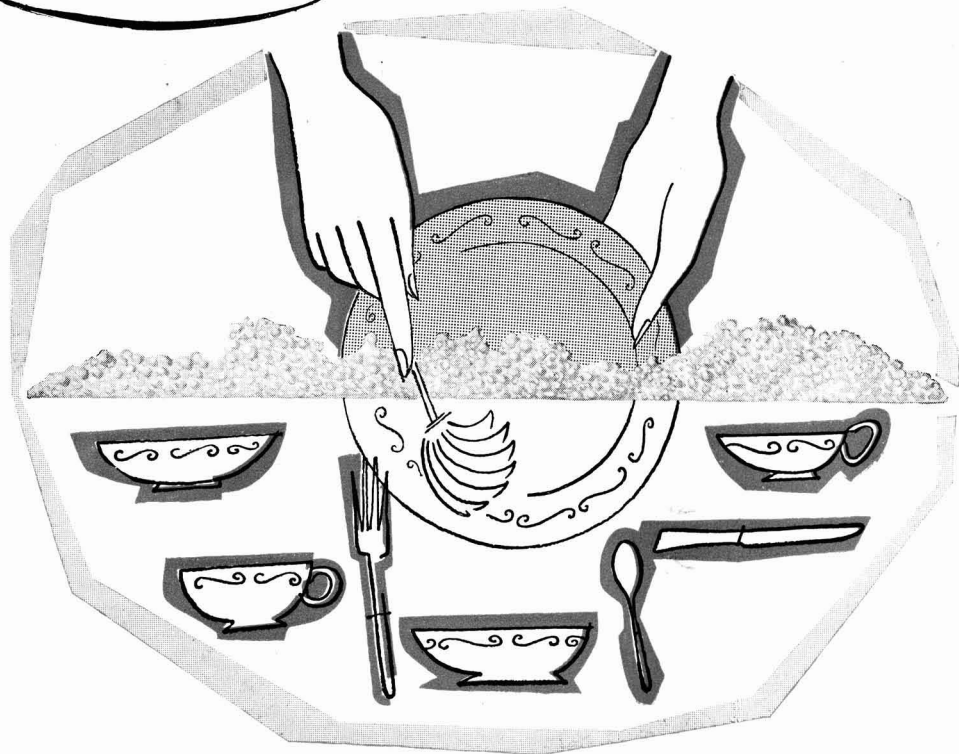


**WIDNES FOUNDRY  
 & ENGINEERING CO LTD**

LUGSDALE ROAD · WIDNES · LANCS

TELEPHONE: WIDNES 2251/4 · TELEGRAMS: 'FOUNDRY · WIDNES'

Chemicals by  
**Marchon**



## EMPILAN MB 303

foam booster and stabiliser

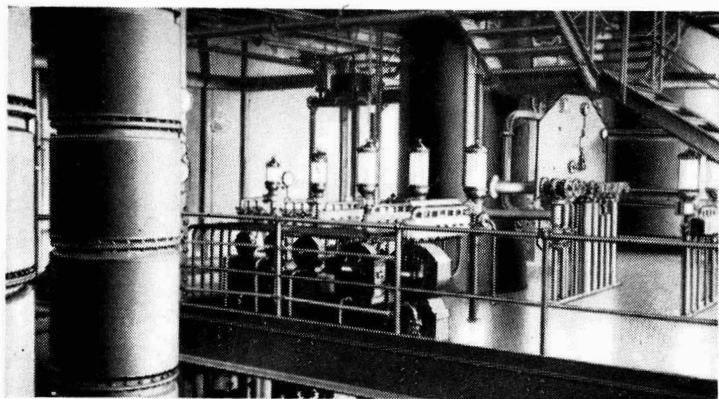
Empilan MB 303 is a new and economic additive for liquid detergents with particular affinities for the popular anionic types. Its presence synergistically boosts detergency and increases fat emulsifying power, thus permitting the formulation of highly concentrated detergent products. The imparting of a pleasant 'soft' feeling to anionic liquid detergents, and a gearing of foaming power to cleaning power, are among other desirable features of this new addition to the comprehensive range of chemicals by Marchon.

# MARCHON PRODUCTS LIMITED

AGENTS AND OFFICES IN PRINCIPAL CITIES OF THE WORLD

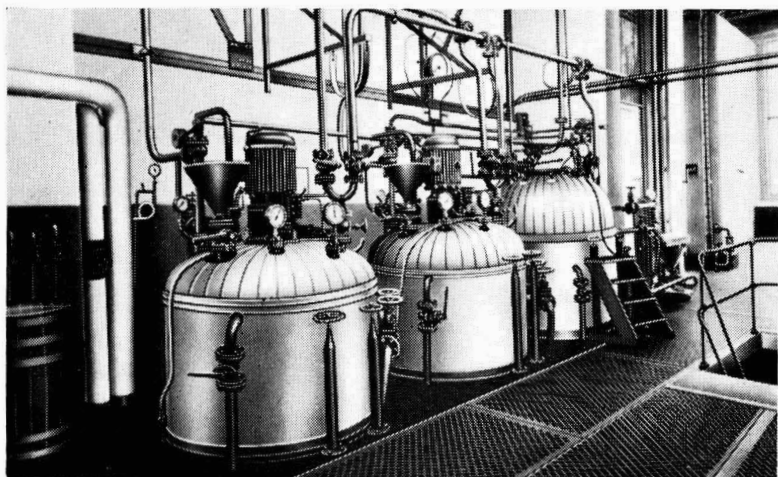
Head Office: Whitehaven. Telephone: Whitehaven 650 & 797 (11 lines)  
 Telegrams: Chems, Telex, Whitehaven.  
 London Office: 140 Park Lane, W.1. Telephone: Mayfair 7385 (3 lines).  
 Telegrams: Marchonpro, Telex, London.

**CEKOP**  
OF WARSAW



# COMPLETE INDUSTRIAL PLANTS

*AND EQUIPMENT*  
*for production of*  
*INDUSTRIAL AND*  
*POTABLE ALCOHOL*  
*AND THEIR*  
*RELATED PRODUCTS,*  
*EDIBLE OILS*  
*AND FATS*  
*including:*

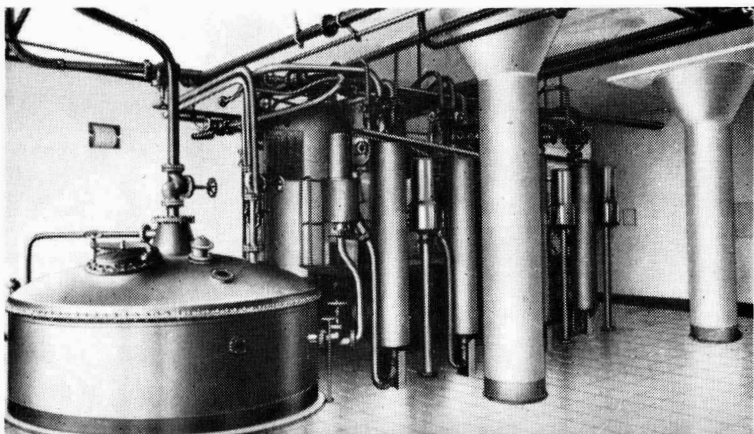


execution of projects, full technical documentation, delivery of machines and equipment, supervision of the assembly and starting up the finished plants and training of the staff, if necessary.

*We shall be happy  
to supply full details*

**CEKOP**

49 MOKOTOWSKA STREET,  
WARSAW, POLAND.  
Telegrams: CEKOP-WARSZAWA



# ULTRASORB ACTIVATED CARBON

ULTRASORB carbons are available for recovery of most industrial solvents, benzole extraction, water purification and other gas and liquid phase applications

**BRITISH**

**CARBO NORIT UNION LIMITED**

LONDON ROAD . WEST THURROCK . ESSEX

Telegrams: 'BRICARBUN GRAYS.'

Telephone: GRAYS THURROCK 4845

## CARBO - UNION - WHESOE

Activated Carbon Recovery Plant for the purification of gases and the recovery of vapour phase solvents

**Whessoe Ltd · Darlington · Co. Durham**

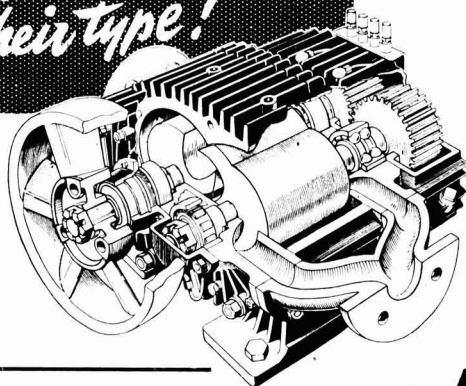
Cables: Whessoe Darlington

Telephone: Darlington 5315

LONDON OFFICE : 25 VICTORIA STREET, S.W.1.

ABBAY 3881

*The only "OIL FREE"  
compressors and  
Vacuum Pumps  
of their type!*



- Designed for specialised service in the Chemical Industry.
- Air or gas compressed and delivered free from oil and oil vapour.
- Air and water cooled models.
- Favourable deliveries.
- First class after sales service.
- 12 months fully comprehensive guarantee.

*Please write for full particulars*

**Northey**  
**ROTARY COMPRESSORS LTD.**

**"OIL FREE" COMPRESSORS AND VACUUM PUMPS**

ALDER ROAD · PARKSTONE · POOLE · DORSET

TELEPHONE : PARKSTONE 4900 (2 LINES)

IT'S PART OF THE NORTHIDE SERVICE

# 4 HAND SIZES - FIVE LENGTHS



## Send for Leaflets

*describing P.V.C. Gloves, Garments, Headgear,  
etc., also Leather and Cotton Safety Gloves.*

**I**F your work demands gloves that give maximum protection against abrasions and chemicals—that are also harder wearing, yet comfortable and easy to keep clean—NORTH fabric-supported P.V.C. Gloves will meet your needs. There are types for most industrial processes, in sizes that assure perfect fit for all workers. Call in Northide for Gloves in P.V.C., leather or cotton. Large stocks, quick deliveries—*it's part of the Northide Service.*

## NORTHIDE LTD

IMPERVIA WORKS, QUEEN STREET, STOCKPORT, CHESHIRE. Tel.: STOCKPORT 2425 (2 lines)

Warehouses in Stockport, London and Birmingham



# ACTIBON

. . . *the highly activated*  
*Carbon for ALL*  
*Decolourising purposes*

## THE CLYDESDALE CHEMICAL CO. LTD.

142 QUEEN STREET · GLASGOW C.1

Phone: CENtral 5247/8

Grams: "Cactus" Glasgow

*Get the best book on the subject*

A. J. YOUNG'S

Introduction to

This is a technical book of more than technical importance (*Economist*).

### PROCESS CONTROL

It should provide an excellent basis for instructional courses to anyone who has to control, operate or design modern plants. The price, two guineas, is reasonable. *Transactions of the Institution of Chemical Engineers.*

### SYSTEM DESIGN

Since 1946 Mr. A. J. Young has been in charge of the Central Instrument Section set up by Imperial Chemical Industries to conduct research into the long-term problems arising from the increasing importance of automatic instrumentation and control in the process industries. To a large extent his book, which has been eagerly awaited for some years now, reports the fruits of the work done by this group. But not only does it make generally available for the first time much recent work which has appeared previously only in papers, it also gives a thorough introductory background in a form likely to appeal to the practising process-control engineer; this is far from true of previous texts in the field, which have been less successful in combining the empirical approach with analysis that is sufficiently advanced to be valuable. *Engineering.*

395 pp. 42s. net

LONGMANS



# SOVIET CHEMICALS

*Rosin, turpentine oil, gums, pine needle oil,  
naphthalene, anthracene oil, pyridine and other  
naval stores and coke-oven products; dyes, soda  
products, solvents, urea, alcohols, accelerators  
and antioxidants for rubber; acids, salts, alkalis,  
oxides, oxygen peroxide, fine chemicals, synthetic  
resins, paints, varnishes, pigments, cinema and  
photo-chemicals, plastifiers, insecticides, castor  
oil, drugs, medicines, Tibetan medicine goods,  
essential oils, aromatics, perfumery, cosmetics  
and other goods . . .*

## and Equipment

*X-ray apparatus,  
medical instruments,  
medical equipment.*

IMPORTED AND EXPORTED BY

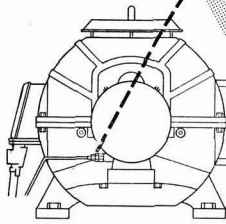
# SOJUZCHIMEXPORT

32/34 SMOLENSKAJA - SENNAJA, MOSCOW, G-200

Telephone : G-4-22-84

Cables : Sojuzchimexport, Moscow

**Fair Warning!**



*\* A typical application, many of which have been supplied*



**by Negretti & Zambra**  
**Dial Thermostats**

\*Motors driving essential fans are connected by mercury in steel temperature systems to N & Z Dial Thermostats on a central instrument panel. If a tendency towards overheated bearings develops, a light on the panel indicates the motor or fan concerned and an audible warning is given. This may be cancelled but the light remains until normal conditions are restored, when the alarm circuit is reset.

Safeguard your plant and/or process by installing Negretti & Zambra instruments.



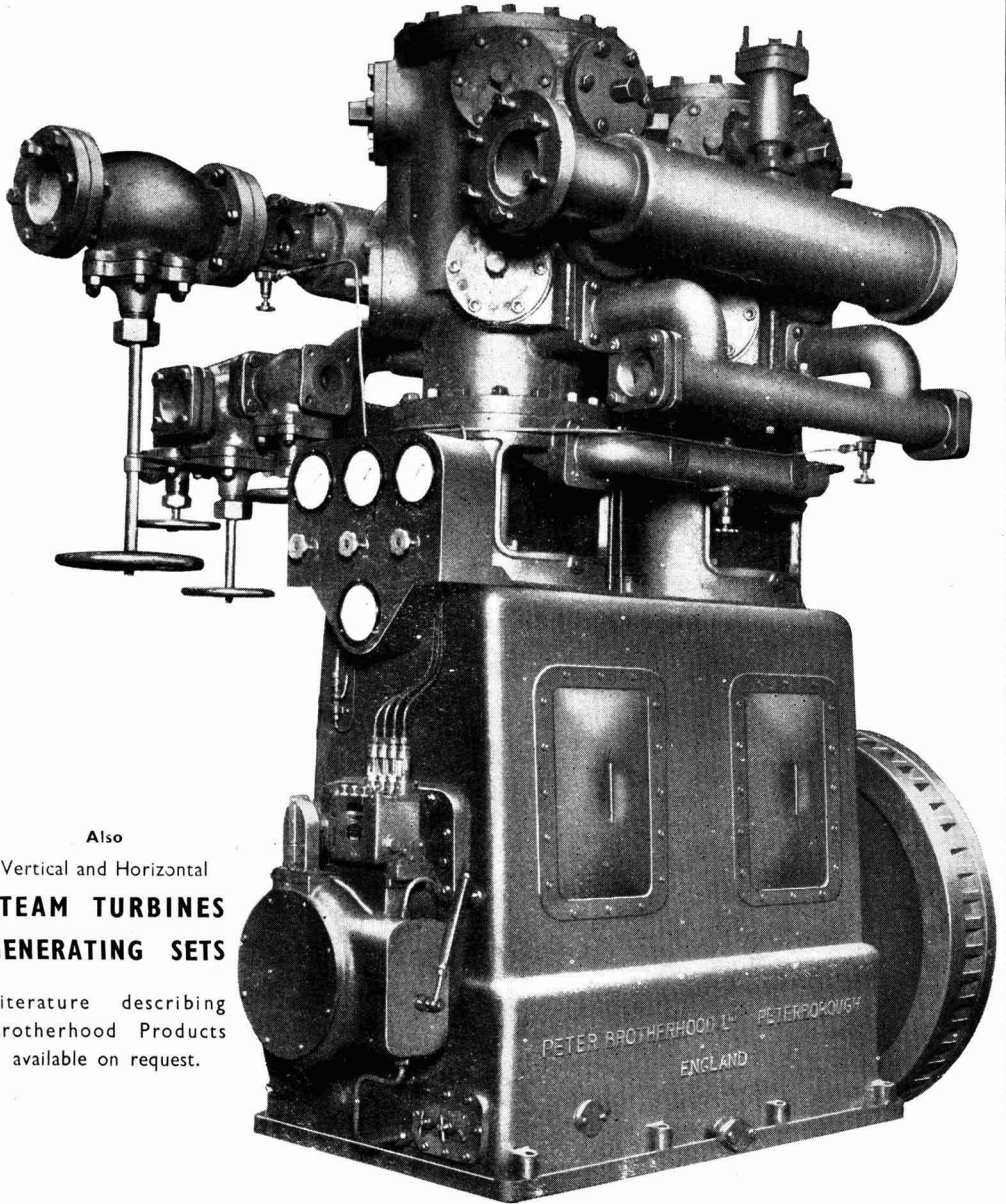
**NEGRETTI & ZAMBRA**

Manufacturers of instruments for the indication, recording, controlling of: Temperature, pressure, liquid level, volume, specific gravity, humidity, etc.

NEGRETTI & ZAMBRA LTD • 122 REGENT STREET • W.1



**BROTHERHOOD** Air, Gas and Refrigerating **Compressors**  
 For the manufacture of  
**ARTIFICIAL FERTILISERS** and other **CHEMICALS**



Also  
 Vertical and Horizontal  
**STEAM TURBINES**  
**GENERATING SETS**

Literature describing  
 Brotherhood Products  
 available on request.



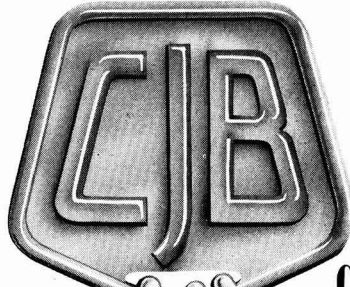
**PETER**  
**BROTHERHOOD** LTD

PETERBOROUGH · ENGLAND

COMPRESSOR & POWER PLANT SPECIALISTS FOR NEARLY A CENTURY

The keys to

Chemical Engineering



**COSTAIN - JOHN BROWN LIMITED**

C-JB chemical engineering service has proved itself so often to be the key to a particular problem, because it offers a flexible plan tailored to suit a clients requirements.

It can embrace a single unit of plant such as a distillation column or a whole scheme from the flow diagram to the commissioned plant, or a "study and report" request similar to that currently in hand for the Indian Government Heavy Water projects.

A fuller assessment of this valuable technical service is easily arranged...  
'phone Fulham 7761.

**CHEMICAL ENGINEERING DIVISION**

**ROXBY PLACE**

**LONDON S.W.6.**



COUMARONE RESINS

*Enquiries to:-*

**UNITED COKE & CHEMICALS COMPANY LTD.**

(SALES DEPARTMENT 35) 34, Collegiate Crescent, Sheffield, 10

*Telephone: Sheffield 63025 Telegrams: 'Unichem' Sheffield*

# ACIDS



*Scientifically prepared for  
TRANSPORT ANYWHERE*



**OLEUM  
SULPHURIC  
BATTERY  
HYDROCHLORIC  
NITRIC  
DIPPING ACID  
DISTILLED WATER (PURE)**

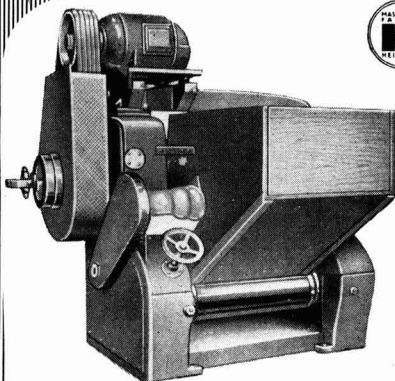
*supplied in any quantity  
and package*

## SPENCER CHAPMAN & MESSEL LIMITED

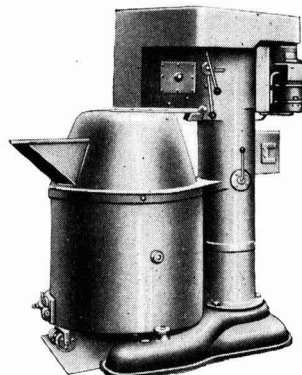
45 · PARK LANE · LONDON W.1.

Telephone: GROsvenor 4311 (4 lines)

WORKS · SILVERTOWN · E.16



**AUTOMATIC HEAVY-DUTY  
MILLING CRUSHER No. 824 NSS**  
for fine-milling soap



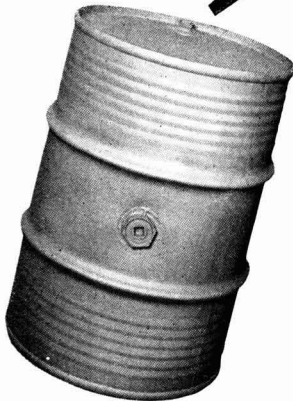
**PLANET MIXING AND  
KNEADING MACHINE No. 191 DH,**  
with run-out type container for the paint and  
news-ink industry as well as for the chemical  
and cosmetic industry.

These and other machines  
for the paint and soap-making industry are made by

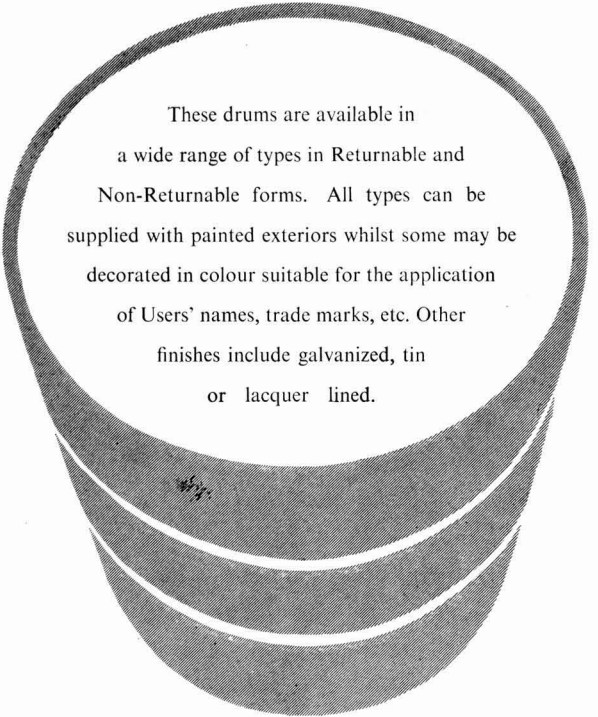
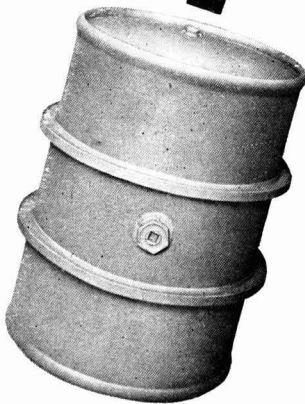
**CHEMIEAUSRÜSTUNGEN**  
DEUTSCHER INNEN- UND AUSSENHANDEL

Mohrenstrasse 61, Berlin W8,  
Telegrams: Chemotechna  
German Democratic Republic

# BRABY (regd.) STEEL DRUMS



*expendable*  
*(single journey)*



These drums are available in a wide range of types in Returnable and Non-Returnable forms. All types can be supplied with painted exteriors whilst some may be decorated in colour suitable for the application of Users' names, trade marks, etc. Other finishes include galvanized, tin or lacquer lined.

*returnable*



**FREDERICK BRABY & COMPANY LIMITED**  
HAVELOCK WORKS, AINTREE, LIVERPOOL, 10. TELEPHONE: AINTREE 1721  
OTHER FACTORIES AT: London Works, Thames Road, Crayford, Kent. TELEPHONE: Bexleyheath 7777  
Eclipse Works, Petershill Road, Glasgow, N. TELEPHONE: Springburn 5151  
Ashton Gate Works, Bristol, 3. TELEPHONE: 64041. And Falkirk  
OTHER OFFICES: 352-364 Euston Road, London, N.W.1 (Head Office). TELEPHONE: EUSTON 3456  
110 Cannon Street, London, E.C.4 (Export). TELEPHONE: MANSION HOUSE 6034  
Queen's Buildings, 10 Royal Avenue, Belfast. TELEPHONE: 26509  
Palace Street, Plymouth. TELEPHONE: 62261

**FOR  
H<sub>2</sub>S AND CO<sub>2</sub> REMOVAL  
BY**

**THE BENFIELD  
HOT POTASSIUM CARBONATE PROCESS**

*and by the GIRBOTOL PROCESS*

*Consult*

**THE POWER-GAS CORPORATION LTD**

(PARENT COMPANY OF THE POWER-GAS GROUP)

**STOCKTON-ON-TEES**

**AND LONDON**

AUSTRALIA · CANADA · INDIA · FRANCE · SOUTH AFRICA



**Ciech**

**LIMITED**

*Import & Export of Chemicals*

WARSAW, JASNA 12, POLAND

Telegrams : CIECH-WARSZAWA

*Recommends . . .*

**ESSENTIAL OILS**

**SODIUM NITRATE**

**ARSENIC OXIDE**

**SODIUM BICHROMATE fused**

**DINITROTOLUENE**

**PIGMENTS such as . . .**

**Ultramarine**

**Zinc Oxide**

**Lithophone**

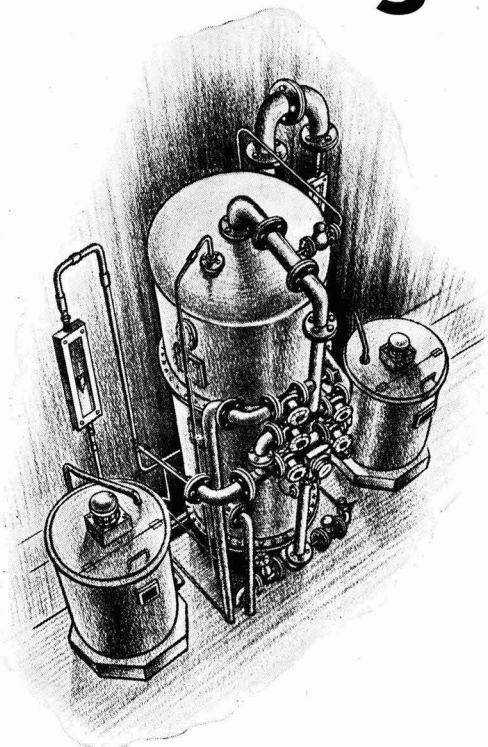
**Pigment Black  
for Lacquer**

**EXPLOSIVES**

**AMMUNITION for HUNTING**

**CIECH LIMITED · WARSAW · JASNA 12 · POLAND**

# Ion exchange



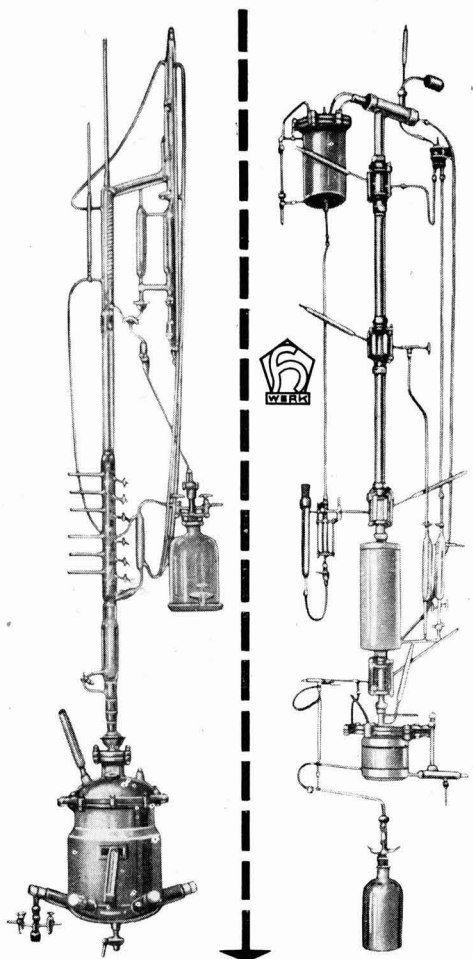
Ion exchange is the answer  
to all requirements for  
water of distilled quality

*Typical plants employing various methods . . . fully  
described in our literature available on request*

# NECKAR

NECKAR WATER SOFTENER CO. LTD.

Artillety Row, London, S.W.1



## BASIC INSTALLATION

Distillation and rectification  
with intermittent feeding  
under atmospheric,  
i.e. normal pressure

## STANDARD INSTALLATION

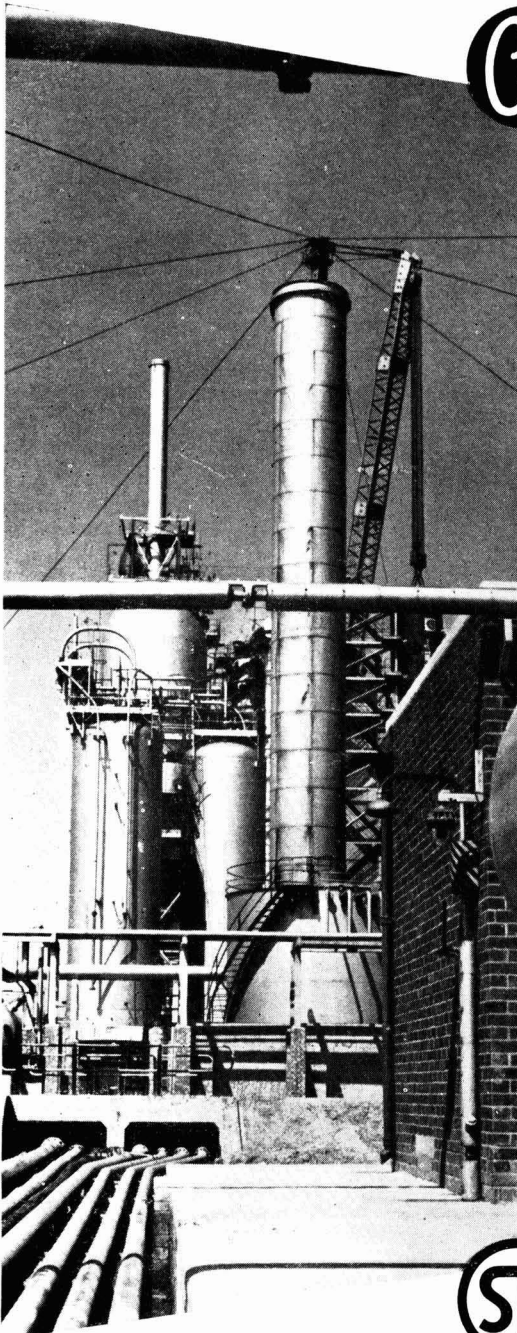
Distillation — fractionating —  
rectification with continual  
and constant running under  
atmospheric, i.e. normal pressure

*These and other installations are made by  
Heckmann Werk, PIRNA-LEIPZIG*

**CHEMIEAUSRÜSTUNGEN**  
DEUTSCHER INNEN- UND AUSSENHANDEL

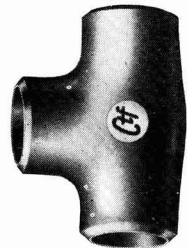
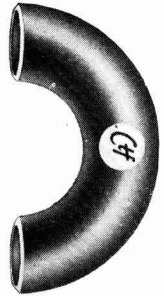
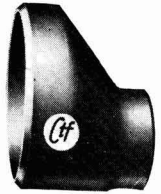
Mohrenstrasse 61, Berlin W8 Telegrams: Chemotechna  
German Democratic Republic





Superior plant is the Potent Agent in achieving economical production. Shipbuilding, Oil Installation, Chemical Plants, Hydro Electric schemes and all the other triumphs of twentieth century engineering require pipes and fittings that will give efficient service allied to well planned layout.

Shaw-Petrie and Clyde Tube Forgings Limited, manufacture, fabricate, and erect, to the highest specification, a complete range of pipework and Seamless Steel and Alloy Butt Welding Fittings.



**SHAW-PETRIE  
LIMITED**

**CLYDE TUBE  
FORGINGS LTD**

**NORTH HILLINGTON · GLASGOW SW2 · TELEPHONE HALFWAY 5551-6**

**LONDON OFFICE 157 VICTORIA ST. SW1  
TELEPHONE TATE GALLERY 9325-6  
AND AT SOUTH SHIELDS, LIVERPOOL  
AND BELFAST**

**OVERSEAS**

**CANADIAN CLYDE TUBE FORGINGS  
P.O. BOX 278 WESTON ONTARIO**

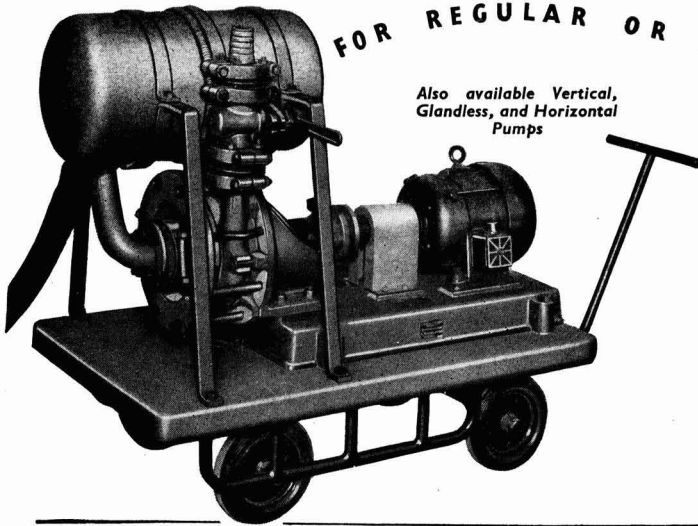
<i>New Zealand</i>	<i>Barbados</i>	<i>Mexico and</i>
<i>East West</i>	<i>British Guiana</i>	<i>Venezuela</i>
<i>Central and</i>	<i>Jamaica</i>	<i>Belgium Holland</i>
<i>South Africa</i>	<i>Trinidad</i>	<i>Norway Sweden</i>
<i>Australia</i>	<i>Italy Spain</i>	<i>and Finland</i>

**CLYDE TUBE FORGINGS OF AMERICA  
PORTLAND OREGON U.S.A.**

*Acid handling*

## PORTABLE PUMPING UNITS

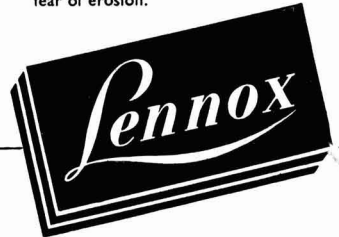
FOR REGULAR OR AUXILIARY WORK



Also available Vertical,  
Glandless, and Horizontal  
Pumps

Lennox Portable Pumping Units are invaluable in every Factory where Chemicals are employed, either as a pumping set for regular production work or as a standby to replace other Pumps undergoing repair. The Pump is easily wheeled to the required position and can be connected with flexible pipe in a few minutes. It will empty Store Tanks, Pickling Tanks, Sludge Sumps, Tank Wagons, Carboys, Process Vessels, or any other receptacle for liquid, and deliver the contents wherever required.

Difficult corrosives, such as Nitric, Sulphuric, Acetic Acid, etc., can be handled without the slightest difficulty, and even gritty substance such as chalk slurry can be pumped without fear of erosion.



LENNOX FOUNDRY CO. LTD.  
Tantiron Foundry, Glenville Grove, London, S.E.8



VITREOSIL  
**FUSED QUARTZ**  
FOR SEMI-CONDUCTOR WORK

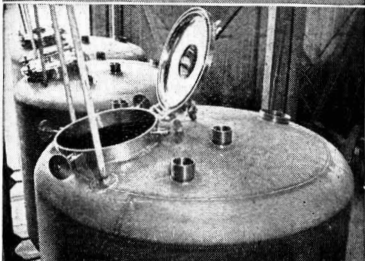
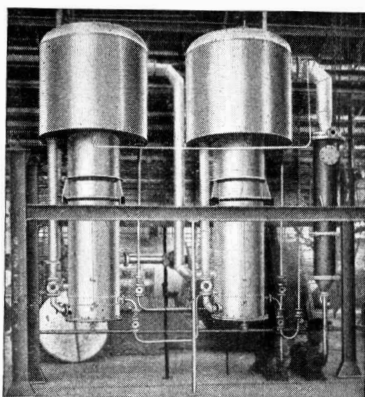


High purity fused quartz (H.P.Q.) boats, crucibles and tubes are available for preparation of hyper-pure silicon. They have an exceedingly low content of boron, aluminium and other elements detrimental to semi-conductors.

THE THERMAL SYNDICATE LTD

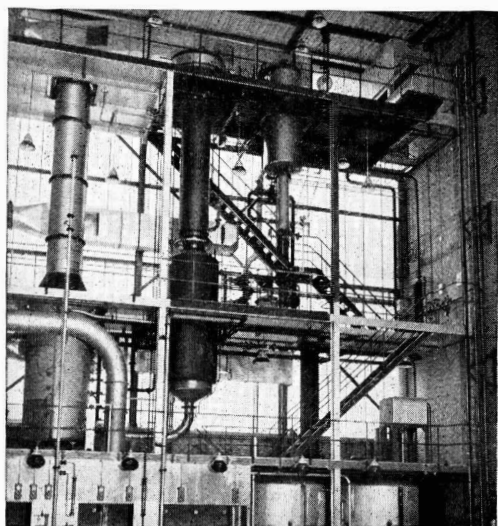


P.O. Box No. 6  
WALSSEND, NORTHUMBERLAND  
Telephone: Walsend 6-3242  
LONDON: 12-14 Old Pye Street, Westminster  
S.W.1. Telephone: ABBey 5469



**... DESIGN**  
**... PERFORMANCE**  
**... QUALITY**

*FABRICATION  
in Stainless Steel,  
Aluminium,  
Monel Metal,  
Copper, etc.*



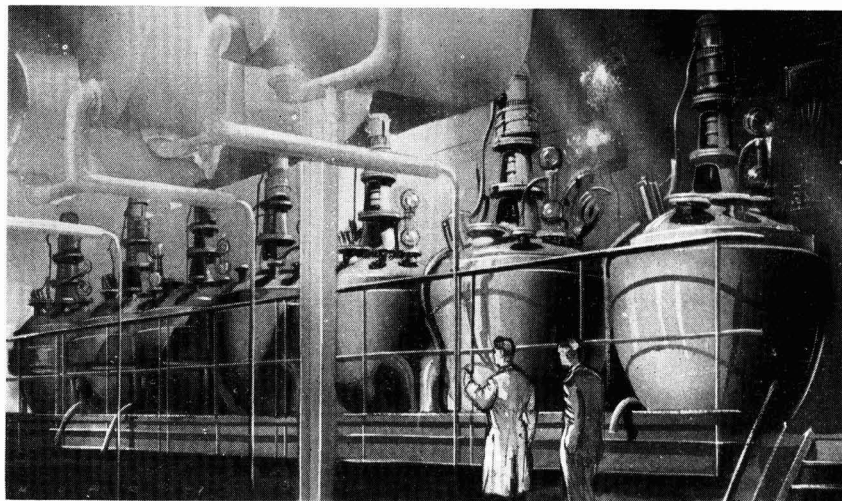
## **PROCESS PLANTS**

**EVAPORATION · FORMALDEHYDE  
ALKYD RESINS · ESTER GUMS  
STAND OIL · DISTILLATION  
SOLVENT RECOVERY · ETC.**

**BURNETT & ROLFE LTD., THE ESPLANADE, ROCHESTER, KENT.**

Telephone: CHATHAM 3861.      Telegrams: FULLYQUIP, ROCHESTER.

NORTHERN OFFICE: 32 DEANSGATE · MANCHESTER · BLACKFRIARS 3851



- New white enamel on cast iron. Chemical and thermic resistance raised to the highest standard.
- Glass lined mild steel equipment.
- Valves in enamelled cast iron with seatings made of TEFLON.

## *Glass and Rubber Lined Equipment*

DE DIETRICH  & CIE

ESTABLISHED IN 1684

FOUNDRY AND ENAMELLING WORKS  
NIEDERBRONN · BAS-RHIN · FRANCE

*Sole Distributors in U.K.*

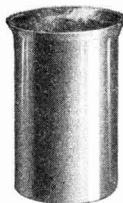
**MACHINERY (CONTINENTAL) LTD**

175 BROMPTON ROAD, LONDON, S.W.3 · TEL: KENSINGTON 6228 (3 LINES) · GRAMS: MACCONTAL, LONDON

The new combined  
reactor with glass lined  
steel tank and enamelled  
cast iron cover.



## *Stainless Steel Plant and Holloware*



We are manufacturers of a wide range of holloware in stainless steel which finds use, because of its resistance to many forms of chemical attack, in dye works, chemical factories, food factories, laboratories and, because of its inherent cleanliness, in hospitals.

We are also plant manufacturers in stainless steel, and will be pleased to have your enquiries for any stainless steel equipment. We are able to fabricate vessels for light, medium and severe duty as laid down in BS. 1500.

Ask for our leaflets.

# The Taylor Rustless Fittings Co. Ltd.

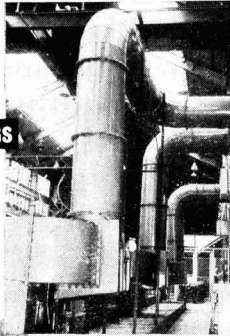
Leeds 638711/2  
Abbey 1575

Head Office:—Ring Roa<sup>1</sup>, Lower Wortley, Lee's, 12  
London Office:—14, Great Peter Street, London, S.W.1

# COBEX Combats Corrosion

## VICKERS-ARMSTRONGS

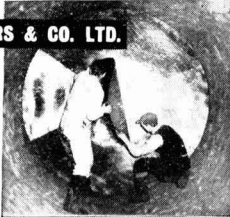
Leading from the anodising tanks at the Vickers Supermarine Works, South Marston, this exhaust ducting is made in COBEX by Horwitch Smith & Co. Ltd.



**THE PROOF** is in the organisations using it. The list is a long and impressive one. The following are just a few of the many world famous industrial companies which choose COBEX for important work involving corrosion resistance.

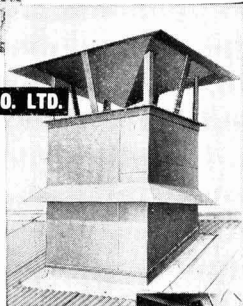
## NEWTON CHAMBERS & CO. LTD.

A dish-ended vessel, fifteen feet long by eight feet diameter, being lined with COBEX/VELBEX LAMINATE for the storage of concentrated hydrochloric acid.



## THE DISTILLERS CO. LTD.

Cowl on the ducting system constructed entirely from COBEX in the Barry (Glamorgan) works of British Geon Ltd., a Distillers plastics company. Fabricated by Tanks and Linings Ltd, Droitwich.



# COBEX REGD.

## RIGID VINYL SHEET

No other synthetic construction material combines the chemical resistance of COBEX with such ease of fabrication and low manufacturing cost

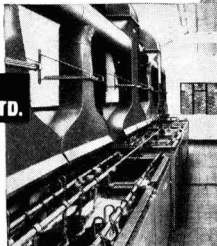
## ENGLISH ELECTRIC CO. LTD.

This famous organisation used COBEX (laminated with Velbex) for the ducting tank lining and facing panels in the Stafford electro-plating shop, equipped by W. Canning & Co. Ltd., Birmingham.



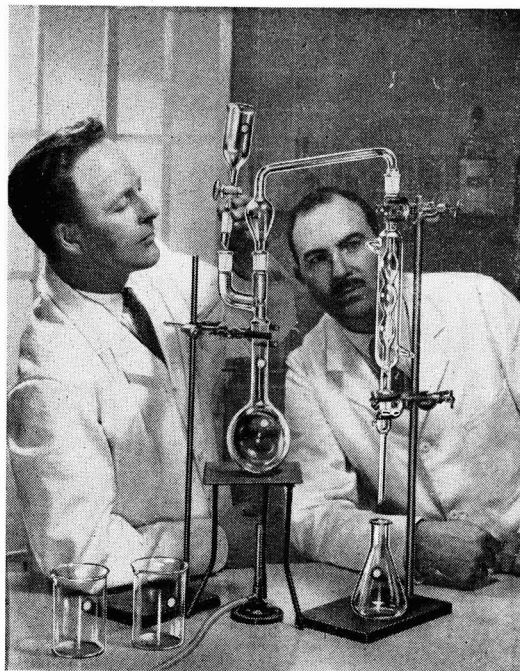
## ELECTRO CHEMICAL ENGINEERING CO. LTD.

Fume ducting in new demonstration plating department at Woking, fabricated in COBEX by Prodorite Ltd., Staffs.



Write for leaflet and technical data to

**BX PLASTICS LTD.** A subsidiary of the British Xylonite Co. Ltd., HIGHAM STATION AVENUE, LONDON, E.A. TELEPHONE: LARKSWOOD 5511



## 'PYREX' 'Grip-Seal' Joints simplify apparatus assembly ... are 100 per cent effective

The perfect-fitting qualities of 'Grip-Seal' Joints are due to the unique 'PYREX' method of manufacture, which ensures that every joint, both male and female, is ground and tested with micrometric precision.

Further, 'Grip-Seal' design results in stronger joints, with sturdier walls, more robust beadings, and sensible parallel gripping surfaces.

The logical result is, of course, that apparatus assembly is simplified, because every joint fits closely and securely, while the clamps hold the apparatus in a firm, safe grip.

Breakages in assembling and dismantling seldom occur, and expensive apparatus is thus safeguarded to give longer service.

That's typically 'PYREX' of course . . . one hundred per cent satisfaction.

- A special section of the 'PYREX' catalogue deals with 'Grip-Seal' apparatus. If you would like a copy, please send your name, address and position in firm or organisation.



**'PYREX'**  
REGD. TRADE MARK BRAND



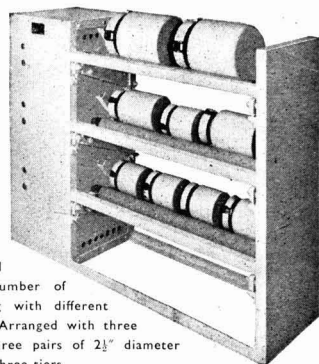
THE BRITISH  
LABORATORY GLASSWARE

**JAMES A JOBLING & CO LTD**

Wear Glass Works Sunderland

THE ONLY MAKERS OF 'PYREX' BRAND GLASS IN THE UNITED KINGDOM

## for laboratory and small scale production



**3-TIER  
BALL  
MILL**

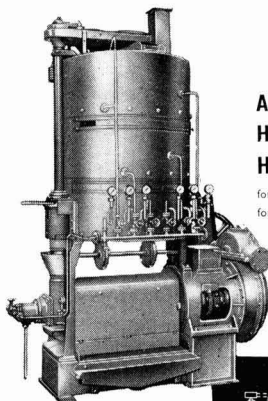
This new ball mill is a useful unit for carrying out a number of separate jobs or for dealing with different materials at the same time. Arranged with three separate motors and with three pairs of 2½" diameter white rubber bonded rolls in three tiers.

Each pair consists of one driven and one idler roll and the latter can be placed in any of three positions to accommodate containers up to 9" diameter. All three tiers can be operated simultaneously or one or two separately and provision is made for varying the speed of the driven rolls. Each tier will carry two 1-gallon or three ½-gallon or four 2 pint or five 1-pint and various combinations of the different nominal capacities can be operated at the same time.

# PASCALL

Write or Telephone  
Crawley 25166 for  
List BM710

THE PASCALL ENGINEERING CO. LTD.  
GATWICK ROAD · CRAWLEY · SUSSEX

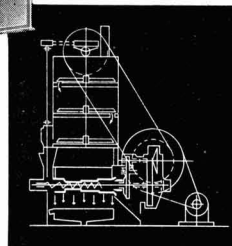


**AUTOMATIC  
HEAVY-DUTY  
HELICAL PRESS 'EP'**

for first and final pressing as well as for single pressing of oil seeds and oil-bearing products.

Protected by national  
and foreign patents

- ★ High oil-yield
- ★ High output
- ★ Low Power consumption
- ★ Un-Interrupted operation
- ★ Simple in operation
- ★ Minimum wear and tear



**CHEMIEAUSRÜSTUNGEN**  
DEUTSCHER INNHEN- UND AUSSENHANDEL

Mohrenstrasse 61, Berlin W8 Telegrams: Chemotechna  
German Democratic Republic

# EDISWAN

CLIX

**FLUOROCARBONS P.T.F.E. & P.C.T.F.E.**

*for the Chemical Industry*

The most comprehensive range of blanks, fabrications, mouldings and dispersion coatings is available. They are fully illustrated in a brochure which can be obtained by professional enquirers

THE EDISON SWAN ELECTRIC COMPANY LIMITED  
155 Charing Cross Road, London, W.C.2 and Branches  
*Member of the A.E.I. Group of Companies*  
Telephone: GERrard 8660 Telegrams: Ediswan, Westcent, London

## TANTALUM

versus

## Corrosive Acids

When processing HOT CORROSIVE ACIDS AND VAPOURS save money by using **TANTALUM** equipment.

Heat exchangers and absorbers fabricated in **TANTALUM** have PROVED the most economical units obtainable for resisting corrosive attack by boiling NITRIC and HYDROCHLORIC acids.

Corrosion resistance, freedom from thermal shock and high heat transfer ensure low maintenance costs, high production rates and minimum shut downs.

**TANTALUM** equipment can also be used with advantage in many instances where it is essential to eliminate product contamination.

Special techniques used in fabrication guarantee the quality of all **TANTALUM** equipment supplied by us.

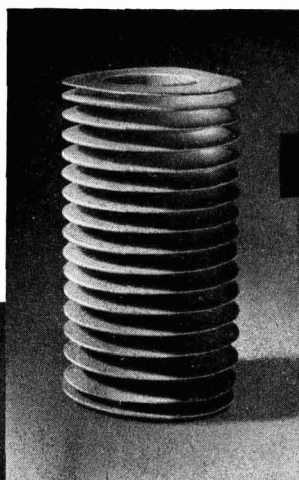
### New Metals and Chemicals Limited

16 Northumberland Avenue, London, W.C.2

Telephone : Whitehall 0573 (5 lines)

Teletypewriter : London 8016

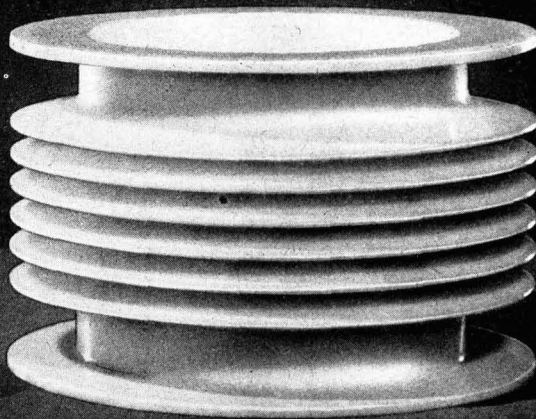
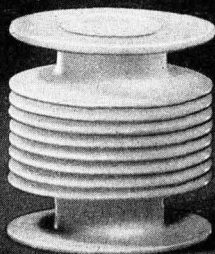
Telegrams : "Newmet London"



STRONGER AND MORE RESILIENT

**'FLUON'** P.T.F.E.

FOR FLEXIBLE BELLOWS



*Expansion bellows manufactured according to a patented process from 'Fluon' p.t.f.e. by Crane Packing Ltd., of Slough, Bucks.*

- **Unaffected by corrosive liquids and gases**
- **Good electrical insulation**

'FLUON' polytetrafluoroethylene, manufactured by I.C.I., is unique among plastics materials. Its latest use in industry, for flexible bellows, exploits its chemical inertness and electrical insulation. Bellows made from 'Fluon' are suitable for use as flexible connectors for pipes, sleeves and shaft glands which operate in contact with corrosive chemicals, solvents and lubricants. They have many uses in hydraulic power and control systems and in fluid pressure operated devices such as meters and governors. Their electrical insulating properties make them suitable for insertion in pipe lines where it is necessary to break the electrical continuity or to prevent electrolysis between dissimilar metals on either side of a joint. Tests so far carried out show that bellows manufactured by the Crane process will with-

stand over 1 million oscillations between the minimum and maximum working lengths at normal temperatures and pressures up to 30 p.s.i. on 2" bore.

#### Some other uses of 'FLUON' p.t.f.e.

'Fluon', because of its remarkable properties, is an ideal material for gaskets, packings, seals and couplings of many kinds. It is chemically inert and unaffected by all known corrosives except fluorine compounds and molten alkali metals. 'Fluon' may also be extruded as continuous-length tubing for lining high pressure hose. It is also suitable for light duty bearings required to work without lubrication.

'Fluon' is non-adhesive, non-wetting and has a remarkably low coefficient of friction. It is tough, resilient and flexible. It has a very low permittivity and power factor and good dielectric strength. Its working temperature range is from  $-80^{\circ}\text{C}.$  to  $250^{\circ}\text{C}.$

*'Fluon' is the registered trade mark for the polytetrafluoroethylene manufactured by I.C.I.*



IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

PF.18



VOL. LXXVI No. 1945

20 OCTOBER 1956

The international weekly  
chemical journal covering every  
aspect of industrial chemistry  
and chemical engineering

# THE CHEMICAL AGE

## OVERSEAS AGENTS

**Argentina**, Inter-Prensa, Florida 229, Buenos Aires • **Australia**, L. M. Cullen & Co. Pty. Ltd., 12 Howard Street, Perth, Gordon & Gotch (Australasia) Ltd., 262-266 Adelaide Street, Brisbane, Queensland. The Grahame Book Co., 39-49 Martin Place, Sydney, N.S.W. John Hinton & Co., 164 Pitt Street, Sydney, N.S.W. Jervis Manton Pty. Ltd., 190 Bourke Street, Melbourne Cl., N.S.W. Bookstall Co. Pty. Ltd., Cnr. Market & Castlereagh Streets, Sydney, N.S.W. • **Belgium**, W. H. Smith & Son Ltd., 71-75 Boulevard Adolphe Max, Brussels • **Brazil**, Livraria Stark Ltda., Caixa Postal 2786, Sao Paulo • **British West Indies**, Christopher B. Hills, 101-103 Harbord Street, Kingston, Jamaica • **Canada**, W. H. Smith & Son (Canada) Ltd., 224 Yonge Street, Toronto • **Ceylon**, The City Stores Ltd., Kandy, The Lake House Bookshop, McCallum Road 10, Colombo • **Chile**, The E. S. Blair Company, Bandera 172-80, Bisco-Ola 14, Santiago, Chile. • **Cyprus**, The Union Trading Co., P.O. Box 123, Larnaca • **Czechoslovakia**, Artia Ltd., 30 Ve Smeckach, Prague 11 • **Denmark**, Illustrated News Service, Dahlerupsgade 1, Copenhagen V • **Egypt**, S. S. Bassous, P.O. Box 109, Alexandria • **Finland**, Akateeminen Kirjakauppa, Helsinki. Rautatiekirjakauppa Oy., Helsinki • **Fiji**, A. A. Shameem & Co., P.O. Box 8, Suva • **France**, Paul Crampel, 54 Rue René Boulanger, Paris X • **Germany**, Buch und Zeitschriften-Union, Harvestehuder Weg 5, Hamburg 13. W. E. Saarbach G.m.b.H., 30, Gertrudenstrasse, Cologne 1 • **Holland**, Dekker en Nordemann's Wetenschappelijke Boekhandel N.V., O.Z. Voorburgwal 243, Amsterdam C. Meulenhoff & Co. N.V., 2-4 Beulingstraat, Amsterdam • **Hong Kong**, F. E. Skinner (Hong Kong) Ltd., P.O. Box 1066, Hong Kong • **India**, Biver & Co., 11, Maharaja Tagore Road, Calcutta 31. J. M. Aina & Bros., Mori Gate, Delhi. Manufacturers' Eastern Agency P.O. Box 301, 105 Apollo St., Bombay. L. V. Paramesh, 32 T.S.V. Kovil Street, Mylapore, Madras, 4. • **Indonesia**, Meulenhoff & Co., N.V., 2-4 Beulingstraat, Amsterdam, Holland • **Israel**, The Collective Subscription Agency, P.O. Box 768, Haifa • **Italy**, Intercontinental S.R.L., Via Edoardo 27, Milan. Messaggerie Italiane S.p.A., Via Lomazzo 52, Milan • **Japan**, Maruzen Co. Ltd., 6 Tori-Nichome, Nihonbashi, Tokyo. Overseas Publications, Ltd., Central P.O. Box 1582, Tokyo • **Malaya**, City Book Store Ltd., Winchester House, Collyer Quay, Singapore • **Malta**, Allied Malta Newspapers, Ltd., Strickland House, 341 St. Paul Street, Valetta. Lewis Gauci, 71 St. Mary Street, Sliema • **Mauritius**, E. Dawood Ltd., P.O. Box 27, Port Louis • **Mexico**, The Crane Agency, Ave. 16 de Septiembre No. 6 Desp. 402, Mexico, D.F. • **New Zealand**, N. Hamilton Baker, G.P.O. Box 721, Wellington. R. Hill & Son, Ltd., Plaza Building, 236 Queen Street, Auckland. C. I. • **Nigeria**, Goodwill Trading Co., Kenta-Okebode, Abeokuta • **Norway**, A/S Narvesens Kioskkompani, Stortingsgata 2, Oslo • **Pakistan**, Danishmand & Co., Karkhana Bazar, Lyallpur, W. Punjab. Seafar Agencies, opp. Grindlays Bank Ltd., Bundar Road, Karachi • **Paraguay**, Representaciones Reuter, Calle Palma 308, Asuncion. • **Persia**, Vitab Commercial Establishment, 1856 Ave. Hafez, Tehran • **Rhodesia & Nyasaland**, Federation of, V. V. Van Rijnberk, P.O. Box 238, Bulawayo. S. Rhodesia • **Salvador**, Antonio Garcia, 54 Calle Orient No. 75 San Salvador • **South Africa**, Technical Books (Pty.) Ltd., P.O. Box 2866, Cape Town • **Spain**, Distribuidora Internacional Soc. Ltda., Duque De Sexto, 36, Madrid • **Sweden**, Wennergren-Williams A/B, Box 657, Stockholm • **Switzerland**, Dr. H. R. Conrad, Rehmat, Meilen, Nr. Zurich • **Syria**, F. H. Tcheleby, P.O. Box 225, Aleppo • **Turkey**, H. C. Hornstein, 1480 inci Sok. No. 12, Alsancak, Izmir • **U.S.A.**, British Publication Inc., 30 East 60th Street, New York 22. American News Co. Inc., 131 Varick Street, New York 13. Moore-Cottrell Subscription Agency, North Cohocton, New York • **Uruguay**, Libreria Inglesa Ltda., Sarandi 530, Montevideo • **Venezuela**, Distribuidora Santiago C.A., Apartado 2589, Caracas.

## NEWS of the WEEK

Achievements & Problems	125
Note & Comment	127
Diary Dates	128
People in the News	129
Hydrazine Conference	130
Chemical Industry Outlines—Holmes	131
Plant & Equipment Review	133
Leather Trades Chemists	141
Restrictive Trade Practices	143
Titanium Dioxide	144
Fire Extinguishing by Chemical Agents	145
Brazilian Chemicals	146
Commercial Intelligence	148
Market Reports	148

## BOUVERIE HOUSE • FLEET STREET • LONDON • EC4

Editor  
GEOFFREY F. D. PRATT

Telephone: FLEet Street 3212 (26 lines)  
Telegrams: Allangas • Fleet • London

Director  
N. B. LIVINGSTONE WALLACE

Manager  
H. A. WILLMOTT

Midlands Office,  
Daimler House,  
Paradise Street,  
Birmingham  
(Midland 0784/5)

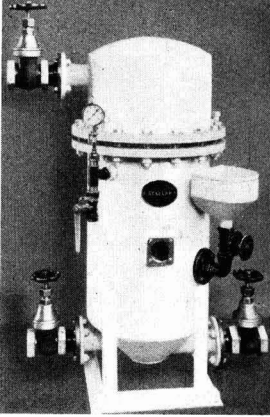
Scottish Office,  
116 Hope Street,  
Glasgow C2  
(Central 3954/5)

Leeds Office,  
Martins Bank Chambers,  
Park Row,  
Leeds  
(Leeds 22601)

The annual subscription is 52s 6d (\$7.40), single copies 1s 3d (by post 1s 6d). Overseas subscribers may send their subscriptions direct to London, or remit through any of our agents.

## THE STELLAR FILTER

*for fine filtration*



Chemicals, precious liquids requiring filtration can be easily and economically dealt with. No loss of valuable liquid whilst cleaning. There is a Stellar Filter for every filtration purpose. Your enquiries are welcomed.

## DRY CHEMICAL FEEDER

*for the Chemical Industry*

Extensively used for application of powdered reagents for water treatment purposes. Also for increasing and proportioning powdered or granular substances. Full details on request.



**THE PATERSON ENGINEERING COMPANY LTD**  
83 WINDSOR HOUSE · KINGSWAY · LONDON · W.C.2

# Heat exchanger standardisation

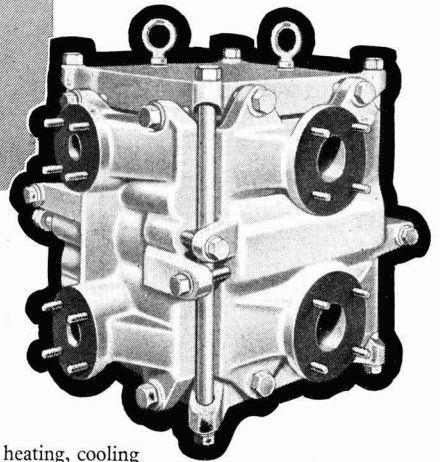
**Can your heat exchangers be readily converted from one duty to another?**

Unsuitably spaced shell baffles, limited pass arrangements, corrosion, space requirements etc. all seriously restrict the flexibility of tube and shell heat exchangers.

Consider the advantages of the graphite block heat exchanger from this point of view :

- ★ Standard sub-assembly, corrosion proof on both sides and suitable for heating, cooling and condensing most fluids and vapours, using steam, water or brine on either side.
- ★ Pass arrangements varying from 1 to 16 are obtainable on either or both sides merely by substitution of headers.
- ★ Exceptionally compact, can be installed in very confined space and requires no special supporting structure. Easily cleaned *in situ* either chemically or by brushing.

**POWELL DUFFRYN CARBON PRODUCTS LTD.**



Springfield Road,  
Hayes, Middlesex  
Phone : Hayes 3994-8

## VIEWPOINT

# Achievements & Problems

**O**UR CHEMICAL INDUSTRY: Some Achievements; Some Problems' was the title of Sir Alexander Fleck's Society of Chemical Industry Messel Memorial Lecture on 12 October. There is probably no person better qualified to speak on UK chemical industry than Sir Alexander, the chairman of ICI Ltd. His remarks therefore deserve careful consideration.

Sir Alexander's lecture reviewed Messel's life and the significant part he played in making the chemical industry of the UK contribute to social development and paid tribute to the important work done by plant managers, section managers, process superintendents and works managers, in the smooth running and development of the chemical industry. He did not minimise, however, the essential, and over a long term, the even more effective work done by research scientists and administrators.

Aided by such statistics as are available for the past 75 years, Sir Alexander outlined the industry's progress. It was not until 1907, however, that the first census of production was taken, and even this can only give an approximate picture because of difficulties of classification and changes in money values.

A graph can be produced taking 1907 as 100 if the statistics are confined to chemicals, dyestuffs and drugs. But this excludes such products as fertilisers and explosives, the whole of the plastics industry and all chemical activities arising from the cracking or other pyrolysis of petroleum products. Such a graph shows that between 1907 and 1951, there has been a five-and-a-half fold increase in the real value of production in this section of the chemical industry, compared with a three-fold increase for manufacturing industry as a whole. Similar estimates for the last five to 10 years show the expansion of the industry.

These figures Sir Alexander considered to be good evidence of the achievements of the chemical industry and its awareness of the needs of the times.

Rate of progress was not discussed, but the lecturer gave his opinion that if the UK is to remain among the leaders of chemical industries of the world, this rate of progress must be kept up for many years. He considered research had gone ahead satisfactorily. Accurate estimation of the cost of research is always a matter of some difficulty, but a figure of £300 million a year has been suggested.

Sir Alexander's analysis of this figure was interesting. He believes it indicates that civilian research and development expenditure is now about £110 million, of which 70 per cent will be spent by industrial concerns. When services are omitted it is about one per cent of the UK's gross national product of manufactured

end products. This shows that the industry's record of increased production is linked with far-sighted, aggressive and effective research. Only with this form of research, and with more technically trained people than are now coming forward, can Britain hope to compete with the chemical industries of other nations.

Rightly, Sir Alexander warned against the transposition of research developments into the field of production. It will be agreed that though time is desirable for adequately proving a project, loss of income, and profit, caused by late production must be considered carefully.

One set of problems which the lecturer believed to merit more detailed examination was that of chemical industry workers. The industry acknowledges that circumstances, which are changing continually, call for methods and conditions of working to be kept under review. Automatic controls are being introduced in many processes with consequent lessening of shift hours. And in this respect the chemical industry is probably unique; unlike other industries the number of people now employed has not increased in comparison with the volume of output. The problem now is to maintain workers' interest and satisfaction in work of a monitoring character.

A possible answer, Sir Alexander suggested, would be the development of the trade union system. He envisaged 'an organisation which will be flexible, which will be capable of understanding current and impending changes and which will be willing, as far as lies in its power, to lend its support to changes which will be good for the industry and for the people in it.' In the meantime he recommended works councils where representatives of the important sections can gain an appreciation of the attitude and point of view of other sections of the industry.

Because of the greater specialisation of the chemical industry, there are comparatively few factory payroll workers. In some cases, only one of every two might be considered thus. Over the whole industry, three out of four might be a reasonably accurate estimation for factory payroll workers compared with six out of seven employed people of the country. As specialisation develops and the industry becomes more and more technical the ratio will decline still further and there will be increasing numbers of people up-graded.

According to Sir Alexander, the answer to these problems lay in sociological advances on many fronts as for instance, profit-sharing schemes, capital participation by the workers and cultural participation in art. Above all, there should be a general advance in the educational level of the people of the UK.

## Electroplating Service

HARSHAW Chemicals Ltd., a wholly-owned subsidiary of the Harshaw Chemical Co., of Cleveland, Ohio, US, is now manufacturing addition agents for the Harshaw Perflow, Perglow, Nubrite and Nibrite nickel electroplating processes.

Facilities are located at Waltham Cross, and include an electroplating service laboratory to provide analyses and testing of nickel solutions.

General manager of the company is Mr. A. C. Benning, who has Mr. S. E. Pross as assistant general manager.

L. van der Hoorn's Chemisch-Technische Industrie NV, Utrecht, Holland, will continue its activity relating to Harshaw processes on the continent.

## Synthetic Rubber Plant

ERECTION of a plant at Barry, Glamorgan, to manufacture Hycar butadiene/acrylonitrile copolymers and latices (nitrile rubbers), has begun. The plant is for British Geon Ltd.

For many years Hycar synthetic rubbers and latices have been manufactured solely by the BF Goodrich Chemical Co., Akron, US, with which company Distillers is associated in the manufacture of polyvinyl chloride in this country.

The plant will be alongside those of British Resin Products Ltd., British Geon Ltd. and Distrene Ltd., the three companies comprising the Distillers plastics group.

# ABCM ANNUAL DINNER

## Sir Cyril Hinshelwood's Three Wishes

THREE WISHES for the Association of British Chemical Manufacturers were made by Sir Cyril Hinshelwood, president of the Royal Society, at the Association's annual dinner in London on 10 October.

'First,' he said, 'I wish that in 10 years' time you are still the ABCM and not the National Chemical Board. Second, that your good relations with pure science continue indefinitely, and third, that your research departments will continue to flourish and give you all you need.'

Earlier Sir Cyril who, as principal guest of the ABCM, was replying to the toast of 'The Guests,' had declared there was no province of human affairs which the chemical industry did not touch. The industry was characterised by its extraordinary understanding and humanity and this would continue if it went on recruiting the right people.

Referring to the education of people coming into the chemical industry, Sir Cyril said he was not very happy about the relation between the sciences and the arts. Young people seemed to be divided by their headmasters into scientists and administrators. He hoped the ABCM would exercise its influence to right this matter.

Sir Cyril reminded the 1,062 members and guests that 'if we continue to be inventive and adventurous we shall go on being a great country.'

Of the Royal Society, he said it symbolised the relations between pure science and the chemical industry. That alliance was essential because much of the industry's works depended on pure science.

Reference to the 'great and expanding' chemical industry was made by Mr. G. F. Williams, chairman of the ABCM Council, when he proposed the toast of 'The Guests.' 'So varied are our products and activities,' he said, 'that no one knows how the national economy is effected by our industry. We have achieved much and will do more.'

Mr. Williams spoke about research work 'which proceeds apace' and the importance of rapid publication of knowledge acquired. This was essential to the advancement of learning, he added.

Of Mr. J. Davidson Pratt, the Association's director and secretary, who is retiring next year, Mr. Williams said he was glad that Mr. Davidson Pratt would continue to act in a part-time advisory capacity.

In his reply, Mr. Davidson Pratt said that he had been 29 years with the ABCM. 'It has been a good innings helped enormously by good relations all round.'

*Sir Alexander Fleck (left), chairman of Imperial Chemical Industries Ltd., receiving the Messel Medal for 1956 from Mr. Julian M. Leonard, president of the Society of Chemical Industry*



## German Synthetic Rubber

AS originally scheduled, the synthetic rubber plant now under construction at Hüls in the Ruhr is expected to begin production in the early summer of 1958. Annual output will amount to 45,000 tons with the production process based on the use of butadiene: Capital investment necessary is about DM 114 million, but direct operating costs will be fairly low as a staff of only 400 workers will be required. Present output of synthetic rubber totals about 12,000 tons. Imports of synthetic rubber in 1955 totalled 19,500 tons while those of natural rubber reached 164,000 tons.

It is understood that 50 per cent of the share capital of the new company, Buna-Werke Hüls, is held by Chemische Werke Hüls with the remainder equally divided among the three successor concerns to the former I. G. Farben.

---

---

---

# NOTE & COMMENT

---

---

---

## INTEREST IN NIOBIUM

ATOMIC ENERGY, jet engines and guided missiles have spurred the development of an, until recently, obscure metal—niobium, or columbium, as it is also known. Like zirconium and hafnium, and even lead and zinc, niobium is nearly always found in nature with a similar element, tantalum. In fact the similarity with tantalum is such that for a long time the two were believed to be identical.

Separation of niobium and tantalum has proved somewhat troublesome. Recently, however, the US Bureau of Mines announced an economic new process, which would enable low grade ores, concentrates or smelter slags to be used. The technique is one of liquid-liquid extraction and involves dissolving the feed material in a water-base solution to which is added an organic solvent which will not mix with the first solution. On churning or shaking the two solutions together, the organic solvent extracts one of the metals. It would appear that to date, hydrofluoric acid and hydrochloric acid contacted with methyl isobutyl ketone are the best solutions.

After further treatment niobium and tantalum oxides of more than 99 per cent purity are obtained, from which the two metals are recovered. The silver-grey metal recovered as end-product can be used to impart strength and stability in alloys suitable for operating in temperatures up to 1,500°F and above, since the melting point of niobium is 2,500°F. It is used as a carbide stabiliser in stainless steels and to inhibit intergranular corrosion in the 800° to 1,600°F temperature range. Niobium can also be used to give strength and high temperature creep resistance to low iron alloys in jet engines exposed to extreme heat and operating strain. Addition of the metal to chromium stainless steels improves ductility and reduces the tendency to air-harden.

## UKAEA'S ORDER

AS NIOBIUM has a low neutron cross-section, it is suitable for certain applications in nuclear reactors. In this respect the UK Atomic Energy Authority has just placed what is believed to be the first full-scale order in the world for niobium for use in the Downreay nuclear reactor power plant, Caithness. Niobium is also considered to have a considerable future in gas turbine engine construction, for this type of engine will require high temperature alloys.

At the present time the US consumes about 85 per cent of the world's total production of columbite and tantalite ores. The US has to import 99 per cent of its needs from such areas as Brazil, Nigeria (see THE

CHEMICAL AGE, 13 October, p. 69), Belgian Congo, Malaya, Mozambique, Uganda, Madagascar, French Equatorial Africa. The Kennecott Copper Corp. is now exercising an option to acquire 51 per cent of Molybdenum Corporation of America's interest in a niobium deposit in the Oka area of Quebec, Canada. Also Fansteel Metallurgical Corporation stockholders have recently approved the authorisation of a convertible debenture issue of up to \$3 million to be used in expanding production of niobium and tantalum at its Muskogee plant, Oklahoma.

Since niobium has so many important uses and there are possibilities of its use in atomic reactors and gas turbine engines, it appears reasonable to suppose that a great deal more will be heard of this metal in the future.

## WATER RESEARCH

THE FIRST Annual Report of the youthful Water Research Association—which is now established at Redhill, Surrey—is a modest enough document, for little of the work by newly appointed staff has been in operation for more than about six months. The Association now has 170 members subscribing between £14,000 and £15,000 per annum, and representing almost 60 per cent of the water supply of Great Britain and Northern Ireland. However, there are still some 250 water undertakings which have not yet joined, and perhaps it is mainly for this reason that application has not yet been made for Grant Aid under the DSIR scheme for research associations. Meanwhile, it certainly seems obvious that an income of about £15,000 a year is very low for any programme of research that could be called sizeable. Industrial firms whose products are used by water supply undertakings may join, but the list of members at 30 June 1956 shows only two such members, Albright & Wilson and F. W. Berk.

The actual research report shows clear signs of activity and programme-formation. Fundamental physico-chemical studies on coagulation are envisaged as a result of discussions with water supply organisations. The only coagulant aid used in the UK is activated silica although its effectiveness lacks a clear scientific interpretation. It is suggested that hydroxyethyl cellulose and bentonite might also be effective. Similarly sand is the main filter medium, but the use of polythene is mentioned.

The information division set up dealt with 45 inquiries during its first half-year of existence. Oddly, one inquiry asked if lead arsenate was a suitable work killer for use on a water-gathering ground!

# DIARY DATES

## MONDAY 22 OCTOBER

### Chemical Society

Oxford: Physical Chemistry Laboratory, South Parks Road, 8.15 p.m. 'Sandwich Complexes' by Professor G. Wilkinson.

### SCI (Plastics & Polymer Group)

London: 14 Belgrave Square SW1, 6.30 p.m. 'Polyurethanes' by Dr. A. Höchtl.

### Institution of the Rubber Industry

Manchester: Grand Hotel, 6.45 p.m. 'Evaluation of Tyre Compounds by Means of Laboratory and Service Tests' by E. R. Thornley.

### Institute of Metals

Sheffield: Engineering Lecture Theatre, The University, St. George's Square, 7.30 p.m. 'Bessemer and His Process' by J. Mitchell.

## TUESDAY 23 OCTOBER

### Royal Institute of Chemistry

Dagenham: South-East Essex College of Technology, Longbridge Road, 7 p.m. 'Newer Analytical Reagents' by Dr. R. Belcher.

### Institution of Chemical Engineers

Chester: The Grosvenor Hotel, 7 p.m. 'Fluidisation Applied to the Handling of Bulk Solids' by D'Arcy Smith.

### Society for Analytical Chemistry

Falkirk: Lea Park Restaurant, 7.30 p.m. Joint meeting with the Stirlingshire & District Sections of the RIC and SCI. Exhibition of special analytical apparatus.

### Hull Chemical & Engineering Society

Hull: Church Institute, 7.30 p.m. Film show: 'Air Compressors, their Manufacture and Use' by C. A. F. Mackintosh.

## WEDNESDAY 24 OCTOBER

### SCI (Food Group—Nutrition Panel)

London: 14 Belgrave Square SW1, 6.30 p.m. Debate: 'That in the Opinion of this Panel, Sugar is an

Unnecessary Article in the Dietary'. Proposed by Dr. A. E. Bender, opposed by H. C. S. De Whalley.

### Institute of Fuel

Manchester: Engineers' Club, Albert Square, 2.30 p.m. Preliminary paper on nuclear energy by I. Hopkins.

### Manchester Metallurgical Society

Manchester: Manchester Room, Central Library, 6.30 p.m. 'Stress Corrosion' by Dr. T. P. Hoar.

### Society of Leather Trades Chemists

Manchester: Reynolds Hall, College of Technology, 2 p.m. 'Modern Management Technique' by Dr. F. H. Kroch, and 'Work Study and Industrial Productivity' by A. G. Rees.

### Manchester Literary & Philosophical Society (Chemical Section)

Manchester: Portico Library, 57 Mosley Street, 6 p.m. 'The Future Shape of Technical Education'.

## THURSDAY 25 OCTOBER

### Chemical Society

Bristol: Chemistry Department, The University, 5.15 p.m. 'Aromatic Substitution' by Professor M. J. S. Dewar.

### SCI (Microbiology Group)

London: 14 Belgrave Square SW1, 6.15 p.m. Showing of films of microbiological interest.

### RIC, CS & SCI

Leeds: Chemistry Lecture Theatre, The University, 6.30 p.m. 'New Developments in the Chemistry and Application of Dyestuffs' by Professor W. Bradley.

### Society for Analytical Chemistry

Nottingham: Gas Showrooms, 7 p.m. 'Recent Advances in Ion-Exchange Resins' by D. K. Hale.

### Institute of Metals

Birmingham: Birmingham Exchange & Engineering Centre, Stephenson Place, 6.30 p.m. 'Dry Corrosion' by E. C. Williams.

### North East Metallurgical Society

Middlesbrough: Cleveland Scientific & Technical Institution, 7.15 p.m. 'Sixty Years of Non-Destructive Testing' by J. F. Hinsley.

### Incorporated Plant Engineers

Manchester: Nag's Head Hotel, Jackson's Row, 7.30 p.m. 'Is Planned Maintenance Worthwhile?'

## FRIDAY 26 OCTOBER

### Royal Institute of Chemistry

London: Sir William Beveridge Hall, Senate House, The University WCI, 3 p.m. Conference on 'The Education and Training of the Chemist'. 'Industrial Employers' by Dr. N. Booth; 'Government Service' by Sir Owen Wansbrough-

Jones; 'Universities' by Professor E. G. Cox; 'Technical Colleges' by Dr. E. G. Edwards; 'Schools' by Sir Eric James. 5 p.m. Discussion, opened by Professor T. S. Wheeler.

### Chemical Society

Exeter: Washington Singer Laboratories, Prince of Wales Road, 5 p.m. 'Modern Research on Phase Transformations' by Professor A. R. Ubbelohde.

Glasgow: Room 24, The Royal Technical College, 3.30 p.m. 'Metal Atoms as Aromatic Systems' by Dr. J. Chatt.

Newcastle-upon-Tyne: Chemistry Building, King's College, 5.30 p.m. 'Modern Inorganic Stereochemistry' by Professor R. S. Nyholm.

### Manchester Statistical Society (Industrial Group)

Manchester: Portico Library, 57 Mosley Street, 6 p.m. 'Some Recent Applications of Statistics in the Chemical Industry' by G. A. Coutie.

### Plastics Institute

Manchester: Engineers' Club, Albert Square, 6.45 p.m. 'Electroformed Moulds' and 'Trueprocess Castings for Plastics Dies etc.' by P. Spiro and A. Torry.

### Institute of Metal Finishing

Sheffield: Fitzwilliam Room, Grand Hotel, 7 p.m. 'Sprayed Plastic for the Prevention of Corrosion on Plating Equipment' by J. C. Lyon.

### Society of Industrial Engineers & Work Study Society

Porthcawl: Esplanade Hotel. Opening of two-day conference on 'Work Study & Industrial Engineering in the Small and Medium-Sized Firm'.

## OEEC Report

EUROPEAN chemical production rose by 11.5 per cent in 1955 compared with a rise in total industrial production of 8.6 per cent. For the first six months of 1956 the figures are six and five per cent respectively. These figures are given in the latest report of the Organisation for European Economic Co-operation.

Investment in the chemical industry in 1955 was 23 per cent greater than in 1954, and the productivity of the industry, which was already high, also continues to increase. In the opinion of the chemical products committee of OEEC, overall chemical production will continue to rise in the foreseeable future, although, for the industry as a whole, the rate of expansion is for the time being at least rather slower than in recent years.

The committee has also made an examination of certain obstacles to trade in chemical products.

● Newly appointed research manager of British Industrial Plastics (Chemicals) Ltd., Oldbury, near Birmingham, is DR. W. WILSON, formerly of the Department of Chemistry at Birmingham University. Dr. Wilson received the Degree of D.Sc. from Birmingham last year.

● Manager of Wembley works of British Oxygen Gases Ltd., MR. A. KNOWLES, has been appointed technical manager (acetylene), at the company's headquarters at Bridgewater House, London. He takes over the position formerly held by MR. E. A. GROOM. New district manager at Wembley is MR. D. R. HARRIS. Another BOG appointment is that of MR. ROBERT J. C. BRYCE (48), as district manager, Scottish division.

● Director of export sales of Du Pont's Organic Chemicals Department, MR. H. JOSEPH SWEZEY, has retired after 37 years with the company. He is succeeded by MR. J. PRESTON WILLS, who has been assistant director of export sales since 1951.

● DR. R. LESSING, who has been associated with the National Smoke Abatement Society and the former Coal Smoke Abatement Society since 1908, has been elected president in succession to SIR ERNEST SMITH. Sir Ernest has been re-elected hon. treasurer. Chairman of the executive council is MR. F. J. REDSTONE (Chief Public Health Inspector, Bristol) and the deputy chairmen are DR. J. S. G. BURNETT (MOH, Preston), and MR. JOHN INNES (Chief Public Health Inspector, Paisley).

● It is announced by Borax & Chemicals Ltd. that MR. GEORGE L. THOMPSON has been appointed general manager, and MR. PETER F. FOSSEY assistant sales manager. Mr. Thompson will continue in charge of all technical services and development.

● DR. PAUL J. FLORY, Professor of Chemistry and acting chairman of the Department of Chemistry, Cornell University, has been chosen to head Mellon Institute's investigational activities as executive director of research. This is a new position of research leadership in Mellon Institute which has been established since the recent retirement of Dr. Edward R. Weidlein as president. Dr. Flory has had a distinguished career in research, having spent twelve creative years in the chemical and allied industries and ten fruitful years in the field of scientific education with much accompanying investigational work. He has pioneered research on the constitution

# People in the NEWS

and properties of substances comprised of giant molecules, such as rubbers, plastics, fibres, films, and proteins, and is the author of 106 papers in scientific journals, all of which have been original contributions to chemical and related literature. A 670-page book, his 'Principles of Polymer Chemistry,' published in 1953, is a respected treatise. Twenty-two patents have been issued to him, inclusive of instances of co-invention. Dr. Flory is also well known professionally for his notable investigational accomplishments in photochemistry, chemical reaction kinetics, thermodynamics, and statistical mechanics. He is a member of the National Academy of Sciences, and he also has membership in the American Chemical Society, in the American Association for the Advancement of Science, and in the Society of the Sigma Xi.

● MR. L. W. GODFREY, formerly with Ancon Metals & Chemicals, London WC2, is shortly starting his own agency at 7 Angel Court, London EC2.

● Federation of British Industries deputy president is now SIR HUGH BEAVER, K.B.E., managing director of Arthur Guinness, Son & Co. Ltd. Since 1942 he has been a member of the DSIR advisory council (chairman 1954-56). In 1953-54 he was chairman of the Committee on Air Pollution (the Beaver Committee).

● President of the Fertiliser Manufacturers' Association is now MR. P. K. PROCTOR (H. & T. Proctor Ltd., Bristol); vice-president is MR. I. McCORMICK (SAI Ltd., Edinburgh).

● Son of the late George Barger, Regius Professor of Chemistry, University of Glasgow, MR. EVERETT BARGER (46), has been appointed Secretary-General of the Common-

wealth Press Union. He is a former lecturer in history at Bristol University and at present holds an appointment with the United Nations Organisation in Geneva.

● Following the 3 October meeting of the council of the Oil & Colour Chemists' Association, DR. H. A. HAMPTON, of the Manchester section, has been appointed Acting Honorary Treasurer of the Association. Dr. Hampton is a graduate of Birmingham University and was awarded a Ph.D. in 1930. In that year he joined Imperial Chemical Industries as a research chemist at The British Dyestuffs Corp. Ltd. Since 1945 he has been manager of the resins service department of the dyestuffs division.

● Assistant secretary of Shawinigan Chemicals Ltd., MR. GEORGE A. DONALD has been appointed treasurer of the company. MR. PERCY W. WRIGHT, formerly secretary-treasurer, will continue as secretary and has been made a director of the company. Mr. Donald comes from Aberdeen.

## OBITUARY

DR. J. W. TREVAN, F.R.C.P., F.R.S., director of the Wellcome Research Laboratories at Beckenham, Kent, from 1940 to 1953, died at his home at Addiscombe, Surrey, on Saturday, 13 October, at the age of 69. A pioneer in the application of statistical methods to the biological assay of drugs, he joined the staff of the Wellcome physiological research laboratories as head of the department of pharmacology in 1920. In 1940 he succeeded Dr. R. A. O'Brien as director of the Wellcome physiological research laboratories and two years later became a director of the Wellcome Foundation. For some months before his retirement in 1953 he combined with his other duties that of acting director-in-chief of the Wellcome Research Institution. Dr. Trevan's researches were concerned with bacterial toxins, snake venoms, the action of local anaesthetics, the physiology of the kidney, the nervous control of respiration, and traumatic shock.

The death occurred on Sunday, 14 October, of Mr. Edward George Lambert, registrar of Imperial Chemical Industries Ltd. He was 59. Mr. Lambert joined the registrar's department of Nobel Dynamite Trust Co. Ltd. in 1912. He became assistant registrar of ICI in 1927 and registrar in 1946. In addition Mr. Lambert was one of the original trustees of the ICI employees profit sharing scheme.

## Hydrazine Conference

### World-Wide Attendance Anticipated

AN INTERNATIONAL conference on 'Hydrazine and Water Treatment' is being organised in May next year by Whiffen & Sons Ltd. It is expected that users from all over the world will attend, together with research workers who will present the latest available information. Papers will be given by delegates from the United Kingdom, United States and European countries.

The conference will be held at the Royal Bath Hotel, Bournemouth, on 15, 16 and 17 May 1957. Registration forms are available from the Conference Officer, Whiffen & Sons Ltd., North West House, Marylebone Road, London NW1. Intending delegates are invited to write direct, if possible before 15 December, so that detailed arrangements can be made.

Hydrazine is added to boiler feed water as an oxygen scavenger. It has the advantage over other scavengers that it produces no solid or corrosive products and it helps to keep the water alkaline.

## Dimethyl Hydantoin

DIMETHYL HYDANTOIN (acetylonyl urea) is now being produced on a tonnage basis by the Glyco Products Co. Inc. at Williamsport, Pa.

DMH (dimethyl hydantoin) is offered commercially as white crystals, melting above 178° C. It is readily soluble in water, alcohol, ether and ethyl acetate. It forms addition complexes with benzene, thiophene and furan. It is non-toxic under ordinary conditions. It reacts with formaldehyde to give methylol compounds or polymer resins (water-soluble).

As a substituted urea cyclic compound, it lends itself to many chemical reactions. As a solid solvent for water soluble inorganic and organic compounds, it is attracting attention.

A four-page bulletin giving the physical properties and chemical reactions of DMH is available from the Glyco Products Co. Inc.

## Jobling Reduces Prices

A NEW edition is announced this month of the scientific catalogue issued by James A. Jobling & Co. Ltd., Sunderland, and covering the wide range of laboratory and scientific glassware manufactured at the Wear glass works. A feature of the latest issue is a number of reductions in the prices of Grip-Seal ground-glass jointed ware. The new edition of the catalogue has a comprehensive price list issued as a companion volume.

## Drawback of Import Duty

THE Board of Trade gives notice that it is considering an application for drawback of import duty under the Second Schedule to the Import Duties Act, 1932, as amended, in respect of the undermentioned material:—

Sodium-4-amino-salicylate imported and subsequently re-exported in the same state, or as tablets in which it is the only active ingredient with the addition of inert excipients of sugar etc. for coating.

Any representations which interested parties may wish to make should be addressed in writing to the Board of Trade, Tariff Division, Horse Guards Avenue, London SW1, not later than 27 October 1956.

## Austrian Oil and Natural Gas

DURING the first five months of this year, Austria's oil production was 1,444,199 metric tons compared with 1,492,021 tons during the same period of 1955. The Austrian's, however, fear they may lose first place in oil production in western Europe to the German Federal Republic, for in May, West Germany's oil production at 295,840 metric tons, nearly equalled Austria's production of 296,132 tons in the same month. Natural gas output in Austria increased slightly from 311.3 million cubic metres in the first five months of 1955 to 320.3 million cubic metres during the same period this year.

## New Company Formed

GLASS fibre reinforced plastics rods, bars, tubes and sheets will, it is claimed, be produced shortly for the first time in quantity and at an economic price, by Thermotank Plastic Engineering Ltd., a new company recently formed by the Thermotank Group. The company states that quantity production will be made possible by the installation of specially-designed and patented equipment, machinery and processes at its Chapelhall Works, near Glasgow, and by the development of new manufacturing techniques. Mr. Iain Stewart, chairman of Thermotank Ltd., the group's parent company, is chairman also of the new concern with Mr. G. Cuming as managing director.

Rods and bars with diameters ranging from  $\frac{1}{4}$  in. to 1 in. will be available in continuous lengths, and tubes are to be produced with internal diameters ranging from 1 in. to 24 in. Any section normally produced as a metal extrusion will also be supplied.

## ICI Nobel Division

### Developments Outlined by Division Chairman

DEVELOPMENT projects in progress in the Nobel Division of Imperial Chemical Industries were outlined recently by Dr. James Craik, chairman of the division council and sectional meetings.

The new continuous nitroglycerine plant (see THE CHEMICAL AGE, 14 July, p. 72) had operated very well, he said, and it was now planned to put into use the remote control system suggested, using television for viewing the plant from the control room. A similar plant will be installed at No. 2 Hill, and building work is well advanced. This unit will be supervised by an optical system working on the periscope principle.

At Dumfries the company was building a unit to manufacture a special grade of Cellofas known as BXHV. This material would not be available commercially until mid-1957 when the plant was completed.

The Ardeer project for the manufacture of silicones was well advanced and it was expected that it would be in use by the end of 1957.

## Titanium Pigments

A FURTHER extension of production facilities at Grimsby is to be carried out by British Titan Products Co. Ltd. These extensions, which are due to be completed during 1958, will raise the production at Grimsby to 70,000 long tons per year, approximately seven times the output of the plant when it started in 1949.

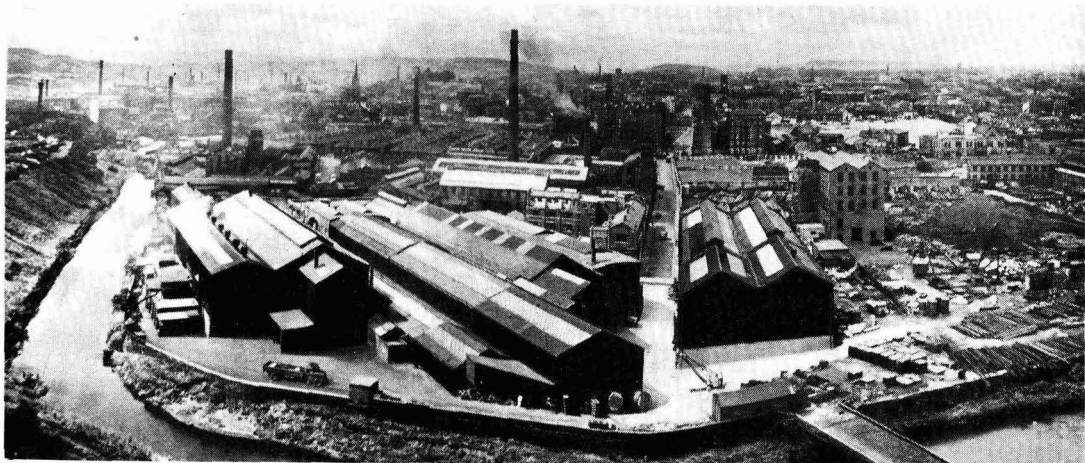
The new production is required to meet the growing home demand for titanium pigments, and also to enable the company to expand its export trade. Production of titanium pigments at the company's Billingham works continues at full output.

## Canadian Trade in Chemicals

A NOTEWORTHY development in Canadian foreign trade during first six months of 1956 was the falling off in the rate of increase of chemical exports. Sales of crude petroleum had largest proportionate increase of all commodities—some 285 per cent over first half of 1955 and almost 1,500 per cent over the corresponding period in 1954. Exports of asbestos also rose.

Data on commodity imports, at present available for the first five months of 1956, indicate a widespread increase among all the major groups. Substantial increases appear in the chemicals and petroleum groups which rose by 25 and 16 per cent respectively.





## CHEMICAL INDUSTRY OUTLINES

### W. C. Holmes—150 Years of Service

**A**N IRON FOUNDRY, which was probably in existence before 1800, was the beginning of the firm of W. C. Holmes & Co. Ltd., of Turnbridge, Huddersfield, manufacturers of plant for the gas and chemical industries. In 1809 the business was in the hands of John Holmes, the next owner being the first William Cartwright Holmes.

Two sons, Joseph Francis and William Cartwright in partnership succeeded the first W. C. Holmes and traded under the name of Holmes Brothers, advertising themselves as 'Whitesmiths and Gas Fitters'. In 1847 the firm moved to Hillhouse, the site of the first Whitestone Iron Works. It was on this site in 1850 that the firm of W. C. Holmes & Co. was established by W. C. Holmes, Jnr., then only twenty-three years old.

#### New & Simplified Type

From 1853 onwards patents taken out by William Cartwright Holmes concerning 'Improvements in the manufacture of gas and apparatus employed therein' led to a new and simplified type of gas plant. One invention covered the production of gas from coal simultaneously with the addition of steam, thus generating water gas in the retort as in present day vertical retort practice.

The activities of the firm in those early days are well described by an advertisement which appeared in the press:

'Gas apparatus for producing gas from coal, wood, peat, oil, resin and other gas-producing material,

on the best and most approved principles'.

In the early days the company offered financial assistance to purchasers of its gas plant. An extract from a catalogue issued at the time reads:

'Messrs. W. C. Holmes & Co. are prepared to assist in the establishment of gas works in any town or village which, after inspection, they know will return a fair dividend upon the outlay, by providing a portion of the required capital'.

At Henley-in-Arden in 1862 a contract was placed for a gas works at a cost of £1,600, half the capital to be provided by the contractor, who received 160 five pound shares in the undertaking. In the following 25 years over 300 installations or extensions of existing works were carried out in towns, villages and private houses. Others were built on the Continent of Europe and elsewhere.

When the site of the works at Hillhouse was acquired by the London North Western Railway in 1880 the company moved to its present site at Turnbridge.

*Above: View of the works of W. C. Holmes & Co. Ltd. Right: Mr. F. Brian Holmes, joint managing director, a grandson of the founder*



With the death of Mr. W. C. Holmes in 1882 his three sons became associated in the management of the business. At about this time the increasing size and complexity of gas works plant led the company to specialise in the cooling, washing, purifying, storing and metering of gas, and later in plant for the recovery of by-products.

The partnership of the three brothers continued and in 1910 it was incorporated as a limited company with Mr. P. F. Holmes as chairman and governing director.

#### Specialisation

The trend towards specialisation which took place at the end of the last century led to a number of important developments by the company.

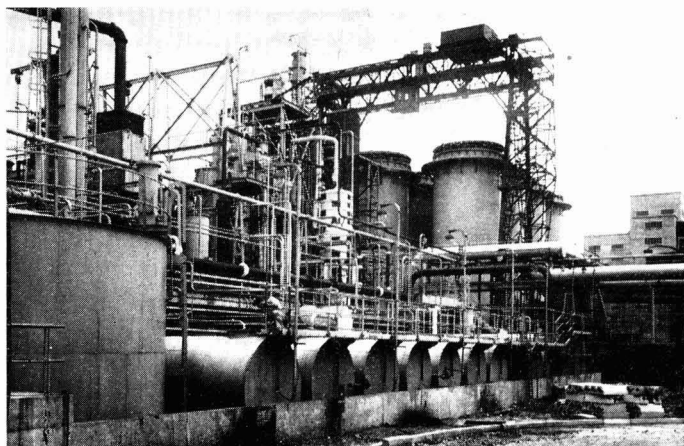
About the year 1882 by-product coke ovens were first introduced into this country for the production of blast furnace and foundry coke, and it was then that the company began the manufacture of by-product recovery plant for such works, and of refining plant for ammonia, tar and benzole. A number of plants were erected for John Darby & Co., later known as Semet-Solvay Co. Ltd.

In 1911 the first installations for the continuous distillation of tar were designed and built under licence.

In 1934 the company, in conjunction with the Gas Light and Coke Co., of London, commenced the building of benzole recovery plants operating with an increased oil circulation with the object of bringing about a considerable reduction in content of sulphur compounds present in gas. A number of installations were made during and after the war.

Another process introduced by the company was for the removal of

## W. C. Holmes



Left: Tower scrubbers, part of the benzole plant, at the East Midland Gas Board's works, Rotherham. Above: Effluent treatment plant at North Western Gas Board's Newton, Manchester, plant

organic sulphur compounds from town gas. This process has been applied to the treatment of town gas used in industry, principally in the manufacture of special glasses, and for heat treatment of non-ferrous metals.

The first commercial plant for the improvement of ammonia still effluent in this country was constructed by Holmes for the Manchester Corporation Gas Department, and installed at their Partington works in 1929. Shortly afterwards a similar installation was made for the chemical works attached to the Glasgow undertaking. Only one other such plant was constructed in this country up to the outbreak of war, but since the end of the war interest has revived and the company has been awarded several contracts in this field.

#### Wide & Varied Range

As might be expected after more than a century of operation the range of products manufactured by the Holmes' organisation is wide and varied. For this reason the organisation has recently been divided into three distinct and separate divisions: Gas and chemical engineering division, gas handling division and gas cleaning division. Each division deals with a specific phase of the company's activities.

The gas and chemical engineering division deals with the design, manufacture, installation and commissioning of plant for the treatment and purification of gas for the carbonising and oil cracking industries, the recovery of the corresponding by-products, and the manufacture of allied chemi-

cal plant. This division maintains a research and development department which is conveniently located at the Spenborough gas works of the North Eastern Gas Board where investigation can be made and pilot plant tried out under actual works conditions.

The research and development department has an extensive programme of research laid out not only in the gas treatment field but in general chemical engineering which will lead to new processes and widen the scope of the division's activities. Active interest is being taken in new methods of purification of the gases produced by new gasification techniques now being developed, including operation at high pressures.

The gas cleaning division, as its name implies, specialises in the manufacture of plant for the cleaning of air and gases. This, in view of the increasing concern over the problem of atmospheric pollution, is a vital and growing field. Plant manufactured by this division ranges from large scale electrical precipitation plant to high efficiency Trion electronic air filters which have recently been introduced in the UK.

#### Inert Gas Generators

In addition to manufacturing the Holmes-Connersville blowers, exhausters and boosters the gas handling division manufactures a large range of inert gas generators at from 3,000 to 50,000 cu. ft. per hour. These generators, together with nitrogen generators and adsorptive air dryers are finding increasing applications in the chemical industry.

Early in 1947 Holmes obtained a

controlling interest in the firm of B. Thornton Ltd., also of Turnbridge. Thornton specialises in the supply of equipment for steel works and rolling mills.

On 7 February 1949 the holding company of BHD Engineers Ltd. was formed and having acquired the whole of the share capital of Holmes and of the Bryan Donkin Co. Ltd., of Chesterfield, controls the activities of these two companies and their subsidiaries.

#### OCCA Conference

PROVISIONAL title of the Oil & Colour Chemists' next biennial conference is 'Catalytic Processes Relating to the Surface-Coating Industries.' The conference will be held at Torquay from 21 to 25 May 1957.

The following have promised to contribute papers: Professor D. D. Eley, of Nottingham University; Dr. G. C. Bond, of Hull University; Dr. D. F. Rushman, of the Paint Research Station; and Mr. R. R. Coupe, of the Printing, Packaging and Allied Trades Research Association. A paper will be presented by a member of the Shell Chemical Co., and other papers dealing with driers and resin polymerisation are envisaged.

Anyone wishing to contribute a paper on this topic should write to Mr. P. J. Gay, Hangers Paints Ltd., Stoneferry Works, Hull, Yorks. Non-members who want details, when published, of accommodation, social activities etc., should write to Mr. R. H. Hamblin, M.A., General Secretary, Oil & Colour Chemists' Association.

Many new or improved items of chemical plant and equipment have been announced during the past year and a number of new installations has been made in the factories of chemical companies. Some of the more interesting developments are reviewed in the following pages

# Chemical Plant & Equipment

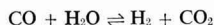
## ANNUAL REVIEW OF DEVELOPMENTS

### Plant Processes

**M**OST recent addition to the range of processes which THE POWER-GAS CORPORATION LTD., STOCKTON-ON-TEES, can offer for producing synthesis gas is the Texaco process. Several ammonia plants incorporating the Texaco partial oxidation process are now in successful operation and the process is accepted practice for the production of synthesis gases.

The process will produce carbon monoxide and hydrogen from a wide range of feedstocks including heavy oils, refinery gases and natural gas. The process is normally operated at a pressure of about 350 p.s.i.g., but operating conditions can be varied to suit particular applications.

Conversion of carbon monoxide to produce hydrogen by the shift reaction:



is carried out at pressure using a sulphur resistant catalyst. The number of conversion stages depends on the percentage of carbon monoxide to be converted, and condensate is injected between the stages of conversion to cool the gases and provide the excess steam necessary to ensure continuation of the shift reaction.

#### Removing CO<sub>2</sub>

To remove carbon dioxide from the gas, hot potassium carbonate, monoethanolamine or water wash absorption/desorption processes either alone, or combined, are adopted, the method chosen depending on the economics of each particular case.

Carbon monoxide and final carbon dioxide removal is achieved by liquid nitrogen wash or copper liquor absorption. The liquid nitrogen wash process is particularly suitable for ammonia synthesis gas production, since an air fractionation plant producing pure oxygen for the Texaco gasification step, and nitrogen for the synthesis gas is an integral part of the factory installation. To reduce the carbon dioxide content of the gas to acceptable limits for nitrogen wash an alkali wash is employed. The cost of utilities and chemicals for these processes affects the choice of the final purification step.

Main advantages of the process are that: (a) Gasification under pressure saves compression costs either by utilising feedstocks available at pressure or by pressurising the feedstock, and (a) The plant can be readily adapted to use either gaseous or liquid fuels within the same reaction chamber and is designed so that a change of feedstock can be made after only a brief shut down.

The process follows the increasing tendency to use hydrocarbon feedstocks in place of coke or coal in countries or locations where hydrocarbon fuels such as natural gas, fuel oil, liquefied petroleum gases or refinery tail gases are available.

**A**S THERE is a growing demand by users of sulphate of ammonia for delivery of supplies in bulk, SIMON HANDLING ENGINEERS LTD., CHEADLE HEATH, STOCKPORT, has designed a pneumatic handling, storage and loading plant. The plant collects the sulphate, distributes it to storage, reclaims it and loads it into railway wagons entirely in bulk.

The sulphate dryer discharges into an open hopper in the sulphate store from whence it is picked up by a suction nozzle attached to a flexible pneumatic pipe. A rotary exhaustor provides vacuum, by means of which the sulphate is drawn up until it enters a cylindrical receiver with a hopped outlet. Here, due to expansion and reduced velocity of the air stream, the sulphate is released and accumulates in the hopper, while the air passes out through a cyclone dust collector and enters the exhaustor.

Sulphate is released from the receiver hopper through a rotary air seal and is discharged over the floor of the sulphate store by gravity chute. Sulphate is reclaimed from floor storage by the same suction nozzle and flexible pneumatic pipe and is delivered into the receiver and discharged through the rotary air seal as described above. A throw-over valve value in the breeches chute below the receiver diverts the sulphate into a loading-out chute in a railway track shed. A flexible pipe at the end of the chute allows uniform loading of a wagon.

Such a plant can handle 5 tons per hour.

**B**ENZOLE recovery and benzole rectification are normally regarded as two separate processes. In conventional processes, the heat needed for recovery and rectification is supplied by steam, much of it at high pressure, and much of this heat is wastefully rejected in cooling water.

In the UCB-Wilton pipestill process developed by UNION CHEMIQUE BELGE and CHEMICAL ENGINEERING WILTONS LTD., CHEADLE HEATH, STOCKPORT, the heat used for recovery is more than enough for complete rectification as well.

Preheated benzolised wash oil is brought into intimate liquid/liquid contact in a distillation column with a recirculating stream of debenzolised oil, which is continuously heated in a Wilton pipestill. The benzole is driven off into a fractionating system, and the same volume of wash oil as that in which the benzole was absorbed is returned to the benzole scrubbers through a series of reboilers and heat exchangers. Thus, apart from a small quantity of low-pressure steam, all the heat used is supplied by the pipestill, which is solely a heater and not a distillation apparatus.

#### Pipestill Process Economies

Compared with steam process, the UCB-Wilton pipestill process has been shown to give economies of £10,000 to £15,000 per annum per thousand tons of coal carbonised per day, and these economies are virtually independent of carbonising plant capacity.

Other products of the company include a pipestill open design for a continuous tar distillation plant at the Caerphilly works of the NCB.

SIMON-CARVES LTD., the parent company, has developed a process for the recovery of ammonium which is entirely separate from the production of sulphate crystals. It is said that the process allows closely controlled conditions of sulphate manufacture so that crystals of the desired size and shape are consistently produced.

## Plant Equipment

**S**TAINLESS STEEL chemical pumps have been developed by SIGMUND PUMPS LTD., GATESHEAD, for chemical and process applications. Known as the B-N series, the pumps are available for outputs of five up to 200 gallons per minute against heads from 10 up to 250 feet. A total of six different hydraulic units can be used, but only two support frame assemblies (sizes 1a and 1) are required. Special attention has been given to effective sealing and the pumps can be supplied with a variety of sealing forms.

Stainless steel 18/8/3 has been used as a basic material for the range as it has a high resistance to corrosion in chemical pump application. The pumps are unaffected by nitric acid, all concentrations, 7° F; sulphuric acid 10 per cent, 7° F; oleum, 7° F; cupric sulphate 10 per cent, 7° F and developers etc. The B-N pumps also satisfactorily handle liquids at temperatures up to 220° F.

This company also produces the Pum Pak, a general service, electric pump unit, intended for such applications as air conditioning, boosting, circulating systems, condensate, general water supply, heating systems, refrigeration, sprinkling, spray booths, bottle washing machinery, water softening etc.

**S**PECIALISTS in chemical plant production are WIDNES FOUNDRY & ENGINEERING CO. LTD., WIDNES. Their separate steel fabricating department covering approximately 200,000 square feet uses mild and stainless steel. The machinery in this particular department includes a 1 in. x 16 ft. roll, a plate edge planer, pells cropper, cold saw etc. The combined production covers pilot plant for the initial stages in production of titanium and more recently, has included cast iron vessels approved by the Government after gamma ray test for porosity. A battery of special cast iron vessels has been ordered by the UK Atomic Energy Authority. The body of the vessel is approximately 5 ft. 8 in. outside diameter x 6 ft. 3 in. high and the complete vessel weighs approximately 30 tons.

**L**AATEST addition to the range of Mopumps manufactured by RHODES, BRYDON & YOUATT LTD., STOCKPORT, is the '350' series of vertical high temperature circulating Mopumps, offered for pressures up to 350 p.s.i.

The company states that the new series should be particularly useful for marine services and for industrial boiler house installations where space is limited. The vertical pumps are stated to have the advantages of horizontal pumps of compactness, ease of access to working parts, reduced overall length, increased rigidity of the pump end, reduced distortion due to pipe strain by the motor not being attached to a base plate or wall, and elimination of static deflection caused by an overhung impeller in the horizontal pumps.

**T**HREE new thermoplastics, under the trade name of Durapipe, Z, K or N, have been developed by RICHARD E. DUPONT LTD., LONDON, for use as pipes by the petroleum industry. The plastics are strong, light in weight, and are said to have excellent resistance to corrosion. The pipes are being made in light, normal and heavy gauges, with outside diameters conforming to British Standard 1600 (1950) and American Petroleum Institute Standard API 5-L. These sizes are also in keeping with British Standard 1387. The pipe is normally fabricated in 20 ft. or 25 ft. lengths. Sound and permanent joints can, it is claimed, be quickly made with solvent or adhesive cement applied with a paint brush. The pipe can be cut and machined easily with simple hand tools. It will take threads and can be welded. Recent developments in the manufacture of Durapipe N, which is a type of nylon, now allow extrusion of pipe and casing up to 5 in. API Standard in 25 ft. lengths.

**N**OW being introduced to this country after being tried and proved in the US are the range of LaBour DZT Pumps manufactured by BRITISH LABOUR PUMP CO. LTD., LONDON. The pumps have been designed with a view to improving efficiency in chemical liquor pumping applications. A tapered open-type impeller is an important feature of design and with this modification a smaller sized pump using less h.p. achieves capacities hitherto requiring larger and more expensive types of pump.

Since the impeller head is separate from the shaft, the impeller can now be removed from the pump without dismantling more than the suction head. A heavier shaft is employed enabling the pump to be run at speeds up to 3,300 r.p.m. with increase in head conditions. Oil lubrication is also adopted.

Another recent introduction by this company is the LaBour alloy—K.26,

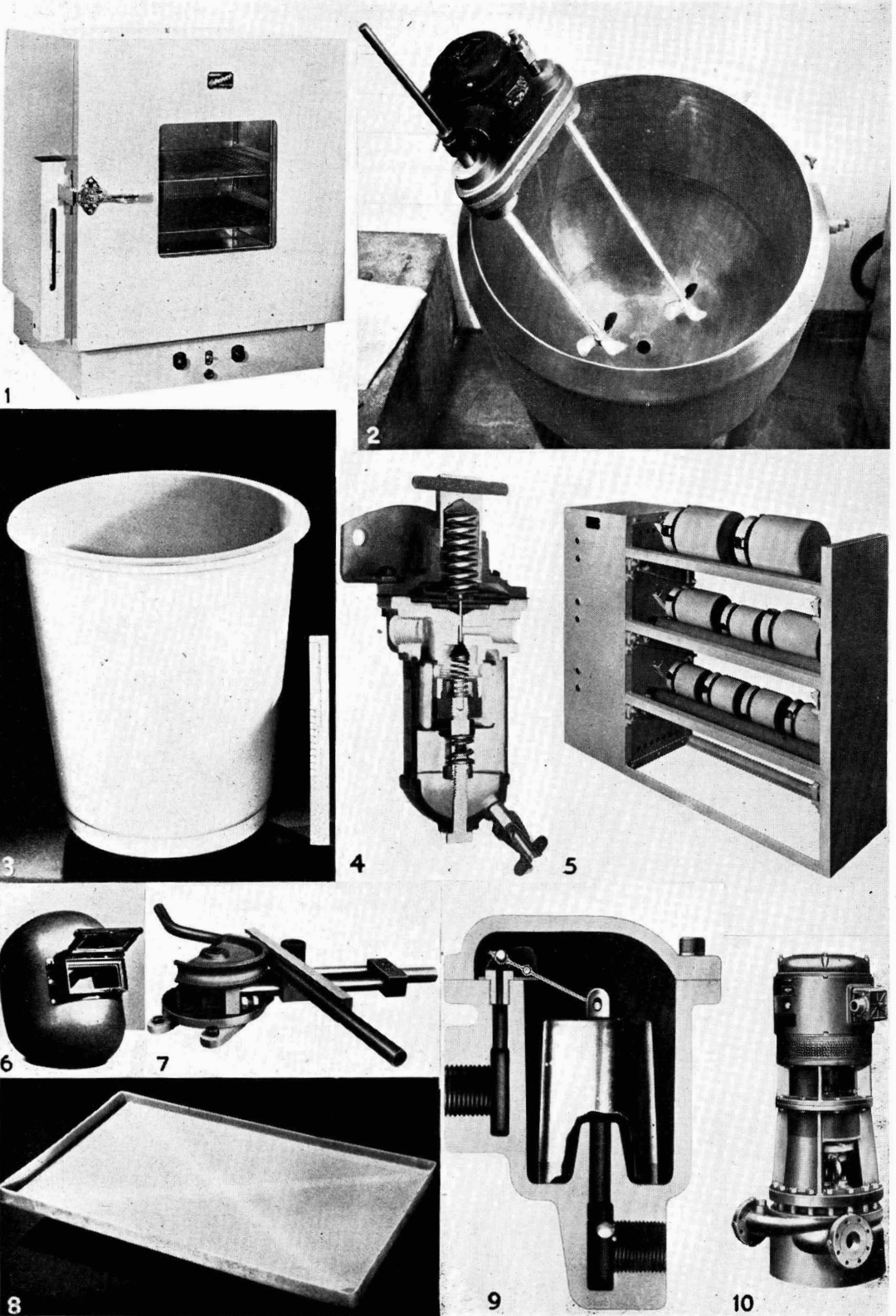
one of a number of alloys specially cast for use on difficult chemical duties. K.26 is an austenitic alloy of low carbon content containing over 50 per cent total of nickel, chromium, molybdenum and copper. Compared with conventional stainless steels, K.26 has increased resistance to corrosion, under oxidising and reducing conditions. The alloy can be welded and machined under conditions similar to those for 18/8 stainless steels and is comparable to the latter in price.

Its duties cover a wide range of chemicals and it has already been subjected to severe independent tests by leading industrial and chemical companies in the country. K.26 has been developed to fill the gap between the conventional stainless steels and the LaBour alloy R.55 which is normally recommended for the majority of particularly corrosive duties.

**T**WO new methods of preventing evaporation from open tanks and vessels have been reported recently. The AMERICAN AGLE CORPORATION, OHIO, US, has developed tiny air-inflated polythene pillows (each measures  $\frac{3}{8}$  in. OD by  $1\frac{1}{4}$  by  $\frac{1}{4}$  in.) which are floated as a  $1\frac{1}{2}$  in. layer on the surface. The pillows are stated to have a virtually unlimited life, are resistant to most chemicals and allow access into the liquid. Evaporation can be reduced as much as 70 per cent. Some 833,000 pillows are already in use at the atomic energy centre in Oak Ridge, Tennessee.

To prevent vapour loss in large petroleum storage tanks, a tyre (the same diameter as the storage tank) made of nylon fabric base and coated with butadiene acrylonitrile synthetic rubber is placed between the floating roof and the tank wall. The tyre is partially inflated with liquid and secured to the floating roof, thus acting as a complete seal between the floating roof and the tank wall. This method is in use at Mobil Oil's Coryton refinery and has been incorporated

- 
- 1 Humidity oven (A. Gallenkamp & Co. Ltd.); 2 Twin-shaft portable type stirrer (Kestner Evaporator & Engineering Co. Ltd.); 3 Polythene bin (British Xylonite Co. Ltd.—Halax Division); 4 Air filter regulator set (Crosby Valve & Engineering Co. Ltd.); 5 Three-tier laboratory ball mill (Pascall Engineering Co. Ltd.); 6 Arc welding face shield (Panorama Equipment Ltd.); 7 Pipe bending machine (Chamberlain Industries Ltd.); 8 Chemical drying tray (British Resin Products Ltd.); 9 Unit steam trap (Lancaster & Tonge Ltd.); 10 Vertical high temperature pump (Rhodes, Bydon & Youatt Ltd.)



## Plant Review

in two 80-foot diameter tanks. The design has been built under licence from the Hammond Iron Works US by WM. NEILL & SON (ST. HELENS) LTD.

THERE are novel features in a mixing machine designed and developed by BAKER PERKINS LTD., PETERBOROUGH. Ingredients to be mixed are weighed off into a wheeled truck which can be placed between the main frames of the mixing machine and clamped to the top flange of the trough. The trough and truck are then up-ended together, the truck staying in position during the period of mixing. When the movement is reversed the truck can be wheeled away for further processing of the contents. Thus dust-free working is ensured as well as ease of charging and discharging.

It is pointed out by the makers that this method of mixing is not universally applicable, but is useful for mixing certain substances. The original machine was designed for handling welding rod flux.

A NEW bagging scale the GA-38, which weighs and bags 50 and 100-lb. bags and, by means of a new pneumatic gate assist mechanism, 25-lb. bags, has been developed by RICHARDSON SCALE CO., CLIFTON, NEW JERSEY, US.

Bagging speeds are normally 15 50-lb. bags per minute, with accuracies ( $\pm 0$  to 3 oz.) and operation.

Special features are the scale's power driven belt feeder, the pneumatic gate assist, compensation and counter mechanisms, dust exhaust vents, variable speed motor drive and bagholder (optional in either manual or air-operated models).

LARGE electric surface heaters are now obtainable from ISOPAD LTD., BOREHAM WOOD, HERTS. The company has recently installed an isomantle for a flameproof area on a 500-gallon resin vessel at W. A. Mitchell & Smith Ltd., Mitcham, Surrey. It has a 56 kW loading and is constructed in two parts, one heating the base and 13 inches of the cylindrical side of the vessel, the other part heating from platform level in three 120° segments. Control is automatic with three heat switches for the 37 horizontal circuits, each controlling a pair of circuits giving choice of 'series', 'parallel' or 'single' circuits. Fine automatic control is effected by mercury-in-steel contact thermometers, one calibrated to 100-350°C, the other

which controls the heating surface being calibrated from 100-500°C.

THE adoption of British Standard 2598: 1955 *Glass Pipelines* in its range of industrial plant and pipeline products was recently announced by QVF LTD., of STONE, STAFFS. Although the manufacture of glassware with the former standards of pipe end will be discontinued, the company states that metal and plastic backing flanges, inserts, gaskets and bolts for use with existing glassware, will continue to be available. The company will also continue to supply the backing flanges to suit Quickfit pipe ends drilled to mate with Jobbing backing flanges, which are suitable for coupling Quickfit pipes in sizes 1 in., 1½ in. and 2 in. to the new QVF standard.

THE most recently introduced insulating refractory of the M.I. range developed by MORGAN REFRACTORIES LTD., NESTON, WIRRAL, CHESHIRE, is M.I.26 low heat storage insulation refractory. It can be used at temperatures of 2,600°F (1,425°C) filling the gas between the lower temperature M.I.23 (2,300°F; 1,260°C) and M.I.28 (2,800°F; 1,538°C) which is used for high temperature work. The M.I.26 can be used as a fuel saver when it is at the hot face, but can be employed as a backing lining when furnace conditions make hot face application impossible.

OF interest is the Paxman rotary vacuum filter, manufactured by DAVEY, PAXMAN & CO. LTD., COLCHESTER. This consists of a drum divided into a number of vacuum and pressure tight cells which are connected to ports in an automatic valvehead. The drum is clothed with a filter medium which may be cloth, gauze, synthetic fibre material, etc. The valvehead is divided into a number of ports which control the filtration cycle. The drum is arranged to rotate partly submerged in the slurry to be filtered, and the speed of rotation varies according to the material filtered. The application of vacuum to the internal cells of the drum causes the solids in the slurry to be drawn against the filtering medium on the periphery of the drum, the filtrate passing through the medium into the cells, and through the valvehead to a filtrate receiver tank. The vacuum continues to be applied to the cells as they leave the filter trough, with the result that moisture is being removed from the filter cake, and this can then be discharged by means of a scraper knife, a doctor roll, string discharge or other means. This pro-

cess is continuous and may include washing of the filter cake if required.

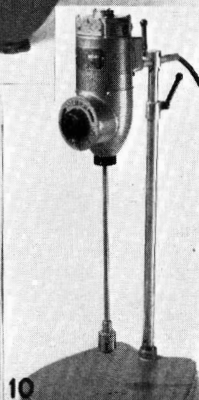
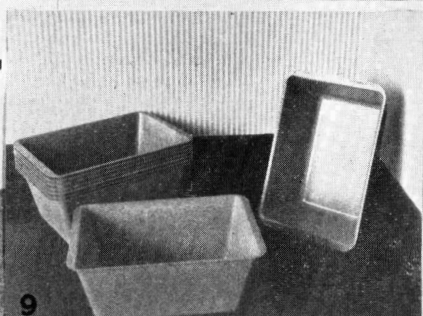
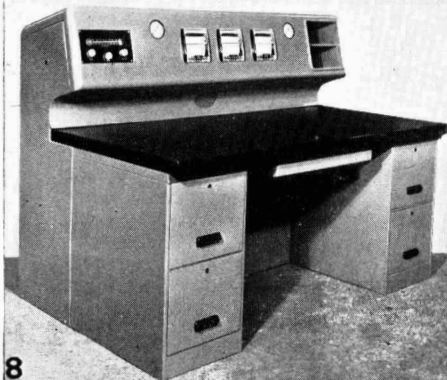
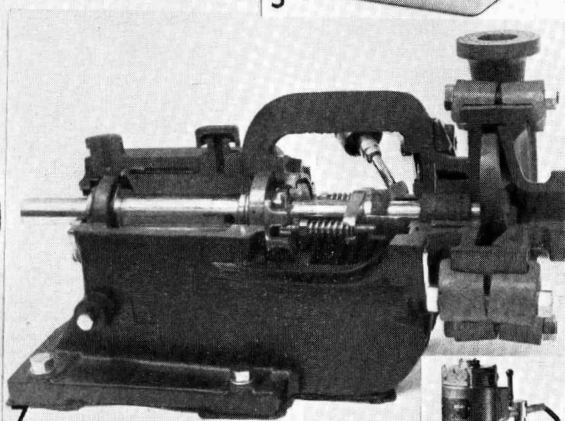
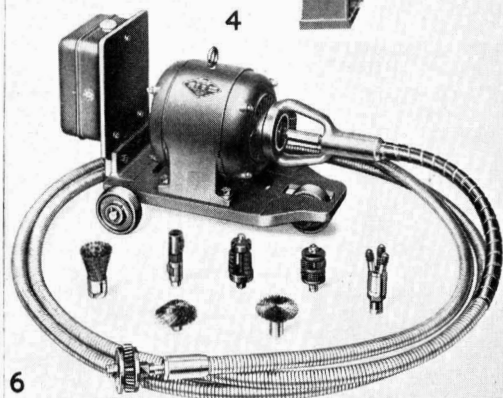
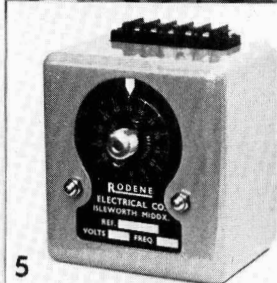
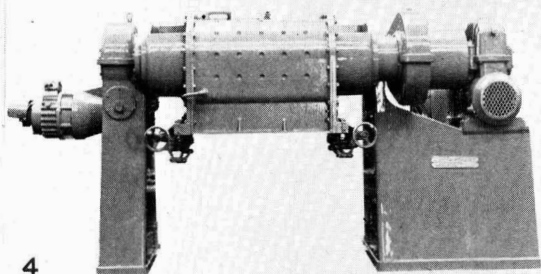
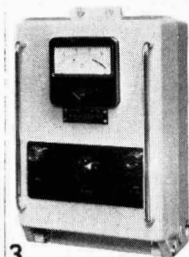
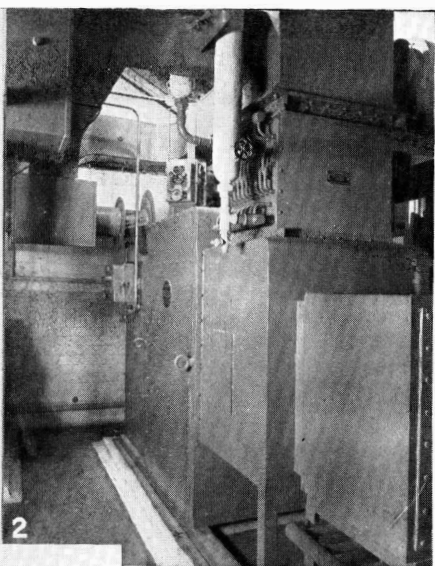
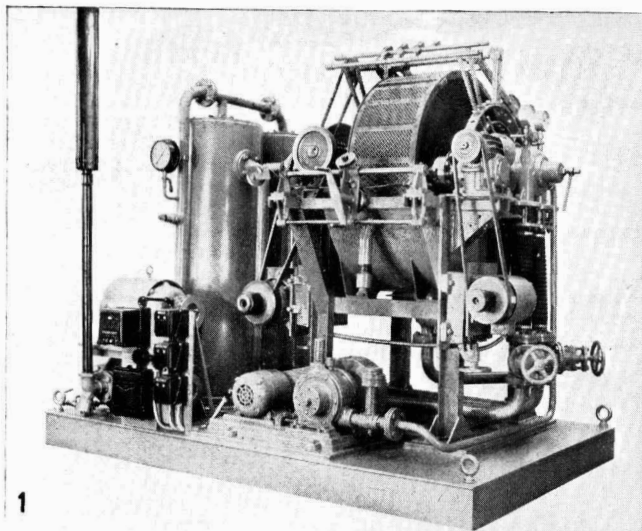
Paxman filters are used for the filtration of froth flotation fines, flocculated coal slurries, chemical slurries, food products, paper pulp, effluents, lime sludges and other materials. The filters can be made in cast iron, mild steel, stainless steel, rubber lined and other materials of construction.

A PORTABLE stirrer developed by KESTNER EVAPORATOR & ENGINEERING CO. LTD., LONDON, is fitted with twin shafts, both being driven by a common motor through a suitable gear box. Each shaft carries one or more propellers rotating in the same direction. This arrangement has three main advantages. Firstly, the number of zones of agitation is increased. Secondly, each zone operates in opposition to the next, so causing a more efficient and overall degree of agitation. Thirdly, mass rotation of the liquid experienced when a single shaft is employed without baffles, is eliminated. The angle of the stirrer shaft can be adjusted and the complete unit easily removed for use on other vessels; the total weight of approximately 80 lb. makes the unit truly portable. Each shaft is held by a quick action collet chuck which enables the length to be adjusted to a maximum of 5 ft. 6 in. The position of the propellers can be adjusted. Fitted with a ½ h.p., totally enclosed motor and gear box, this stirrer will give a high degree of agitation in up to 100 gallons of a fluid having a viscosity of eight poises and a specific gravity of 1.8, and mild agitation in up to 200 gallons.

A new Kestner special side entry type stirrer, is a development of the conventional unit which has been employed for many years for the agitation of fluids contained particularly in deep tanks or vessels under pressure or vacuum. A special bearing assembly is employed which allows the propeller shaft to be moved forward by hand while not rotating and locked in position to form a seal which prevents the escape of fluid held in the

---

1 Rotary vacuum filter (Davey, Paxman & Co. Ltd.); 2 Direct dehumidifier—model CHK (Birlec Ltd.); 3 Nucleonic level indicator (Baldwin Instrument Co. Ltd.); 4 Mixing machine (Baker, Perkins Ltd.); 5 Self-resetting process timer (D. Robinson & Co.); 6 Tube descaler (Flexible Domer (Gilman) Ltd.); 7 Flooded suction pump—model DZT (British LaBour Pump Co. Ltd.); 8 Control desk (Foxboro Yoxall Ltd.); 9 Glass fibre reinforced work baskets (Universal Metal Products Ltd.); 10 Laboratory mixer (Premier Mills Ltd.)



mixing vessel. This feature allows the stuffing box to be repacked without the need for draining the mixing vessel of its contents. An extra deep stuffing box is provided with grease feed to lantern rings and also a flushing connection. Quantities of up to 20,000 gallons or more may be handled with these units depending upon the viscosity of the fluid which is to be agitated and the degree of agitation required.

**SPECIALIST** in heat transfer equipment for the chemical, oil and other industries with emphasis on extended surface is **BROWN FINETUBE (GREAT BRITAIN) LTD.**, BIRMINGHAM. Now being used extensively in many varying applications in both the chemical and oil industries is the **LEC2005RR** Hairpin type extended surface heat exchanger, 17 sq. ft. The shell assembly can be manufactured from carbon steel and stainless steel, and the inner elements can be manufactured from carbon steel, admiralty brass, aluminium brass, aluminium and stainless steel. This type of exchanger is manufactured in 5, 10, 15, 20 and 30 ft. lengths and can be banked together into any required number of parallel streams to suit any application. The streams can be changed in accordance with the process requirement.

**OF** entirely new design is the Panorama welding helmet marketed by **PANORAMA EQUIPMENT LTD.**, LONDON. The helmet has a flip front glass holder which allows quick observation of work without raising the helmet. A ratchet adjustable cushion headband allows instant fitting to all head sizes and there is a three-position adjustable chin rest. These new features, combined with a moulded one-piece fibre shell, have produced a helmet which is light in weight, comfortable and completely proof against light leaks, side flashes, etc.

## Heating & Maintenance

**THE** packaged boiler is considered to be ideally suited to the chemical industry. Recently, **G. W. B. FURNACES LTD.**, DUDLEY, WORCESTERSHIRE, has installed a powermaster packaged automatic boiler at Sandoz Products Ltd., of Bradford. This works specialises in the production of dyes, bleaches, detergents and similar materials for textile applications. The steam demands of this type of plant are therefore subject to considerable fluctuations. Since the firing system of the new boiler is subject to fully

modulating control, violent fluctuations in steam are easily catered for. Thus, from 20-100 per cent boiler capacity the correct fuel/air ratios are maintained giving consistent operating efficiencies of over 80 per cent.

The boiler sent to the customer only requires to be connected to fuel, water steam and electricity lines. Model 200 is capable of a maximum steam output of 6,900 lb./hr. F and A 212°F. It occupies a floor space 18 ft. 3 in. long by 8 ft. wide. Apart from providing process steam in works and laboratories, the boiler caters for space heating in offices, stores, laboratories etc. The pressure is then reduced to 10 and 15 p.s.i. Feed water to the boiler comprises approximately 60 per cent condensate return, the rest coming from the mains. All types of fuel may be used for firing the powermaster range of boilers. The model 200 fires on 950 secs. viscosity oil, this oil being maintained by means of steam heated coils at a temperature of 90-100°F, while a built-in pre-heater on the boiler itself raises the temperature still further to the optimum for atomisation which is 150°F.

**BASIC** feature of patent 637943 taken out by **CHAMBERLAIN INDUSTRIES LTD.**, LONDON, for its small hand-operated tube bending machine type TRU/1), is the method employed in securing the tube during bending to prevent slipping and at the same time gripping the minimum of tube. The result permits close set bends which are necessary when bending tubes to fit around piers and projections.

The Staffa bender is capable of bending light gauge ferrous and non-ferrous tubes of up to 1½ in. diameter and steam and gas tube up to ¾ in. n.b. The forming of tube is by compression bending over an accurately machined centre forming die and slipper. The throat ratio of the bend is equal to 3 × diameter, and bends of up to 180° can be produced cold and unloaded and free from flattening and wrinkling. Change-over from right to left in bending direction can be carried out in a matter of seconds when the bending arm is returned to its pre-bending position a device automatically ensures the correct angle of lead prior to the next bend.

The bender can be mounted on bench, vice or bipod.

**STAINLESS STEEL** bellows with a wide variety of applications in the chemical, Diesel, steam plant, petrol refining, atomic energy and marine

## Annual Review of Plant

industries are produced at **TEDDINGTON AIRCRAFT CONTROLS'** recently formed industrial bellows section.

The bellows are made from highly finished cold, rolled sheet (avoiding the unequal stress characteristics of lap-welded tube) of uniform thickness with internal diameters ranging from one inch to 84 in. and which can stand temperatures up to 800°C. They are said to have proved particularly effective for exhaust connections, expansion joints and wherever a corrosion or temperature resistant flexible connection is required.

**OF** entirely new design is the unit steam trap which has just been added to the range of Lancaster steam traps made by **LANCASTER & TONGE LTD.**, PENDLETON, MANCHESTER. It is an inverted bucket trap with a double leverage action, which enables large diameter seatings to be used, thus giving a large capacity to size ratio. It is suitable for pressures up to 200 p.s.i. saturated, and will lift its condensate. All internal parts are made of stainless steel (copper float excepted) and the unit can be examined and cleaned without breaking pipe joints. The unit is, at present, available in ¾ in. and 1 in. sizes, but a ½ in. size should be available shortly. The ¾ in. and 1 in. size weighs 7 lb. and can be suspended on the pipeline. The ½ in. trap will weigh 4 lb. All traps are steam tested to working pressure and hydraulically tested to 400 p.s.i.

**MUCH** of the range of equipment designed by **FLEXIBLE DRIVES (GILMANS) LTD.**, SMETHWICK, for descaling boilers, economisers, or other tubular installations, was being shown at the recent Fuel Efficiency Exhibition. Two main types of tube descalers were being exhibited: those incorporating the use of a flexible drive, driven by either compressed air or an electric motor, or the air-turbine type tube cleaners which are inserted into the tubes themselves. This latter type is of particular interest to petroleum refineries, power stations, chemical plants or any installation where spark risk must be avoided.

**MODELS** illustrating applied fuel economy in some of the principal power stations and works of **IMPERIAL CHEMICAL INDUSTRIES LTD.** were among the company's exhibits at the Fuel Efficiency Exhibition. ICI products and processes contributing to fuel efficiency were on show. These included Alflac water treatment



## and Equipment

methods for preventing the formation of scale, and chlorine manufactured by General Chemicals Division for the prevention of slime in steam condensers and process coolers. Pioneer insulating plaster board was used to illustrate the theme 'Fuel economy in a fertiliser factory.'

The Metals Division of the company showed the contributions made by various of its wrought non-ferrous metal products, including plain and integral finned heat exchange tubes and aluminium integral heat transfer sheets, while Marston Excelsior Ltd., an ICI subsidiary, displayed heat exchangers. Reference was also made to a number of other ICI products which are being used to achieve fuel efficiency in some form or other.

**P**ERMANENT protection for insulation is provided by Corrosheath jacketing aluminium which is thin sheet aluminium, cross-corrugated to give strength and to facilitate handling. It is supplied by CORROSHEATH LTD., LONDON, in rolls, plain or backed with an asphaltic moisture barrier. The jacketing is easily cut to the required size on the spot and is fitted on any size of pipe; fixing is by means of aluminium hands and seals. The jacketing can be removed and re-installed with ease. Where insulation may be alkaline, jacketing with factory attached moisture barrier to prevent corrosion may be used.

## Laboratory Equipment

**T**HREE-TIER laboratory ball mills are obtainable from the PASCALL ENGINEERING CO. LTD., CRAWLEY, SUSSEX. Known as the No. 6 model, three pairs of 2½ in. diameter rolls are mounted one above the other in three tiers. Each pair consists of one driven roll and one idler roll. The idler can be placed in any of three positions to accommodate containers up to 9 in. diameter. The rolls are of hard white rubber bonded to steel spindles and are accurately centred and ground concentric with the journals. Each pair of rolls can accommodate pots of the following capacities:—two 1-gallon or three ½-gallon or four ¼-gallon or four 2-pint or five 1-pint. Various sizes of pots can be set up on the rolls such as two 1-gallon, three ½-gallon and four 2-pint, that is a total of nine pots. A separate drive is provided to each pair of rolls so that one, two or three tiers can be operated as required. The three

motors are ¼ h.p. wound for 200/220 or 230/250 volts, single phase, 50 cycles, a.c. supply. The driven rolls can be operated at 132, 190 or 277 r.p.m. The main frame of the mill is fabricated from rolled steel angle and plate and all bearings apart from those fitted to the motors are self-lubricating.

**A**HUMIDITY OVEN for moderate test conditions has been displayed by A. GALLENKAMP & Co. LTD., LONDON. With a capacity of 6 cu. ft., the oven can be used over a temperature range of ambient or slightly below to 50°C. It has a sturdy, enamelled steel case with tinned copper liner and the door is closed by a roller bolt catch. The makers claim that there is rapid recovery of temperature and humidity after opening the door which is airtight to give good humidity control. Air circulation is maintained by a centrifugal fan driven by an induction motor mounted at the back of the oven. Air is circulated through ducts at the top and bottom and a removable tray is fitted in the bottom duct for containing salt solutions, over and under which the air passes at high velocity. Heating is by means of a tubular element mounted near the fan. Electrical controls, which are fitted to the bottom front panel, consist of mains and heater indicator lights, a mains fuse and a door heater switch. Automatic control is available as an optional extra. The makers state that a rigorous specification of all parts ensures high performance and excellent reliability.

**U**NIQUE FEATURES of the Premier laboratory mixer, Model 1300 developed by PREMIER COLLOID MILLS LTD., WALTON-ON-THAMES, are the high-speed turbine type head and the Premier dispersator. The latter gives results comparable to intricate high-speed machines relying on ultrasonic vibrations. Apart from conventional mixing and agitating, the unit can be used for emulsifying, dispensing, melting, pigmenting, reacting, dissolving, etc. The dispersator, considered the best type of mixing head for general use, can be replaced by a marine-type propeller for gentle agitation, or a small cage-type beater for mixing thicker products. The motor is 1/30th h.p., maximum speed 4,000 r.p.m.

Also new to this company's range of mixers is the Premier multipurpose

colloid mill, model 3000. Occupying some three sq. ft. of bench space, this mill is a universal machine for the small manufacturer and can be used for producing small special orders in larger organisations. It also has applications in the laboratory as the results obtained can be duplicated on a works scale. The mill can be supplied either with flat abrasive (carborundum) stones, three in. in diameter for dispersing and grinding, or flat stainless steel working surfaces for emulsification. The unit is belt driven and speeds of up to 12,000 r.p.m. can be obtained when using stainless steel working surfaces and up to 8,000 r.p.m. using abrasive stones. The hopper has a capacity of seven pints (four litres). The outlet is of stainless steel construction. Output is of the order of 60/300 lb. per hour, depending on viscosity of material, clearance and type of working surface used.

## Handling Equipment

**A**POLYTHENE bin with a capacity of 10 gallons has been added to the BEX range of products. Made by the Halax Division of BRITISH XYLONITE CO. LTD., it should be ideal for a wide number of industrial purposes.

The lid fits closely on the rim of the body, which is curved over to provide an all-round grip for easy lifting. Unaffected by acids, alkalis, water and all chemicals (except some fats and oils) it is moulded in one piece, eliminating seepage through seams. The manufacturers claim that it will neither rust nor corrode, and the absence of hard, sharp edges reduces the likelihood of damage to floors or woodwork, even when it is full.

Measurements are 21 in. deep (18½ in. without lid) 15½ in. inside diameter.

**P**OLYTHENE snap-on caps for sealing glass vials are one of the latest additions to the range of injection moulded thermoplastic closures marketed by THE METAL BOX CO. LTD., LONDON. The cap, which is attractive in appearance, is stated to give a first-rate seal and it is easy to snap on or remove, because of the flexibility of polythene. An aluminium tear-off seal can be fitted over the polythene cap giving tamper-proof protection to the container until it has been opened. The polythene cap can be used with or without the metal overseal, as the contents of the vial would still be protected. Closing machinery has been developed to close the overseal.

The snap-on cap is used mainly for medical powders, tablets, pills, capsules etc. However, it is also suitable for packaging certain liquids, and it is

## Plant Review

now being tested as a seal for that purpose.

**P**LASTIC work baskets made from glass-fibre reinforced plastic material, are moulded by UNIVERSAL METAL PRODUCTS LTD., SALFORD. They are being used by a number of firms for handling work in progress. The advantages of these containers are said to be their toughness and wearability and their light weight. They can easily be stacked, and the corners are radiused to facilitate cleaning, an important factor when used for handling precision products. Each container measures 17 in. by 13 in. by 7 in. deep.

## Control Equipment

**A** SELF-RESETTING PROCESS-TIMER (or synchronous time delay unit), Type 2500, has recently been added to the Rodene range of timers, distributed by D. ROBINSON & CO., HARLOW, ESSEX. The dial only has to be handled, it is stated, when pre-setting a new timed period, as the unit automatically resets when the mains are disconnected. The output switch (rating, 5 amps.) has a change-over action which allows the controlled circuit to be made either for the timed period or from the end of the timed period and until the mains are switched off. A new motor, the Rodene Type 2000, is incorporated in the timer. It is also supplied separately for driving recorder charts etc. The Type 2500 timer occupies about 4 in. cube.

**A** SHIFT manager's control desk has been designed by FOXBORO-YOXALL, LTD., LONDON, for ICI's plant at Billingham. It is designed to focus at one point the critical measurements which the shift manager requires to have under his eye at all times. In the centre of the panel, over the desk proper, three Foxboro Consotrol 2-pen recorders provide a continuous record of six critical measurements. These Consotrol recorders are so grouped that the six records can be comfortably seen with a single glance. On the left of the desk is an F/M radio receiver which provides up to the minute weather forecasts, since weather conditions may have an important bearing on the operation of plants which use large amounts of cooling water or are affected by extreme changes of temperature. The

desk is provided with four deep, lockable drawers so that shift managers may each have a place to leave their personal equipment in safety.

**T**WO NEW thermostats, the TQP water thermostat and the FSI flue thermostat, have been introduced recently by SUNVIC CONTROLS LTD., HARLOW, ESSEX. Although developed particularly for the control of automatically fired boilers, these thermostats are suited for many and varied temperature control applications.

The TQP thermostat is said to satisfy the need for a simple and robust control device providing a change-over switch facility. The scale is clearly marked in °F (range, 70° F to 190° F, temperature differential, 7° F to 12° F) and the instrument is easily set to the required operating temperature. The setting is not affected by the position in which the TQP is mounted.

The FSI also features change-over contacts which in this case are operated from a bimetal helix via a clutch. The use of the clutch ensures that the contacts change on a rise or fall of approximately 50° F at any flue gas temperature. The maximum operating temperature is 750° F and the maximum permissible temperature is 1,000° F.

**F**OR use with oil burners of the high and low flame type, a range of adjustable by-pass oil valves has been developed by BLACK AUTOMATIC CONTROLS LTD., CORSHAM, WILTS. These by-pass valves are of three types: (a) with adjustable minimum opening position set by means of a screwed stop and lock nut; (b) having stable calibrated adjustment of minimum opening position (in small sizes only); (c) metering valves with adjustment for both high and low flame settings and (d) re-circulating by-pass valves specially designed for packaged boiler units.

The company is also developing a range of pressure switches. Their outstanding feature is the use of a small, neat microswitch which is nevertheless capable of handling adequate control current. The pressure switches are of the diaphragm type and are available in various pressure ranges. They are provided with full adjustment over their respective pressure ranges, differentials being factory set as required.

In addition the company is developing other items for the growing field of automatic control, including diaphragm and differential piston valves and miniature solenoid valves.

## Air Conditioning

**S**PECIALISTS in air conditioning and dehumidification plant are BIRLEC LTD., BIRMINGHAM. The available range of standard Birlec air conditioning equipment is comprehensive, ranging from small units such as the BE40 and CHE units which are suitable for conditioning small rooms with two and six occupants respectively, to the CHX direct dehumidifier, the largest unit, which is used for rooms having several hundred occupants and extensive processing machinery.

Birlec laboratory lectrodryers, of both low and high pressure designs may be used when a supply of dry air or gas is required in laboratory work e.g., humidity control in drying cabinets, prevention of condensation in cooling chambers, drying out vessels and tubing, removal of oxidising moisture from furnace atmospheres etc.

**I**MPROVEMENTS have been made in the Crosby Mason Neilan No. 74 air set by CROSBY VALVE & ENGINEERING CO. LTD., WEMBLEY, MIDDLESEX. The air set includes a 50 micron ceramic cartridge type filter, a tight shut off reducing valve and a relief valve. It is claimed that the instrument will provide a stable air output despite fluctuations of supply or demand. The filter element can be replaced by undoing one bolt and nut. Light alloy and steel have been eliminated from the all-brass body, which is rated at 250 p.s.i.

**A** DEVICE for increasing the average size of finely suspended mists or dusts to facilitate their efficient removal by classic methods has been developed by the BRITISH CECA CO. LTD., LONDON. It is known as the aero jet venturi and is an effective wet scrubbing system, capable of dealing with the finest particles of noxious gases. Because of its simplicity it would appear to have marked advantages over the alternative systems of electro-static and ultrasonic precipitation. Initial outlay for installation is low and in many instances cyclones and filters hitherto operating with low efficiency can be re-utilised. Using various solutions and liquors it is possible with an aero jet venturi to scrub out soluble vapours and fumes from gas streams. The equipment requires little space for installation. Total power requirements are usually of the order of 1.7 h.p. per 600 c.f.m. of gas treated.

# SLTC ANNUAL GENERAL MEETING

## Papers Presented at Leeds Conference

THE ANNUAL general meeting and conference of the Society of Leather Trades' Chemists was held on Friday and Saturday 21 and 22 September at Leeds University. On the first day Dr. G. W. Kenner delivered the seventh Procter Memorial Lecture on 'The Present and Future Scope of Peptide Synthesis'. Following this came the annual general meeting of the Society, and among the items considered was the adoption of the revised Official Methods of Analysis. These will be available in book form in the near future.

During the meeting the following papers were presented: 'Some Further Electron Microscope Researches' by Professor D. Burton and Dr. R. Reed; 'The Tanning Characteristics of Aliphatic Aldehyde-Ketone Resins' by J. R. B. Hastings and Dr. T. White; 'New Light on the Mechanism of Liming and Bating' by Dr. G. H. Green; 'Some Investigations into the Rate of Tannage of Sole Leather' by N. L. Holmes and Dr. H. G. Wollenberg; and 'Some Experiments on the Impregnation of Sole Leathers' by J. M. Harrison and T. Turner. Summaries of these papers are given below.

IN RECENT years, great advances have been made in the analytical and structural chemistry of proteins and the question must be asked whether synthesis will keep pace. No deep and rapid incursion into this field should be expected, but progress in two directions is discernible. Oligopeptides containing some ten amino-acid residues arranged in a definite sequence can now be constructed from most, if not all, of the amino-acids which occur in proteins; the chief interest in such compounds has lain in their relation to hormones and antibiotics, but they may also prove useful as models in studies of protein reactions. Many polypeptides have been synthesised from single amino-acids and the possibility of repeating many times a given short sequence is now apparent.

### Defined Structure

For building oligopeptides of defined structure we still rely fundamentally on the approach made by M. Bergmann, namely protection of the terminal amino group of an amino-acid or peptide, while the terminal carboxyl group is condensed with the amino group of another section of the peptide chain. However, the actual range of methods is now much greater than was available to Bergmann. In addition to his carbobenzyloxy protecting group we now have the tosyl, phthaloyl, and trityl groups to name only the most important, and in addition to the azide method of condensation there are those methods relying on various mixed anhydrides, cyanomethyl esters, thioesters, derivatives of trivalent phosphorus, and carbodiimides. The power of these methods has been amply demonstrated in the syntheses of oxytocin and related compounds by du Vigneaud and his colleagues as well as other groups of workers.

Polypeptides have been synthesised from the N-carboxyanhydrides of amino-acids, but this method is not

applicable to the production of material containing more than one amino-acid and having a defined structure. For this purpose some of the methods used in the synthesis of oligopeptides can be adapted, but there are many problems in securing reasonable yields of material with a high molecular weight. Nevertheless progress along these lines can be confidently expected.

### Electron Microscope Researches

STRUCTURAL changes in tanned collagen fibrils during shrinkage in hot water were described. First the fibrils swell either at certain regions along their length or at their ends. The bands across the fibrils become fainter in the swollen regions and, significantly, become much closer together. At the same time the swollen portions flatten and assume a peculiar spiral form. This initial swelling is usually observed at a temperature below that of macroshrinkage, i.e. below that of a strip of leather as determined in the usual apparatus. Moreover, the fibrils in any particular sample of leather do not all swell and shrink at the same rate.

### Stubby Structures

On raising the temperature, the swollen fibrils break across to form short, stubby structures, which on prolonged heating are reduced to ill-defined masses of glue-like material. These changes appear to take place with all the leathers so far examined, but are best illustrated in the case of chrome and oil-tanned leathers where the fibrils are not obscured by the presence of amorphous material such as vegetable tannin.

On the basis of these results suggestions were put forward for the structure of the native collagen fibril, its

stabilisation by tannage and its shrinkage by hot water.

### Aliphatic Aldehyde-Ketone Resins

THE alkali-catalysed reaction between aliphatic aldehydes and ketones provides condensates which can be resinated by further treatment with alkali. This provides the basis for a process of resin tannage consisting of:

(i) impregnating hide with a suitable condensate.

(ii) Resinifying the condensate *in situ* by alkali treatment. The method gives a range of light leathers, pale cream to yellow in colour, having shrinkage temperatures raised as much as 14° C, and containing up to 20 per cent of resin.

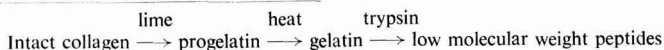
Conventional methods of tannage can be applied if the condensates are converted to water-soluble resins containing sulphonic acid groups by treatment with alkali sulphites or bisulphites. Tannage with these products gives a range of light leathers, cream to orange in colour, having shrinkage temperatures raised as much as 5° C, and having a degree of tannage of up to 60.

The analysis of such solubilised resins by the Official Method gives unreliable results. This can be shown by varying the time of contact with hide powder, the ratio of resin to hide powder, and the extent of acidification of the analytical solution. Like other sulphonated materials, these solubilised resins leach inorganic salt from the hide powder—a feature that can introduce as much as five per cent error into the tannin estimation.

The role of the sulphonate group in these solubilised aldehyde-ketone resins is discussed in relation to the results presented, and to published data on analogous sulphonated tanning materials. It is suggested that the products may have a certain potential value if used in conjunction with other tanning materials.

### Mechanism of Liming and Bating

THE MAIN function of bating is to reduce the tendency of the leather fibres to stick together on drying. A similar effect is obtained by drying the leather under tension or with acetone. With some skins, bating can be completely replaced by scudding. A skin re-limed after bating or scudding requires to be re-bated. Bating is effective at a low temperature providing the skins are pre-heated, e.g. to 40° C for calf and 45° C for goatskin. On the basis of this evidence the following scheme is proposed:



## SLTC Meeting

Progelatin consists of filamented collagen fibrils. Liming, or other swelling treatment, causes splitting-up of the fibre bundles with the formation of progelatin on the newly formed fibre surfaces. The polar nature of progelatin causes it to act as a glue when the fibres are dried, thus nullifying the beneficial splitting action of the lime. Alkali causes hydrolysis of the amide groups and rapid lowering of the isoelectric point to about pH 5.0. This accounts for the partially plumped condition of limed pelt delimed to pH 8-9. Removal of progelatin restores the iso-electric point and causes 'falling', development of flaccidity, scud loosening, air-permeability, and, to some extent, silkiness of the grain of the pelt. The main cause of silkiness is, however, loss of occluded particles of calcium carbonate.

Very little progelatin is produced, but in bating a relatively large amount of intact collagen is also attacked. Reliming after bating, but not after scudding, causes serious loss of substance (progelatin formation) due to the bating enzymes assisting the action of the lime.

The optimum pH for bating coincides with the optimum for gelatinase activity, and bating power is directly related to gelatinase activity.

## Rate of Tannage of Sole Leather

THE EFFECT of temperature on the rate of tanning of sole leather has been investigated in two liquors of different strengths, and with respect to pelt of three levels of compactness.

Rate of tanning was followed by the non-destructive method of weighing pieces of pelt/leather in the liquors in which tanning was proceeding. Four temperature levels were used, 8°C, 18°C, 28°C and 38°C. Increase of weight in liquor was taken as being proportional to tanning matter uptake. Tanning was still proceeding when the experiment was concluded at 56 days though at a slow rate. The total uptake of tannin matter was determined by analysing the air dry leathers. Rates of tanning were characterised by the time taken to absorb 0.5, 0.75 and 0.875 of the maximum tanning matter for each piece. Generally speaking, total tannin uptake increases with increasing temperature as does rate of uptake.

Relative rates of tanning for the less dense fore-end pelt, for the average pelt comprising most of the butt and for the densest part over the kidneys, were obtained at each temperature. Virtually complete liquor equilibrium

was always attained and differences in total tannin taken up were due to tannin removed from solution under the conditions of the experiments. Degrees of tannage at near equilibrium were calculated for each piece of leather tanned, by two methods. One method made use of the analytical data as referred to the wet leather. From a knowledge of free water in the wet leather, a division of the total tanning matter into fixed tannin and that corresponding to the interfibrillary liquor was made and a degree of tannage figure obtained. The other method was based on the assumption that when the wet leather was weighed in the corresponding liquor, the weight obtained related only to the extent to which hide substance, bound water and fixed tannin were heavier in density than the liquor in question, and that the interfibrillary liquor was weightless. Degrees of tannage obtained by the two methods were substantially in agreement.

## Impregnation of Sole Leathers

THE competition from synthetic soling materials makes it necessary for tanners to improve the abrasion resistance and water repellence of sole leathers, as these are the most important characteristics claimed by the manufacturers of composition soling material.

It has been suggested that the introduction of polymeric materials into leather will improve its properties, and the purpose of this paper was to report the results obtained in a number of laboratory scale experiments carried out with this object in view.

The methods of applying polymers may be classed under three headings: (a) from aqueous emulsions, (b) from solvent solutions, (c) by polymerising monomers *in situ*.

### Aqueous Emulsions

The application from aqueous emulsions depends upon such factors as the nature of the tannage, the pH stability of the emulsion, the particle size of the polymer etc., and it is necessary to find the optimum conditions for each type of tannage.

Impregnation from solvent solutions can be achieved provided that the polymer is of suitable molecular weight and viscosity. Difficulties associated with this method of application are those of solvent recovery and fire risk. The extent of the deposition depends upon the available air space which is determined by the nature of the fibre structure.

Many of the monomers, which, on polymerisation, would give the type of

## Fertiliser Shortage

### Hungary May Overcome by New Process

ALTHOUGH fertiliser production has trebled in the past 11 years, Hungary is still short of fertilisers. It is hoped, however, that a new and cheaper artificial fertiliser manufacturing process, using nitric acid instead of sulphuric acid, which Hungary has to import, may overcome this shortage. Laboratory experiments have shown that the new fertiliser contains about 40 per cent of active agent, a much higher concentration, it is claimed, than is to be found in the 'traditional' fertilisers. Also, it is stated that Nifosz can be stored for 'several years' without absorption of moisture. All by-products of the manufacturing process can be utilised, it is reported. Lime can be made from one by-product and cryolite, now imported for use in the aluminium industry, is prepared from another.

Production of Nifosz has already started at the Pét nitrogen works and it is planned to build a 10,000 ton capacity plant for the new fertiliser at the new Borsod chemical works. It is also proposed that the Tiszapalkonya Chemical Combine, which will mainly supply basic materials for the Hungarian plastics industry, will also produce 15,000 tons of Nifosz.

## Norwegian Ilmenite Deposits

DISCOVERY of new deposits of ilmenite ore with a high titanium content has recently been reported by the most important Norwegian producer of titanium oxide. The deposits are located in the Jossing-fjord on the west coast and are estimated to contain over 100 million tons of ore. Most of the ilmenite is accessible for open-pit burning. The company now plan to increase its annual production of ilmenite concentrate from 160 thousand tons to about 200 thousand tons. Norway supplies about 16 per cent of the total world production. Norwegian ilmenite concentrate contains 45-55 per cent of titanium dioxide.

elastomer required, are very volatile, and this has been one of the difficulties in this phase of the work. One *in situ* method of polymerisation has been developed which gives a leather with much improved properties.

Analytical data and physical tests on some of the experimental leathers were presented.

by  
Peter Pain M.A.

# Restrictive Trade Practices

## THE MACHINERY OF REGISTRATION

**M**Y FIRST article dealt with the types of agreement which have to be registered under the terms of the Restrictive Trade Practices Act. I shall explain what has to be done about agreements which are registrable, and the machinery which is being established on the official side to deal with them. Later I shall consider the very pertinent question of what happens to the parties to a registrable agreement if they do not register it.

King-pin is the Registrar of Restrictive Trading Agreements. He has been appointed and is now building up his official structure. His first function is the keeping of the register. This will be a public document and will be open to inspection. It will be possible to obtain certified copies from the registrar upon payment of the appropriate fee, as is the case with other public registers.

### Secret Section

Provision is made for a secret section of the register in which will be included particulars giving information, publication of which would be contrary to the public interest. It will also contain particulars of any secret process of manufacture; the presence, absence or situation of any mineral or other deposits; or any other similar matter, being information which, in the opinion of the Board of Trade (not the registrar) could not be published without substantially damaging the legitimate business interests of any person.

### Presenting Agreements

Second function of the registrar is to present agreements to the Restrictive Practices Court. It appears from the Act that the registrar must present every registered agreement to the Court. He is left a discretion, subject to direction from the Board of Trade, as to the order in which he will present agreements. He will be represented before the Court and will presumably be prepared to argue either for or against an agreement in accordance with the view which he takes of it. He is specifically given power to consult the Law Officers of the Crown—no doubt he will require their assistance during the early years. When the Restrictive Practices Court has made a declaration or order, the registrar must cause notice of it to be entered in the register.

Particulars of the agreement must contain the names of the parties to the agreement and the whole of the terms of the agreement, whether or not these relate to the restrictions which make registration necessary. The original of the written agreement must be produced.

The Act says nothing as to which party to such an

agreement must furnish the particulars. It is sufficient if they are furnished by one party. A party who fails to furnish particulars does not commit any offence, until official action is taken as mentioned below. A variation of an agreement must be notified in the same way as the original agreement.

### Penalties

*Powers to Obtain Information.*—If the registrar has reasonable cause to believe that a person carrying on business in the UK in the production, supply or processing of goods, or a trade association with members carrying on such business is or may be a party to a registrable agreement, he can require notification to be given within a specified time whether the person or association is a party to any agreement containing any of the specified restrictions (set out in my first article) and if so to furnish the particulars required by the notice. It is an offence not to comply with such a notice without reasonable excuse; the penalty is trifling compared with the magnitude of the matters that may be covered—a maximum fine of £100 and £10 per day for which the offence continues.

The registrar can apply to the High Court for an order requiring the person on whom the notice was served to attend for examination with regard to the matters specified in the notice. A regular hearing will then take place at which both the registrar and the party summoned may be represented.

Notes on the examination must be taken down in writing and read over to or by the person examined and signed by him; they can thereafter be used in evidence against him. The Court can require the person examined to produce any particulars, documents and information in his possession or control, provided these were mentioned in the original notice served by the registrar. In the case of a limited company, any company official may be examined in this way.

### Within a Specified Time

Where default is made in furnishing particulars, the High Court can authorise the registrar to treat such information as he has as particulars and to register these. The Court can also order the party to supply the information within a specified time. Failure to do so will be contempt of court. The Court may also declare such an agreement to be invalid and restrain the parties from giving effect thereto. In this way a body refusing to register may have its agreements invalidated, without the benefit of the judicial inquiry which would otherwise take place before the Restrictive Practices

[Turn to next page

## TITANIUM DIOXIDE & SILICA

### Reduction by Calcium Hydride

**R**EDUCTION of titanium dioxide and of silica by calcium hydride is described by Michel Bichara in *Annales de Chimie*, 3rd Series, 1956, Vol. 1 (May-June), 399 (paper in French). Firstly the conditions for reduction of titanium dioxide to titanium metal or hydride have been determined. A radio crystallographic study of TiH completes this section. The reduction of silica is then described, and the calcium-silicon mixtures formed are specified. Various secondary reactions which occur have been studied in detail. Lastly, the reduction of titanium dioxide by calcium silicides was studied and also the titanium silicides which result.

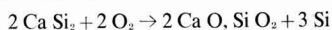
The action of calcium hydride on titanium dioxide establishes the possibility of obtaining very pure titanium. Thus a mixture maintained at 900°C for 15 minutes, then cooled under vacuum gives, after washing with acetic acid, a grey, very fine powder containing 99.5 per cent titanium. (In a study of the formation of the hydride, it was found that temperature, purity of the products used and previous treatment of the metal were important. The absorption of hydrogen liberated by dissociation of calcium hydride, using freshly reduced titanium, reached a maximum limit corresponding to TiH<sub>2</sub>).

### Reduction is Complex

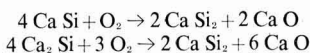
The reduction of silica by calcium hydride is complex. Besides the formation of silicon, other reactions occur: (1) the interaction between silicon and calcium hydride to form calcium silicides, (2) the formation of 2CaO, SiO<sub>2</sub>, refractory to reduction as well as oxides of silica and by the action of calcium silicides on silica. With regard to the nature and composition of the final product the molecular ratio, CaH<sub>2</sub>/SiO<sub>2</sub> is the determining factor, states Bichara. With the ratio, CaH<sub>2</sub>/SiO<sub>2</sub>=1, silicon is obtained. By progressively augmenting the proportion of hydride, the silicides, CaSi<sub>2</sub>, CaSi and Ca<sub>2</sub>Si result.

### Suggested Uses

Calcium silicides fix free oxygen to give calcium silicate and free silicon. CaSi is oxidised directly,



then CaSi and Ca<sub>2</sub>Si change to the silicate through the intermediate CaSi<sub>2</sub>.



These silicides also combine with oxygen. This property, together with the compounds' reducing properties, is of particular interest. Thus, CaSi reduces silica at a low temperature (950°C) and silicon of great purity is obtained. These notable chemical properties of calcium silicides suggested their use in the preparation of binary metallics of silicon. Used in the reduction of titanium dioxide, the three silicides are differentiated by the fixation of free oxygen. CaSi<sub>2</sub> reduces TiO<sub>2</sub> directly; CaSi and Ca<sub>2</sub>Si<sub>2</sub> reduce it in two stages through the intermediate CaSi<sub>2</sub>. Reduction of TiO<sub>2</sub> finally gives

## The Restrictive Trade Practices Act

Court. It is noteworthy that the preliminary questions are all dealt with by the High Court; the Restrictive Practices Court does not become seised of an agreement, until the agreement is brought before it by the registrar.

Any person aggrieved by the inclusion of an agreement in the register and who wishes to contend that it is not registrable, may apply to the High Court for the rectification of the register.

There may also be doubts as to whether an agreement falls within the scope of the Act at all. In such a case, application may be made to the High Court for a declaration whether the agreement is within the Act or whether it falls within any order made by the Board of Trade as to registration.

### Time Limits

In the normal case a party will probably wait until a notice has been served by the registrar requiring registration, before testing whether an agreement is registrable. There is no time limit within which an application for a declaration may be made. But a party who waits too long may find that the High Court, which always has a discretion as to whether it will grant a declaration or not, is not disposed to act.

The Board of Trade has power to authorise the registrar to remove from the register particulars of agreements which appear to be of no substantial economic significance.

It is an offence to make a false statement in connection with any registration or to alter, suppress or destroy any document. An official of a limited company may be made personally liable for any offence which has been committed with his consent or connivance, or through his neglect. It is also an offence to disclose any information obtained under the Act with respect to any trade or business without the consent of the person carrying on that trade or business, except for the purposes of the Act.

(to be continued)

Si and Ti. For 3 atoms of silicon there are 2, 3 or 5 atoms of titanium according to whether reduction is by CaSi<sub>2</sub>, CaSi, or Ca<sub>2</sub>Si. These two elements unite to form three binaries: Ti<sub>2</sub>Si<sub>3</sub>, TiSi and TiSi<sub>2</sub>. With CaSi<sub>2</sub> and CaSi, free silicon is stated to be always present in the final product. On the other hand, using Ca<sub>2</sub>Si in the ratio Ca<sub>2</sub>Si/TiO<sub>2</sub>=4/5 and at a temperature of 1,200°C, Ti<sub>2</sub>Si<sub>3</sub> has been obtained in a pure state.

The conditions for the formation of titanium silicides were studied separately. These depend on the Ti/Si ratio and temperature. Ti<sub>2</sub>Si<sub>3</sub> is formed first at 700°C. If the ratio is Ti/Si=1/2, TiSi<sub>2</sub> appears at about 800°C. Its formation is complete at 1,200°C. For the ratio Ti/Si=2/3, formation of Ti<sub>2</sub>Si<sub>3</sub> increases with temperature and is complete at 1,200°C. For the ratio Ti/Si=1, at 1,250°C, a new phase, probably TiSi, is added to Ti<sub>2</sub>Si<sub>3</sub> and TiSi<sub>2</sub>.

by

R. Long Ph.D.

Birmingham University

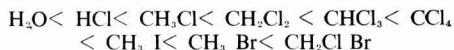
# Fire Extinguishing by Chemical Agents

AT ONE time the scientific study of fire and its suppression was rather neglected. But during the last few years there has been much interest in the practical aspects of fire prevention and suppression and in the more fundamental problems involved. In this review it is proposed to deal with two types of fire extinguishing agent, namely, the vaporising liquid type and the dry powder type and to consider briefly the results of recent work undertaken in an attempt to find out how they function in suppressing flame.

It is well known that some of the halogenated methanes are valuable as vaporising liquid fire extinguishing agents. Recent developments include the testing of compounds such as trifluorobromomethane and tetrafluorodibromoethane which are said to be of low toxicity and high stability (1). Tests have also demonstrated that chlorobromomethane is superior to carbon tetrachloride (2). The effect of various halogenated methanes on the inflammability limits of n-hexane in air has been studied (3). It has been found that the total inhibitory effect as assessed by the values for the limiting safe mixtures increases with increasing chlorine content in the series  $\text{CH}_3\text{Cl} < \text{CH}_2\text{Cl}_2 < \text{CHCl}_3 < \text{CCl}_4$ .

## Calculations of Burning Velocities

Zentler-Gordon (4) from approximate calculations of burning velocities from flame heights, found that organic halides cause a reduction, with bromides more effective than iodides or chlorides. Burgoyne (5) has shown that methyl bromide reduces the burning velocities of methane/air and hydrogen/air mixtures and the reduction increases with further addition. Simmons and Wolfhard (6) have shown that methyl bromide reduces the burning velocity of ethylene/air mixtures. Garner, Long and Graham (7) have recently pointed out that the order of effectiveness of additives when present in mole percentages of less than 1 per cent in reducing the maximum burning velocity of propane/air mixtures is:



The last three additives show a markedly higher inhibiting effect than that of the series of chlorinated methanes.

Additives might influence flame propagation in three ways by:

- (1) altering the properties of the unburnt mixture so as to influence heat conduction or radical diffusion,
- (2) altering the flame temperature,
- (3) specific chemical inhibition of the combustion reactions.

It seems most unlikely that the very small concentra-

tions of additive employed in the above work could have any appreciable influence upon the physical properties of the unburnt mixture. There is little information on the effect of small amounts of additives upon flame temperatures, but calculations by Simmons and Wolfhard (6) indicate that the flame temperatures of stoichiometric hydrocarbon/air flames are not greatly affected by the introduction of small amounts of bromine.

It appears that the halogenated methanes exert a specific chemical inhibition of the flame reactions. This supports the conclusions of Burden, Burgoyne and Weinberg (8), and of Simmons and Wolfhard (6).

## Halogenated Methane

It seems reasonable to suppose that the halogenated methane additive acts not merely as an inert diluent, but causes a reduction in the concentration of active free radicals in the flame boundary. Consequently there is a more important function of the fire extinguishing agent than merely to act as an inert blanket of heavy vapour and so prevent access of oxygen to a fire.

Work in the US has led to similar conclusions (9, 10, 11) and the mode of action postulated is that of chain-breaking reactions with such active radicals as H, O, and OH in the reaction zone of the flame.

Dry-powder fire extinguishers have been in use for many years; the most usual chemical employed is sodium bicarbonate and other substances are sometimes added to prevent moisture absorption.

The effectiveness of this agent has been attributed to the release of carbon dioxide from the sodium bicarbonate, but there is now considerable evidence to show that this is not a factor of great importance.

## Extinction Efficiency

Investigation of such extinguishing agents has been carried out by the Fire Research Board (12) and it has been shown that the quantity of powder necessary to extinguish a fire is less for a fine powder than for a coarse one. The efficiency of extinction depends upon the total surface area presented by the powder to the fire.

Recent work in the US by McCamy, Shoub and Lee (13) indicates that salts of the alkali metals are more effective than other materials tested, and that there appears to be a correlation between the fineness of powders and their effectiveness in extinguishing fires. On the other hand there appears to be no such correlation between heat capacity and effectiveness. These workers conclude that the effectiveness of dry

## Fire Extinguishing by Chemical Agents

powder does not depend primarily upon excluding oxygen, diluting the atmosphere, cutting off the fuel supply, or blowing out the fire. Experimental work (13) indicates that dry powders probably have two most important functions; they act as chain-breaking agents in the combustion process and also cut-off much of the radiant energy from the fire.

Dolan (14) has studied the suppression of methane/air ignitions by fine powders. He, too, finds that the one factor above all others which plays a part in enabling the powder to affect flame propagation is the surface area of the material in suspension. Some 40 substances have been examined but the order of effectiveness does not fit into any single pattern. In general, salts with melting points below 200°C are more effective than those which melt at higher temperatures. With isolated exceptions, salts of the alkali metals are the most effective class. Salts which decompose are also effective, although the class can be divided into those which decompose below 200°C (which are partially or wholly effective) and those which decompose above 200°C (which are ineffective). Salts with water of crystallisation are generally ineffective as inhibitors.

Dolan attributes the dependence of the suppression effect on surface area, in the first instance, to the more complete heating of the smaller particles and consequently the greater cooling of the burning gases. In the case of the highly efficient alkali halides, however, a purely thermal explanation is unsatisfactory and some form of surface activity is postulated.

It appears therefore, that there is no unanimity of opinion regarding the mechanism of dry powder extinguishing agents. Probably a combination of mechanisms is involved in the suppression of fire by such materials; cooling, chain-breaking and radiation shielding.

### REFERENCES

- (1) *Report of the Fire Research Board*, 1951, HMSO (1952).
- (2) *Report of the Fire Research Board*, 1955, HMSO (1956).
- (3) *Report of the Fire Research Board*, (1951).
- (4) Zentler-Gordon, H. E., Ph.D. Thesis, London (1940).
- (5) *Report of the Fire Research Board*, 1951.
- (6) Simmons, R. F. & Wolfhard, H. G., *Trans. Faraday Soc.*, 1955, **51**, 1211.
- (7) Garner, F. H., Long, R. Graham, A. J. & Badakhshan, A. *Sixth Symposium (International) on Combustion*, Yale University (1956).
- (8) Burden, M. C., Burgoyne, J. H. & Weinberg, F. J., *Fifth Symposium (International) on Combustion*, Reinhold (1955), 647.
- (9) Fryburg, G., *NACA TN* (1950), 2102.
- (10) Belles, F. E., *NACA, TN* (1955), 3565.
- (11) Belles, F. E., *Sixth Symposium (International) on Combustion*, Yale University (1956).
- (12) *Report of the Fire Research Board*, 1955, HMSO (1956).
- (13) McCamy, C. S., Shoub, H., & Lee, T. G., *Sixth Symposium*, Yale (1956).
- (14) Dolan, J. E., *Sixth Symposium (International) on Combustion*, Yale University (1956).

## Italian Exports of Plastics

EXPORTS of Italian plastics materials and synthetic resins up to the end of June rose by 31.7 per cent over the figures for the first five months of 1955. The principal customer has been the US. Exports to Germany, France, Hong Kong, Australia and South Africa are also reported to have increased.

## DEVELOPMENTS IN BRAZIL

### Chemicals and Mining Affected

PLANS have been announced for the establishment of a new factory in Brazil to manufacture formal and synthetic resins at an initial rate of 30 tons a day. It is hoped that methanol will be produced in the same plant at a later date. The new plant will be part of the Alba S.A. organisation, in association with the Karl Fischer Company of Berlin. In order to produce substantial quantities of ferro-sulphate and sulphuric acid, the Cia. Siderurgica Nacional plans to import new equipment from Germany. Production of sufficient supplies of aluminium oxide to meet the needs of abrasive manufacturers in Brazil has now been partly realised. A recently opened factory at Salto de Itu near São Paulo has increased the total Brazilian production to 600 tons per month.

The German company, Roehm & Hass of Darmstadt is negotiating with chemical manufacturers in Rio Grande do Sul with a view to manufacturing a type of synthetic rubber. The same company is said to have decided to participate in a new chemical undertaking at São Leopoldo in Rio Grande do Sul. The United States Steel Corporation is reported to be negotiating privately for a manganese concession near Urucum in Matto Grosso. Deposits in this area are stated to be among the richest in the world, but transport difficulties have hindered their successful exploitation. Important deposits of zinc near Vazante in north west Minas Gerais are reported by a US geological survey. Samples are said to average 35 per cent zinc. It is reported that at Itaiacoca, in the state of Panama, there are large deposits of talc. Reserves are stated to be not less than 150,000 tons of good quality.

## Ductile Zirconium

VERY PURE metallurgical and ductile zirconium made by the van Arkel method, i.e., thermal decomposition of zirconium iodide on a tungsten or zirconium filament heated to 1,400°C under vacuum, is reported by F. Plzak (*Hutnické Listy*, 1956, **11** [9] 518. Paper in Czech, English summary). An all-glass production unit composed of Supremax refractory glass and molybdenum glass for the part of the unit containing metallic parts melted into it, was designed. The methods used and the results achieved are reported. Plzak claims he has obtained zirconium filaments, 50 centimetres long and 3 millimetres in diameter, of a high degree of chemical purity.

## Pumps for Industrial Processes

A LAVISHLY illustrated catalogue showing some of the typical duties for which Plenty pumps are being used in industrial processes all over the world has been produced by Plenty & Son Ltd., Newbury, Berkshire. Plenty pumps are designed for easy maintenance. Records are kept of all pumps supplied and spare internal components of standard materials are always available ex stock.



# TOO MUCH OLD IRON?



A PINCH OF **SEQUESTROL CS**  
MAY BE THE ANSWER

SEQUESTROL CS is a special modified grade of Sequestrol (Ethylene Diamine Tetra-Acetic Acid Geigy) designed specifically for complexing and decolourising iron in strongly alkaline solutions. It can thus form the basis of alkaline de-rusting baths

and is particularly effective in removing heavy rust when used electrolytically. SEQUESTROL CS is also of use in complexing iron in caustic soda, in kier boiling, bottle-washing, etc., where strongly alkaline media are in use. Details on request from Development Division.



THE GEIGY COMPANY LTD., Rhodes, Middleton, MANCHESTER

## Commercial Intelligence

## MARKET REPORTS

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

### Mortgages & Charges

The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced.

GLAMORGAN ALKALI & ACID CO., LTD., London EC.—21 September, deed varying the terms of two debentures dated 1 October 1952 and 1 June 1955, to Industrial & Commercial Finance Corporation Ltd.; charged on property charged by said debentures and a general charge. \*£186,000. 4 April 1956.

MICRO-BIOLOGICALS LTD., London SW.—25 September, £5,000 debentures, part of a series already registered.

SUPRA CHEMICALS & PAINTS LTD., Tipton.—20 September, charge to Barclays Bank Ltd. securing all moneys due or to become due to the Bank; charged on land at Hainge Road, Tivdale, Tipton. \*Nil. 4 April 1956.

### Satisfaction

CLODOL INDUSTRIES LTD., Newcastle-on-Tyne, chemical manufacturers.—Satisfaction 24 September, £11,000 registered 4 August 1951.

### Increase of Capital

W. G. MACNAMARA LTD. (171,582). Chemical engravers, etc., 251 Aston Brook Street, Birmingham, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £5,000.

## New Registrations

### Great Lakes Trading Co. Ltd.

Private company. (572,499). Registered 5 October. Capital £100 in £1 shares. Objects: To carry on the busi-

ness of manufacturers of, dealers in and importers and exporters of, suppliers of and traders in crude and refined tar, pitch, creosote, crude and refined tar acids, all grades of naphthalene, phenol, phenolic resins, plastics and plasticisers, insecticides and all other kinds of industrial chemicals etc. The subscribers (each with one share) are: T. C. Robey and A. E. T. Menzies, solicitors, both of 3 Finch Lane, London EC3. The first directors are to be appointed by the subscribers. Solicitors: Allen and Overy, 3 Finch Lane, London EC3.

### L. M. Anderson & Co. Ltd.

Private company. (572,635). Registered 9 October. Capital £15,000 in £1 shares (5,000 founders and 10,000 ordinary). Objects: To acquire the business of a chemical lead plumbing contractor now carried on by Lawrence M. Anderson at Rodwell Place, Whitechurch Lane, Edgware, Middlesex, as L. M. Anderson & Co. The permanent directors are: Lawrence M. Anderson (managing director), 2 Pembroke Place, Edgware; David Kleppin, 88 Littlefield Road, Burnt Oak, Edgware; and Leonard H. Monk, 138 Malford Grove, South Woodford, London E18. Secretary: L. H. Monk.

### Tank Cleaning Equipment Ltd.

Private company. (572,531). Registered 5 October. Capital £100 in £1 shares. The subscribers (each with one share) are: R. A. Clark and R. M. Sears, both solicitors, of 18 Austin Friars, London EC. The first directors are to be appointed by the subscribers. Solicitors: Slaughter & May, 18 Austin Friars, London EC2.

### Mesco Laboratories Ltd.

Private company (572,758). Registered 11 October. Capital £5,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in pharmaceuticals, chemicals, antibiotics—vials and tablets etc. The subscribers (each with one share) are: Thomas W. Scott, 190 Willesden Lane, London NW6, accountant; and Leslie H. Roberts, 26 Whitethorn Gardens, Enfield, Middlesex, solicitor's clerk. The first directors are to be appointed by the subscribers. Solicitors: Henry Boustred & Sons, 115 Moorgate, London EC2. Registered office: 35 New Broad Street, London EC2.

**LONDON** Demand has been quietly steady in most sections of the market and the movement to the chief consuming industries against contracts, in the aggregate, has covered good volumes. Export trade continues to be fairly active with a good flow of orders for shipment despite the keen competition in many overseas markets. The price position for most industrial chemicals is steady at recent levels with few alterations to record. The basis price for white lead was reduced to £147 15s per ton, red lead to £142 15s per ton and litharge to £144 15s per ton as from 10 October. Firm conditions prevail in the coal-tar products market with a good home and overseas demand for creosote oil and cresylic acid. Pitch is in good request on home account.

**MANCHESTER** Quotations for heavy chemical products on the Manchester market during the past week have maintained a steady to firm undertone and few changes of any consequence have occurred since last report. The alkalis and other leading heavies are going into consumption against contracts in satisfactory quantities and shipping business keeps up reasonably well. New enquiries have been on a fair scale. Activity in fertiliser materials is confined to a relatively few sections, but a steady demand for most of the by-products is reported.

**GLASGOW** Reports from various sources covering the merchant consumer trade indicate that business continues to be brisk in the various sections of the heavy chemical market. No particular emphasis can be placed on any one section; an increased demand is being experienced generally throughout the trade. Prices, with the exception of some of the metallic salts, have been steady. As far as export is concerned, there is little or no change in the position. The general opinion is that satisfactory business is being conducted covering a varied range of chemicals.

### Shawinigan Water & Power Co.

At a meeting of the board of directors of The Shawinigan Water & Power Co. on 24 September, a dividend of 45 cents was declared on the no par value common shares of the company for the quarter ending 30 September 1956, payable 23 November to shareholders on record 15 October.

*“Fluor acid air is procured by dissolving the earthy substance called fluor in vitriolic acid. This kind of air extinguishes a candle and, like vitriolic air, one measure of it saturates two of alkaline air. It is peculiar to this kind of air to dissolve glass when it is hot. It seems to consist of a peculiar acid vapour, united to the strong substance of the fluor;*

*for water being admitted to it absorbs the acid vapour, and the stony substance is deposited. By this means it exhibits an amusing appearance, whether water be admitted to a glass jar previously filled with that air, or the bubbles of air be admitted, as they are formed, to a quantity of water resting on mercury.”*



## . . . an amusing appearance

So, in 1797, Joseph Priestley described his early observations on hydrofluoric acid to students at the New College in Hackney, and recorded them under the title of *Heads of Lectures on a Course of Experimental Philosophy*. Today, using fluor acid air dissolved in aqua destillata, and costly vessels of silver and platinum, B.D.H. chemists make vast quantities of

a great variety of fluorides of high purity, free from all stony substances, for which the B.D.H. sales departments will happily quote for deliveries by the pound, the cwt. or the ton.

Such fluorides are used industrially for all sorts of purposes from increasing the light transmitting properties of lenses to aiding the production of atomic energy.

# B.D.H. LABORATORY CHEMICALS

THE BRITISH DRUG HOUSES LTD. B.D.H. LABORATORY CHEMICALS GROUP POOLE DORSET  
LC/P/15vt

# Classified Advertisements

**CLASSIFIED RATES:** All sections 5d. per word. Minimum 8/-. Three or more insertions 4d. per word. Box Number 2/- extra. Up to mid-day Tuesday for insertion same week.

**SEMI-DISPLAY:** 30/- per inch. Three or more insertions 25/- per inch.

**SUBSCRIPTION:** Annual Subscription of 52/6 brings 52 weekly copies of *THE CHEMICAL AGE* direct to your address from the printer (postage paid by the publishers), and a copy of *THE CHEMICAL AGE YEAR BOOK*.

**COMPANY MEETINGS AND REPORTS:** £12.12.0 per column. Three column measure (approximately 360 words).

## SITUATIONS VACANT

### LATEX OR RUBBER CHEMIST

Are you a prospective **PLANT MANAGER**? Does your present position allow for increasing responsibilities to satisfy your ambitions?

**DEPARTMENT MANAGER** required for Compounding Section of American Latex dipping plant. Can you qualify?

Write or call: Mr. H. F. Bader, International Latex Corporation, Port Glasgow, Scotland. Telephone, Port Glasgow 41631.

### PARANTHAN CHEMICALS CORPORATION, CEYLON.

**PRODUCTION MANAGER** required for 2 years in first instance. Salary up to £2,500 a year according to qualifications and experience. Free quarters and First class passages. Candidates must be qualified Chemical Engineers of a recognised University with experience of the erection and operation of an Electrolytic Caustic Soda Plant (diaphragm cells). The person selected will be responsible for the erection and subsequent operation of the D.D.T./Caustic Soda Factory at Paranthan. Write to the Crown Agents, 4 Millbank, London. S.W.1. State age, name in block letters, full qualifications and experience and quote M3B/43709/CAJ.

Closing date for receipt of applications, 31st October.

**THE STOURBRIDGE REFRACTORIES CO. LTD.,** of Pensnett, Brierley Hill, Staffordshire, require a **WORKS' CHEMIST** to take charge of their modern and extremely well equipped Laboratory. A Science degree or equivalent and technical experience in the manufacture and firing of refractory products are necessary qualifications. The post is progressive and pensionable and offers good scope to the right man.

Salary according to qualifications and experience.

Applications to be made in writing to the Secretary at the above address.

## OFFICIAL APPOINTMENTS

### EASTERN REGION, NIGERIA INDUSTRIAL CHEMIST, DEPARTMENT OF HEAVY INDUSTRIES

**QUALIFICATIONS:** Honours degree in chemistry or Membership of Institution of Chemical Engineers and at least 10 years' experience as a chemist in industry since qualifying.

**DUTIES:** To advise on the design of laboratory and subsequently direct its work. To undertake research into local raw materials, organic and inorganic, and their potential utilisation either alone or in combination with imported material.

The post calls for wide interests and a pioneering spirit rather than for highly specialised research.

**TERMS OF EMPLOYMENT:** Contract for one tour 18-24 months, consolidated salary £2,244 per annum and gratuity of £37. 10s. for each completed period of 3 months residential service on the satisfactory completion of contract. Furnished quarters provided at rental of 10% of salary. Free first class passages and generous leave. Income tax at low local rates. Apply to Director of Recruitment, Colonial Office, London, S.W.1. State age, qualifications and experience. Quote BCD. 461/411/02.

## OFFICIAL APPOINTMENTS: continued

### NORTH THAMES GAS BOARD

**A SENIOR DRAUGHTSMAN**, aged 30-45, is required at the Chemical Products Works, Beckton, E.6. Candidates should have considerable experience in the design and layout of plant from flow diagrams, and in the preparation of schemes and contract specifications both for development and maintenance work. Starting salary will be within the range £750 to £900 per annum according to age, qualifications and experience. The successful candidate will be required to join the Staff Pension Scheme.

Applications, giving age and full particulars, to Staff Controller, North Thames Gas Board, 30 Kensington Church Street, W.8, quoting reference 666/324.

### NORTH THAMES GAS BOARD

**CHEMISTS and PHYSICISTS** holding University degrees are required in the Laboratories at Watson House, Fulham, S.W.6. to undertake research work on the utilisation and design of domestic and industrial gas and coke appliances, particularly on cookers, water heaters, gas and coke fires, refrigerators, and industrial apparatus.

The Laboratories have recently been modernized and extended and are responsible for research work for the Gas Industry throughout the country.

The appointments will be permanent and pensionable and the starting salary will be within the range of £680—£900 per annum, according to age, qualifications and experience.

Applications should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, W.8, quoting reference No. 666/280, to reach him within ten days of the appearance of this advertisement.

## FOR SALE

**CHARCOAL, ANIMAL AND VEGETABLE**, Horticultural, burning, filtering, disinfecting, medicinal. Also lumps, ground and granulated. **THOMAS HILL-JONES, INVICTA WORKS, BOW COMMON LANE, LONDON, E.3. (TELEPHONE: EAST 3285).**

For disposal, surplus stock of Terpenesless Lemon Oil, Sicilian Lemon Oil, Allyl Caproate etc. **BOX NO. C.A.3506. THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

**VACUUM OVEN**, 4 ft. 7 in. by 3 ft. 3 in. by 3 ft. internal, with 3 Steam Heated Shelves. Quick clamping Balanced Door.

**GARDNER SIFTER-MIXERS**. Two H, 5 cwt. size.

**MIRACLE MILL** with 30 H.P. Motor

**JACKETED 'U' BLENDER/DRYER**, 3 cwt.

**HOBART MIXER**, 4-speeds, 80 qrt. removable Bowl.

**MIXING PAN**, 100 gallons, water jacket. Bottom Outlet.

**WINKWORTH MACHINERY LTD.**, 65 High Street, Staines. Telephone 1010.

FOR SALE: continued

**600****CHEMICAL PLANT**

**COMPLETE VACUUM DRYING PLANT** by Scott, comprising Horizontal Band Drier, approx. 35 ft. by 6 ft., with Service Feed Hoppers, Shaker Feeder, Condensate Receivers for Hot-plates, Vacuum Augmentor, Kek Mill, Screening and Finished Material Hoppers, Tailings Elevator, Wet and Dry Vacuum Pumps. Fully motorised.

**COMPLETE DRYING PLANT** by Dunford & Elliott, comprising Rotary Louvre Drier, approx. 18 ft. by 4 ft. diam., geared Motor drive, complete with Keith Blackman Steam Heater with Motor driven Fan, steam traps, Exhaust Fan, cyclone, etc.

**TWIN-CYLINDER STEAM HEATED DRUM DRIER** with rolls 40 in. long by 28 in. diam., for steam pressure of 100 lb. sq. in., fitted splash feeder.

**STEAM JACKETED VACUUM MIXER**, 20 in. by 18 in. by 16 in., cast iron construction single spur gearing, double 'Z' bladed, glanded shafts, hand tilting. Vacuum cover secured by swing bolts. Jacket suitable 30 lb. sq. in. w.p. Mounted on robust stand.

**DOUBLE TROUGH MIXER** by Morton, 18 in. by 18 in. by 16 in. deep, mild steel construction twin 'Z' blades. Hand tilting. Glanded shafts. Driven by 3 h.p. 400/440/3/50 motor.

**NEW STAINLESS STEEL STORAGE VESSELS AND TANKS**, with capacities ranging from 8 gallons to 1,000 gallons.

**GEORGE COHEN SONS & CO., LTD.**  
WOOD LANE, LONDON, W.12.  
Tel.: Shepherds Bush 2070 and  
STANNINGLEY, NR. LEEDS.  
Tel.: Pudsey 2241

**FLAMEPROOF SCREW DISPLACEMENT PUMPS**

Stothert & Pitt Type 95 Screw Displacement Pumps with Flameproof E.E.C.  $3\frac{3}{4}$  h.p. Motor mounted on cast iron bedplate complete with Flameproof Automatic Star Delta Starter. Capacity 100 G.P.M. of spirit.

20 sets available.

Further details from:—

Leighton Warehouse Company, 6, Church Road, Linslade, **LEIGHTON BUZZARD, BEDS.**,

Telephone: L.B. 3400.

**MIXERS**—1 Baker Hand-tilted Trough, 16 in. by 24 in. by 20 in. Fast and loose pulleys and clutch. "Z" blades.  
1 Ditto Power-tilted Trough, 30 in. by 20 in. by 24 in. Pulley drive and clutch. Four "L" blades.

**THOMPSON & SON (MILLWALL), LTD.,**  
LONDON, E.14.  
TEL.: EAST 1844

**PHONE 98 STAINES**  
**STAINLESS STEEL PLANT**

S.S. GARDNER SIFTER/MIXER 40 in. by 17 in. by 17 in.  
S.S. AUTOCLAVES 6 ft. by 3 ft. 100 w.p. (3).  
S.S. JAC. MIXER 39 in. by 32 in. and 40 in. by 24 in. deep.  
S.S. JAC. PAN 36 in. by 38 in. 60 lbs. w.p.  
S.S. TIPPING PANS 2 ft. 6 in. by 2 ft. 4 in. with coils.  
S.S. OPEN PANS 200 galls. and (2) 150 galls.  
S.S. ENCLOSED ELEVATOR 40 ft. centres.  
S.S. AND CHROME EMULSIFIERS/MIXING ARMS.  
'Z' and FIN BLADE MIXERS, PUMPS, FANS, HYDROS, CRUSHERS, DRYERS, OVENS, REFINERS, PULVERIZERS, and (275) TANKS in stock up to 13,000 galls.

**HARRY H. GARDAM & CO. LTD.**

We offer 35 tons Marine Rope, U.S.A. origin. 3 million sheets Abrasive Papers and Cloths. Chevrolet Fire Trucks. 3 International Mobile Cranes, excellent condition, 5-ton fixed Jib, U.S.A. origin. Ethylene Oxide Derivates, powerful detergent Neutronix. 22 tons Waterproofing Tar. 230 tons "Passivating" medium, with a phosphoric acid base. 20 tons Product for developing colour photographs. 2 tons. **SOCOMO, 10 RUE D'HAUTEVILLE, PARIS 10, FRANCE.** TEL.: PRO. 40-23.

FOR SALE: continued

**MORTON, SON AND WARD, LIMITED, STAINLESS STEEL VESSELS**

**VESSELS** of all shapes and sizes, jacketed or unjacketed—with stainless steel mixing gear to requirements; also stainless steel storage tanks and vacuum vessels.

"MORWOOD" "U"-shaped **TROUGH MIXERS**—up to 2 tons, in stainless steel, with agitators, scroll or paddle type, jacketed or unjacketed.

**Stainless Steel TROUGHS, TANKS and CYLINDERS** made to requirements.

These items can also be fabricated in mild steel.

**JACKETED PANS**

100g., 150g., and 200g., new, in mild steel, for 100 lb. p.s.i. w.p.—with or without mixing gear.

3 cwt. **TROUGH MIXERS** by **CHALMERS** and **GARDNER**—stainless steel-lined troughs.

50g., 75g. and 100g. heavy duty **MIXERS** by **FALLOWS** and **BATES**. Agitators driven through bevel gears from fast and loose pulley.

200g. cast-iron **JACKETED MIXING VESSEL** with nickel-chrome impellor type agitator driven through bevel gears from fast and loose pulley.

**BROADBENT HYDRO EXTRACTORS**

21 in. **EQUAL TO NEW**, galvanized baskets, electrically driven through centrifugal clutch or belt driven. Safety inter-locks.

**AIR COMPRESSORS**

**THREE** 30 c.f.m. at 100 lb. pressure, water cooled, automatic overloads, with or without motors.

**AIR RECEIVERS MADE TO REQUIREMENTS PUMPS** Selection of new **MONO** and second-hand Pumps in stock—2 in. to 5 in.

**Inquiries Invited.**

**MORTON, SON AND WARD, LIMITED,**  
WALK MILL,  
DOBCROSS, NEAR OLDHAM,  
Lancs.  
Phone Saddleworth 437

**SIMPLITE PUMPS** are the World's Simplest, Lightest, Safest and Cheapest diaphragm type. 2 in. Suction completely self priming. Water, mud or chemicals. Petrol, Electric or Hand models from £20. Illustrated leaflet from the makers: **WM. R. SELWOOD LTD., 3 CHANDLER'S FORD, HANTS. Phone 2275.**

**STURTEVANT FINE GRINDING AND SELECTION PLANT**, cap. 1-2 cwt. per hour 100 mesh med. hardness material comprising Fine Crusher No. 0, Ring Roll Mill 00. Fan, Air Separation, Conveyors, etc., Drawings available. W. Urquhart, 1023 Garratt Lane, S.W.17.

**600**

**TWO ROTARY KILNS** by Newell, 70 ft. by 5 ft. diam., welded steel construction on two roller paths. Gas heated, each with Rotary Cooler, 24 ft. by 4 ft. diam.

**GEORGE COHEN SONS & CO., LTD.**  
WOOD LANE, LONDON, W.12.  
Tel.: Shepherds Bush 2070 and  
STANNINGLEY, Nr. LEEDS.  
Tel.: Pudsey 2241

**WORK WANTED & OFFERED**

**CRUSHING, GRINDING, MIXING and DRYING for the trade.**  
**THE CRACK PULVERISING MILLS LTD.**

Plantation House  
Mincing Lane,  
London, E.C.2.

**GRINDING, CRUSHING AND GRADING**  
**FINE GRINDING LTD.,**  
**BLACKHOLE MINE, EYAM**  
**TELEPHONE: EYAM 227**

**PULVERISING** of every description of chemical and other materials. Collections, storage, deliveries. **THOMAS HILL-JONES, LIMITED, INVICTA WORKS, BOW COMMON LANE, LONDON E.3. (TELEPHONE: EAST 3285).**

*WANTED*

**INDUSTRIAL BY-PRODUCTS, LTD.**, 16, Philpot Lane, London, E.C.3. will be pleased to receive particulars of any by-products, waste materials and residues for disposal.

*PATENTS*

The Proprietors of Patent No. 644299 for "Improvements in or relating to Method of Cracking Hydrocarbons" desire to secure commercial exploitation by Licence in the United Kingdom. Replies to **Hasetine Lake & Co.**, 28 Southampton Buildings, Chancery Lane, London, W.C.2.

*AUCTIONEERS, VALUERS, Etc.*

**EDWARD RUSHTON, SON AND KENYON** (Established 1855).

Auctioneers, Valuers and Fire Loss Assessors of  
**CHEMICAL WORKS PLANT AND MACHINERY**  
York House, 12 York Street, Manchester.

Telephone 1937 (2 lines) Central Manchester.

## CHEMICAL LEADWORK

Fabricated Lead Sheets and Pipes. Homogeneous interior Lead lining of flanged mild steel tubes, bends, and tees.

**W. THOMASON & SONS, LTD.**

Walton Works, Great Moor Street, **BOLTON**

Established 1875

Telephone 306

## May we quote for



Complete Tar Plants,  
Tar Stills, Benzol  
Stills, Autoclaves,  
Vacuum Drying and  
Impregnating Plants,  
Jacketted Pans etc.  
and for all Steel Plate Work for Chemical  
Processes

**LEEDS & BRADFORD BOILER Co. Ltd.**

STANNINGLEY

Near LEEDS

# Classified Advertisement Order Form

To The Manager  
**THE CHEMICAL AGE**  
Bowerie House  
Fleet Street, London E.C.4

Please insert the following in your next issue and for.....  
weeks thereafter

Date.....

SITUATIONS VACANT	• EDUCATIONAL
OFFICIAL APPOINTMENTS	• WANTED
FOR SALE	• INVITATION TO TENDER
AUCTIONEERS, VALUERS, etc.	• PATENTS
<b>WORK WANTED AND OFFERED</b>	


**CLASSIFIED RATES** All sections 5d. per word. Minimum 8/-. Three or more insertions 4d. per word. Box Number 2/- extra. Up to 10 a.m. Tuesday for insertion same week.

**SEMI-DISPLAY** 30/- per inch. Three or more insertions 25/- per inch.

Name .....

Address .....

# Raw Materials for Electric Cables

By

A. KING & V. H. WENTWORTH

OF PRACTICAL importance to engineers *Raw Materials for Electric Cables* is a comprehensive account of the materials used in the construction of cables. There are chapters devoted to sources of materials, special forms and requirements for cables, operative conditions, and tests for maintenance of quality standards—British Standards being given wherever possible.

The authors have the advantage of wide experience in one of the leading cable-making companies in the country. Illustrated with photographs and diagrams and two colour plates.

44s. [postage paid]

**Ernest Benn Limited**

Bouverie House · Fleet Street · London · EC4

## Decolorising **CARBON**

ALL GRADES  
FOR  
ALL TRADES

HIGHEST EFFICIENCY  
LOWEST PRICES

**Granular Carbon for Solvent Recovery  
Regeneration of Spent Carbon**

Write for samples and quotations.

**FARNELL CARBONS LIMITED**

CONDUIT ROAD, PLUMSTEAD, LONDON, S.E.18

Telephone :  
Woolwich 1158 (2 lines)

Telegrams :  
Scofar, Wol, London.

## CALDER VALE GLASSWORKS LTD

Calder Vale Rd. · Wakefield · Yorks

TEL. WAKEFIELD 3857

● SPECIALISTS IN ●

**Carboys · Demijohns  
Winchesters**

## FILTER • CRUCIBLES • of Porous • Porcelain

- retain the finest precipitates and filter rapidly. They are not affected by acids, remain constant in weight within very fine limits and can be heated to high temperatures.

Made by

The **WORCESTER  
ROYAL PORCELAIN CO.  
LIMITED**

Supplied by all recognised Laboratory Furnishers.

## For all types of **BOILERS**



**DURABILITY  
EFFICIENCY**

Patents  
207123  
490306  
581396




AIR SPACE  
DESIGNED TO  
SUIT DRAUGHT  
AND FUEL HEAT  
RESISTING METAL

**COLLINS IMPROVED  
FIREBARS LTD.**

51 · THE MALL · EALING · LONDON · W-5

Tel: EALING 4070



**SCIENTIFIC GLASSWARE**

LARGE QUANTITIES of  
MONAX, PYREX and WOODS GLASSWARE

IN STOCK: SPECIAL APPARATUS  
MADE TO YOUR OWN SPECIFICATION - ALSO  
BALANCES, FILTER PAPERS  
AND THERMOMETERS

Stockists for ANALAR Chemicals and  
E-mil Volumetric Glassware

**MIDDLETON & CO. LTD.**  
SCIENTIFIC APPARATUS DEALERS  
BOUNDARY ROAD, MIDDLESBROUGH  
TELEPHONE: MIDDLESBROUGH 44361

The **Jefco**



**FACE SCREEN**

Reg. Design 751914 Patent applied for

Perfect protection when grinding or machining. Comfortable to wear, stands clear of the face, adjustable to any angle, non-splinter front easily renewable.

**J. & E. FERRIS LTD**

33 Museum St., London, W.C.1

**CROMIL & PIERCY LTD.**



REGD. & CROMIL

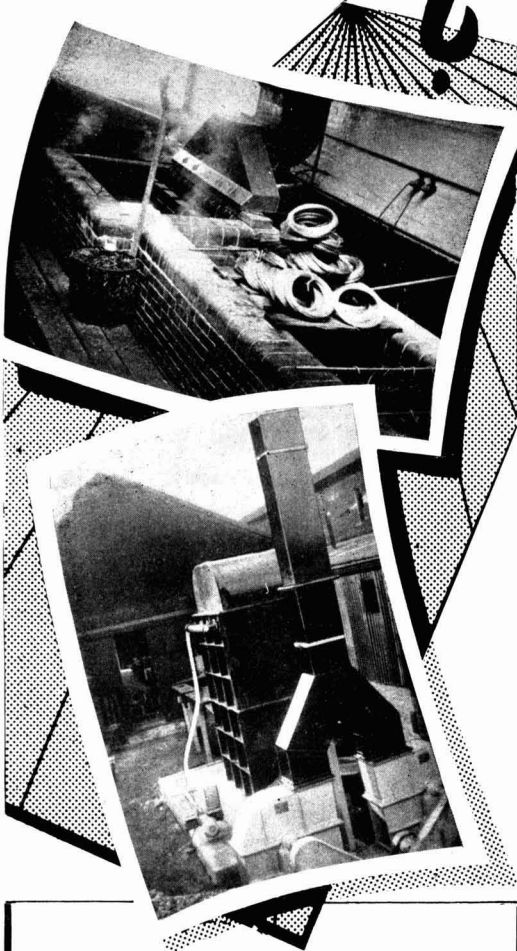
**GRAPHITE**  
IN ALL FORMS

MILBURN HOUSE,  
"E" FLOOR  
**NEWCASTLE-ON-TYNE**

Tel.: 2-7761



# Corrosion?



**Specify**

for acid resisting tanks, floors, effluent treatment and all anti-corrosive construction and materials

# ACALOR

THE CORROSION SPECIALISTS  
**ACALOR (1948) LTD.**

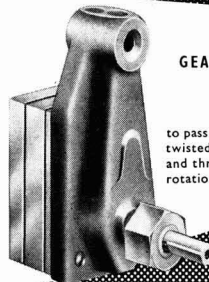
KELVIN WAY, CRAWLEY, SUSSEX. Tel : Crawley 1571 (3 lines)



If you have an EFFLUENT or SEWAGE TREATMENT problem we can be of assistance  
We are Manufacturers of ALUMINIUM SULPHATE—the use of which is frequently an essential step in the process of producing a satisfactory liquid effluent.  
May we examine your present effluent and offer our advice?

THE **ALUMINA** CO. LTD.  
IRON BRIDGE WORKS  
**WIDNES.** LANCS.

PHONE  
WIDNES  
2275



### GEARED SPINNING PUMPS

.6 cc. per rev.  
— 12 cc. per rev.

to pass spinning fluid for artificial silk, twisted silk, cellulose rayon web and thread. Direction of rotation: left or right

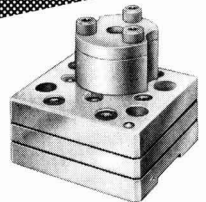


WERKO

### PRECISION SPINNING PUMPS

0.6 — 20 cc. per rev.

for the synthetic fibres industry, for the extrusion of synthetic threads, particularly those made from the polyamides perlon and nylon



**CHEMIEAUSRÜSTUNGEN**  
DEUTSCHER INNEN- UND AUSSENHANDEL

Möhrenstrasse 61, Berlin W 8,  
Telegrams: Chemietecha  
German Democratic Republic

# Cyanamid Chemicals are shaping the future

*From a single unit producing calcium cyanamide nearly 50 years ago, the American Cyanamid Company—with its far-reaching ramifications—has grown into one of the world's leading manufacturers of chemicals for every major field of industry. Many materials coming from Cyanamid's vast production centres are destined to play a vital part as chemical foundation stones in shaping the great industrial developments of the future.*

## ACRYLONITRILE $\text{CH}_2=\text{CH}-\text{CN}$

Acrylonitrile became available commercially some fifteen years ago and has steadily increased in use until it is now one of the most valuable chemical building stones of the day. Its use as a monomer in the fields of nitrile rubber, synthetic fibres, plastics, etc., is very well known. Acrylonitrile is also a chemical intermediate capable of undergoing a host of reactions. Perhaps the best known of these is its ability to react with almost any compound containing a labile-hydrogen atom—the so called cyanoethylation reaction. Here the possibilities are almost endless since solvents, plasticizers, dye intermediates, pharmaceuticals, insecticides etc., may evolve from this process. A promising new development is the cyanoethylation of cotton to impart desirable properties which this natural fibre never had before. Polymers and copolymers of acrylonitrile have been found useful for treating textiles, paper, leather, surface coatings, adhesives, etc. Unquestionably, acrylonitrile is an outstanding raw material for the chemical and processing industries.

**whenever you think of industrial chemicals ... think of**

**Cyanamid**

*The Company's accumulation of experience in the field of industrial chemicals is at your disposal. Please address your inquiries to—*

**CALLOW ROCK***Gas-Burnt***LIME***for all purposes***QUICKLIME***(Calcium Oxide)*of the highest commercial quality, in lumps  
or in coarse powder form**HYDRATED LIME***(Calcium Hydroxide)*in Standard and Superfine grades to meet  
most industrial requirementsThe Callow Rock Lime Co. Ltd.  
CHEDDAR, SomersetAgents: DURHAM RAW MATERIALS, LTD.,  
1-4 Great Tower Street, LONDON, E.C.3**GLASS ENAMEL LINED  
CHEMICAL PLANT**A Complete Plant  
or a Single unit**T. & C. CLARK & CO. LTD.**  
**WOLVERHAMPTON**

Grams: Clark, Wolverhampton.

Tel: 20204/5

**DUST, FUME OR SMOKE  
PROBLEMS**We can probably solve yours with attractively simple  
plant of high efficiency and low maintenance.Why not consult us? We will be pleased to discuss  
your requirements by visit or letter.**DRUMMOND PATENTS LTD.**

5 GREAT WINCHESTER STREET, LONDON WALL, E.C.2

Telephone: London Wall 4132 &amp; 2626

NORTHERN OFFICES:  
141 Royal Exchange,  
Cross Street, Manchester 2.  
Tel: Deansgate 7015MARKET CHAMBERS  
New Market Street,  
Newcastle upon Tyne,  
Tel: Newcastle 2-3837

# AHF

## ANHYDROUS HYDROFLUORIC ACID

AHF is the most important agent for the production of organic fluorine compounds either by replacement of chlorine atoms or by addition to unsaturated substances. Another important use is as a catalyst in the production of high-octane fuels by alkylation. Other alkylation and acylation reactions are also catalysed by AHF. It is the raw material for producing fluorine and has been used as a solvent medium for certain reactions.

### PHYSICAL PROPERTIES

Boiling Point (760 mm.)	19.9°C.
Freezing Point	- 83°C.
Specific Gravity (Liquid 0°C.)	1.01
Specific Heat (Liquid 0°C.)	0.85

The vapour is polymerised to a degree which varies rapidly with temperature and pressure producing a corresponding variation in the heat of vaporisation.

### SPECIFICATION

The normal grade of AHF contains at least 99% HF, and impurities to the following limits:-

H <sub>2</sub> O	0.5% max.
SO <sub>2</sub>	0.25% max.
Si (calc. as SiF <sub>4</sub> )	0.25% max.
H <sub>2</sub> SO <sub>4</sub>	0.01% max.
H <sub>2</sub> S	may be present in traces

Higher grades up to 99.9% HF can be supplied according to need.

### CONTAINERS

AHF is transported in steel tank wagons holding from 6 to 8 tons, and in steel cylinders of 6 lb., 50 lb. and 230 lb. capacity.

*Advice on materials of construction, handling and first-aid measures may be obtained from*



**IMPERIAL SMELTING CORPORATION (SALES) LTD., 37 DOVER STREET · LONDON · W.1**