

# Chemical Age

incorporating

**PETROCHEMICALS and POLYMERS**

VOL. 86 No. 2197

19 AUGUST 1961

**FOR  
HIGH  
QUALITY  
BORON  
PRODUCTS**

**20 MULE TEAM**



## **Dehybor** **ANHYDROUS BORAX** **Boric acid**

*Boron products bearing the 20 MULE TEAM symbol are backed by the technical services of a world-wide group of companies whose constant research is yielding new and improved boron materials to match modern techniques.*

20 MULE TEAM and DEHYBOR are Registered Trade Marks

**BORAX  
CONSOLIDATED  
LIMITED**

BORAX HOUSE  
CARLISLE PLACE  
LONDON SW1

Tel: VICToria 9070



# FLUOROBORATES

**LEAD FLUOROBORATE**

**TIN FLUOROBORATE**

**TIN-LEAD FLUOROBORATE**

**ZINC FLUOROBORATE**

**CADMIUM FLUOROBORATE**

**COPPER FLUOROBORATE**

**NICKEL FLUOROBORATE**

**POTASSIUM FLUOROBORATE**

**SODIUM FLUOROBORATE**

**FLUOROBORIC ACID**

**AMMONIUM FLUOROBORATE**

C 7056



### Cruickshanks specialise in Fluoroborates

These chemicals have the same high quality as the vast range of products Cruickshanks have provided to industry for over 90 years. The fluoroborate range is backed by our usual competitive prices and speedy delivery.

For further information please contact our Technical Sales Department, where our technicians are at your disposal for advice and consultation.

**R. CRUICKSHANK LTD.**

CAMDEN STREET

Phone: CEutral 8553 (6 lines).

BIRMINGHAM 1.

Grams: Cruickshank Birmingham.

## Compressors for Industrial Gases

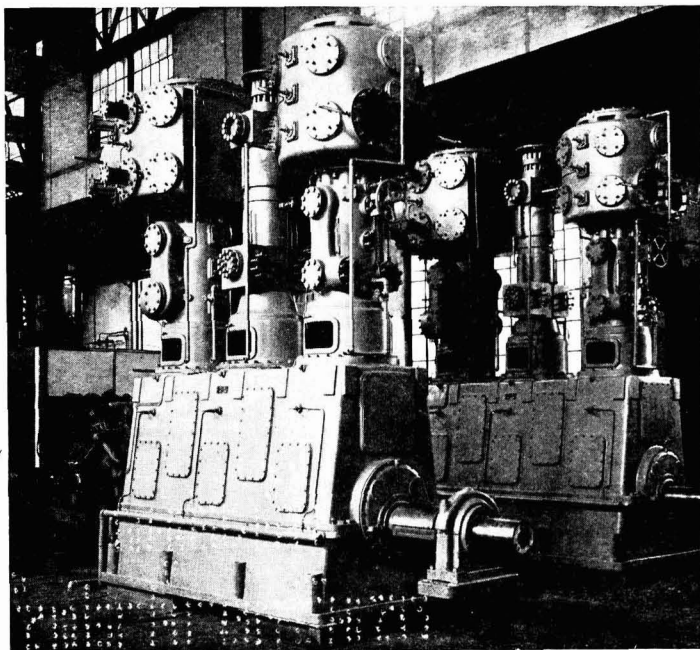
Moderate speed compressors carefully designed for reliability, are available in both vertical and horizontal arrangement from small capacities up to units of over 5,000 H.P. and very high pressures.

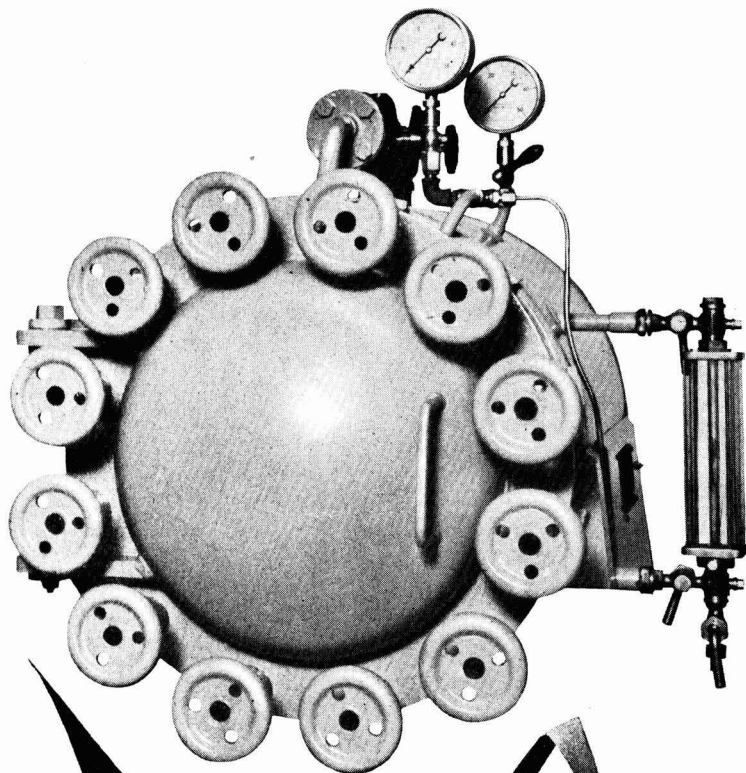
The illustration shows two vertical, three crank, six stage compressors each with a capacity of 3,000 cu. ft. per minute and a delivery pressure of 326 atmospheres.

Maschinenfabrik **Esslingen** Germany

**LLOYD & ROSS LTD**

58 VICTORIA STREET S.W.1  
TELEPHONE: VICTORIA 4873





HERE'S  
AN  
INTERESTING  
PLANT

PRODUCED BY LENNOX

In their 50 years and more of producing equipment for the Chemical Industry, Lennox Foundry have met some highly individual demands. "Specialised unit plants", they call them, designed for a very specific purpose. This, bear in mind, is in addition to the mainstream of their activities which is the manufacture of plant for a wide range of less unorthodox processes.

Experience of this length and breadth in the world of chemical engineering is embodied in every piece of equipment that Lennox provide. It might be a complete plant or simply a single item such as a Pump or a Valve, a Pipe or a Fitting, a Nozzle for mixing or a Dish for etching—all these and more of the apparatus that industry needs are supplied by Lennox and thus backed by the 'know-how' and skill that ensure satisfaction.

And much of it in Tantiron, which is the original and still the finest acid-resisting ferrous metal in the world.

Lennox introduced this high grade silicon iron in 1910. Since that time, constant improvement in casting techniques has widened the scope of its application. Today castings of the finest quality—from the simplicity of a length of pipe work to the intricacy of an absorption tower—are serving every sphere of industry where corrosion and erosion are encountered. If yours is such an industry—Steel, Gas, Petroleum, Textiles, Chemicals—get in touch with Lennox—they're bound to produce something that will interest you.

*Lennox*

LENNOX FOUNDRY COMPANY LIMITED  
Chemical Engineers

Tantiron Foundry, Glenville Grove, London, S.E.8.  
Tel: TIDeway 2401/2 Telex: Equifex Green, London.

# INDEX TO ADVERTISERS

The first figures refer to advertisements in Chemical Age Directory & Who's Who, the second to the current issue

Page	Page	Page	Page	Page	
A.P.V. Co. Ltd., The	—	163 Brotherhood, Peter, & Co. Ltd.	—	Dunlop Rubber Co. Ltd. (G.R.G. Dunclad)	—
A. W. Instruments (Guildford) Ltd.	—	Brough, E. A., & Co. Ltd.	—	E.C.D. Ltd.	—
164 Acalor (1948) Ltd.	—	Brown, N. C., Ltd.	—	Electric Resistance Furnace Co.	—
African Pyrethrum Technical Information Centre	—	Bruno Pahlitzsch	—	Electro-Chemical Engineering Co.	—
148 Almer Products Ltd.	—	132 Bryan Donkin Co. Ltd., The	—	Electrothermal Engineering Ltd.	—
121 Air Products Gt. Britain Ltd.	—	Bulk Liquid Transport Ltd.	—	Elga Products Ltd.	—
Air Transfers Link Ltd.	—	276 Bulwark Transport Ltd.	—	Book Mark Elliott, H. J., Ltd.	—
Aiton & Co. Ltd.	—	66 Burnet & Rolfe Ltd.	—	Elliott Brothers (London) Ltd.	253
147 Albany Engineering Co. Ltd., The	—	194 Bush, W. J., & Co. Ltd.	—	145 Elmatic	—
155 Alginate Industries Ltd.	—	124 Butterfield, W. P., Ltd.	—	Endecotts (Filters) Ltd.	—
123 Allen, Edgar, & Co. Ltd.	—	Butterworths Scientific Publications	—	Evans Electroelenium Ltd.	—
130 Allen, Frederick & Sons (Poplar) Ltd.	—	—	—	Evered & Co. Ltd.	—
160 Allis-Chalmers Great Britain Ltd.	—	245 Callow Rock Lime Co. Ltd., The	—	Farbwerke Hoechst A.G.	—
Alumina Co. Ltd., The	—	& 249 Calmic Engineering Co. Ltd.	—	Farnell Carbons Ltd.	—
Ancorite Ltd.	—	Carless, Capel, & Leonard Ltd.	258	Feltham, Walter H., & Co. Ltd.	—
Andrew Air Conditioning Ltd.	—	175 Causeway Reinforcement Ltd.	—	156 Ferris, J. & E., Ltd.	—
136 Anglo-Dal Ltd.	—	Chappell, Fred. Ltd.	246	279 Ferrostatics Ltd.	—
Anthony, Mark, & Sons Ltd.	—	Chemical Age Enquiries	279 & 280	Fielden Electronics Ltd.	—
211 Armour Hess Chemicals Ltd.	—	Chemical & Insulating Co. Ltd., The	—	Flight Refuelling Ltd.	—
Ashley Associates Ltd.	—	Chemicals & Feeds Ltd.	—	Fireproof Tanks Ltd.	—
Ashmore, Benson, Pease & Co. Ltd.	—	Chemieausrustungen Deutscher Innen-Und. Aubenhandel	—	185 Foxboro-Yoxall Ltd.	—
Associated Electrical Industries Ltd.	—	Chemolimpex	—	Fraser, W. J., & Co. Ltd.	—
Motor & Control Gear Division	—	Christy & Norris Ltd.	—	Freeman, William, & Co. Ltd.	—
Associated Electrical Industries Ltd. Turbine-Generator Division	—	158 Ciba Clayton Ltd.	—	Fullers' Earth Union Ltd., The	—
153 Associated Lead Mfrs. Ltd.	—	Ciech Ltd.	—	122 G.Q. Parachute Co. Ltd.	—
G/Card Audco Limited	—	164 Citenco Limited	276, 277 & 278	168 Gallenkamp, A., & Co. Ltd.	—
B.S.A. Small Tools Ltd.	—	169 Classified Advertisements	—	Gascoigne, Geo. H., & Co. Ltd.	—
179 Baker Perkins Ltd.	—	138 Clayton, Son & Co. Ltd.	Cover iii	Geigy Co., Ltd., The	—
173 Balfour, Henry, & Co. Ltd.	—	138 Clydesdale Chemical Co. Ltd.	—	183 General Precision Systems Ltd.	—
182 Barclay Kellett & Co. Ltd.	—	Cohen, George, Sons & Co. Ltd.	—	Glass Manufacturers' Federation	—
138 Barytes (Shielding Products) Ltd.	—	141 Cole, R. H., & Co. Ltd.	—	Giusti, T. & Sons Ltd.	—
Begg, Cousland & Co. Ltd.	—	Colt Ventilation Ltd.	273	Glebe Mines Ltd.	247
128 Belliss & Morcom Ltd.	—	131 Comet Pump & Eng. Co. Ltd., The	—	Goodyear Pumps Ltd.	—
165 Bennett, Sons & Shears Ltd.	—	269 Commercial Plastics Ltd.	—	167 Graviner Mfg. Co. Ltd.	—
G/Card Berk, F. W., & Co. Ltd.	—	Consolidated Zinc Corporation Ltd.	—	172 Greeff, R. W., & Co. Ltd.	—
138 Black, B., & Sons Ltd.	—	Constable & Co. Ltd.	—	Halex (Bex Industrial)	—
2 Blackman, Keith, Ltd.	—	G/Card Constantin Engineers Ltd.	—	144 Haller & Phillips Ltd.	—
Blaw, Knox Chemical Engineering Co. Ltd.	—	Constructors John Brown, Ltd.	250	Hamilton Company Inc.	—
190 Blundell & Crompton Ltd.	—	Controlled Convection Drying Co.	—	156 Harris (Lostock Gramal) Ltd.	—
Boby, William, & Co. Ltd.	—	Cooke, Troughton & Simms Ltd.	—	Harvey, G. A., & Co. (London) Ltd.	—
Borax & Chemicals Ltd.	—	Coulter Electronics Ltd.	—	6 Haworth, F. (A.R.C.) Ltd.	—
Borax Consolidated Ltd.	Front Cover	Cromil & Piercy Ltd.	—	Heafield Industries Ltd.	—
4 Boulton, William, Ltd.	271	Crossfield, Joseph, & Sons Ltd.	—	Hearson, Charles, & Co. Ltd.	—
Braby, Frederick, & Co. Ltd.	—	Crossley, Henry (Packings) Ltd.	—	Helmets Ltd.	—
Brackett, F. W., & Co. Ltd.	—	Crow Carrying Co. Ltd., The	—	161 Hercules Power Co. Ltd.	—
265 British Acheson Electrodes Ltd.	—	133 Cruickshank, R., Ltd.	Cover ii	Hindle, Joshua, & Sons Ltd.	—
132 British Carbo Norit Union	—	159 Curran, Edward, Engineering Ltd.	—	164 Holden, Chris, Ltd.	—
British Ceca Co. Ltd., The	252	219 Cyanamid of Great Britain Ltd.	—	Humphreys & Glasgow Ltd.	—
193 British Celanese Ltd.	—	213 Cyclops Chemicals Ltd.	—	151 Huntingdon, Heberlein & Co. Ltd.	—
British Drug Houses Ltd., The	—	126 Cyclops Engineering Co. Ltd., The	—	I.C.I. (Billingham)	—
154 British Ermoto Corporation Ltd.	—	235 Dalglish, John, & Sons Ltd.	256	I.C.I. Catalysts	—
Spine British Geon Ltd.	—	152 Danks of Netherton Ltd.	—	I.C.I. General Chemicals Division	—
271 British LaBour Pump Co. Ltd.	—	136 Davey & Moore Ltd.	—	I.C.I. Ltd. Heavy Organic Chemicals	—
British Lead Mills Ltd.	—	144 Davey, Paxman & Co. Ltd.	—	I.C.I. Metals Titanium D.	—
G/Card British Oxygen Company Ltd. (Heavy Industrial Dept)	—	Davy & United Instruments Ltd.	—	I.C.I. Nobel Chemicals	—
146 British Rototherm Co. Ltd., The	—	140 Dawson, McDonald & Dawson Ltd.	—	I.C.I. Plastics—Darvic	255
122 British Steam Specialties Ltd., The	—	Deutsche Steinzeugwarenfabrik	—	I.C.I. Plastics—Fluon	—
126 British Tar Products Ltd.	—	143 Distillers Co. Ltd., The	—	I.C.I. Plastics—Kralastic	—
British Thomson-Houston Co. Ltd., The	—	139 Distillers Co. Ltd., (The Chemical Div.)	—	I.C.I. Ltd. (Plastics Division), Corvic	—
G/Card British Titan Products Co. Ltd.	—	Distillers Co. Ltd., (The Industrial Group)	—	I.C.I. (Florube) Ltd.	—
British Visqueen Ltd.	—	135 Dorr-Oliver Co. Ltd.	—	I.M.P.A. Ltd.	—
321 Broadbent, Thomas, & Sons Ltd.	—	131 Doulton Industrial Porcelains Ltd.	—	Interscience Publishers Ltd.	—
		Dow Chemical International S.A.	—	Isopad Ltd.	—
		154 Dowling Lime & Stone Co. Ltd.	—		
		127 Dryden, T., Ltd.	—		

(Continued on page 248)

THE ALL STAINLESS STEEL TANKER SERVICE

## FRED CHAPPELL LTD

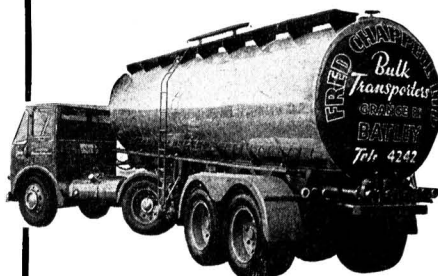
GRANGE ROAD • BATLEY • YORKS

Telephones : BATLEY 4242-3-4

EDIBLE OILS - SYNTHETICS - ACIDS Etc.

DELIVERIES THROUGHOUT THE U.K. or CONTINENT

CONTRACT OR SPOT HIRE RATES





# FLUORSPAR

ACID GRADE

**GUARANTEED  
SPECIFICATION**  
98%  $\text{CaF}_2$

**GLEBE**

*of course!*

Also producers of

HIGH GRADE BARYTES

GROUND AND FILTER

CAKE AND LEAD CONCENTRATES

A MEMBER OF THE LAPORTE  
GROUP OF COMPANIES

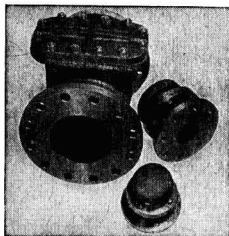


**GLEBE MINES LIMITED**  
EYAM, NEAR SHEFFIELD. TEL. EYAM 286

# INDEX TO ADVERTISERS

The first figures refer to advertisements in Chemical Age Directory & Who's Who, the second to the current issue

Page	Page	Page	Page	Page
174	—	190	—	—
172	—	Naisea Engineering Co. Ltd.	—	—
Jackson, J. G., & Crockett Ltd.	—	National Coal Board	—	3
Jamesles Ltd.	—	National Industrial Fuel Efficiency Service	—	Shell Chemical Co. Ltd.
Jenkins, Robert, & Co. Ltd.	—	118	—	Shell-Mex & B.P. Ltd.
Johnson, Matthey & Co. Ltd.	—	Neckar Water Softener Co. Ltd.	—	Shell Industrial Oils
128	—	149	—	Shirley, Aldred, & Co. Ltd.
Johnsons of Hendon Ltd.	—	Negretti & Zambra Ltd.	—	197
Jones & Stevens Ltd.	—	Newnes, George, Ltd.	—	157
—	—	Back	—	Silvercrown Limited
186	—	Cover	—	40
K.D.G. Instruments Ltd.	—	Newton Chambers & Co. Ltd.	—	Simon, Richard, & Sons Ltd.
K & K Laboratories Ltd.	—	Normalair Ltd.	—	Sipon Products Ltd.
170	250	Northgate Traders (City) Ltd.	—	Sojuzhimexport
K.W. Chemicals Ltd.	—	Nuovo Pignone	257	267
Kaylene (Chemicals) Ltd.	—	—	—	Southern Analytical Ltd.
198	—	162	—	Spence, Peter, & Sons Ltd.
Kellie, Robert, & Sons Ltd.	—	190	—	199
Kellogg International Corporation	—	Orthos (Engineering) Ltd.	—	Spencer, Chapman & Messel Ltd.
180	—	Oxford Paper Sack Co. Ltd.	—	Spencers Joinery Ltd.
Kenton Fluorescent Mfg. Co.	—	—	—	223
166	—	G/Card P.G. Engineering Ltd.	—	Standard Chemical Co.
Kernick & Son Ltd.	—	Palfrey, William, Ltd.	—	Stanton Instruments Ltd.
319	—	Peebles, Bruce & Co. Ltd.	—	Staveley Iron & Chemical Co. Ltd.
Kestner Evaporator & Engineering Co. Ltd.	—	Penrhyn Quarries Ltd.	—	182
Kestner Evaporator & Engineering Co. Ltd.	—	215	—	196
(Keebush)	—	Permutit Co. Ltd., The	—	196
Klinger, Richard, Ltd.	—	Petroderivatives Ltd.	—	Super Oil Seals & Gaskets Ltd.
—	—	188	—	Surface Protection Ltd.
Laboratory Apparatus & Glass Blowing Co.	—	Pfizer Ltd. (Chemical Division)	—	192
Laboratory & Electrical Engineering Co.	—	Pickfords Limited	—	Synthite Ltd.
Laboratory Glassblowers Co.	—	Pickstone Limited	Cover iii	—
176	—	Plastic Constructions Ltd.	—	191
Langley Alloys Ltd.	—	140	—	Taylor Rustless Fittings Co. Ltd.
124	—	Platon, G. A., Ltd.	—	194
Lankro Chemicals Ltd.	—	Podmores (Engineers) Ltd.	—	Thermal Syndicate Ltd., The
G/Card Laporte Chemicals Ltd.	—	257	—	Tidy, S. M. (Haulage) Ltd.
Laporte Industries Ltd.	—	251	—	156
Lechler, Paul Firma	—	251	—	Titanium Metal & Alloys Ltd.
134	—	251	—	Todd Bros. (St. Helens & Widnes) Ltd.
Leek Chemicals Ltd.	—	251	—	268
176	—	251	—	Towers, J. W., & Co. Ltd.
Leigh & Sons Metal Works Ltd.	—	251	—	261
Lennig, Charles & Co. (Great Britain) Ltd.	—	251	—	Tylors of London Ltd.
166	245	251	—	—
Lennox Foundry Co. Ltd.	—	251	—	Uhde, Friedrich, GmbH
Light, L., & Co. Ltd.	—	251	—	180
181	—	251	—	Unicone Co. Ltd., The
Lind, Peter, & Co. Ltd.	—	251	—	200
Lloyd & Ross Ltd.	—	251	—	Unifloc Ltd.
177	Cover ii	251	—	Univer Ltd.
Lock, A. M., & Co. Ltd.	—	251	—	Union Carbide Ltd.
Longman Green & Co. Ltd.	—	251	—	United Coke & Chemicals Co. Ltd.
162	—	251	—	251
Longworth Scientific Instruments Co.	—	251	—	170
188	—	251	—	United Filter & Engineering Co. Ltd., The
Lord, John L., & Son	—	251	—	196
Loughborough Glass Co. Ltd.	—	251	—	United Wire Works Ltd., The
Low & Bonar Ltd.	—	251	—	G/Card Universal-Matthey Products Ltd.
Lurgi Verwertung GmbH	—	251	—	Volcrepe Ltd.
Luwa (U.K.) Ltd.	258	251	—	—
—	—	251	—	188
162	—	251	—	W.E.X. Traders Ltd.
McCarthy, T. W., & Sons	—	251	—	189
188	—	251	—	Walker, P. M., & Co. (Halifax) Ltd.
McMurray, F. J.	—	251	—	8
187	—	251	—	Waller, George, & Son Ltd.
Maine, B. Newton, Ltd.	—	251	—	Ward, Thomas W., Ltd.
134	—	251	—	Warren-Morrison Ltd.
Manesty Machines Ltd.	—	251	—	148
129	—	251	—	Watson, Laidlow, & Co. Ltd.
Marchon Products Ltd.	—	251	—	Watson-Marlow Air Pump Co.
May & Baker Ltd.	—	251	—	125
Mechans Ltd.	—	251	—	Wellington Tube Works Ltd.
Front Cover Metal Containers Ltd.	—	251	—	242
G/Card Metalock (Britain) Ltd.	—	251	—	Whitaker, B., & Sons Ltd.
146	—	251	—	Widnes Foundry & Engineering Co. Ltd.
Metcalf & Co.	—	251	—	253
Metering Pumps Ltd.	—	251	—	Wilcox, W. H., & Co. Ltd.
Metrimplex	—	251	—	137
Metropolitan-Vickers Electrical Co. Ltd.	—	251	—	Wilkinson, James, & Son Ltd.
130	—	251	—	142
Middleton & Co. Ltd.	—	251	—	Williams & James (Engineers) Ltd.
Mirrless Watson Co. Ltd., The	—	251	—	Witco Chemical Co. Ltd.
178	—	251	—	Wood, Harold, & Sons Ltd.
Mirvale Chemical Co. Ltd., The	—	251	—	184
Mitchell, L. A., Ltd.	—	251	—	Worcester Royal Porcelain Co. Ltd.
120	—	251	—	—
Mond Nickel Co. Ltd., The	—	251	—	Yorkshire Engineering & Welding Co. (Bradford) Ltd.
Monkton Motors Ltd.	—	251	—	150
Monsanto Chemicals Ltd.	275	251	—	Yorkshire Tar Distillers Ltd.
Morgan Refractories Ltd.	—	251	—	Young, A. S., & Co.
178	—	251	—	—
Moritz Chemical Engineering Co. Ltd.	Cover iii	251	—	150
—	—	251	—	Zeal, G. H., Ltd.



**FLAME TRAPS  
TO OUR OWN  
DESIGN AND SIZE  
IN ANY METAL**

**RICHMOND WELDING COMPANY**

ESTABLISHED 1929

RICHMOND ROAD, BRADFORD 7

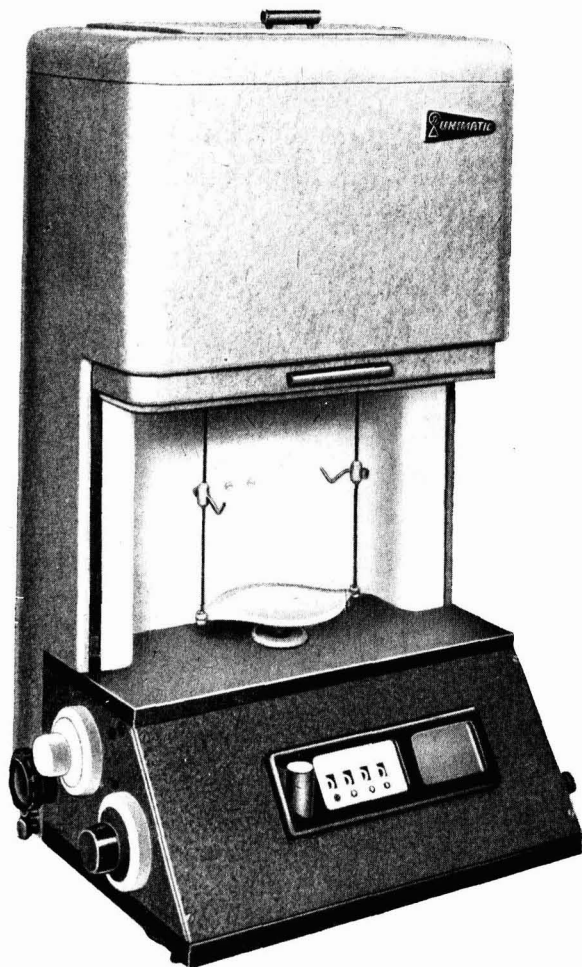
TELEPHONE 25405

*Turn your surplus equipment  
into cash!*

A buyer for any plant which you now regard as obsolete can be found through the Classified Advertisement Section of Chemical Age.

A small ad, costing only a few shillings will be seen by potential users, not only in the U.K. but also in those overseas countries where second-hand plant is given a new lease of life.

Full details of advertisement rates will be found at the top of page 276.



# CONSTANT LOAD WEIGHING BY SUBSTITUTION

As an alternative to the applied-load system of weighing, Stanton now offers the Unimatic single-pan balances—constructed on the constant-load principle of weighing by substitution. The compact, sturdy aluminium case enclosing the instrument is finished in green and black hammertone. Width 13", depth 16", height 20½", weight 32 lb. With the introduction of the Unimatic series, the Stanton range of precision balances now provides an unrivalled choice to meet every requirement.



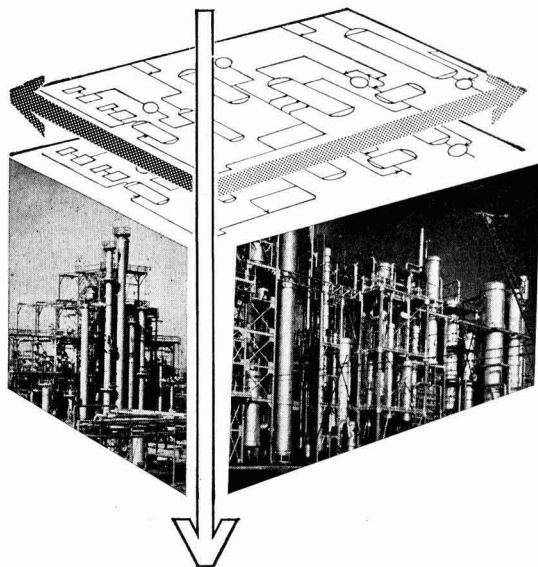
- UNIMATIC Balances** maintain their accuracy over the whole weighing range being designed on the now well known principle of weighing by substitution.
- UNIMATIC Balances** are simple to use—even an inexperienced operator can learn how in a few minutes.
- UNIMATIC Balances** are safe in use—their non-magnetic stainless steel weights are adjusted to within the new N.P.L. tolerances for analytical weights (errors less than 1 in 200,000). They are well protected within the balance case and their accuracy cannot vary.
- UNIMATIC Balances** are fast—very fast in use. Their controls are conveniently positioned at bench level. *Time and Motion study* experts have approved this design which results in less fatigue and more weighings in less time—in fact less than 30 seconds for the weighing of an unknown object.

## STANTON UNIMATIC BALANCES

Write for details to

STANTON INSTRUMENTS LTD. 119 OXFORD STREET, LONDON, W.1

Telephone: Gerrard 7533 · Cables: Stanbal London



C J B experience and interest in Chemical Engineering is world-wide. The company has been responsible for both engineering and construction of many successful projects throughout the world.

By arrangement with leading British, American and Continental manufacturers, C J B can offer a wide range of complete processes and plant for various industries, including Petrochemicals, Plasticisers and Resins, Edible Oils, Fermentation.

**CJB** adds the 3<sup>rd</sup> dimension

**CONSTRUCTORS JOHN BROWN LIMITED.**

*A member of the John Brown Group*

**CJB HOUSE, EASTBOURNE TERRACE, PADDINGTON, LONDON, W.2**

Telephone: **AMBASSADOR 8080.** Telex: 25356 Cables: **CIVANIC, LONDON** also at **MANCHESTER, MELBOURNE & TEHERAN.**

**LINDANE**

**KW**  
**CHEMICALS LTD**  
**KW**

55/57  
HIGH HOLBORN  
LONDON W.C.1  
T.A. CHLORATE  
T.N. CHANCERY  
7981/7

## Fire Prevention Standard Recommendations

THIS SYSTEM OF STANDARD RECOMMENDATIONS for fire prevention was devised by the Kent County Brigade.

'..... streamlines paper work in the preparation of fire prevention reports'. **Municipal Journal**

'..... intelligent standardization of form and wording makes for more efficient work all round'

T.L.S.

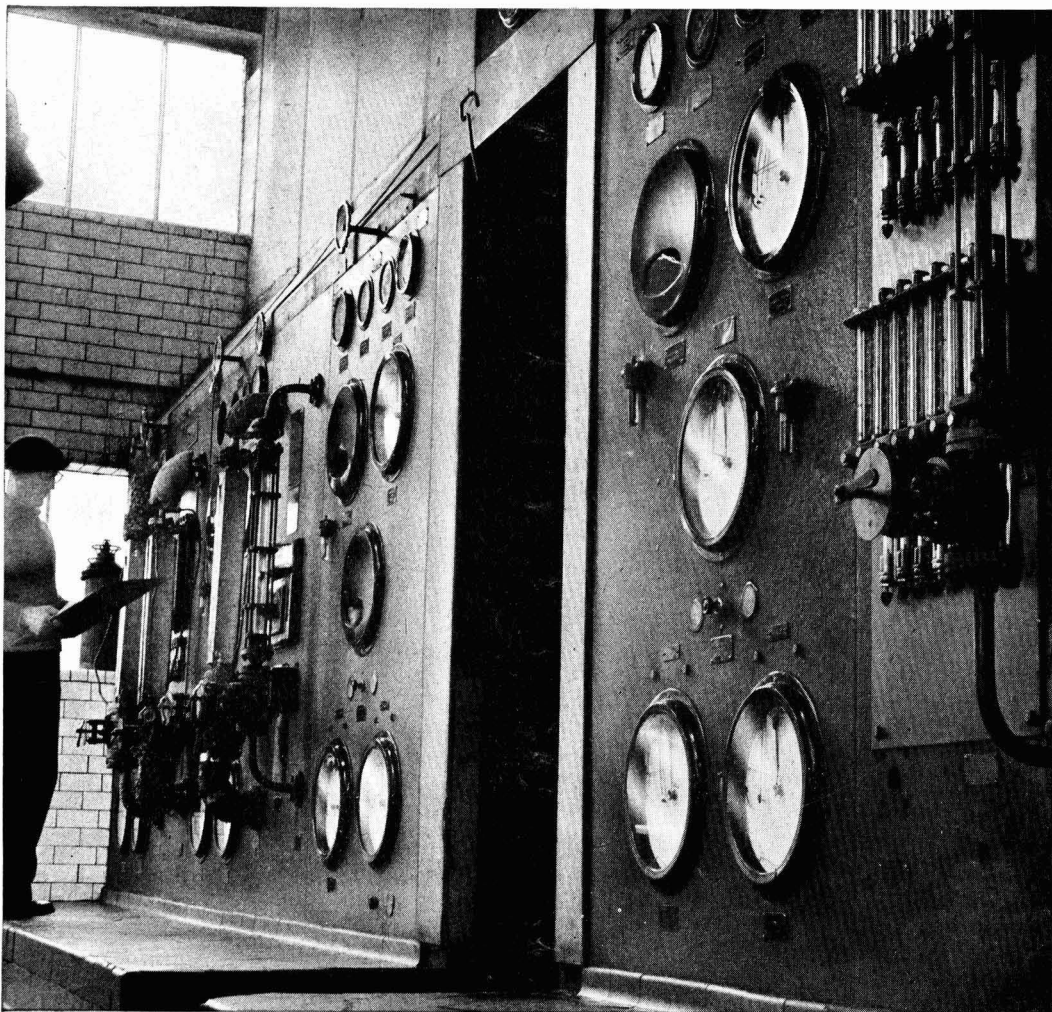
8s. 6d. [postage paid]

Published by

**ERNEST BENN LIMITED**

Bouverie House . Fleet Street . London . EC4





Products of controlled quality . . .

### TAR ACIDS

Tar acids are refined at U.C.C.'s Orgreave distillery in a continuous high-vacuum distillation plant.

Phenol	C.Pt. 40-41°C
o-Cresol	C.Pt. 30.3-31°C (Grade 'A')
m-p-Cresol	60-68% Meta 52-54% Meta
Xylenols	1:3:5 Concentrate 2:4/2:5 Concentrate 5/7° Mixture



Please send for details to:—

### UNITED COKE AND CHEMICALS COMPANY LIMITED

(Sales Department 23) P.O. Box 136, Handsworth, Sheffield S13  
Telephone: Woodhouse (Sheffield) 3211      Telegrams: Unichem, Sheffield



# Filter aids

**NEW**

**CLARCEL**

**CLARCEL FLO**

The most widely used diatomaceous filter aids in Europe.  
Purity — uniformity and high performance with maximum economy.

Expanded Perlite base filter aids  
MANUFACTURED IN THE UNITED KINGDOM  
offering exceptional economy and high efficiency.

*Samples and technical information on request.*



**THE BRITISH CECA COMPANY LTD.**

INDUSTRIAL PRODUCTS  
DIVISION

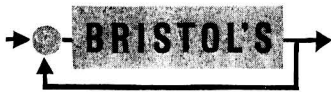
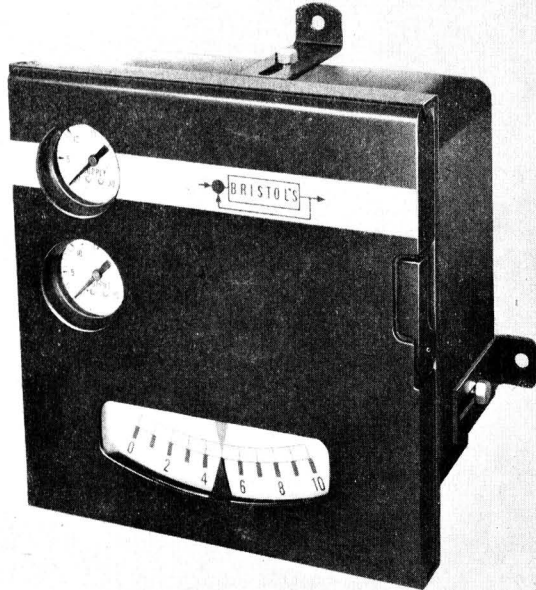
**175, PICCADILLY, LONDON, W.1.**

Telephone: HYDe Park 5131

Telegrams: ACTICARBON, LONDON, TELEX.

Cables: ACTICARBON, LONDON

## New advanced design indicating pneumatic controller



### SERIES 624

Highlight of this new indicating pneumatic controller is the new Bristol advanced design control unit.

#### Summary of A/D Controller features

It can be used with the wide range of Bristol's precision measuring elements for pressure, temperature, and flow.

**PERFORMANCE** Excellent frequency response, far better than most comparable control units.

#### EASY MAINTENANCE AND INTERCHANGEABILITY

Plug-in units, simple to work and calibrate.

**LONG LIFE** Type 316 stainless steel parts. Rugged construction.

**STABILITY** Single-capacity systems.

**AMBIENT COMPENSATION** Wide-range temperature and pressure compensation, so that control unit does not shift its set-point.

### SPECIFICATIONS

**MODEL** No: 624.

**CASE:** Cast aluminium 8" x 8" x 5".

#### MEASUREMENTS:

Pressure—full vacuum to 10,000 psi.

Temperature—minus 100°F to +1000°F.

Flow and level—wide range with both mercury and dry type meter bodies.

#### CONTROL:

Proportional with 1 to 400% proportional band, direct or reverse action (Model 624B).

*Proportional-plus-reset control unit.* Proportional band adjustable 0-400%. Reset rate adjustable from less than 0.1 to more than 100 repeats per minute.

*Proportional-plus-derivative control unit.* Proportional band is adjustable 0-400%. Derivative time is from 0-10 minutes.

#### PILOT VALVE:

Non-bleed, high capacity. Low air consumption.



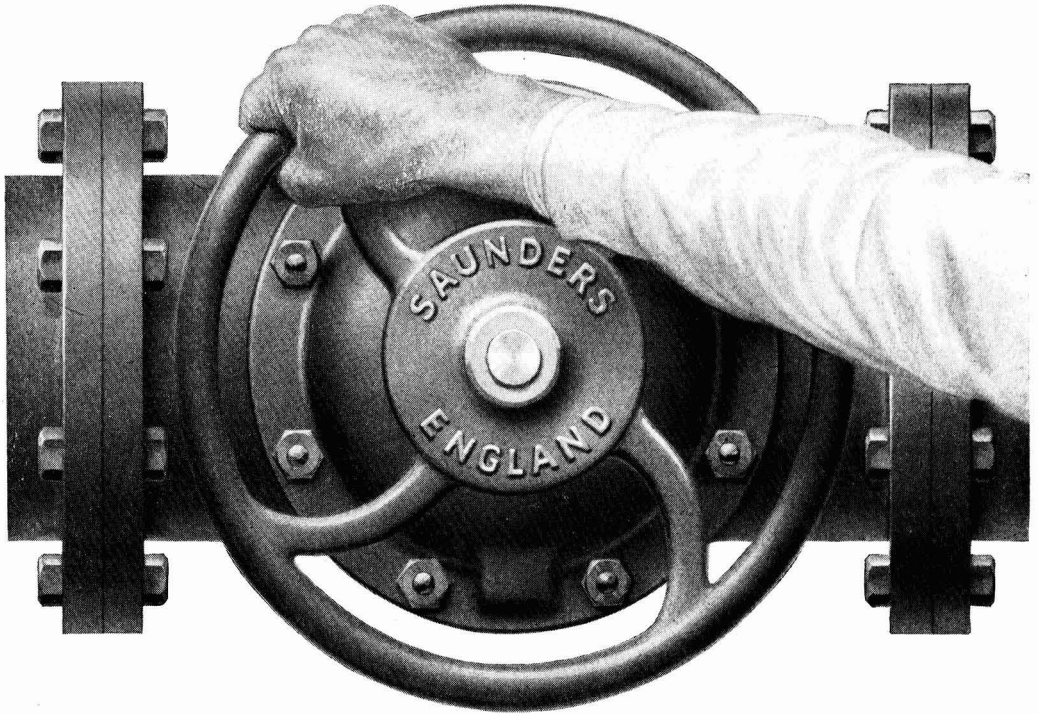
Full details from: PROCESS CONTROL DIVISION

**ELLIOTT BROTHERS (LONDON) LTD**

INCORPORATING BRISTOLS INSTRUMENT COMPANY LIMITED

Century Works, Lewisham, London SE13 Telephone TIDeway 1271

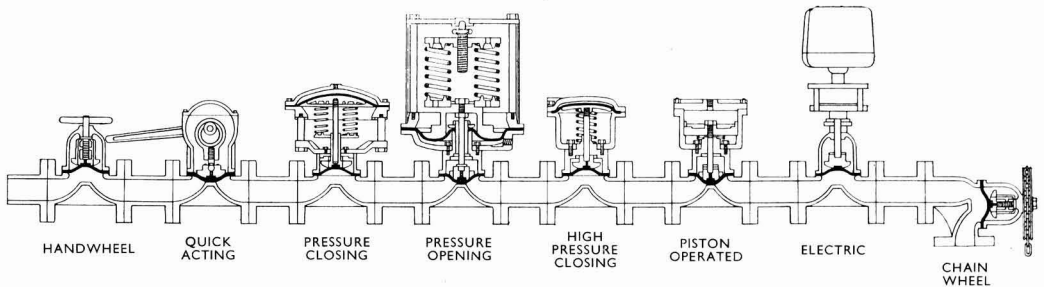
 Members of the Elliott-Automation Group



The hand that operates the SAUNDERS rules the world of fluids—

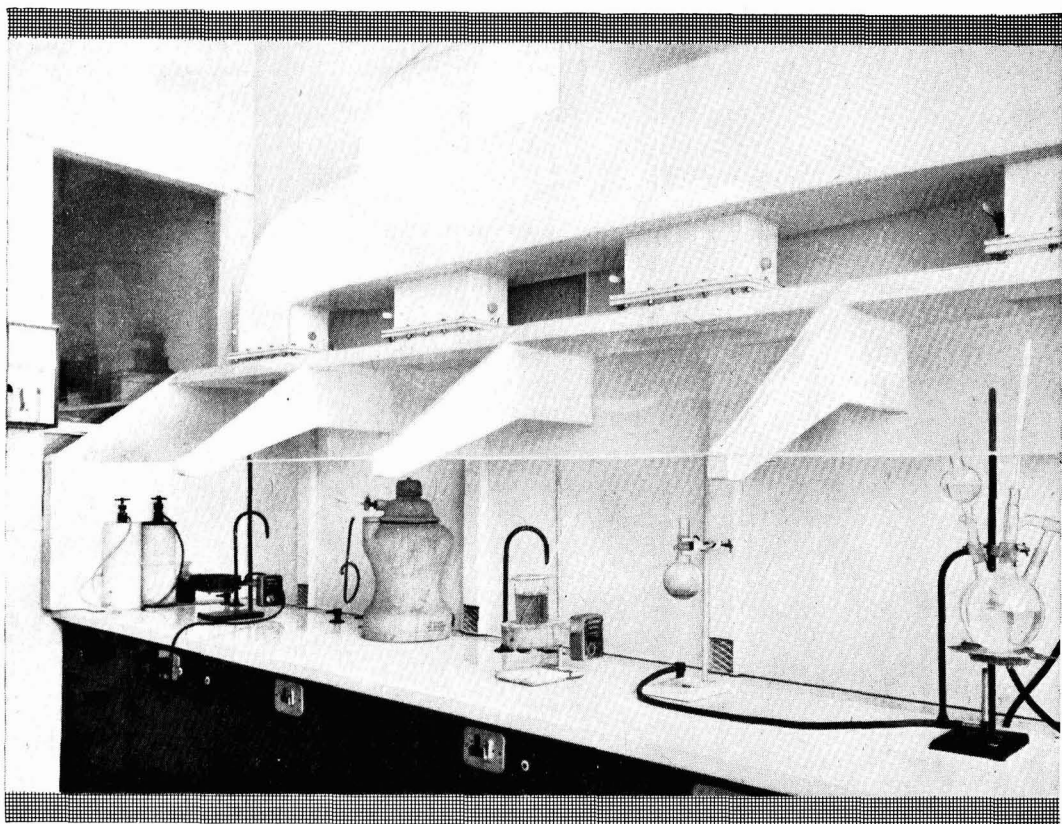


Isolated mechanism — safe with damaging fluids, hygienic with edibles. Sure closure even with gritty or pulpy fluids. Glandless construction. The simplest of all valves to maintain. Available with many forms of manual and power operation.



DIAPHRAGM VALVE DIVISION  
 CWMBRAN MONMOUTHSHIRE Telephone: CWMBRAN 3081

## Tough, corrosion-resistant 'Darvic' and 'Perspex' combine to get rid of fumes at Ferranti Laboratory



Fume extraction canopy faced with 'Perspex' acrylic sheet with supports and ducting made from 'Darvic' p.v.c. sheet by Tanks and Linings Ltd., Droitwich, Worcs, installed at Ferranti Ltd., Manchester.

THE fume extraction equipment over this laboratory bench is tough, lightweight and unaffected by most forms of chemical corrosion. It was made by Tanks and Linings Ltd. for the Manchester laboratories of Ferranti Ltd. The transparent facing of the canopy is made from 'Perspex' acrylic sheet with cantilevered supports and the ducting made from 'Darvic' rigid p.v.c. sheet. Both these I.C.I. materials combine their strength, light weight and resistance to corrosion with a glossy surface which is extremely easy to keep clean. Both are easily worked and shaped, and both are available in a wide range of colours. 'Darvic', although light in weight, remains rigid even in thin sheets. Fume extraction equipment made from 'Darvic' and 'Perspex' can, therefore, be simply constructed, quickly installed, and very easily maintained. The range of colours available in 'Darvic' and 'Perspex' sheets make it possible to blend equipment made from them to suit the surroundings.



**'DARVIC'**

'Darvic' is the registered trade mark for the rigid p.v.c. sheet manufactured by I.C.I.

**'PERSPEX'**

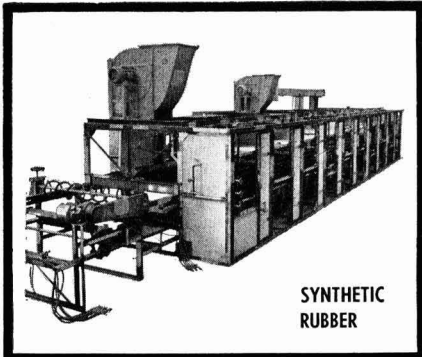
'Perspex' is the registered trade mark for the acrylic sheet manufactured by I.C.I.

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON S.W.1

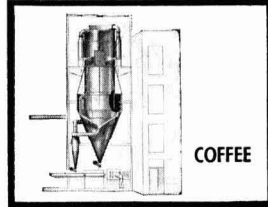
# Proctor



# DALGLISH



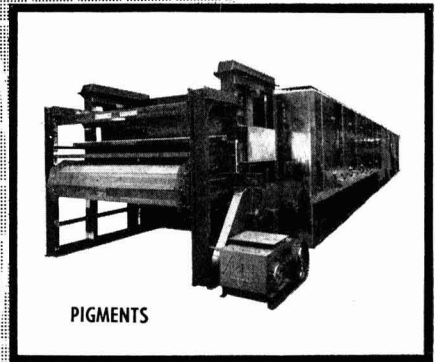
SYNTHETIC RUBBER



COFFEE

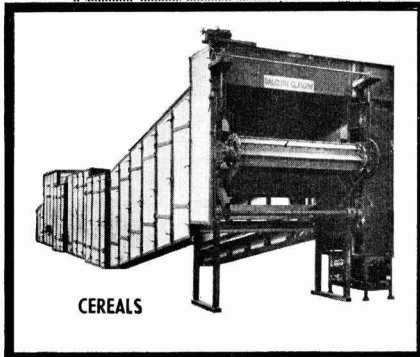
—serving

the world's

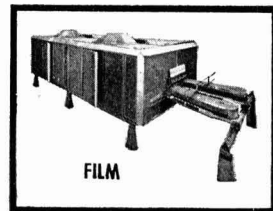


PIGMENTS

process industries



CEREALS



FILM

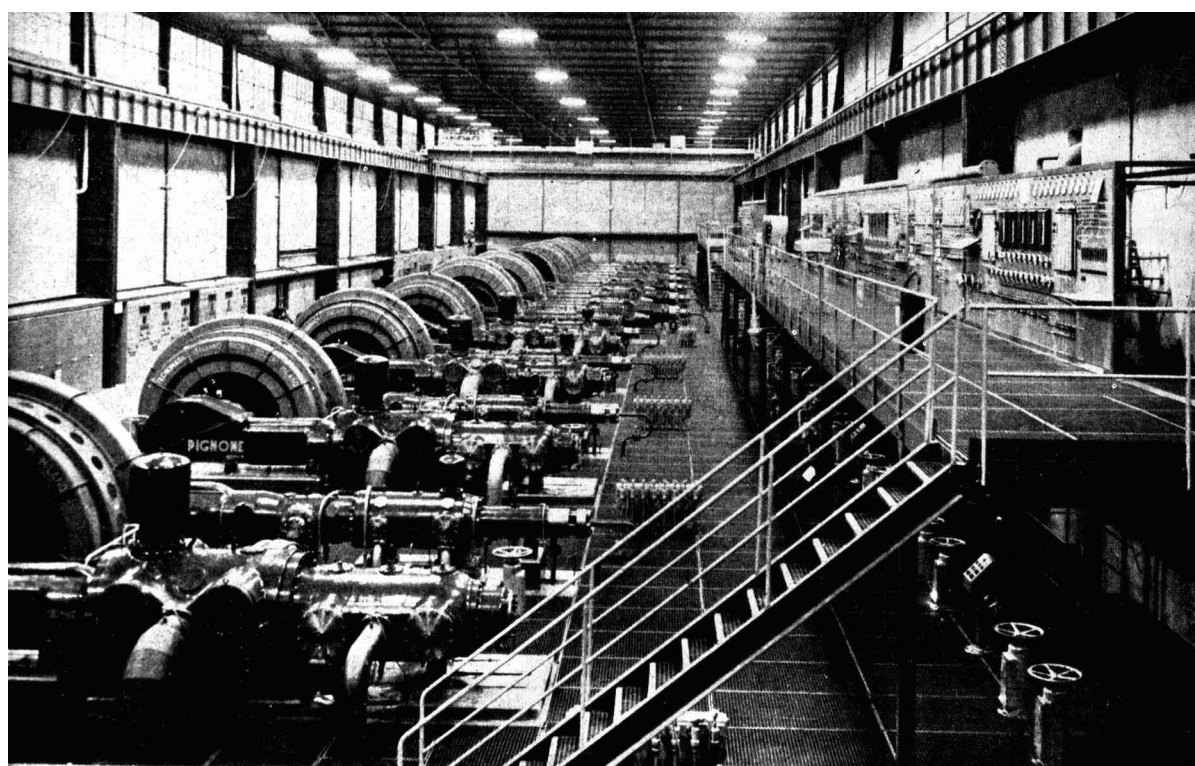
# JOHN DALGLISH & SONS LTD

Thornliebank Industrial Estate, GLASGOW

Telephone: GIFFNOCK 2322

Telegrams: 'DALGLISH, GLASGOW'

Telex: 77185



Compressor hall for ammonia  
synthesis plant  
overall capacity 34.000 HP.

# Pignone compressors

for the chemical industry

**NUOVO PIGNONE**

*of the E.N.I. Group*

INDUSTRIE MECCANICHE E  
FONDERIA SpA FLORENCE, ITALY.

- Complete drilling installations
- Air and other gas compressors
- Gas-driven engine compressor units and engines
- Centrifugal compressors
- Centrifugal pumps
- Pipeline valves
- Valve fittings
- Castings
- Complete oil refinery units
- Complete units for the chemical and petrochemical industries
- Nuclear power plant units

# CARLESS

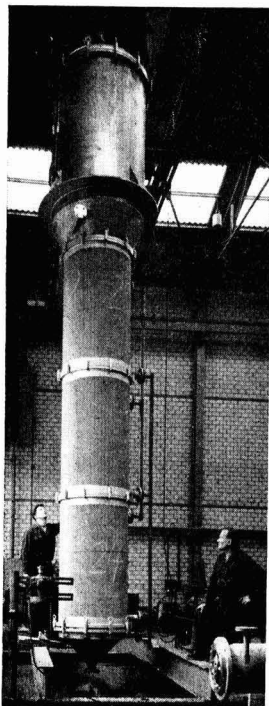
*Hydrocarbon  
Solvents and  
Diluents*

## SPECIAL NAPHTHAS

- Specific gravity 0.860—0.865
- Distillation range 145°C—180°C
- Flash point minimum 87°F
- Specifications varied to meet requirements of individual customers

*Let us send you a sample and a quotation*

**CARLESS, CAPEL & LEONARD, LTD.**  
HACKNEY WICK, LONDON, E.9 *Amherst 5500*



## LUWA THIN LAYER EVAPORATOR

For:

- EVAPORATION
- DISTILLATION
- CONCENTRATION
- DEODORISATION

of all heat-sensitive liquids in any range of temperature, vacuum or capacity.

The modern Luwa system ensures for you the highest product quality, improved yields and the advantages of rapid continuous processing.

Why not take advantage of our great experience in the treatment of heat-sensitive liquids. The superiority of the Luwa Evaporator has been proved in the manufacture of many products including:—

- Dyestuffs
- Plasticisers
- Heavy and fine organic chemicals
- Natural and synthetic latices
- Fruit juice concentrates
- Vitamins and antibiotics
- Urea
- Gelatine

Also available: High Vacuum Fractionator · Air Conditioning

Write for details:—

**LUWA (UK) LTD.**, Reliance House, 340 Clapham Rd.,  
London, S.W.9

Telephone: Macaulay 7776

Offices: Switzerland · Germany · France · Spain · Brazil  
Cuba · Mexico · U.S.A.



VOL. 86

No. 2197

AUGUST 19 1961

Telephone: FLEet Street 3212 (26 lines)

Telegrams: Benformula - London E.C.4

Editor  
M. C. HYDEManager  
R. C. BENNETT

Director N. B. LIVINGSTONE WALLACE

**Midland Office**Daimler House, Paradise Street,  
Birmingham. [Midland 0784-5]**Leeds Office**Permanent House, The Headrow,  
Leeds 1. [Leeds 22601]**Scottish Office**116 Hope Street, Glasgow C2.  
[Central 3954-5]**IN THIS ISSUE**

Embargo List for Soviet Bloc	260
Du Pont Hylene for U.K.	260
Project News: I.C.I. Dyestuffs Plant; Yugoslavia Contract for Ernest Scott; S.A.I. Basic Slag; Fuel Loading of Atomic Power Plants	261
Distillates	262
Japanese Nylon Process	263
Tantalum Fabrication Techniques	263
Montreal Aromatics Plant	264
Port Talbot Coking Plant	265
C.J.B. Project Progress	265
Nitrogen Fertiliser Problems	266
Overseas News	267
People in the News	268
Commercial News	269
Trade Notes	272
Market Reports	272
New Patents	274

Annual subscription is: home, 57s 6d,  
overseas, 65s, single copies 1s 9d (by  
post 2s)

# Chemical Age

Incorporating

PETROCHEMICALS and POLYMERS

BOUVERIE HOUSE • 154 FLEET STREET • LONDON • EC4

## COMPUTER CONTROL

**A**LTHOUGH there have been a number of interesting conferences and symposia on the applications of electronic computers, and some useful ideas have emerged, the emphasis has tended to be on the uses of computers for design and evaluation; little has come forth about their practical application to the direct control of chemical processes. The fact is, the rapid technological advances of the computer manufacturers in the U.K. are some way ahead of manufacturing industry's ability and incentive to make full use of such development. This is illustrated by the setting up of a new automation analysis department by the Elliott-Automation Group, reported on page 260. Elliott's state that in the great majority of cases there is no precise knowledge available of the true mathematical nature of industrial processes, and that this is one of the factors delaying the extensive introduction of complex automation systems. Their new department is aimed at showing, by studying particular processes, what benefits automation can bring.

Quite apart from technical considerations, there are of course economic obstacles to the widespread use of control computers at present. So far, only one or two of the larger companies in Europe have progressed to the point of installing or planning on-line computer control of a plant process. I.C.I. now have a Ferranti digital computer system to control one of their processes at Fleetwood (C.A., 18 February, p. 290); in Germany, B.A.S.F. have a U.S.-designed closed loop system working on their Ludwigshafen plant (C.A., 29 October 1960, p. 710). Fresh evidence of German interest in computers is the establishment of a computer centre by Chemische Werke Hüls (this issue, p. 267). But nowhere in Europe is there the inclination or the means to indulge in the same lavish expenditure on computers that is to be found in the U.S.—where Monsanto's Luling, La., ammonia plant is already a 'model' example of computer control—or in the U.S.S.R. where automation is pursued with a fervour that suggests ideological influences rather than practical expediency.

One important consideration is the size of the plant in relation to the cost of the computer installed; there are divergent views on this although it appears to be generally agreed that there is a certain minimum of capital investment below which the expectation of a reasonable return is slender. But, particularly with the advent of smaller, specialised computers there is a need for more definite cost data.

Where the present computer users stand to gain, in the long run, is that they are accumulating experience that will enable them to apply computer control in the future with much greater certainty of success. This aspect might profitably be studied by those whose argument against computers is that they depend for precise control on the calibre of the associated instrumentation, and that instruments at present are not good enough. Computer control *is* being used successfully with currently available instruments; perfection will come later.

Besides direct 'on-line' computer control, possibilities are open for 'off-line' use of computers for evaluating process data and for simulation techniques as described by Dr. P. V. Youle in our issue of 15 October 1960.

*(Continued on page 260)*

## First Bulk Shipment of Du Pont Hylene Organocyanates to U.K.

DESTINED for the U.K. market is the first bulk shipment of Hylene organic isocyanates to reach this country, recently unloaded at London's Royal Victoria Docks from the *American Hunter*. Two tanks, each weighing 8½ tons when full and containing 1,250 imp. gall. of Hylene, were shipped from Du Pont's Chambers Works, Deepwater Point, New Jersey. The cylindrical tanks are 7 ft. high and 6 ft. 9 in. in diameter. They are insulated and equipped with steam heated coils to maintain the temperature of the isocyanate material in cold weather. Hitherto, the material has normally reached the U.K. in drums of about 45 imp. gall.

Du Pont's New Jersey Hylene plant has been in operation since 1956. The Du Pont Company (United Kingdom) Ltd, recently announced plans to build a plant for the manufacture of Hylene organic isocyanates—a basic raw material used in the production of urethane foams—on their site at Maydown, near Londonderry (C.A., 8 July, p. 51).



Bulk shipment of U.S.-produced Hylene arrives in U.K.

## Chemicals Feature in Amendments to Embargo List for Soviet Bloc

CHEMICALS, chemical and petroleum equipment, scientific instruments and other items are included in a consolidated list of goods subject to embargo for the Soviet Bloc and China, published in the *Board of Trade Journal*, 11 August. This supersedes the previous list and includes some amendments not previously published. Thus, under Group K, 'Chemicals, metalloids and petroleum products,' the list now takes in tetrafluoroethylene and trifluorochloroethylene, to which the embargo applies whether they are polymerised or not, "and manufactures wholly thereof." However, it is noted that the Export Licensing Branch will consider applications for the export of individual shipments containing up to 50 kg. of tetrafluoroethylene, or up to 5 kg. of trifluorochloroethylene, in any form, as well as for larger quantities in fabricated forms which can be shown to have no strategic applications.

Under Group B, 'Atomic energy list', amendments relate to nickel powder of less than 200 microns particle size; beryllium, beryllium oxides and other compounds and certain alloys; trichlorotrifluoroethane and dichlorotetrafluoroethane; hafnium metal, alloys, and certain compounds; calcium containing both less than 0.01% by weight of impurities other than magnesium and less than 10 p.p.m. of boron; and tritium and compounds containing tritium in which the ratio of tritium to hydrogen by atoms exceeds one part in 1,000. Contained thorium in compounds or up

to 1 kg. of thorium metal, and also certain lithium compounds and products, become eligible for licence concessions. The atomic energy list also includes electrolytic cells for the production of fluorine with a production capacity greater than 100 grammes/hr. of fluorine, and a number of other equipment items. There are no new amendments shown under Group D, 'Chemical and petroleum equipment.'

General enquiries about the embargo should be addressed to the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, London S.W.1.

### Quality Control in Chemical Production

Recently published by the Department of Scientific and Industrial Research is a booklet on 'Quality measurement in the chemical factory'. A physicist and physical chemist discuss the use of instruments to control processes in the production of chemicals. The authors come to the conclusion that all plants should have skilled analysts for measuring product quality, but where the successful functioning of a process depends on a large number of routine analytical operations it is worthwhile to consider whether an instrument would be a more effective way of doing the job.

Copies of the booklet may be obtained free from the D.S.I.R. Library, Charles House, 5-11 Regent Street, London S.W.1.

## John Thompson Form Chemical Plant Division

ESTABLISHMENT of a Chemical Plant Design and Construction Engineering Division at their main works at Ettingshall has been announced by John Thompson (Wolverhampton) Ltd., founder member of the John Thompson Group of companies. The company, besides over 130 years' experience of shell boiler design and manufacture, has been responsible for considerable work in the pressure vessel field of chemical engineering. Other John Thompson Group companies have also acquired much experience in chemical plant design and manufacture.

The newly formed division is able to offer facilities for effecting the complete plant contract including mechanical, electrical and civil work, from initial design from a flow sheet to the final erection and commissioning.

## Balfour Get Planning Approval for New Fabricating Shop

Henry Balfour and Co., the Leven, Fife, engineers, have received approval from the Fife planning committee for the erection of a heavy fabricating shop at Mountfleurie, Leven. This is the second phase in the programme announced some time ago by Henry Balfour for the expansion of their chemical engineering equipment manufacturing units at Leven, the earlier stage having been the launching of a major laboratory.

## Computer Control

(Continued from page 259)

For companies unable to purchase their own computer, it is a good sign that facilities are becoming available among the computer manufacturers, an example being the computing centre opened earlier this year by Electronic Associates Ltd. at Burgess Hill, Sussex.

One further obstacle to computer applications that must be mentioned is the large segment of industrial management with a die-hard mistrust of automation as "scientific hoo-hah", and an inclination to regard computers as expensive gadgets with no great practical utility. On the other hand, the varied selection of computer systems, both digital and analogue, that are being offered by their manufacturers tends somewhat to dazzle and bewilder the uninitiated; in some instances the computer manufacturers, in their enthusiasm for their techniques and their natural eagerness to sell their products, have not been very sympathetic towards the practical and economic problems of their potential customers. These two opposing tendencies must be reconciled before real progress can be made.

## Project News

### John Thompson to Engineer I.C.I. Dyestuffs Plant

● CONTRACT for the engineering of a dyestuffs intermediates plant, for I.C.I. Dyestuffs Division, the finished cost of which will be approximately £250,000, has been awarded to **John Thompson (Wolverhampton) Ltd.** The project is understood to be at Huddersfield, but no details are revealed except that the contract involves extensions to an existing plant and includes vessels ranging from 50 to 2,000 gall. capacity, suitably lined where required.

As reported on page 260, John Thompson (Wolverhampton) have now established a Chemical Plant Design and Construction Engineering Division.

### British Celanese Solvents Plant Nearly Complete

● THE aromatics plant of **British Celanese Ltd.**, under construction at Spondon Derby (see CHEMICAL AGE, 12 November 1960), is now nearing completion. The plant is due to go on stream in September, but British Celanese have still not revealed its capacity. The toluene produced at Spondon will supply the caprolactam plant of **Courtaulds** which will use the Snia Viscosa process (see CHEMICAL AGE, 10 June 1961, p. 924).

### Glandless Pumps for 'Dragon'

● CONTRACT, valued at some £19,000 for glandless circulating pumps has been received by **J. and S. Pumps Ltd.**, from the **U.K. Atomic Energy Authority**, acting on behalf of the signatories of the O.E.E.C. High Temperature Reactor Project (Dragon). The contract was secured in the face of international competition.

### Soda Recovery Unit for Yugoslavia

● FOR a pulp and paper mill in Yugoslavia, **Ernest Scott and Co.**, a subsidiary of Henry Balfour and Co., have won a £480,000 contract from Millspaugh Wimpey under which they will supply a complete soda recovery unit.

A similar order for a £90,000 plant

## Prefabricated D.O. for Humglas



**On-the-spot drawing office work for the new Clayton Aniline Co. Ltd. dyestuffs plant extensions now under construction at Manchester is carried out by Humphreys and Glasgow Ltd. in a prefabricated building supplied by Middlesex Prefabricated Buildings Ltd., Green Lane, Hounslow, Middlesex. The new dyestuffs plant, for which Humglas are the main contractors, is part of a £6 million modernisation and development scheme**

is for Ballarpur Paper Mills, India, while Ernest Scott will also supply Mysore Paper Mills with an evaporation plant worth £56,000.

### Fuel Loading Begins at Atomic Power Plants

● URANIUM fuel is being loaded into the reactors at Bradwell (300 Mw.) and Berkeley (275 Mw.)—the first commercial nuclear power stations in the U.K. to commence fuel loading. This operation indicates the nearness to completion of the two stations, which have been designed and constructed for the Central Electricity Generating Board by the **Nuclear Power Group**.

Loading of the fuel and subsequent achievement of criticality precede some months of running trials both of the reactor and its connected generating plant before the station as a whole is connected to the national grid and enters into full commercial service.

At the same time as fuel loading begins at Berkeley and Bradwell, the Nuclear Power Group are submitting their tender—in competition with other groups—to the Central Electricity Generating Board for the 550 Mw. nuclear power station at Oldbury-on-

Severn, Gloucestershire.

The design being submitted has two reactors, each enclosed in a pre-stressed concrete pressure vessel. Such a design is regarded as the precursor of larger and cheaper reactors of this type in the future.

### New Research Centre for Reed Paper Group

● A NEW research and development centre is under construction by the **Reed Paper Group** at their Aylesford (Kent) site. The first stage comprises a £500,000 laboratory, providing about 50,000 ft. of laboratory floor area, a pilot plant building of about 12,000 sq. ft. and office space amounting to 10,000 sq. ft.

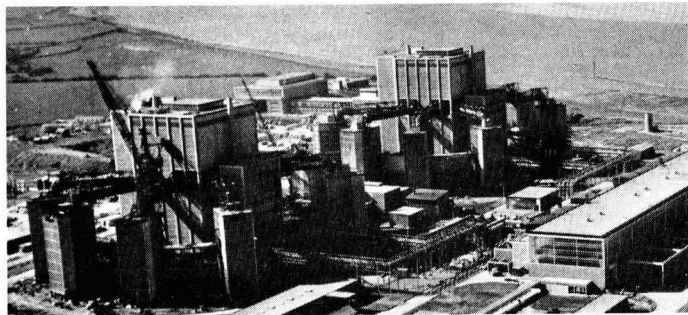
A travelling crane will serve the single-storey pilot plant building, which will be concrete framed and panel-walled with steel deck roofing.

The laboratory is expected to be ready for occupation in May 1962.

### Autumn Opening Scheduled for S.A.I. Basic Slag Plant at Scunthorpe

● BASIC slag will be produced in a new £500,000 works to be officially opened at Scunthorpe, Lincs, for **Scottish Agricultural Industries Ltd.** in the autumn. Raw material for this plant will be drawn from the new Rotor furnace shortly to be commissioned at the Redbourn works of Richard, Thomas and Baldwins Ltd., where two such furnaces—the first in this country—will pre-refine the iron with oxygen as a preliminary to open hearth furnace operations.

The new S.A.I. plant will process more than 100,000 tons/year of high grade slag, and the company points out that imports of basic slag from the Continent can thereby be considerably reduced.



A recent view of the Berkeley nuclear power station



★ PRODUCERS of alkyl (dodecyl) benzene detergent alkylate in the U.K. are not pleased with the Board of Trade, who last week announced that "in present circumstances" they are taking no further action on the move to have an anti-dumping duty imposed on imports of this material from Italy. It was on 10 March this year that the B.o.T. gave notice that they were considering an application for an anti-dumping duty. They now say they are not satisfied that a case has been made out for imposition of such a duty. Meanwhile, Italian dodecyl benzene continues to come in.

U.K. producers are Shell, Monsanto Chemicals and Grange Chemicals, with a total capacity of some 66,000 tons/year, estimated at just about double the domestic requirements. Largest Italian producer of dodecyl benzene is Siedison, of the Edison Group, with capacity for 20,000 tonnes/year. Montecatini are also producers.

It seems to me that the Board of Trade are getting increasingly tough about anti-dumping applications in general. It could be that Common Market considerations have something to do with it.

★ MUCH talk is at present floating around the Continent about denationalisation of chemical concerns. The Dutch State-owned coalmines Staatsmijnen, of Limburg, have denied (see CHEMICAL AGE, 17 June, p. 992) that they are planning to privatise their chemical interests, though rumours still circulate to the contrary. Now the word has started going the rounds in Germany that the Federal German Government may be disposing of the nationalised coal-mining and carbon chemical company Bergwerksgesellschaft Hibernia AG, of Herne. Apart from its own output of nitrogenous compounds and carbon chemicals, this concern owns 25% of the Marl chemical giant Chemische Werke Hüls AG. It seems likely that the Hibernia shares may be sold to the general public in small lots in the same way as those of the Preussag and Volkswagen companies, both of which were formally in Government or State Government hands.

Statements that Hugo Stinnes AG, who also produce nitrogen products and coal by-products, would be privatised soon have been officially denied by the Federal German Treasury. Whatever happens, it is certain that at least one State-owned company will be given free and that the announcement will be made within the coming four weeks.

As for other European countries, there

seems a good chance that any change in the Government of Austria would bring about at least consideration of whether the Stickstoffwerke chemical company, of Linz—Austria's biggest—could not change its present status. As a State-owned concern, it has been the centre of political strife for years and is now in the middle of a scandal big enough to have caused anger between the two Coalition Parties at top level and resulting in the dismissal of the Socialist general director. The ensuing court cases against and on the part of the director are expected to turn a good deal of public and political opinion against the company's past and present organisation as a State concern, and should a Right-Wing Government ever take over in Austria it remains to be seen what might happen.

★ RECENT award of two tonnage oxygen and nitrogen plants for Poland (C.A., 12 August, p. 222) are significant for two reasons. Firstly they represent the first contract to be gained by a U.K. company for a tonnage oxygen plant for supply to East Europe; secondly, it must represent the first major contract with a Soviet-bloc state in which an American company has been concerned.

The contract was signed a few weeks ago, but it could not become effective until ratification by the U.S. licensors of the air separation process—Hydrocarbon Research Inc. Readers will doubtless be interested to see whether this contract is likely to mean that other U.S. companies will now be more active in bidding for East European chemical projects. Until now, many U.S. companies have, in view of State Department feelings, not even bothered to enter bids.

Mr. A. M. Clark, executive responsible for tonnage oxygen, who was one of C.J.B.'s contract signatories in Warsaw, recently gave a paper in Zagreb on the provision of oxygen for chemical and metallurgical industries.

★ A COMMERCIALY feasible fuel cell, a durable coloured plastic for coating an asphalt surface and more efficient ways of using oil to heat the home are some of the projects, mentioned in the summer edition of the *Esso Magazine*, towards which the research efforts of groups like Esso are directed.

Last year, Esso spent nearly £25 million on research and development, more, it is claimed, than any other petroleum company. Of this outlay, 25%

was spent on chemical research. Esso Research and Engineering Co. has two large research centres at Linden and Florham Park in New Jersey. Because of the increasing growth of oil in Europe and the variety of technical problems encountered in different parts of the world, Esso Research Ltd. was set up at Abingdon in Berkshire to investigate European and African problems, and recent additions to Esso's European research have been two new laboratories at Rouen and Hamburg.

Over the last 20 years, Esso have developed 25 new processes, among them fluid catalytic cracking, power-forming, hydrofining and fluid coking. An important innovation in the chemical field has been butyl rubber, which was developed at Linden.

These are some of the highlights in a research programme which goes on continually. For example, Esso Research and their European affiliates have been trying to develop a tyre which embodies the advantages of the all-butyl tyre of the U.S. but which meets the demands of European driving conditions. The recently announced 'composite Butyl tyre' is expected to achieve these aims.

★ PRESERVATION of wooden objects by impregnating them with polyethylene glycol is a method which has been used for sometime, but now a new procedure has been developed by a Swedish engineer which is said to be quicker and more effective in certain cases. The method has been tried out on wooden finds from the warship *Wasa* which has been lying on the bottom of Stockholm harbour since 1628. To prevent cracks, shrinking or cellular collapse of the wooden objects when they dry out, the water in them is replaced by PEG.

The object is left for the water to drip off the surface layer. It is then placed in an air-tight steel cylinder, the air is evacuated and the cylinder filled with PEG. The pressure is gradually raised to about 10 kg./sq. cm.

After the first impregnation, the wooden object is left to dry under controlled conditions. The polyethylene glycol serves as a screen through which the water in the interior of the wood penetrates very slowly. When enough water has escaped the object is given a further treatment. In most cases, the procedure is repeated a third time. Once the degree of moisture has been reduced to normal, superfluous PEG is washed off with alcohol.

This treatment, not only preserves the dimensions and shape of the object, but in most cases restores the surface of the wood to its original appearance. By using different liquids for impregnation, the method can be used for preserving other porous objects, such as leather, bones and archeological finds of metal.

*Alembic*

## Japan Reviews Nylon Position

# New Caprolactam Process Developed by Toyo Rayon

CONCERN is being shown by the Japanese Government over the number of tie-ups with overseas firms involving production techniques for caprolactam and nylon. The Scientific and Technical Agency of the Government held a Chemical Technical Liaison Council to consider the existing seven cases. This is the first of a series of formal discussions to be held by the Government to consider the whole question of nylon manufacture in Japan, and is expected to concentrate on caprolactam manufacturing techniques.

The companies involved in the seven agreements are: Mitsubishi Chemical who have an agreement with Snia Viscosa for the manufacture of caprolactam; Kanegafuchi Spinning Co., who also have a tie-up with Snia Viscosa but for nylon production; Kureha Spinning Co. have agreements with Zimmer of West Germany, for the production of both caprolactam and nylon; Asahi Chemical have an agreement with Zimmer for caprolactam and with Firestone of the U.S. for nylon production; Teikoku Rayon also have a tie-up with a U.S. firm—Allied Chemical—for nylon and with Snia Viscosa for caprolactam.

### Supply and Demand

The problem of the introduction of nylon techniques to Japan is to be tackled first by a consideration of the supply and demand situation. The Textile Department of MITI is now working on a revision of the 1965 forecast of the demand and supply of textiles. This survey is not expected to be completed before the end of September, so that the whole question cannot be fully discussed before then. Also, caprolactam is controlled by the Light Industry Department of MITI, which has not up to now entered the discussions. Because of these factors, it is thought that the Scientific and Technical Agency will consider the technical aspects of the problem separately from the supply and demand aspect.

It is felt in certain quarters in Japan that the immediate introduction of both the Snia Viscosa and Zimmer techniques is rather a risk in the light of previous experience with the acrylonitrile technique which could not be operated promptly. In this instance, Mitsubishi, Ashia and Nippon entered into agreements with Standard Oil, Ohio, immediately after the success of the pilot plant but commercial operation was delayed owing to plant repair.

Existing manufacturers of caprolactam, Toyo Rayon, are expected to change over from their phenol process to a new photochemical technique de-

veloped in the company's research laboratories. The process, which uses cyclohexane, is the subject of Japanese Patent No. 216,535.

Nitrosyl chloride is absorbed in cyclohexane and the solution subjected to light—preferably from a high pressure mercury lamp with a wavelength ranging from 3,650 to 6,000 Å—at a temperature

## Royal Dutch/Shell Engineers Develop Welding Techniques for Tantalum

METALLURGISTS at the Amsterdam laboratory of Royal Dutch/Shell are trying to find a way round the high cost of tantalum as a chemical plant material, by studying methods of using it as liners for large pressure vessels, since its cost when used as a thin internal coating is not prohibitive.

A snag in fabricating tantalum into linings for large plant items is that the metal cannot be welded in the presence of air because it becomes brittle under such circumstances. So Shell engineers have adapted techniques of welding it in an inert atmosphere of argon, similar to those used for welding titanium. More accurate control of the welding condition is, however, necessary, because tantalum has a melting point of about 5,425°F and a strong tendency to warp. Jigs and fixtures are used so that the back of the weld can be protected with argon and warping is prevented.

In this way, simple welds can be made in the atmosphere, provided all parts of the joint near the torch are shielded with argon. But objects of intricate shape are best welded in an argon-filled chamber or welding box. The same

method is advisable for the welding of connections to tubes of small diameter.

Another difficulty presented by tantalum is that welding it to other materials, like steel, results in an imperfect bond. The attachment of a tantalum liner to a steel vessel, therefore, requires special techniques. Methods are being developed similar to those applied for the construction of titanium linings, where strips of titanium are riveted on the inside of the vessel. Grooves of about 9 mm. are left between each pair of parallel backing strips which serve as channels to distribute the argon supply. Argon reaches these channels when it is fed to the reverse side of the weld via holes drilled through the steel wall of the vessel. The panels of lining material are attached to the backing strips by spot welding and interconnected by means of overlapped fusion welds.

The oily layer consists mainly of cyclohexanone oxime or its hydrochloride. This is separated and dissolved in water. Neutralisation with caustic soda or barium carbonate until the pH is 6.5, results in the crystallisation of cyclohexanone oxime.

Many patents also exist between Toyo Rayon and Du Pont concerning the production of both caprolactam and nylon so that the discussion is expected to be rather sharp.

method is advisable for the welding of connections to tubes of small diameter.

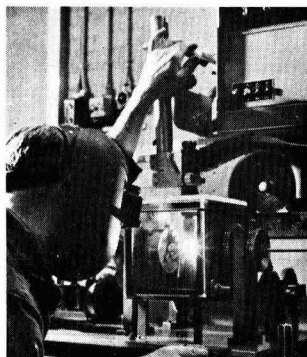
Another difficulty presented by tantalum is that welding it to other materials, like steel, results in an imperfect bond. The attachment of a tantalum liner to a steel vessel, therefore, requires special techniques. Methods are being developed similar to those applied for the construction of titanium linings, where strips of titanium are riveted on the inside of the vessel. Grooves of about 9 mm. are left between each pair of parallel backing strips which serve as channels to distribute the argon supply. Argon reaches these channels when it is fed to the reverse side of the weld via holes drilled through the steel wall of the vessel. The panels of lining material are attached to the backing strips by spot welding and interconnected by means of overlapped fusion welds.

### Competition on Applications of Oxy-acetylene Flame

An international competition on the applications of the oxy-acetylene flame is being organised by the Commission Permanente Internationale de l'Acetylene de la Soudure Autogene et des Industries qui s'y Rattachent (C.P.I.). The competition is open from 1 October 1961 to 31 March 1963, and a considerable sum of money is being put up by way of awards.

Participants are required to submit a paper dealing with either (1) investigations, research or tests connected with the stability of the flame of oxy-acetylene torches in their various applications, or (2) investigations concerned with the improvements that may be made in the use of oxy-cutting with the oxy-acetylene flame, towards the cutting of greater thicknesses or raising cutting speeds.

Further details of the competition are available from Mr. P. L. Taylor, Secretary, British Acetylene Association, 55 Gordon Square, London W.C.1.



Welding tantalum in an atmosphere of argon at the Royal Dutch/Shell Laboratory

# Montreal Aromatics Plant Construction Record Called for Unusual Working Techniques

**T**IGHT construction scheduling and close planning of all phases of the project were necessary in the building of British American Oil Co.'s new \$2½ billion aromatics extraction plant at their Montreal refinery, which was brought on stream earlier this year (see *CHEMICAL AGE*, 27 May, p. 847). Foster Wheeler Ltd., Canada, completed the engineering design, procurement and construction of the plant in less than eight months from award of the contract.

The plant, designed for a 7,000 b.p.s.d. feed, employs the Udex process, benzene being recovered from an aromatics rich stream produced by catalytic hydrogen reforming of low octane naphthas. Solvent extraction with a glycol-water solution is used to remove the aromatics, followed by fractional distillation to recover benzene. Provision is made for the future production of other aromatics such as toluene and xylenes. Process design work for the Montreal plant was carried by the Universal Oil Products Company, Des Plaines, Ill., U.S., who license the Udex process.

Meeting the tight construction schedule—during a period when severe winter conditions made outside work very difficult—called for unusual techniques. To avoid excessive manpower density in

the working area, with a resulting loss in productivity, trays were installed in the water still, debutaniser and benzene column in the fabricator's shop rather than on site. Shortest possible material deliveries were necessary and all major items of equipment were placed on order within a week of the contract award.

Limited space and accessibility of the plot necessitated early erection of the major columns, so shop fabrication of the extractor and stripper columns was placed on a round-the-clock basis. In actual erection, problems were posed by the inaccessibility of the site from all but one end; for example, foundation work at the 'front end' could not be started until the towers and heavy equipment had been lifted at the far end. To minimise delay in completing foundations and other underground work, each tower was lifted into position using mobile cranes rather than the more usual gin poles. This saved an estimated two weeks of construction time.

Erection of equipment, structural steel, pipework, instruments, etc., was completed using conventional techniques although cold weather often made working conditions difficult. Altogether, 13 working days were lost through bad weather. Construction was halted temporarily only when snow or ice made the work dangerous.

## Scope for British Plastics Raw Materials in Colombia

**T**HE plastics industry in Colombia has grown rapidly over the last few years. There are now 45 factories producing plastics goods but no plastics research laboratory. Icollanta, a joint venture of Goodrich and Colombian interests, whose principal product is tyres but who also manufacture polythene sheeting and polythene and polyvinyl tubes, expect their 1961 production to amount to a value of Ps.2.5 million. Their consumption of raw materials is expected to be 29,000 kg. plasticised vinyl, 5,800 rigid vinyl, 90,000 kg. polythene and 4,400 kg. of other plastics.

The main supply of plastics to Colombia is from the U.S. and Germany, mainly due to more aggressive selling but U.K. products advanced in 1960 and appear to be competitive. Local agents are keen to obtain representations for British plastics raw materials manufacturers. The following are prices for at which various items have been imported from the U.S. (U.S. dollars per lb. f.a.s.): high pressure polythene, 0.28; low pressure polythene 0.25; wood flour 0.13; p.v.c., 0.28 and silicone emulsion 1.11.

The Board of Trade in the 3 July

issue of *Export Service Bulletin Weekly Supplement*, expresses the opinion that the plastics goods industry in Colombia is thriving and there is scope for increased U.K. sales of raw materials. Competition is keen but agents are interested in U.K. sources of supply.

Enquiries relating to this report may be made to Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London W.C.1, quoting reference 9753/61. Detail on reports on other markets for these materials may also be obtained from the Export Services Branch.

### Simazine and Atrazine Recommended for Safe Use

Both simazine and atrazine are recommended for safe use in the U.K., and neither need be included in the Agricultural (Poisonous Substances) Regulations. The use of simazine on any growing edible crop should present no hazard to consumers but there is insufficient information on which to base recommendations on the safe use of atrazine on edible crops other than maize on which it should constitute no hazard.

## New Safety Code for Radiation Workers

**C**OMING into operation in six months time is a new safety code for workers exposed to ionising radiation in industry. Laid down in the Ionising Radiations (Sealed Sources) Regulations, 1961, and made by the Minister of Labour, the code was presented to Parliament on 3 August.

The regulations impose requirements for safeguarding the health and safety of persons working in factories and other places to which the Factories Acts apply, who may be exposed to ionising radiations from sealed radioactive substances, and from certain machines, such as X-ray apparatus. They require the restriction of the exposure of workers to such radiations, the adequate shielding of sources of ionising radiations and instructions to workers likely to be exposed to them about the hazards involved and the precautions to be taken. Maximum permissible radiation are also laid down.

Although most of the requirement come into operation in six months time, those requiring the notification of the use and disuse of ionising radiations in factories will be effective from 15 August.

## New British Chemical Standards

**T**HE following new British Chemical and Spectrographic Standard Samples have been issued by the Bureau of Analysed Samples Ltd. B.C.S. No. 300, 6% zinc aluminium alloy analysed for Cu, Mn, Si, Mg, Fe, Ti, Cr and Zn. B.C.S. No. 304, 10% aluminium bronze analysed for Cu, Zn, Ni, Fe, Mn, Si and Al. B.C.S. No. 305, 75% ferro-silicon analysed for P, Al, Ca and Si. B.C.S. No. 306, 0.4% carbon free-cutting steel analysed for Si, S, P, Mn and C.

These samples are only available in the finely divided form for chemical analysis. S.S. Nos. 21-24, a series of low tungsten steels standardised for tungsten only with tungsten contents ranging from 0.7% to 3.4%.

This series is supplied in the form of ¼ in. diameter rods each 3 in. long for use as Spectrographic Standards, but is also available in the form of turnings for chemical analysis bearing the reference numbers BCS 281-284.

Further details of these new samples are given in List No. 400R and the latest supplementary insert sheet, which are obtainable free on request from Bureau of Analysed Samples Ltd., Newham Hall, Middlesbrough.

## Oxidation Processes in Chemical Manufacture

**T**he London Section of the Society of Chemical Industry is holding a symposium on 'Oxidation Processes in Chemical Manufacture' at the William Beveridge Hall, Senate House, University of London, London W.C.1, on 28 and 29 September. Registration fee for members of the Society is £1. Non-members may attend on payment of £4.

### Elliott Set Up New Computing Service

AN automation analysis department has been created by Elliott Brothers (London) Ltd.—a member of the Elliott-Automation Group—within its Data Processing Group of Divisions. Elliott, who have accumulated extensive experience of both the 'on-line' and 'off-line' application of electronic computers to industrial processes, state that in the great majority of cases it has been found that there is no precise knowledge available of the true mathematical nature of industrial processes, and that this is one of the factors delaying the extensive introduction of complex automation systems.

They point out that in the U.S., U.S.S.R. and certain other Eastern European countries, the attitude adopted by industrialists is to install a computer to gather and evaluate the data available with the intention that when the true natures of the processes involved have been determined, the computers will be put on to their operational control. In the U.K., it is added, the immediate incentives to adopt this course of action do not exist with the result that the introduction of automation is being delayed.

To deal with this problem the new department has been created, under the leadership of Dr. L. C. Payne, to undertake the specialised studies involved.

### W. P. Butterfield to Make U.S. Cryogenic Equipment

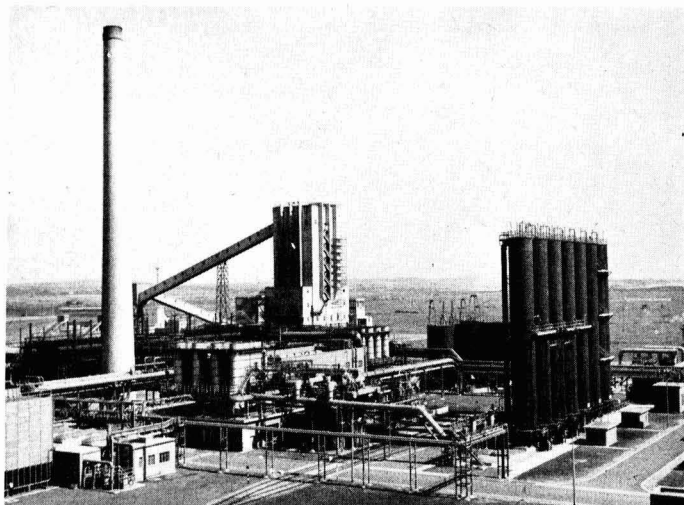
A range of cryogenic equipment is to be manufactured by W. P. Butterfield (Engineers) Ltd., at their Shipley, Yorks, works under an agreement concluded with Ryan Industries Inc., of Cleveland, Ohio, U.S. Ryan are prominent in the field of cryogenic equipment and in the manufacture of cryogenic vessels for the storage and transportation of liquefied gases. Apart from sole manufacturing rights for Ryan equipment, Butterfield have been granted sole marketing rights in the U.K., the whole of Europe and West Africa.

In recent years Butterfield have invested quite heavily in equipment for cryogenic engineering, and the new agreement will enable them to offer "a very comprehensive range" of vessels in the future, to Ryan designs, for the transportation and storage of liquefied oxygen, nitrogen, argon, hydrogen, helium, etc. Vessels will range in capacity from 30 U.S. gall. to over 4,800 U.S. gall., while certain special vessels will probably be of more than 11,000 U.S. gall. capacity.

### International Plastics Congress in Amsterdam

The Plastics and Problems of Choice Congress to be held in Amsterdam on 15-17 October, 1962, will precede the third international plastics exhibition, macroPlastic, which will take place in Utrecht, 18-25 October.

## COKING INDUSTRY VISITORS SEE S.C.o.W. CARBONISING PLANT



General view of the by-products plants at Grange Works

ON a recent visit to the Grange coking plant of the Steel Company of Wales Ltd. at Port Talbot, a number of people, prominent in the coking industry, inspected the carbonising units which have a capacity of 10,900 tons of coal a week. Production is about 7,760 tons of furnace coke, 250 tons of tar, 84 tons of ammonium sulphate, 22,000 gall. of benzole and 117 million cu. ft. of gas a week.

Coke is used in the company's blast furnaces; tar is used either as a fuel in the Margam melting shop or is sold to

refiners; ammonium sulphate goes to fertiliser mixers; crude benzole is passed to the Port Talbot Chemical Co. as a material for hydrotreating with coke oven gas to high purity benzene; gas is boosted out for general works

Steel Company of Wales have 310 coke ovens, 230 at the Margam works and 80 at Grange. These ovens produce more than 30,000 tons of coke a week. Since it came into operation on 17 September 1959, the Grange coking plant has carbonised over 950,000 tons of coal.

## C.J.B. Have Good Forward Order Book for Chemical Engineering Projects

ALTHOUGH business in the U.K. field in which Constructors John Brown Ltd. operate has been scarce and highly competitive for some time, C.J.B. continue to complete their contracts on time. The company has a good forward order book for the current year and next year, although further work is needed for which capacity exists. This is stated in the annual report of John Brown and Co. Ltd.

Contracts in progress or awaiting execution for C.J.B. include a fertiliser works in Ulster for Richardson's Fertilisers Ltd. in whom I.C.I. have a substantial interest; four chemical plants for the U.S.S.R., two with members of the Fison group, two with the Albright and Wilson group; and a lube oil plant in association with Foster Wheeler for the West Australian refinery of British

Petroleum Co. Ltd.

C.J.B. have had a difficult year in Persia and anxiety is felt as to the eventual financial outcome of contracts, particularly as some have extended credit terms, not wholly covered by E.C.G.D. guarantee. Although the Kharg Island project in which C.J.B. played a leading part, was concluded profitably, two out of the company's major contracts now in course of execution in Persia in association with other concerns, are taking longer and proving costlier to complete than was expected.

This is largely due in each case to alterations by the customer in the project requirements, and to delays in materials procured by others. Provisions have been made on what "should be a sufficient scale to meet the final outcome of these contracts."

## The Nitrogen Problem

# Indian Professor Discusses Dangers of Fertiliser Excess

THE danger of over-dosing the soil with chemical fertilisers and the importance of humus and other organic matter used in conjunction with fertilisers was stressed by Professor N. R. Dhar in his presidential address delivered to the 48th Indian Science Congress held this year in Roorkee.

The title of the Professor's address was 'The nitrogen problem.' He first outlined the development of the nitrogen industry and its present state. At present, the world production of nitrogen is 7.4 million tons, 85% of which is produced in the form of ammonia by direct synthesis and 15% as calcium cyanide. Of the nitrogen consumed, 80% is as artificially fixed nitrogen, 10% comes from Chile salt-petre and a further 10% from coal ammonia. About 75% of the 2 million tons of nitric acid at present manufactured in the U.S. is used as fertilisers, 15% for explosives and 10% for dyes, fibres and plastics.

Although synthetic nitrogen factories have been started in industrially underdeveloped countries in recent years, these countries find it difficult to meet the heavy capital investment. The cost of different types of ammonia plant for the production of 100 tons of ammonia a day is as follows (in dollars): natural gas, 3,950,000; fuel oil, 4,098,000; coal, 4,248,000; coke oven gas, 3,620,000; and catalytic reformer gas, 2,980,000.

### World N Demand

In 1960-61, the world demand for nitrogen is expected to be 8.1 million tons, 3.1 million tons in Europe, 2.4 million tons in the U.S. and 2.6 million tons in other areas. This estimate is made by Professor Tinbergen and others of the Netherlands Economic Institute. They concluded that the consumption of nitrogen per acre of land is directly proportional to the population density of the country.

Professor Dhar went on to describe the researches that had been carried out on the problem of atmospheric nitrogen fixation in soils by the addition of various organic compounds. He said that they have come to the conclusion that these compounds, not only improve the physical properties of the soils, add colloids and improve the tilth, crumb formation and water retention capacity but the organic substances undergo slow oxidation in the soil and liberate energy which is utilised in fixing atmospheric nitrogen."

Referring to the U.S., the Professor said that it has been recorded that 35 million acres of cultivated land cannot grow food and have been abandoned

and 1½ million acres are being worn out every year. It has been frequently observed in different countries that the graph for the yield of increasing doses of nitrogen shows a higher maximum when straw has been added than in its absence. The humus content of the Corn Belt lands in the U.S. is declining due to inadequate replacement of organic matter and the yield is decreasing. In various parts of the world either insufficient amounts of organic matter has been returned to the land or humus oxidation has been promoted by too frequent cultivation and application of heavy doses of nitrogen fertilisers.

### Role of Manure

From the consideration of the results which were discussed in the Address it appears, the Professor stated, that manure and fertiliser can be profitable in permanent agriculture even in temperate countries because manure always supplies fair amounts of calcium carbonate and fixes atmospheric nitrogen in the soil and also protects soil nitrogen and humus.

The world cereal production can be roughly taken as 1,000 million tons and other food materials are produced to the extent of 700 million tons. Consequently, approximately 100 million tons of nitrogen are necessary for producing the world food materials. But the chemical industry is supplying only 7 million tons of nitrogen and legumes, 5 million tons.

The nitrogen requirements for food materials produced in the U.S. is of the order of 15 million tons. Figures show that chemical nitrogen is supplied to the extent of 1.5-2 million tons, legume nitrogen to 2 million tons and farmyard manure nitrogen to perhaps 1 million tons. This is applied to 520 million acres of agricultural land.

In the U.S.S.R., the total nitrogen requirement is 14-16 million tons a year. In 1958 in the U.S.S.R., 12.4 million tons of mineral fertilisers were produced, but nitrogen formed approximately 1 million tons. Russia is planning to triple her output of mineral fertilisers in the next five years and produce 70% more crops. By 1965, 35 million tons of mineral fertilisers are expected; the nitrogen content of the fertilisers would be of the order of 3 million tons. However, the amount of nitrogen necessary for the increased crop production is likely to be 20 million tons.

It is interesting to note that Japan expects to produce 1.3 million tons of nitrogen as early as possible. Moreover, at present, there is an enormous demand for nitrogenous fertilisers in China and

the application of chemical fertilisers is going up. China, however, is also the largest user of organic materials and utilises 70%. It has been estimated that the Chinese use over 1 million tons of nitrogen, 1-2 million tons of potassium, and 1-4 million tons of phosphorus as organics per year. Their crop production is higher than in many countries although the lands have been cultivated for thousands of years. This is possible because in China the quantities of plant nutrients introduced in the soil along with humus in the form of organics exceed the amounts applied as commercial fertilisers.

Similarly in Japan, along with large doses of artificials a great amount of humus is produced by organic manures. It appears that, in intensive cultivation, a large dose of organic matter is absolutely necessary for crop production with increasing amounts of chemical fertilisers.

From observations of total agricultural areas, total nitrogenous fertilisers used, amount of nitrogen applied and the cereal production in various countries, it appears that in countries not using large doses of commercial fertilisers, the cereal response to nitrogen is very marked, but that the law of diminishing return, which is often neglected in modern agriculture, is in actual operation in countries like the Netherlands, Belgium, Norway, etc. In countries such as Japan and China where a lot of composts and plant and animal wastes are used along with commercial fertilisers, better crop yields per unit of nitrogen applied are still obtained.

Professor K. A. Bondorff, Director of the State Laboratory, Lyngby, Denmark, has emphasised that fertilisers do not add any organic matter to the soil and undoubtedly increase the breakdown of humus. From observations at Rothampstead and in Scotland evidence is accumulating in favour of the view that fairly heavy doses of mineral nitrogen are accelerating the loss of humus.

It seems that 250 million tons of available nitrogen are necessary for the food, fibre and fodder production of the world, but only 3% of it comes from artificial fertiliser, 2% from legume nitrogen, 2-3% from precipitation and about 2% from farmyard manure. The rest comes from the soil, the nitrogen of which appears to have been derived from the thermal and photochemical oxidation of photosynthesised carbohydrates.

## Advances in Cereal Processing

FOOD GROUP of the Society of Chemical Industry is to hold a symposium on recent advances in processing cereals at the Royal Society of Medicine, London, on 14 and 15 September. Dr. D. W. Kent-Jones will give the opening address.

Papers will cover plant breeding, nutrient location, the malting process, protein wheat flour, wheat flour lipids, starches and bread. Applications to attend should be sent to the assistant secretary, S.C.I., 14 Belgrave Square, London S.W.1.



## Overseas News

### POLISH-HUNGARIAN CO-OPERATION ON CHEMICAL PRODUCTION

AN agreement has been drawn up between production units of the Polish and Hungarian chemical industries. The Hungaria chemical plant, of Hungary, is to work with the Oswiecim chemical combine of Poland in the field of p.v.c. production and with the Polish nitrogen works in Tarnów in that of caprolactam manufacture. Tarnów has at the same time formed a link with the Pét nitrogen combine of Hungary. (It is for ammonia producing operations at Tarnów that the London firm, Construction John Brown Ltd., will design and supply tonnage oxygen and nitrogen plants under the contract announced in C.A. last week, p. 222.)

Co-operation agreements have also been made between the Polish and Hungarian rubber industry research bodies, between pharmaceutical works at Kőbánya in Hungary and Jelenia-Góra in Poland (this for exchange of experience in steroid-hormone field) and between the Vác photochemical plant of Hungary and two Polish concerns. Planned for the future is a link between Hungarian and Polish industrial plastics producers. The pharmaceutical research institutes of the two countries have already been in communication for some time.

#### U.S. Production of Carbon Black

Production of carbon black from January to June 1961 in the U.S. was 972,798,000 lb., according to the Bureau of Mines. This compares with 1,078,253,000 lb. for the same period of the previous year.

#### Licensed Stearate Production in Holland

Witco-Gouda Stearaten NV is the name of a new chemical production undertaking set up in Holland by the Gouda concern NV Koninklijke Stearine Kaarsenfabrieken Gouda-Apollo. The company will produce metal stearates under licence from the Witco Chemical Co. Inc., of New York. The stearates are destined for both domestic industrial markets and for export.

#### Du Pont to Build Delrin Pipe Plant

E.I. Du Pont de Nemours will build a plant in Tulsa to manufacture oil field pipe of Delrin acetal resin. The company said that the plant, which will have a capacity of 5 million lb./year, will be in production by next summer. Construction will begin in a few weeks. The plant will be located on a site in the industrial district about six miles south-west of the city.

Mr. Walter H. Salzenberg, general manager of the company's poly-chemical department, which will operate the Tulsa plant, said the city was selected because of its location in the great oil producing region of the south-west. He said that additional fabricating plant may be built in that general area if the business grows as anticipated.

The Tulsa plant, which will employ 45 persons, will produce pipe in various diameters and thicknesses from resin manufactured at Du Pont's Parkersburg, W.Va., Delrin plant. The Tulsa plant is designed for possible future expansion.

Extensive field tests of the new type of pipe have been carried out by Du Pont over the past three years in the South West and other oil producing regions. Since introductory sales were begun in 1960, more than 30 miles of Delrin pipe have been installed. The pipe has been used successfully in crude oil flow lines, gathering lines, water flood lines and salt water disposal lines.

#### Czech Chemical Production Outpaces Plant Manufacture

Over the first half of the current year Czech chemical production was higher by 16.3% than that for the corresponding 1960 period. This was the highest increase rate for any branch of industry, though specific chemical products were manufactured in quantities below those planned.

Production of chemical plant and equipment over the period reached only 82.2% of the target figure and the erection of a number of new plants is being delayed.

#### ENI Will Build Petrochemical Plant for India

The Italian State-owned concern ENI, has obtained from the Indian Government a 100 million lire order for a petrochemical plant, a petroleum refinery, and a pipeline. The Indian Government has refinery projects at Gauhati (Assam), Barauni (Bihar), and in Gujerat, but it is not yet known which of the three will be built by ENI.

#### Imported Pharmaceuticals for Israel

As a result of consultations between the Minister of Finance, Public Health and representatives of medical organisations, the Israel Government has decided to grant £200,000 for a fund to be used to import pharmaceuticals.

#### U.S.-Italian Participation in Brazilian Chlorine Project

The Diamond Alkali International Co., a wholly-owned subsidiary of the Diamond Alkali Co., are to build a \$15 m.

electrolytic caustic-chlorine plant at Cubatao, Brazil, in partnership with the Brazilian industrial groups and Italian interests. Production is scheduled for 1963.

Quimica Industrial Medicinalis S.A. and Brazil Warrant Cia de Comercio e Participacoes and an Italian group represented by Ibis International Investments Incorporated will join Diamond Alkali in the construction of the plant.

#### Canadian Plant Produces Rubber Blowing Agent

A new plant of Canadian Industries Ltd. at Hamilton, Ontario, is now in commercial production of Vulcaceal BN, a proprietary blowing agent for use in the manufacture of foamed rubbers and plastics. The plant is the only one of its kind in Canada and is capable of producing all Canadian requirements for the chemical.

#### Swiss Chemical Exports Up

Over the first half of the current year Switzerland exported chemicals and pharmaceuticals worth 811.5 million francs, as against a total of only 749.9 million for the first half-year of 1960. These exports stood in second place in the list of total Swiss exports, the combined worth of which rose over the period from 3,791,900,000 francs to 4,174,300,000 francs.

#### New Hewlett-Packard Capacities in Europe

Hewlett-Packard Co., the California, U.S., producers of laboratory equipment, are to erect a new four-building production plant at Boeblingen, West Germany. The company already has the use of a leased plant in Boeblingen, capacity potential of which is however no longer sufficient. The new German unit will cost something over £100,000 and some into operation early next year. The company's U.K. subsidiary, Hewlett-Packard Ltd., plans to start production at a leased works in Bedford in September of this year.

#### Foam Catalyst Expansion for Houdry

Houdry Process Corporation will more than double their production capacity for Dabco (triethylenediamine) foam catalyst through construction of a second plant at Paulsboro, N.J. A company spokesman states that Dabco orders from both domestic and foreign urethane foam producers have increased steadily since the initial marketing of the chemical.

#### Computer Centre for Huls

The new computer centre of Chemische Werke Huls at Marl, officially opened recently, is believed to include the most advanced electronic data processing facilities that have yet appeared in West Germany. The centre is designed to deal with a number of scientific and engineering problems relating to laboratory and plant operations, as well as handling Huls' accountancy work.

The computer equipment is American in origin, including a high speed, four channel IBM 7070 computer along with eight IBM 719 magnetic tape units and two IBM 1401 data processing units.

The new centre is a further indication that German chemical companies are interested in the adaptation of computers to processing operations. *British Anilin- und Soda-Fabrik* will have a chemical process controlled by a Thompson Ramo Woodridge RW-300 digital computer at their *Lugwigshafen am Rhein* plant (see *CHEMICAL AGE*, 29 October 1960, p. 710).

### Polythene Film Expansion for Du Pont

Plans to double the capacity of their polythene film plant at Richmond, Virginia, have been announced by E. I. du Pont de Nemours and Co., U.S. Construction will begin immediately and the additional facilities are expected to start production about the middle of 1962. When in full operation the plant will be able to produce more than 60 million lb./year of the packaging film. Du Pont report that sales of their polythene films for packaging have grown steadily since the present manufacturing facility started operations in June of last year.

### New Drug Firm for Canada

John Labatt, Ltd., London, Ontario, one of Canada's major brewery companies, and Philips Canada have joined to form a new company, Canada Duphar Pharmaceuticals Ltd., it was announced by Mr. J. H. Moore, president of John Labatt, and Mr. D. C. F. van Eendenburg, president of Philips Electronics Industries Ltd., controlled by Philips of Eindhoven, Holland. Canada Duphar have purchased Charles R. Will and Co. Ltd., who have been making pharmaceuticals in London, Ontario, since 1922.

Philips Canada are associated with Philips-Duphar, a producer of basic chemicals and pharmaceutical products in the Netherlands.

### Austrian Methanol Plant in Operation

The first half of next year is given as the starting date for the second stage of the petrochemical methanol plant of the Austrian HIAG-Werke concern, the first production section of which has now begun operating. The plant, which cost some Sch.40,000,000 and took nine months to build, initially produces 10,000 tonnes/year of pure methanol, a capacity to be doubled by the future opening of the second stage.

### U.S. Plant Produces New Polyethers

A new line of polyethers to be marketed to the urethane industry, designated Actol, are now being made available in commercial quantities, following the start-up of Allied Chemical International's new 20 million lb./year plant at Baton Rouge, Louisiana, U.S. First two polyethers to be marketed are

Actol diol 21-56 and Actol triol 31-56, these being specially tailored to meet the needs of the urethane industry for flexible foams of consistent quality.

Previously, foam producers have experienced variations in compression and rebound characteristics traceable to variations in polyether quality. Allied Chemical state that the elimination of these problems in formulations using the new Actol resins reflects the development of a new type of reactor designed by the company's engineering staff.

### Oronite Phthalic Anhydride Plant for New Jersey

A 30 million lb./year phthalic anhydride plant is to be built at Perth Amboy, New Jersey, U.S., by the Oronite Division of California Chemical, a Standard Oil subsidiary. The plant will be adjacent to the refinery of California Oil Co. Oronite's present production of phthalic anhydride is centred mainly at Richmond, California.

### Houdriformer Unit On Stream in Japan

A Houdriformer unit with a nominal design capacity of 6,000 b.p.s.d. of petroleum naphtha has started operations at Nippon Mining Co.'s refinery at Mizushima, Japan. The Houdriformer, licensed and designed by Houdry Process Corporation, Philadelphia, is the largest of its kind in Japan. The unit has a pre-treater which also handles the desulphurisation of naphtha to be used in jet plane fuel.

### New Chemical Lab. for C.S.I.R.O.

A new chemical laboratory to be built by C.S.I.R.O. at Clayton, Victoria, Australia, will be one of the most modern and best equipped chemical laboratories in Australia. It will cost £450,000 and will house the Division of Chemical Physics, a unit of the C.S.I.R.O. Chemical Research Laboratories. It is hoped

that the building will be ready for occupation in 1963.

The laboratory will be named the David Rivett Laboratory in memory of the first chief executive officer of the C.S.I.R.O.

### U.S. Firm Produces New Corrosion Inhibitor

An oil-soluble corrosion inhibitor with many uses in the protection of metal parts and products has been announced by the Industrial Division of Nopco Chemical Co., Newark, N.J., U.S. Called Nopcochex D, the product can be mixed with water, conventional oils or solvents to produce many different types of rust preventives from the single concentrate. The various blends can be applied by brushing, dipping, spraying or slushing. Nopcochex D is claimed to be highly effective in the treatment of bar stock, sheet steel, tools, castings, assemblies and storage tanks, and in final tumbling operations of ferrous metal parts.

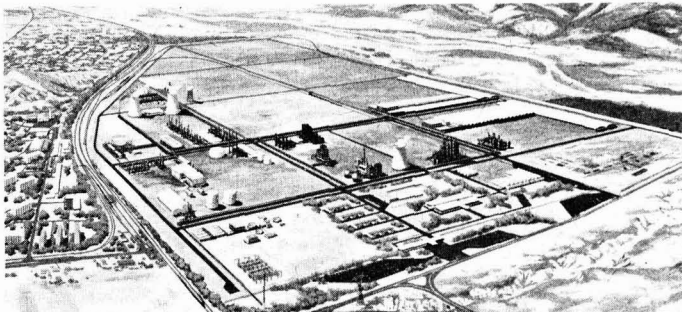
### Spectral Analysis Rods From Czechoslovakia

The *Technokarbon* concern, of Topolcany, Czechoslovakia, have started production of high-purity, boron-free carbon rods for use in spectral analysis. The rods will be available for export.

### U.S.-French Agreement on Solid Fuels for Rocketry

Thiokol Chemical Corporation, of the United States, and the French company Société d'Etude de la Propulsion par Réaction have signed an agreement under which each signatory will be able to market the products of the other. The agreement, which also foresees exchange of experience in the sector, covers the field of solid fuel for rockets. Should it be ratified by the French and U.S. Governments, the agreement will result in sales of Thiokol and SEPR fuels in U.S. and Europe.

## Artist's View of ANIC's Ferrandina Plant



Artist's view of the petrochemical plant which ANIC (E.N.I. Group) has started building at Pistici, near the now famous natural gas beds of Ferrandina, Southern Italy. The new plant will utilise about 600,000 cu. m./day of methane, producing methanol, monomers for plastic materials, man-made fibres, and acetylene derivatives. Some units will be ready to operate in two years' time, while the full production schedule (including man-made fibres) will be launched a year later.

● Three new directors have been co-opted to the board of Goulding Fertilisers Ltd., Dublin. **Mr. T. G. Webb**, technical superintendent of the group for some years, joined the staff in 1947 after 20 years' experience as a chemist in the oil industry in the Middle East and U.S.A. He was a member of the Councils of the Society of Chemical Industry and the Fertiliser Society during 1959-61. **Mr. L. D. Latham**, chief engineer of the group, joined the staff in 1953, having had extensive experience in India and Rhodesia. **Mr. J. W. Good** has been secretary of W. and H. M. Goulding, Ltd., and other companies in the Goulding group since July, 1960.

● **Mr. B. T. Jenkins**, labour manager for four years at the Wilton works of I.C.I. Ltd., has been appointed to the company's central labour department and takes up his new post later this year. His successor at Wilton, **Mr. C. T. G. Blackmore**, is at present staff manager. **Mr. Blackmore** joined I.C.I. in 1948.

● **Mr. Peter Bonner** has been appointed to the board of T. C. Jones and Co. Ltd., structural engineers of the 600 Group. Before joining T. C. Jones he was with Ashmore, Benson, Pease and Co., where he held technical sales, production engineering and managerial positions.

● **Professor Giulio Natta** has been awarded the Medal of the Benemeriti della Scuola, dealla Cultura e dell'Arte, which is reserved for those who have distinguished themselves particularly in the fields of education, culture or arts. Professor Natta has about 350 publications and over 100 patents to his credit. He has been interested in polymerisation since 1938. In 1953 he extended his work—until then confined to olefins—to the study of stereospecific polymerisation.

● **Mr. A. B. Merriam** has been appointed to the board of Halex (division of the British Xylonite Co. Ltd.) as production director. For the past three years works manager of Halex, he is a great-grandson of the original founder of the British Xylonite Co. Ltd., **Mr. L. P. Merriam**.

● **Mr. A. van Halewijn** has left the board of the Vereinigte Glanzstoff-Fabriken synthetic fibres producers, Wuppertal, West Germany, being replaced by **Mr. J. J. W. den Haan**.

● A number of scientists of the Department of Scientific and Industrial Research are taking part in the 18th International Congress of Pure and Applied Chemistry in Montreal from 2 to 12 August. **Dr. H. Egan**, of the Laboratory of the Government Chemist is presenting a paper on the 'Paper chromatographic determination of dielin and pesticide residues in wildlife.' Other papers are being read by **Mr. A. S. Joy** of Warren Spring Laboratory and **Mr. A. J. Heselden** of the Joint Fire Research Organisation (Reactions at a copper/xanthate electrode) and by **Mr. H. A. Sloman** of the National Physical Laboratory (an assessment of the present position in the U.K. of the quantitative

## PEOPLE in the news

determination of gases in metals). In addition **Dr. J. S. Anderson**, Director of the National Chemical Laboratory, will be co-chairman of one of the sessions concerned with phase equilibria and reactions at high temperature.

● **Mr. David K. Watkins**, product group executive, has been promoted sales manager of William R. Warner Pharmaceutical Division. **Mr. Francis R. Elkins**, sales manager, has been appointed marketing and sales promotion group manager of William R. Warner and Co.

### Obituary

## Mr. W. J. V. Ward, I.C.I. Billingham Chairman

**Mr. W. J. V. Ward**, chairman of the Billingham Division, Imperial Chemical Industries Ltd., died on 10 August in Stockton and Thornaby Hospital. He had been seriously ill for a week. He had been chairman of the Billingham Division since February, 1955, and the whole of his 35 years' service with I.C.I. had been with that Division. He would have been 59 this month.

A Londoner by birth, he was educated at the Royal College of Science, of which he was an Associate, and at Cambridge University where he obtained a B.A. degree with first class honours in natural



W. J. V. Ward

science. He went to Billingham in 1926 as a chemist in the Research Department laboratories and in 1928 became a process plant manager on methanol, ammonia and Drikold. In 1932 he became senior plant manager on process and the following year was appointed

Ltd., Eastleigh, Hants. Three new regional managers appointed by William R. Warner and Co. are **Mr. L. W. Brock**, who will cover the Eastern region; **Mr. E. J. Russell**, who will cover the Birmingham and South Wales region; and **Mr. H. O. Annett**, who will cover the Southern region.

● **Mr. H. Warne** has resigned his position of managing director of William Blythe and Co. Ltd. He has also resigned his seat on the board of the parent and subsidiary companies.

● The Incandescent Group of companies has appointed **Mr. W. S. Sinclair** to be manager of their Cardiff office. **Mr. Sinclair** has been 12 years with the company.

### Wills

**Mr. William Herbert Fletcher**, formerly of Southall Bros. and Barclay, manufacturing chemists, who died on 24 May, left £20,015 net (duty paid £2,418).

**Mr. Walter Topliss Watts**, formerly a director of Stevenson and Howell Ltd., manufacturing chemists, distillers of essences and essential oils, etc., of Standard Works, London S.E.1, who retired in 1953 after 59 years' service with the company, and who died on 1 April, left £8,695 net (duty paid £698).

Drikold Group Manager. In 1933 he was promoted to deputy works manager of Oil Division and for about 10 years was closely associated with the hydrogenation process for making petrol and other products.

In 1936 he joined the directorate staff as chief technical assistant and in 1940 went to the Heysham Works as hydrogenation manager. He returned to Billingham in 1944 as ammonia technical manager in the technical department and three years later was appointed organics technical manager. In 1948 he became technical department manager and at the end of 1949 was appointed to the Division board as technical director. He succeeded Dr. G. I. Higson as the Division chairman in 1955. He had also been a member of Wilton Council from the same date.

**Prof. Ralph Francis Naylor**, London-born organic chemist who was appointed to the Chair of Chemistry at the new Royal College in Nairobi at the beginning of this year, has died in a road accident in Northern Rhodesia at the age of 40. After graduating at Imperial College and later obtaining his Ph.D., he was engaged for a period with a research association in the U.K. until obtaining a post as lecturer in chemistry at Makerere College in Kampala in 1949. He retained this post until his appointment to the new Chair at Nairobi.

## Commercial News

### B.B.H.

Accounts of Burt, Boulton and Haywood Ltd. show net profits of £398,097 for the year ended 31 March 1961, compared with the comparative 1960 figure of only £148,218. The 50% interest in Burts and Harvey Ltd. held by outside shareholders was purchased as at 31 March and the above amount includes the profits of Burts and Harvey and the proportion of the profits of its subsidiary attributable to its holding therein, for the 15 months ended 31 March 1961. One half of such profits has been treated as pre-acquisition.

Group profits, before tax, attributable to the parent company after deducting the cost of Preference dividends, amount to £427,251 compared with the forecast of £420,000 in the May circular to Ordinary holders.

Dividends totalling 16%, against 10%, have been paid on the Ordinary capital increased by acquisition and absorbed £123,559 against £55,657.

### British Tar Products

Net profit of British Tar Products for the year ended 31 March 1961 was £45,943 (£54,971) and the dividend 15% (same).

### Dales Chemicals

Orbit Holdings Ltd., London E.C.2, have agreed to acquire the undertaking of Dales Chemicals Ltd., Otley, Yorks, a private company producing high-grade fluorspar and barytes from its mineral concessions in Yorkshire. The purchase price of £120,000 is to be satisfied as to £30,000 in cash and the issue to the vendors of 156,522 Orbit ordinary shares.

### Mead Johnson

Mead Johnson, the American pharmaceutical company which has acquired a 35% interest in British Drug Houses, announces higher earnings for the first half of 1961. Earnings a share were \$2.98 against \$2.78 in the same period of 1960.

### M.O.R. (Holdings)

Manchester Oil Refinery (Holdings), controlled by Lobitos Oilfields, are acquiring the balance of the ordinary capital of a company engaged in the business of refining and merchanting oil products for a consideration of £46,704.

### Settle Limes

The offer by Imperial Chemical Industries to members of Settle Limes Co. Ltd. (see C.A., 3 June, p. 884) has been accepted in respect of more than 90% of the shares concerned and is now unconditional.

### B.A.S.F.

The extra shares worth a total of DM 100 million which have been introduced to raise the capital of the Ludwigshafen-on-Rhine, West Germany,

- **B.B.H. Group Profits Exceed Forecast**
- **Orbit Acquire Dales for £120,000**
- **I.C.I. Offer for Settle Limes Accepted**
- **Du Pont Form Swedish Subsidiary**

chemical concern Badische Anilin- und Soda-Fabrik AG (see CHEMICAL AGE, 15 April, p. 628, and 22 April, p. 666) have been introduced to West German Stock Exchanges and to those of Zurich, Basle and Geneva. Trading in them began on 8 August. Introduction of the new shares to such other foreign Stock Exchanges as carry B.A.S.F. shares will be "in the near future", says the company.

### Du Pont, Sweden

E. I. du Pont de Nemours and Co., of Wilmington, Delaware, have formed a wholly owned Swedish subsidiary which will manufacture and sell paint products in Sweden and other markets of the European Free Trade Area. The new subsidiary, Du Pont de Nemours Nordiska A/B, was established through Du Pont's purchase of the capital stock of A/B Dulac, its paint distributor in Sweden for the past 30 years.

The new company will build a multi-million Swedish Kroner plant on a 15-acre site at Maersta, about 24 miles north of Stockholm, to produce paint, enamels, lacquers, varnishes and thinners, for automotive, industrial and household uses. Construction will get under way later this year, and the plant is expected to begin operation by the end of 1962.

### Inco

Interim report of the International Nickel Company of Canada Ltd. and subsidiaries for the six months ended 30 June, 1961, shows net earnings in terms of U.S. currency of \$37,653,000 after all charges, depreciation, depletion, taxes, etc., equivalent to \$1.28/common share. In the first six months of 1960 net earnings were \$43,902,000, or \$1.50/common share. Net earnings of \$18,993,000, or 65 cents/common share, in the three months ended 30 June, compare with \$18,660,000, or 63 cents/common share, in the first quarter. They were substantially the same as the \$18,970,000, or 65 cents/common share, for the second quarter of 1960.

Capital expenditures of \$22,205,000 were made during the first six months, compared with \$36,179,000 in the first six months of 1960.

### Sachtleben

The Cologne, West Germany, chemical producer Sachtleben AG für Bergbau und Chemische Industrie is to recommend to its shareholders' meeting, to be held on 30 May, a 1960 dividend of 12%. A 10% dividend was paid on the previous financial year.

### Associated Continental Petroleum

Associated Continental Petroleum will be registered in Melbourne shortly with

a nominal capital of £A5 m. The company will acquire one half of Papua Apinaipi Petroleum's interests in existing joint venture arrangements which will enable it to operate within Associated group.

This group comprises Associated Australian Oilfields, Associated Freney Oilfields and Papuan Apinaipi Petroleum operating in conjunction with Interstate Oil and H. C. Sleight. The new company will seek £A250,000 by an issue of 5s. shares.

### Pechiney-Outreau

Péchiney and Acieries de Paris et d'Outreau are to form jointly a new company—Les Metaux Pours Péchiney-Outreau M.P.O.—on a fifty-fifty basis. Main object of the new company, with an initial capital of NF.5 million, is to produce and sell electrolytic manganese.

A plant with an initial capacity of 3,000 tons per annum is to be built in Boulogne sur Mer in Northern France.

### NEW COMPANIES

CROFTSHAW (SOLVENTS) LTD, Manufacturers of and dealers in machinery or devices for the extraction, reclamation, filtration and purification of paints, plastics, chemicals, lubricants, catalysts, etc. Directors: P. G. Croft, J. R. Foxcroft. Secretary: J. R. Foxcroft. Reg. office: 523 Ordnance Road, Enfield Lock, Middx.

CHASE ORGANICS (GREAT BRITAIN) LTD, Cap. £30,000. Manufacturers of and dealers in natural, chemical and manufactured fertilisers, etc. Directors: J. L. H. Chase and H. T. L. Loftus-Tottenham. Reg. office: Gibraltar House, Govett Avenue, Shepperton.

BRADFORD PATENT SOAP CO. LTD, Cap. £100. Subscribers: S. Hart and A. Hart. Reg. office: 160 Canal Road, Bradford.

### INCREASES OF CAPITAL

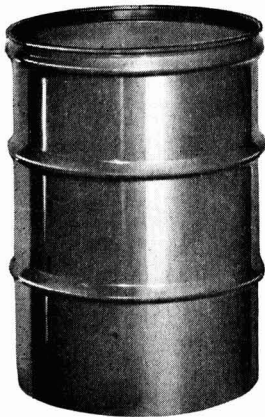
CHEMISCHE FABRIEK NAAEDEN, the Dutch chemical producer, has increased its capital from 6,255,000 florins to 7,055,000 florins. This is connected with Naarden's taking-over of all shares of an as yet unnamed organics producer with international interests (C.A. 5 Aug., p. 203).

KOHLensäUREINDUSTRIE AG, the Düsseldorf, West Germany, chemical concern, have increased their capital from DM 10 million to DM 12 million. The new shares have been issued at par.

PARTICIPATIONS COMMERCIALES, CHIMIQUES ET MINIERES S.A., chemical holding company, Basle, Switzerland. Capital increased from S.F. 1 million to S.F. 2 million.

*Braby*  
(REGD.)

# STEEL



# DRUMS

There are Braby Drums for every purpose—oils, insecticides, liquid chemicals, greases and powders.

Braby Drums are obtainable in many sizes, types and weights and in a variety of finishes, both exterior and interior. Painted, galvanized, shot-blasted and lacquered finishes can be supplied and the exteriors of certain drums can be decorated to customers' designs. Write for details to:

**FREDERICK *Braby* & COMPANY LIMITED**

**LIVERPOOL** Havelock Works, Aintree, Liverpool 10 Tel: Aintree 1721

**HEAD OFFICE:** Braby House, Smithfield Street, London, E.C.1 Tel: Central 2388

**CRAYFORD · GLASGOW · BRISTOL · BELFAST · PLYMOUTH**

**MEMBER OF BRABY OF BRITAIN GROUP**



# TRADE NOTES

## TiO<sub>2</sub> in Paper

A booklet dealing with the estimation of titanium dioxide in paper has been produced by British Titan Products Co. Ltd., 10 Stratton Street, London W.1. Methods of testing the raw material bought as a pigment, of checking the titanium content of the paper stock or coating mix, and of checking the amount of titanium in the finished product are described.

## Laboratory Apparatus Exhibitions

Modern laboratory equipment will be shown by a number of well known manufacturers at two exhibitions being staged in Cardiff and Manchester by Griffin and George Group. They will be held in the Welsh College of Advanced Technology, Cathays Park, Cardiff, 12-14 September inclusive, and at the Chorlton Town Hall, Cavendish Street, Manchester, 18-21 September inclusive.

Enquiries should be addressed to the Group's regional service centres at Birmingham (Mr. C. J. Passmore) and Manchester (Mr. D. F. Savage) respectively.

## Molybdenum Disulphide Varnish

A new grade of varnish for the production of resin-bonded molybdenum disulphide films on metals and other surfaces is Molydite Plus, which is being marketed by Rocol Ltd., Swillington, Leeds, Yorks, in addition to their Molytox Plus general purpose varnish. The new grade gives a tougher bonding but requires more care in application and baking at a comparatively high temperature (200°C/392°F). The two varnishes are described in Leaflet I.F.S. 111 available from the company.

## New B.D.H. Chemicals

Among the additions to the B.D.H. range of chemicals is a series of special grade hydrocarbons—*n*-heptane, *n*-hexane and *n*-pentane—with a purity of at least 98%, as determined by gas-liquid chromatography, and a boiling range of not more than 1°C. These are available in addition to the petroleum fractions already listed.

## British Petroleum Equipment

The 1961/62 edition of 'British Petroleum Equipment' is now available. The first section, comprising some 120 pages, contains a complete list of all member firms of the Council of British Manufacturers of Petroleum Equipment, their addresses, telephone numbers and spheres of activity. It also includes a classified list of equipment and services provided by these firms, broken down into 2,000 separate headings and including everything from rivets to refinery installations. A fully cross-referenced 10-page index is provided.

The second section, comprising 812 pages, is devoted to announcements from member firms. These take the form of condensed catalogues and specification

sheets of the company's products, providing all the technical information necessary before the oil buyer decides upon a preliminary enquiry.

This reference book, copiously illustrated and strongly bound, is available from the Council of British Manufacturers of Petroleum Equipment, 2 Princes Row, London S.W.1, price £2 10s.

## Changes of Name

General Chemical and Pharmaceutical Co. Ltd., Judex Works, Sudbury, Wembley, have changed their name to General Chemical Co. Ltd., Ansar Harford and Co. Ltd., 3 Abchurch Yard, London E.C.4, to A. Karford and Co. Ltd., and Caleno Co. Ltd., 86-88 Queen Victoria Street, London E.C.3, to Coplans and Wilkinson Ltd.

## Butyl Rubber Technology

Technical information sheets B-46 and B-47 issued by the Esso Petroleum Co. Ltd., Chemicals Division, 50 Stratton

Street, London W.1, are entitled, respectively, 'Resistance of butyl vulcanisates to 300-500°F temperatures' and 'A versatile filler for butyl rubber—platy tale'. The latter publication deals with a selected type of tale (a platy one) which is claimed to fill a need for a moderately priced, high physical strength filler which is also outstanding for its ability to improve the high dielectric strength of insulation compounds.

## Fielden Service

Fielden Electronics Ltd., Wythenshawe, Manchester, announce that they are now able to offer better after-sales service to customers in the Midlands Area through a recently opened service department in the building housing their Walsall Offices.

## Electronic Computer Exhibition

Details of an Electronic Computer Exhibition, which is to be held in London on 3 to 12 October, 1961, are announced in a booklet recently issued. The booklet, written in five languages—English, German, French, Italian and Spanish—reveals that 37 manufacturers in the computer field in the U.K. will display their equipment.

## WORKS ACCIDENT STATISTICS RECORDED AND ANALYSED

**I**N 1960 there were 190,266 industrial accidents thought serious enough to require reporting to the Factory Inspectorate, and very many more of a less serious nature.

To deal effectively with this problem it must be known when, where, why and how accidents are occurring. This means that a satisfactory accident recording system must be established. To do this, prepare statistics from the records and present them in a clear and concise manner may present some difficulty without guidance. It is to meet that need that 'Works Accident Statistics, Part 2: Records and Analysis' has been published by the Royal Society for the Prevention of Accidents.

The pamphlet, Safety Organisation Pamphlet Number 6, describes the best method of recording accidents, some ways of drawing statistics from the records and the methods of presenting them in the form of tables and graphs. The difficulty of drawing graphs so that they do not allow for any misrepresentation is also discussed.

The pamphlet is available at 5s (3s 9d to members) from the Service Department, RoSPA, 52 Grosvenor Gardens, London S.W.1.

## Extra Pharmacopœia Supplement Published

It has been the practice in the past to publish new editions of the two volumes of the *Extra Pharmacopœia* every four or five years. However, due to the increasing rate at which new medicinal

substances are introduced, it has been decided that, rather than produce at this time a completely revised edition of Volume II, the needs of most users of the *Extra Pharmacopœia* would be best served by the publication of a smaller volume providing supplementary information on those sections of volume II that are most in need of revision together with information on the composition, dosage, therapeutic applications and toxic effects of the new drugs and proprietary medicines that have been introduced since the publication of the last edition of volume I.

The 1961 supplement to the *Extra Pharmacopœia* is now available from the Pharmaceutical Press at a cost of 32s 6d.

## Principles of Chemical Equilibrium

Number 5 in the Monographs for Teachers Series is a booklet on the 'Principles of Chemical Equilibrium'. The series is published by the Royal Institute of Chemistry and sponsored by the Institute's fund for the development of education in chemistry. As with the first four monographs in the series, the publication is intended for the guidance of those who teach chemistry at the G.C.E. Advanced Level and above, but the monograph is expected to be of value to a wider readership, including more advanced students of chemistry.

Copies of Monograph No. 5 may be obtained from the Royal Institute of Chemistry, 30 Russell Square, London W.C.1, price 4s 6d.

## COLT create the right climate in

On the upper working levels especially—with half of the reactor and steam pipes below him—a man needs fresh air to be comfortable.

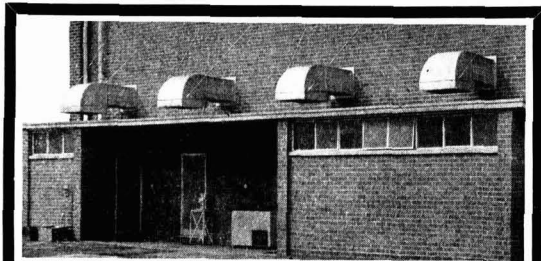
The first summer's operation of their No. 1 Polyethylene Pilot Plant at Carrington, brought this home to Shell Chemical Co. Ltd. So they called in Colt to improve conditions.

One result of the Colt installation of a system of air inflow units and natural extractors was a repeat order! A similar system has now been installed in the recently completed No. 2 Pilot Plant.

Similar Colt systems are at work in every branch of the Chemical industry, eliminating conditions that make efficient, contented work difficult, or even impossible.

Colt's practical experience of the ventilating problems that arise in Chemical Manufacture and Processing could prove useful to you.

Ask your Secretary to write to the Information Officer for a free Manual of Colt Service and Equipment.



Four of the eight Colt filtered air inflow units in the No. 2 Pilot Plant at the Carrington Research Laboratories of Shell Chemical Company Ltd., nr. Manchester.

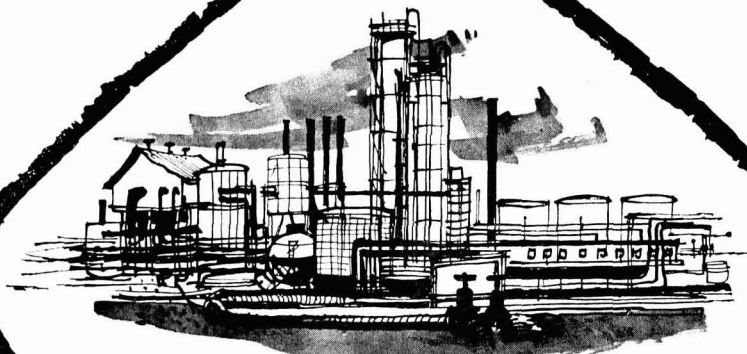
# COLT

industrial ventilation

COLT VENTILATION LTD SURBITON SURREY Tel: ELMBRIDGE 0161

## 200 chemical works

Albright and Wilson (Manufacturing) Co. Ltd  
 Allen and Hanbury's  
 Aspro-Nicholas  
 E.B. Badger and Son Ltd  
 Bakelite  
 F. W. Berk and Co. Ltd  
 J. Bibby and Sons  
 Boots Pure Drug Co. Ltd  
 Bowmans Chemical Ltd  
 British Glues and Chemicals  
 British Geon Ltd  
 British Hydrocarbon Chemicals Ltd  
 British Industrial Solvents Ltd  
 British Oxygen Co. Ltd  
 British Resin Products  
 British Titan Products Ltd  
 W. J. Bush and Co  
 B. X. Plastics  
 Coates Bros. and Co  
 Courtaulds Ltd  
 Distillers Co. Ltd  
 Distillers Co. (Biochemicals) Ltd  
 Alexander Duckham and Co  
 Esso Petroleum Co  
 Evans Medical Supplies  
 Fisons Ltd  
 Forth Chemicals Ltd  
 Glaxo Laboratories  
 I.C.I. Ltd  
 Laporte Industries  
 Monsanto Chemicals Ltd  
 Metal Box Co. Ltd  
 Petrochemicals Ltd  
 Pinchin, Johnson and Associates  
 Reckitt and Coleman Ltd  
 Shell Chemical Co. Ltd  
 Smith and Walton  
 Stewart and Lloyds Plastics Ltd  
 Vulcanite Ltd  
 Unilever  
 Yardley and Co



# NEW PATENTS

By permission of the Controller, H.M. Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2. price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

## ACCEPTANCES

### Open to public inspection 13 September

- 6-Sorbamidopencillinic acid. Beecham Research Laboratories Ltd. **877 323**  
 Boron nitrogen polymers. United States Borax & Chemical Corp. **877 324**  
 Steroid compounds. Merck & Co., Inc. [Divided on 877 087.] **877 086**  
 Steroid compounds. Merck & Co., Inc. [Divided on 877 085.] **877 087**  
 Cross-linked polyesters derived from epoxy fatty acids or esters and trialkoxy boroxines. Swift & Co. [Divided out of 861 971.] **877 137**  
 Production of condensation products. Badische Anilin- & Soda-Fabrik AG. **835 588**

### Open to public inspection 20 September

- Phosphatic fertilisers. Fisons Fertilisers Ltd. **877 618**  
 Curing of epoxide resins. Devoe & Ravnolds Co. Inc. **877 827**  
 Preparation of cyanuric acid. Food Machinery & Chemical Corp. **877 725**  
 Isopropanol purification process. Distillers Co. Ltd. **877 622**  
 Dyestuffs derived from perinones and a process for their preparation. Compagnie Francaise des Matières Colorantes. **877 910**  
 Phthalazinium compounds and their pseudo basis and the anhydrides thereof. Ciba Ltd. **877 623**  
 Protein hydrolysates. Merck & Co. Inc. **877 727**  
 Purified silicon, bromide and silicon iodide and silicon prepared therefrom. Licentia Patent-Verwaltungs-GmbH. **877 904**  
 Methods of nitriding articles made from a metal alloy. Elektrophysikalische Anstalt B. Bergaus. **878 675**  
 Phosphoric acid ester derivatives of hydroxy-alkyl or hydroxycycloalkyl esters of  $\alpha,\beta$ -ethylenically unsaturated monocarboxylic acids. Rohm & Haas Co. **877 905**  
 Process for the production of polyethers. Farbenfabriken Bayer AG. **877 913**  
 Stabilisation of rubbery copolymers. Monsanto Chemical Co. **877 771**  
 Heterocyclic sulpho-compounds. Dehydtag Deutsche Hydrierwerke GmbH. **877 957**  
 Process for the manufacture of cyanuric chloride. Mitto Nagaku Kogyo Kabushiki Kaisha and Zaidan Hojin Nitto Rikagaku Kenkyusho. **877 906**  
 Aliphatic acyl esters of oleandomycin. Pfizer & Co. Inc. **877 730**  
 Manufacture of ion exchange resins in spherical form. Schwarz, G., and Naumann, K. **877 935**  
 Preparation of organoborons. Purdue Research Foundation. **877 936**  
 Cellulose acetate films. British Celanese Ltd. **877 937**  
 Preparation of carbon black. De Galocsy, Z., and Prunet, J. **877 938**  
 Heat hardenable compositions. British Resin Products Ltd. **877 733**  
 Polymers. Celanese Corporation of America. **877 829**  
 Polymers and telomers of tetrafluoroethylene. Imperial Chemical Industries Ltd. **877 961**  
 Elastomer adhesives and method for the employment thereof. Borg-Warner Corp. **877 923**  
 Tetra-aza-porphin dyestuffs. Farbenfabriken Bayer AG. **877 894**  
 Oxidation of organic compounds. Imperial Chemical Industries Ltd. **877 677**

- Monoazo dyestuffs and the production of same. Badische Anilin- & Soda Fabrik AG. **877 678**  
 Process for the production of hydrocyanic acid. Imperial Chemical Industries Ltd. **877 947**  
 Phenol-formaldehyde reaction products. Union Carbide Corp. **878 034**  
 Water-insoluble monoazo dyestuffs. Farbenfabriken Bayer AG. **877 739**  
 Process for dyeing nitrogenous fibres. Ciba Ltd. **878 021**  
 Aryloxyaliphatic compounds. Rhone-Poulenc. **877 830**  
 Synthetic resin coatings. Imperial Chemical Industries Ltd. **877 858**  
 Metallised monoazo triazine azo dyestuffs. Imperial Chemical Industries Ltd. **877 859**  
 Polymerisation catalysts for certain unsaturated organic compounds. Canadian Industries Ltd. **877 862**  
 Process for the production of amine boranes. Farbenfabriken Bayer AG. **877 863**  
 Flame retardant or self-extinguishing polymer compositions and method for their production. Dow Chemical Co. **877 864**  
 Process for the production of modified melamine resins. Henkel & Cie GmbH. **877 670**  
 Phosphoryl and thiophosphoryl isocyanates and isothiocyanates. Armour & Co. **877 671**  
 Polymerisation. Union Carbide Corp. **877 672**  
 Process for the manufacture of certain substituted naphthalene sulphonic acids. Farbenfabriken Bayer AG. **877 835**  
 Solvents for polymers. Chemstrand Corp. **877 657**  
 Polymerisation. Union Carbide Corp. **877 879**  
 Organic tertiary phosphines. American Cyanamid Co. **877 920**  
 Method of producing phosphoric acid ester-containing cleansing and disinfecting agents in cake form. Goldschmidt AG. **877 873**  
 Production of acrylonitrile. Du Pont de Nemours & Co., E. I. **878 054**  
 Curable halogenated alpha olefin polymers. Esso Research & Engineering Co. **877 833**  
 Copolymerisation of vinylidene chloride and vinyl chloride. Grace & Co., W. R. **877 631**  
 Phenyl cyanates and a process for their production. Farbenfabriken Bayer AG. **877 843**

- Epoxidation. Food Machinery & Chemical Corp. **877 632**  
 Process for producing para-nitrodiarylamines. Universal Oil Products Co. **877 884**  
 Polymerisation of conjugated dienes. Goodrich-Gulf Chemicals, Inc. [Addition to 827 365.] **877 661**  
 Treatment of aromatic polyamide structures. Du Pont de Nemours & Co., E. I. **877 885**  
 Preparation of acetaldehyde monoacetate. Union Carbide Corp. **877 662**  
 Process of reacting cyclododecatriene and maleic anhydride. Esso Research & Engineering Co. **877 634**  
 Recovery of alkylamines by distillation. Pennsalt Chemicals Corp. **877 843**  
 Production of dicyanogen. Rohm & Haas GmbH. **877 684**  
 Copolymers. Chemstrand Corp. **877 967**  
 Preparation of aromatic orthodisubstituted acid amides and salts and quaternary ammonium compounds of said acid amides. Lääketehdas Orion Oy. **877 846**  
 Method of producing polycyclic aromatic boron-containing compounds. American Cyanamid Co. **877 874**  
 Production of alkylene oxide polymers. Shell Research Ltd. **878 033**  
 Preparation of steroids. Upjohn Co. **877 636**  
 Granular potassium metaphosphate. Scottish Agricultural Industries Ltd. [Addition to 832 011.] **877 955**  
 Production of pure 1,4,5,6,7,7-hexachlorobicyclo-[2,2,1]-heptene-5-dicarboxylic acid-(2,3). Badische Anilin- & Soda-Fabrik AG. **878 003**  
 Manufacture of pyran derivatives. Hoffmann-La Roche & Co. AG, F. **877 960**  
 Vulcanisable compositions. Pirelli S.p.A., and Montecatini. **878 004**  
 Preparation of polyhydric alcohols. Atlas Powder Co. **877 643**  
 Therapeutic compositions containing isoniazid. Horner Ltd., Frank, W. [Addition to 791 404.] **877 927**  
 Production of adiponitrile. Rhone-Poulenc. **877 664**  
 Polyolefin compositions. Du Pont de Nemours & Co., E. I. **877 750**  
 Catalytic isomerisation of olefinic hydrocarbons. Shell Internationale Research Maatschappij N.V. **878 035**  
 Polymers of thiocarbonyl difluoride. Du Pont de Nemours & Co., E. I. **877 834**

## Market Reports

### STEADY REQUEST FOR HYDROGEN PEROXIDE

**LONDON** Allowing for seasonal influences there has been a satisfactory flow of new home trade inquiry during the past week, while the movement against contracts to the chief consuming industries, if not yet on pre-holiday scale, is greater than of late.

Among the soda products there has been a good call for sodium chlorate, bichromate and hyposulphite and a steady request has been reported for hydrogen peroxide and copper sulphate.

The flow of export inquiry has been maintained at a good level and the supply position generally presents little difficulty.

A continued steady demand for crude and refined tar has been in evidence among the coal tar products and trading conditions generally show little change on the week.

**SCOTLAND** Although some areas of the Scottish market are still being affected by the holiday period, there has been an improvement generally during the past week. From those areas which have restarted, buying has been brisk, particularly towards the end of the week, and

quantities have been well maintained, with quite a varied range of chemicals involved. Next week should see a return to more or less normal conditions. There has been some improvement in agricultural chemicals but for the most part business has been quiet in this section.

The export market remains fairly active with a varied volume of inquiries being received.

**MANCHESTER** Trade in textile and other industrial chemicals on the Manchester market has continued under the influence of holiday conditions which have affected the movement of supplies to a number of works in the Lancashire and Cheshire areas, as well as the volume of fresh business, which has been on the quiet side. However, there has been a fair aggregate consumption of the soda compounds and other bread-and-butter lines, as well as of the leading light and heavy coal tar products.

In fertiliser materials, buying interest has been chiefly concentrated on the compounds and the higher grades of basic slag.





PRESERVE  
AND PROTECT  
WITH  
**Santobrite**  
and  
**Penta**

Santobrite, Monsanto's sodium pentachlorophenate, protects a wide range of products against attack by fungi and bacteria, and also destroys algae. Small wonder it finds great use in so many fields!

**CUT AND SAWN TIMBER** Santobrite is the most widely used chemical for preventing sapstain in timber. Its parent compound, Monsanto Penta, is an outstanding long-term wood preservative.

**PAPER BUILDING BOARDS** Santobrite protects against all the micro-organisms met in paper manufacture. It is used for mould-proofing paper and keeps building boards safe from attack by fungi and termites.

**ADHESIVES** Santobrite guards all adhesives of animal or vegetable origin against fungi and bacteria.

**PAINTS** Many paints, particularly emulsion paints, are prone to biological attack. Santobrite prevents this.

**INDUSTRIAL WATER SYSTEMS** Santobrite prevents the growth of slime and algae in water-cooling systems.

**TEXTILES** Santobrite checks the growth of micro-organisms in textile sizes, and its lauryl derivative is widely used for rot-proofing canvas and other fabrics.

An analytical test kit has been developed to help you determine Santobrite in water. Apply for details from Baird & Tatlock (London) Limited, Freshwater Road, Chadwell Heath, Essex.

*Send now for more information on Santobrite and Penta.*

*Santobrite is a Registered Trade Mark*

**Monsanto  
chemicals  
help industry—  
to bring a  
better future  
closer**



**MONSANTO CHEMICALS LIMITED**

929 Monsanto House, Victoria St., London, S.W.1 and at Royal Exchange, Manchester 2

*In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto Canada Limited, Montreal. Monsanto Chemicals (Australia) Ltd., Melbourne. Monsanto Chemicals of India Private Ltd., Bombay. Representatives in the world's principal cities.*

Regd.

# CLASSIFIED ADVERTISEMENTS

**CLASSIFIED RATES:** All sections 5d. per word. Minimum 8/. Three or more insertions 4d. per word. Box Number 2/- extra.

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

## ENGINEERING & BUILDING MATERIALS

### ROLLED STEEL JOISTS

4" x 3"	20 off	16'	lengths
5" x 3"	50 off	12'	6" lengths
6" x 3"	40 off	20'	lengths
6" x 4 1/2"	20 off	15'	lengths
8" x 4"	60 off	15'/40'	lengths
8" x 5"	20 off	20'	lengths
8" x 6"	15 off	30'	lengths
8" x 6"	10 off	15'	lengths
10" x 4 1/2"	10 off	20'	lengths
10" x 6"	20 off	40'	lengths
10" x 6"	10 off	15'/18'	lengths
12" x 6"	125 off	18'/40'	lengths
12" x 8"	2 off	40'	lengths
13" x 5"	12 off	20'	lengths
14" x 6"	10 off	40'	lengths
14" x 6"	8 off	15'	lengths
16" x 6"	12 off	26'	lengths
20" x 7 1/2"	2 off	20'	lengths
22" x 7"	4 off	40'	lengths

### MILD STEEL PIPING

1/2"	N.B.	600'	(new) Stock length
1 1/2"	N.B.	100'	in 8 to 20' lengths
2"	N.B.	1000'	in 8 to 26' lengths
3"	N.B.	500'	in 10 to 14' lengths
4"	N.B.	600'	in 10 to 14' lengths
5"	N.B.	50'	in 8" and up in length

### BRAITHWAITE TANK PLATES

80 off 4' x 4' x 1/4"

### ALL WELDED RECTANGULAR TANKS

- 1 off 12' x 8' x 5' open top with angle strengthening bars.  
(In good condition.)
- 2 off 12' x 8' x 4' Acid Storage Tank
- 2 off 5' x 4' x 3' Mild Steel Tanks (riveted)

### SPENCER BROS. (LIVERPOOL) LTD.

20, Chapel Street, Liverpool, 3.

(CENTral 5262—3 lines)

## EDUCATIONAL

### UNIVERSITY OF MANCHESTER

THE NEXT SESSION COMMENCES ON

TUESDAY 10th OCTOBER, 1961

## 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).**

## OFFICIAL APPOINTMENTS

### SENIOR CHEMIST, WATER— COVENTRY

Applications invited from men possessing academic and/or professional qualifications for senior post within laboratory service. Minimum period of three years industrial experience desirable. Salary within the range £1,310-£1,480. Application forms from City Analyst, City Laboratories Service, Shortley Road, Coventry.

### ASSISTANT ANALYSTS— COVENTRY CORPORATION

Partially-qualified individuals, conversant with modern analytical techniques, preferably with some experience in (a) the analysis of Food and Drugs, or (b) analysis of Industrial Discharges and Trade Wastes.

Salary within the range £645-960 plus £26 per annum in certain circumstances on salary up to £795. Age, experience, status and qualifications to City Analyst, City Laboratories Service, Shortley Road, Coventry.

## PATENTS & TRADE MARKS

**KINGS PATENT AGENCY, LTD.** (B. T. King, A.I.Mech.E., Patent Agent), 146a Queen Victoria Street, London, E.C.4. City 6161. Booklet on request.

## PLANT AND MACHINERY FOR SALE

Seven—Lithcote Lined 15,000 gallons capacity Vertical M.S. Storage Vessels 23 ft. high x 12 ft. dia. in excellent condition.

**G. E. Simm (Machinery) Limited,**  
27, Broomgrove Road,  
Sheffield, 10.  
Telephone: 64436

PLANT AND MACHINERY FOR SALE: *continued*

Baker-Perkins Class BB "Double Naben" Bladed Steam Jacketed Mixers. Four—size 12 and Three—size 11, of 20 and 8 gallons respectively.

Oil Jacketed Double Trough Mixer 48 in. by 36 in. by 29 in. deep. Paddle Blades. Bottom Outlets.

Barron 'U' Sifter Mixer 96 in. by 33 in. by 33 in. with 10 H.P. A.C. Motor.

Gardner 'U' Sifter-Mixers 66 in. by 24 in. by 24 in. with 5 H.P. A.C. Motors. Four available, of modern streamlined design.

Horizontal 'U' Trough Mixers 48 in. by 18 in. by 22 in. Three—Tilting type, Paddle Blades. Glanded.

Over-Arm Twin-Blade, Tilting, 30 gallon Mixers with 3 H.P. Geared Motors. Five available.

Lying at our No. 2 Depot, Willow Tree Works, Swallowfield, Berkshire.

Apply: Winkworth Machinery Limited, 65 High Street, Staines, Middlesex. Telephone 55951.

Phone 55298 Staines

## STAINLESS STEEL PLANT

S.S. Tanks 500, 400 and 220 galls. Cyl. Conical Bottoms.

S.S. Mixing Tank—300 galls. A.C.

S.S. Jac. Pasteurisers/Mixers 50, 100 and 150 galls.

S.S. Rect. Tanks 850 and 450 galls.

S.S. Spherical Still 6 ft. 6 in. diam.

S.S. Duplex 'Z' Mixer (Vacuum) 3 ft. by 3 ft. by 3 ft. deep.

S.S. Worm Conveyor—Trough 10 ft. by 5 in. by 5 in.

S.S. Homogeniser  $\frac{1}{2}$  H.P. 1,000 p.s.i. 25 g.p.h.

S.S. 'Hurrell' Homogeniser 5 H.P. 400/3/50.

Glass Lined Tanks 1,300, 2,000, 3,000, 3,250 and 3,600 galls.

(2) Jacketed Glass Lined Tanks 2,000 galls. each.

Mixers, Hydros, Condensers, Stills, Retorts, Reactors, etc.

Send for Lists.

HARRY H. GARDAM & CO. LTD.,  
100 CHURCH STREET, STAINES.

## REPRESENTATIVE

Gentleman returning to Copperbelt, Northern Rhodesia in September, willing to represent company interested in copper mining and other industries. Write Box No. 3759, Chemical Age.



**just to  
remind  
you . . .**

to send details of your products for inclusion in the 1962 Chemical Age DIRECTORY and WHO'S WHO.

If you have not received a booklet containing a list of Classified Buyers' Guide Headings and details of free facilities please telephone Fleet Street 3212 or write to :

The Manager,

**CHEMICAL AGE**

154 FLEET STREET, LONDON, E.C.4

## SITUATIONS VACANT



THE BAHRAIN PETROLEUM CO. LTD.  
REQUIRE A  
**SHIFT SUPERVISOR—  
CONTROL LABORATORY**

The position calls for supervision of a shift in the Refinery Control Laboratory and involves organisation of work and tests being performed by Bahraini employees in accordance with the latest standard methods of test.

Applicants should be between 22 and 28 and possess a H.N.C. in Chemistry and preferably have some previous practical oil laboratory experience.

A good commencing salary would be offered, dependent upon qualifications and experience, in addition to which free air-conditioned accommodation and a living allowance are provided. An initial kit allowance, medical attention, paid home and local leaves (passages paid for the former and generous assistance towards the latter) are also provided, with participation in Pension and Provident Fund Schemes.

*Suitably qualified men should apply to  
Caltex Services Limited, Caltex House,  
Knightsbridge Green, London, SW1.*

ASSISTANT WORKS CHEMIST REQUIRED, RESPONSIBLE FOR QUALITY CONTROL OF RAW MATERIALS, FINISHED PRODUCTS, CUSTOMERS COMPLAINTS AND SOME DEVELOPMENT WORK. APPLY GIVING BRIEF DETAILS OF AGE, EXPERIENCE, QUALIFICATIONS, ETC. PERSONNEL DEPT. Box No. 3760.

Here is an unusual opportunity in  
MARKET RESEARCH  
for a  
GRADUATE CHEMIST

with an interest in the COMMERCIAL aspect of business life. Graduate Chemists with PRODUCTION, RESEARCH or SALES experience in the Chemical Industry are invited to write for details of this opening to Box No. 3761.

## WORK WANTED &amp; OFFERED

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

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



**PLASTICS  
DIVISION**

*offer opportunities for*

**CHEMISTS,  
PHYSICISTS  
AND  
CHEMICAL  
ENGINEERS**

*in their research  
technical service and  
production departments*

The Plastics Division of  
**IMPERIAL CHEMICAL INDUSTRIES LTD.**

is expanding rapidly and applications are invited for the following vacancies:

**5135 A/AO**

**RESEARCH DEPARTMENT**

Physical and organic chemists with research experience for:

- (i) exploratory organic work aimed at the discovery of new polymers.
- (ii) physico-chemical studies of polymerisation reactions and the characterisation of the products.
- (iii) development of new products and processes from the laboratory scale up to the production plant.

**5135 B/AO**

**TECHNICAL SERVICE AND  
DEVELOPMENT DEPARTMENT**

Honours graduate for employment in the fields of technical service and application development.

**5135 C/AO**

**PLANT MANAGERS AND PLANT  
DEVELOPMENT OFFICERS**

There are vacancies in our factories at Wilton in Yorkshire, Hillhouse near Blackpool and Stevenage in Hertfordshire for graduates holding Honours degrees with experience of process development or plant management.

---

Reply briefly to : **Personnel Manager,**  
**Imperial Chemical Industries Limited,**  
**Plastics Division, Bessemer Road,**  
**Welwyn Garden City, Herts.**  
quoting appropriate reference No.

# Chemical Age Enquiry Service

For fuller details of equipment, apparatus, chemicals etc., in the advertisement or editorial pages of Chemical Age, fill in the coupons below, ONE PER ENQUIRY, and return to us.

<p><i>Please send further details about</i> .....</p> <p>.....</p> <p>.....</p> <p><i>mentioned on page</i> ..... <i>of this issue.</i></p> <p><i>Name</i> ..... <i>Position</i> .....</p> <p><i>Firm</i> .....</p> <p><i>Address</i> .....</p> <p>.....</p> <p><b>Chemical Age Enquiry Service.</b></p>
<p><i>Please send further details about</i> .....</p> <p>.....</p> <p>.....</p> <p><i>mentioned on page</i> ..... <i>of this issue.</i></p> <p><i>Name</i> ..... <i>Position</i> .....</p> <p><i>Firm</i> .....</p> <p><i>Address</i> .....</p> <p>.....</p> <p><b>Chemical Age Enquiry Service.</b></p>
<p><i>Please send further details about</i> .....</p> <p>.....</p> <p>.....</p> <p><i>mentioned on page</i> ..... <i>of this issue.</i></p> <p><i>Name</i> ..... <i>Position</i> .....</p> <p><i>Firm</i> .....</p> <p><i>Address</i> .....</p> <p>.....</p> <p><b>Chemical Age Enquiry Service.</b></p>

★ *Detach this page complete then fold as marked overleaf to use the post-paid reply folder*

# Chemical Age

## ENQUIRY SERVICE



☐ *This is a special service for readers of*

**CHEMICAL AGE**

☐ *It is designed to give fuller information on equipment, apparatus, chemicals etc., mentioned in this issue—whether in the editorial text or in an advertisement*

☐ *Cut out the whole of this page, fold as instructed with post-paid address on the outside*



**Chemical Age**

154 Fleet Street, London, E.C.4  
Tel.: Fleet Street 3212

2nd FOLD

Postage  
will be  
paid by  
the  
Licensee

No Postage  
Stamp  
necessary if  
posted in  
Great Britain  
or  
Northern Ireland

BUSINESS REPLY FOLDER  
Licence No. 2501

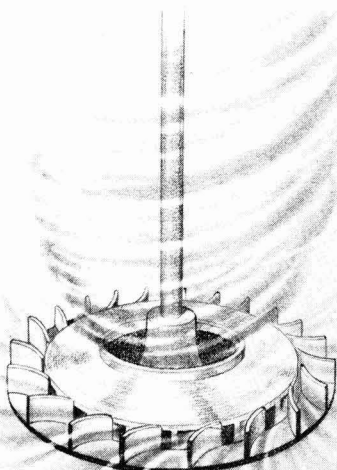
**CHEMICAL AGE**  
**154-160 FLEET STREET**  
**LONDON, E.C.4**

1st FOLD

3rd FOLD

CUT ALONG THIS DOTTED LINE

TURBO-  
AGITATORS  
TURBO-  
EMULSIFIERS  
TURBO-  
REACTORS  
TURBO-  
IMPASTERS  
TURBO-  
CLEAVERS  
TURBO-  
DISPERSERS  
MIXERS OF  
ALL TYPES



**MIX  
WITH**

**MORITZ**  
CHEMICAL ENGINEERING CO. LTD.  
Thames Side, Kingston-on-Thames

Phone: Kingston 7413, 4 Grams: MORICHEM KINGSTON-ON-THAMES

**LEAFLETS ON REQUEST**

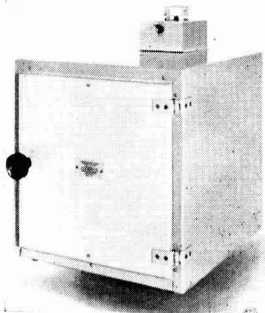


**A NEW  
ECONOMY  
OVEN**

*for Laboratories, Teaching  
Centres and Workshops*

Low cost combined with reliable performance makes this new Pickstone Economy Oven an attractive buy for all who need a Laboratory Oven. Made throughout of mild steel. Heating chamber finished with a high temperature-resisting aluminium coating, and fitted with two 1" weldmesh trays. Fibreglass insulation separates exterior from heating chamber. Insulated cavity-type door has simple lock. Fittings include thermometer aperture; on-off switch; quick-read calibrated thermostat control knob.

**NOW OFFER  
FOR ONLY £15-15s**

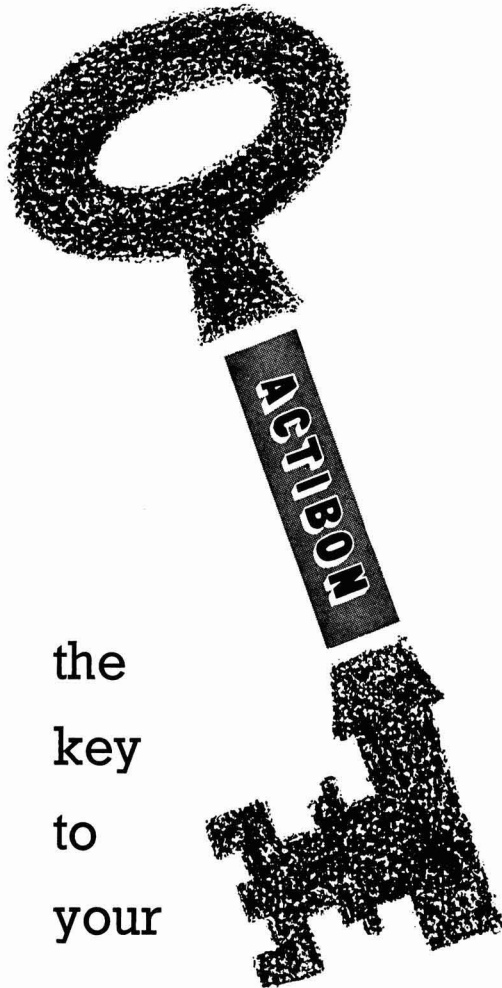


**COMPACT · ROBUST · SIMPLE  
AND EFFICIENT**

Overall dimensions: 12" × 15½" × 15½" (high)  
Heating Chamber: 10" × 10" × 10"  
Operating Temps.: 5° above ambient to 200°C  
Heating-up time: To 200°C—One Hour  
Temperature Fluctuation is of the order of  
± 2° at 200°C.  
Order with confidence or write for Technical  
Leaflet to:

**R. E. PICKSTONE LTD.**  
Dept. C.A.

36, Avon Trading Estate, Mornington Ave., London, W.14  
FULham 4558



the  
key  
to  
your

**DECOLOURISING**

**problems**

Unwanted colour and impurities  
which impede the sale of your  
Product CAN be removed . . .



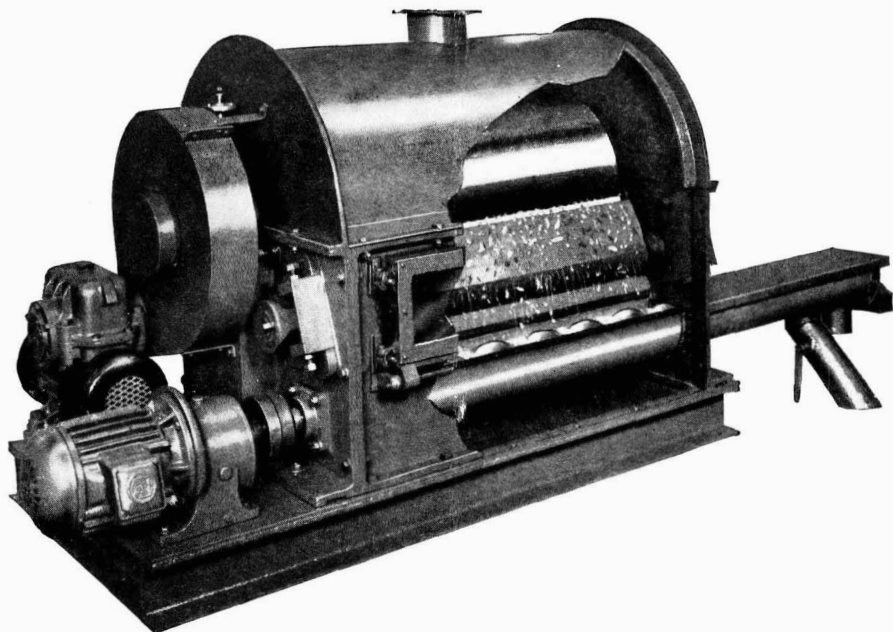
**THE  
HIGHLY ACTIVATED  
DECOLOURISING  
CARBON**

**THE CLYDESDALE CHEMICAL CO., LTD.**  
SALES OFFICE  
142 QUEEN STREET, GLASGOW, C.I.  
Phone: CENTral 5247-8  
Grams: "Cactus" Glasgow.

# SIMON

P A T E N T

## COOLING & FLAKING MACHINE



In constant production in a large number of sizes ranging from 8" dia. x 8" long to 42" dia. x 108" long. Rolls are constructed of cast iron, chromed cast iron, nickel iron, stainless steel, phosphor bronze, etc.

Machines have been supplied to leading chemical manufacturers at home and abroad for flaking such materials as naphthalene, phthalic anhydride, carbamite, stearines, waxes, etc., etc.

Test machines are available at these Works, and experiments are carried out on customers' materials without charge or engagement.

**RICHARD SIMON & SONS, LTD.**  
PHOENIX WORKS · BASFORD · NOTTINGHAM

Telephone: 75136-7-8

Telegrams: Balance, Nottingham

SPECIALISTS IN DRYING PLANTS AND AUTOMATIC WEIGHING MACHINERY FOR OVER 60 YEARS