Chemical Age

incorporating

PETROCHEMICALS and POLYMERS

VOL. 85 No. 2186 3 JUNE 1961

INDEX TO ADVERTISERS

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

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INDEX TO ADVERTISERS

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

VERSATILE FUNGICIDE AND BACTERICIDE FOR INDUSTRY—

Whatever your business, you'll find 'TOPANE' the best germicide you can buy. Outstanding in safety and non-toxicity, 'TOPANE' also fills the bill in efficiency and economy. Consider the low concentrations of 'TOPANE' needed to control the growth of these prevalent fungi and bacteria:

Industry	*Species of fungi or bacteria prevalent*	*% for inhibition of growth*
Disinfectants	*Aerobacter aerogenes*	0·032
	Bacillus rubricus	0·004
	Escherichia coli	0·032
	Pseudomonas caudata	0·032
	Staphylococcus aureus	0·032
	Trichophyton interdigitale	0·008
Textiles and Ropes	*Aspergillus niger*	0·004
	Chaetomium globosum	0·008
	Cladosporium herbarum	0·008
	Memnoniella echinata	0·004
	Myrothecium verrucaria	0·002
	Penicillium notatum	0·008
Adhesives	*Bacillus subtilis*	0·016
	Aspergillus flavus	0·008
	Paecilomyces varioti	0·008
	Penicillium variabile	0·004
Timber	*Ceratocystis pilifera*	0·008
	Coniophora cerebella	0·008
	Merulius lacrymans	0·001
	Polystictus versicolor	0·008
Foods	*Alternaria citri*	0·008
	Diplodia natalensis	0·010
	Penicillium italicum	0·016
	Rhizopus nigricans	0·016

'TOPANE' (I.C.I.'s brand of ortho phenylphenol) is soluble in organic solvents, and **'TOPANE' WS** (I.C.I.'s brand of sodium ortho phenylphenate) is its water-soluble grade. Both products are lethal to many bacteria, fungal spores, surface mildews, and rots, and can be employed to protect organic matter against most forms of microbiological degradation.

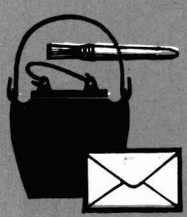
'TOPANE' COMBINES EFFICIENCY WITH OUTSTANDING SAFETY

1. DISINFECTANTS

'Topane' is a powerful weapon against infection. It broadens the killing range of disinfectant formulations against both Gram-positive and Gram-negative bacteria, and has low affinity for extraneous organic matter and low toxicity to higher life. 'Topane' is not classified as a poison and its high efficiency plus safety-in-handling recommend it in domestic, veterinary and industrial disinfectants.

2. TEXTILES and ROPES

Rotproofed with 'Topane', textiles and ropes stay strong, last longer. Effective and persistent, easy and economical to use, non-toxic and non-irritant, 'Topane' gives excellent protection against rot caused by bacterial and fungal attack to ropes and fishing-nets, canvases, carpets and felts, rubberised or p.v.c.-coated fabrics and textile finishes.

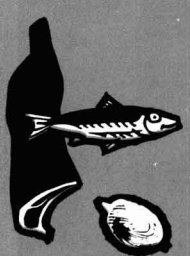


3. ADHESIVES

'Topane'-preserved adhesives are fully protected against bacteria and fungi. Incorporated early in the manufacture of the adhesive, 'Topane' ensures the protection of the finished product even after subsequent reconstitution and use. 'Topane' is ideal for the preservation of adhesives incorporating glue and gelatine; starch, dextrin and cellulose; casein; blood and albumin; and latex.

4. TIMBER

Deadly to wood-destroying fungi but non-toxic to humans, 'Topane'-based formulations are safe and economical for treating wet and dry rot in buildings and boats or for preventing sap-stain in freshly sawn timber. Tests carried out on highly resistant fungi show that 'Topane' gives outstanding protection to both soft and hard woods. It may also be used in conjunction with insecticides to give single-treatment timber protection.



5. FOOD STORES

Food stores disinfected with 'Topane' prevent waste and cut losses. Stored food is vulnerable to bacterial and fungal attack; 'Topane' kills food-spoiling bacteria and fungi. Cleaning and disinfecting with 'Topane' helps to keep stored food fresh by eliminating the sources of infection in warehouses, bakeries, breweries, ships' holds and slaughterhouses, and maintains the hygienic conditions essential wherever food products are prepared, stored or transported.

6. YOUR PROBLEM?

We have mentioned some of the major applications of 'Topane' preservatives. There are many more potential uses of 'Topane'. Perhaps, after reading this advertisement, you may think 'Topane' can help *you* solve a problem in *your* industry. Let us know about it—we shall be glad to assist you while extending our own knowledge of the applications of 'Topane'.

NAME ..... **COMPANY** .....

ADDRESS ..... **TEL. No.** .....

Please send further information on 'TOPANE' for Application No. .....

Please arrange for representative to call to discuss 'TOPANE' for Application No. .....

(If your interest is aroused by Application No. 6, please enclose with this coupon a brief statement of the problem.)

IMPERIAL CHEMICAL INDUSTRIES LIMITED, MILLBANK, LONDON, S.W.1

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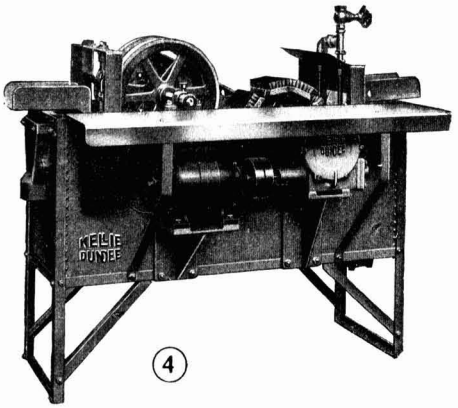

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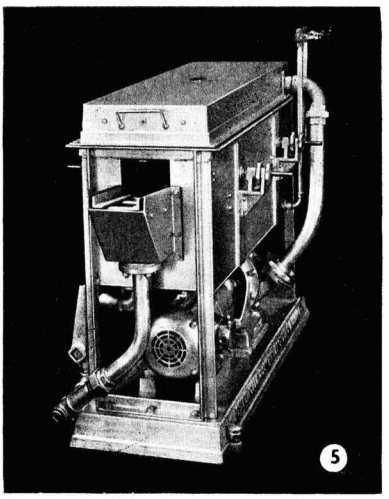
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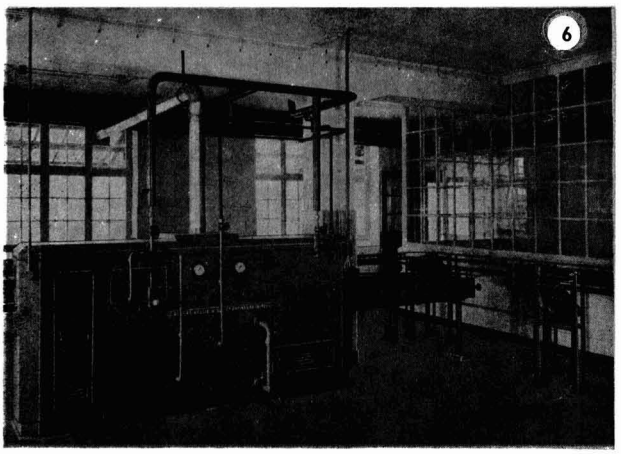
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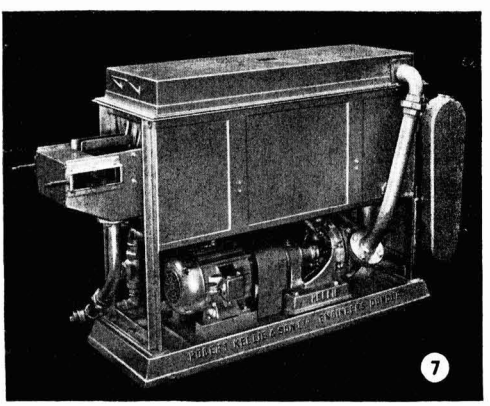
KELLIE

FOR MODERN FOOD PLANT

1. Type 410JJ Hydro Electric Washing, De-Labelling, Rinsing, Sterilizing and Drying Machine for Biscuit Tins and all types of open-mouth containers—capacity up to 2,000 units per hour.
2. Type 71JJ Washing and Sterilizing Machine for Bakers' Boards, Trays and all types of utensils—capacity according to size. Larger models available to suit individual requirements.
3. Type 6JJ Rotary Washing and Sterilizing Machine for all types and sizes of glassware—capacity up to 72 units per minute.
4. Washing Machines for filled cylindrical cans from 8 oz. to A2½ with stationary brushes (Model 5JJ) and revolving brushes (Model 21JJ).
5. Type 27JJ Spray Washing Machine for all types of filled cylindrical cans from 8 oz. to A2½.
6. Type 50JJ Washing and Sterilizing Machine for ½ lb., 1 lb., and 2 lb. glass jars—capacity up to 160 per minute.
7. Type 27JJ/C Conveyor type Spray Washing Machine for filled cylindrical rectangular and flat cans.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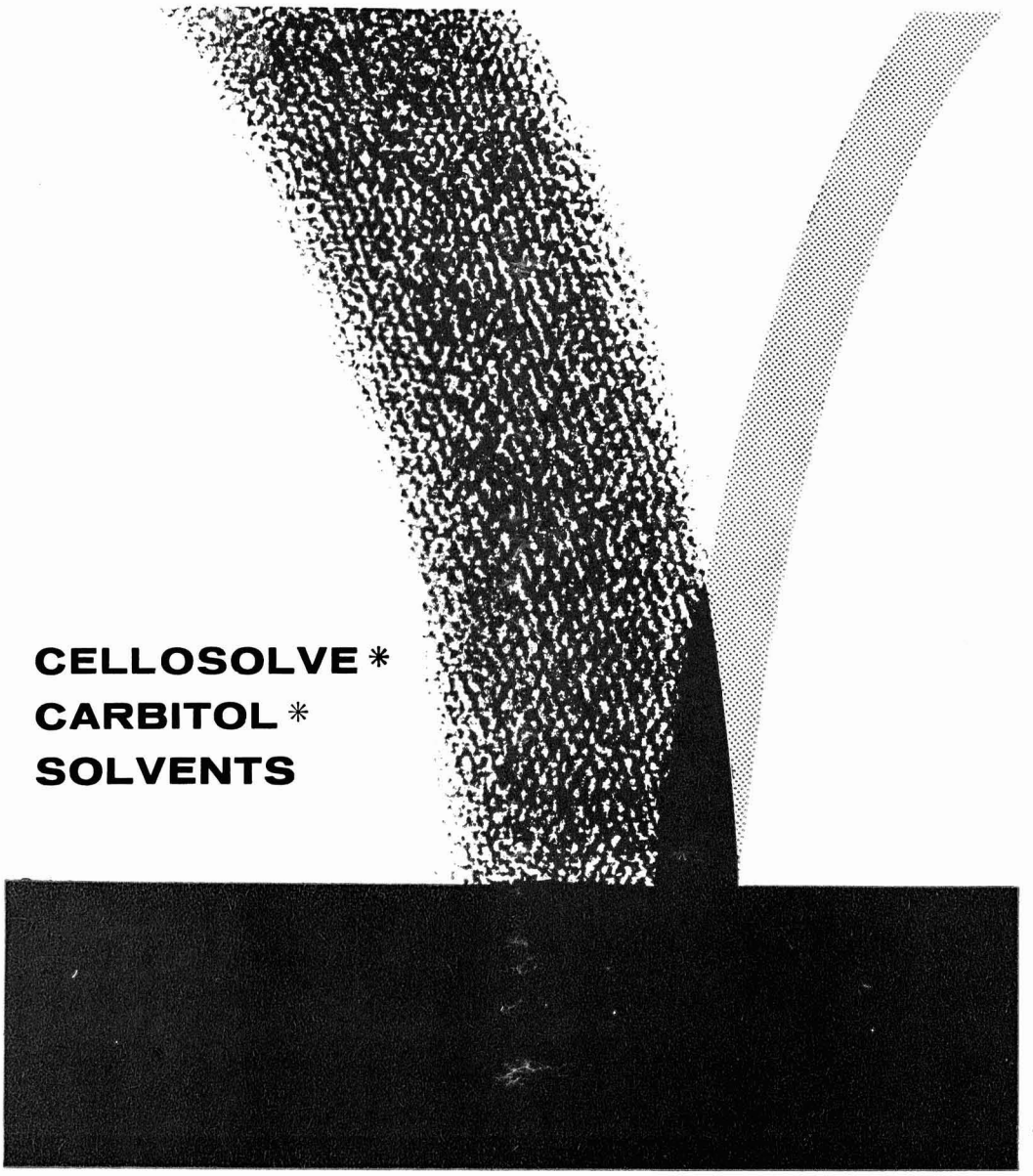
ROBERT KELLIE & SON LIMITED

THE DUNDEE FOUNDRY • DUNDEE

Telephone: **DUNDEE 25687/8** *Telegrams and Cables:* **KELLIE, DUNDEE**



Union Carbide have been leading glycol ether manufacturers for over 30 years. Cellosolve and Carbitol solvents—two organic solvents used widely in industry—belong to a range of glycol ethers now being manufactured at Britain's latest Ethylene Oxide derivatives plant at Hythe, Hampshire.

Carbitol and Cellosolve solvents from this new plant carry the full backing of Union Carbide's outstanding experience in the petrochemicals field; they are manufactured with special emphasis on consistently high quality and they are regularly delivered to industries everywhere in the United Kingdom. Union Carbide Technical Service with its constant research into new and better ways of using quality chemicals is ready to help you with problems you have on hand connected with your own products and processes, present or in project.

UNION CARBIDE

* CELLOSOLVE, CARBITOL and UNION CARBIDE are trade marks of UNION CARBIDE CORPORATION

UNION CARBIDE LIMITED · CHEMICALS DIVISION · 8 GRAFTON STREET · LONDON W1 · MAYFAIR 8100

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IN THIS ISSUE

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PROFITLESS PROSPERITY?

TOWARDS the end of last year CHEMICAL AGE assumed the role of a prophet and, at the expense of being called a Jeremiah, suggested that the coming decade might not be the 'Golden 60's' that many then expected (C.A., 8 October 1960, p. 573). Unfortunately, events are proving that judgment correct.

Although most British chemical companies have reported higher profits in 1960 the rate of increase has been much lower than in previous years. Profit margins came under pressure last year and, as Mr. S. P. Chambers said at the recent annual meeting of Imperial Chemical Industries Ltd., this state of affairs is likely to continue throughout 1961. Chemical imports have continued to rise at a much higher rate than have exports of British chemicals and it is obvious that even more attention will have to be paid to selling overseas in the next few years if a better rate of growth is to be achieved.

At present it is the U.S. chemical producers who have registered the most spectacular increases in their U.K. sales, marketing large tonnages at relatively low prices—the result of massive over-capacities at home. A similar situation is building up in Europe as has already been stated in the C.A. survey of the Italian chemical industry (CHEMICAL AGE, 27 May, p. 852). As *The Financial Times* pointed out recently, if Britain joins the Common Market, then chemical imports, particularly from France, Germany and Italy, can be expected to rise more steeply than at present. On the other hand, C.M. membership would present the U.K. industry with a large enough market in which to make best use of mounting capacities.

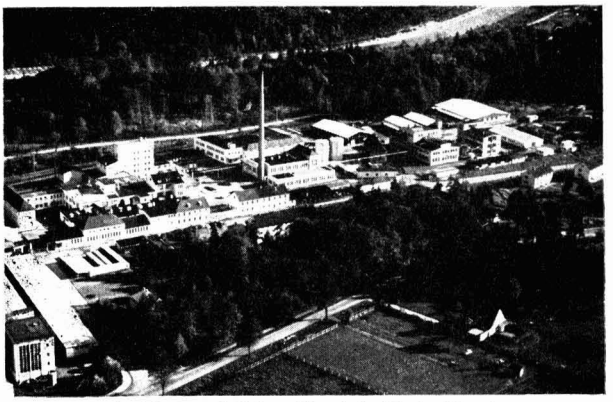
It is already felt in some circles that Britain is moving towards U.S. experience so far as surplus capacity is concerned, but we do not believe that U.K. capacities will be anywhere near as unrealistic compared with the situation in either America or Italy. In any event, overcapacity throughout the world, if only of a temporary nature, has led to an intensification of the search for new and more economic processes—a trend which we forecast a year ago as being inevitable if British producers were to remain competitive in world markets. A recent example of this policy being put into effect is I.C.I.'s decision to change over from coal to oil as a raw material for fertiliser operations at Billingham, as a result of the development of a more efficient process using oil.

One fallacy that must be guarded against is that the newer, most rapidly expanding fields of chemical manufacture are necessarily the most profitable—despite the advent of the more 'glamorous' petrochemicals and polymers there is still a solid, if less spectacularly increasing, profit to be made from some of the old-established basic chemicals and what our market correspondents call the 'bread-and-butter lines'. There is still plenty of scope for further efficiency in the manufacture of such chemicals and dynamic research and development must be relentlessly pursued in this field no less than for the newer products.

Whether the products are old or new, however, even the most efficient processes will not in themselves be sufficient to ensure prosperity for U.K.

(Continued on page 884)

Laporte Acquire Major German Hydrogen Peroxide Producers



Aerial view of Elektro-Chemische Werke Munchen

A SURPRISE announcement by Laporte Industries Ltd. reveals that the company have agreed to acquire all the issued share capital of Elektro-chemische Werke Munchen A.G. of Hollriegelskreuth, near Munich, Western Germany. E.W.M. is one of the major producers in the German Federal Republic of hydrogen peroxide by the electrolytic process, organic and inorganic peroxides, persulphates and chlorites and other chemical products. The principal customers of E.W.M. are in the textile, plastics, paper and chemical industries. This acquisition provides L.I.L. with the opportunity to invest their know-how in the continent of Europe. The main products of E.W.M. are also produced in the U.K. by Laporte Chemicals Ltd., one of the principal subsidiaries of Laporte Industries, Laporte Chemicals are at present operating E.W.M.'s process for the manufacture of sodium chlorite at Luton.

The consideration for this acquisition will consist partly of shares of L.I.L. and partly of cash, the total amount being £1,506,629 at present market prices. The profit of E.W.M. for the year to December 31, 1960, converted at DM11.1 to £1 sterling was, in round figures, £264,000.

E.W.M. was founded in 1911. During World War II part of the plant was destroyed and following reconstruction in 1948, much of it has been enlarged.

Mr. Geoffrey Hickson, managing director of Laporte Chemicals Ltd., and a director of L.I.L., Mr. L. H. Binding, group chief accountant of L.I.L., and Dr. J. Strobl, a lawyer practising in Munich, will join the board of directors of E.W.M. Dr. K. Merck, the present chairman of E.W.M., will retain this position. The management of E.W.M. will remain in the hands of Herr Paul O. Schlick and Dr. Eugen Klenk.

G. Hickson L. H. Binding

Import Duty on Synthetic Methanol from E.F.T.A. to be Reduced

THE full rate of duty on synthetic methanol, classified in Tariff heading 29.04(B), will be reduced on 1 June from 33⅓% to 27½% *ad valorem*. This follows the submission of an application to the Board of Trade for the removal of this duty on imports from the E.F.T.A.; after consideration the Board have reached the conclusion that this import duty should not be removed but should be reduced. The reduction is introduced by the Import Duties (General) (No. 6) Order 1961 (S.I. 1961, No. 959) which relates to imports from E.F.T.A., and copies of which are available from H.M.S.O., price 3d each.

The reduced full rate of duty on synthetic methanol will be shown in an amendment, also just published, to the United Kingdom Tariff. The reduced E.F.T.A. rates of duty will be shown in an amendment to the United Kingdom Tariff to be published shortly.

Methane Agreement Awaits Government Sanction

AN agreement was signed in Paris on 26 May between the Gas Council, French producer companies and Conch International Methane, which brings the import of Saharan natural gas to the U.K. a step nearer. The agreement awaits the approval of the British and French governments.

Under the agreement, the French producer companies, S.N. Repal and Compaingie Francaise des Pétroles, together with the Bureau de Recherches de Pétrole, Air Liquide, and Algerian investment companies will build a gas liquefaction plant at Arzew on the Algerian coast. This plant will supply the British market with 1,000 million cu. m. a year. In the meantime, Conch International Methane will soon place orders for tankers to carry the liquefied gas. Three tankers would be built for the purpose.

If the agreement is approved by both governments, shipments should begin in 2 to 2½ years. The price at which natural gas would be available in the U.K. is not revealed.

The agreement covers a period of 15 years.

I.C.I.'s £1.3 m. Offer for Settle Limes

TAKEOVER bid for the lime quarrying company, Settle Limes Co. Ltd., is being made by I.C.I., who will offer Settle shareholders one fully paid £1 ordinary share of I.C.I. for every seven 5s ordinary of Settle, which makes the bid worth £1.34 m. Ordinary capital of Settle Limes amounts to £600,000.

The Settle Limes board will consider this approach and are expected to make an announcement soon.

The I.C.I. move is aimed at augmenting their stocks of lime, of which there is a foreseeable shortage.

Profitless Prosperity

(*Continued from p. 883*)

manufacturers, for chemical industries in other highly industrialised countries are also engaged in the same research. In many of these countries, producers enjoy cheaper and more readily available raw materials—this is particularly true of Italy, where large-scale natural gas deposits are being exploited to the full. We believe it imperative that in the next few years, British manufacturers should have access to natural gas. Even with transportation costs, there would still be economic advantages in using natural gas for many purposes; that is why we feel that before the 1960's are out methane tankers will be calling regularly at some of the major U.K. chemical centres—most of which have dock facilities.

Project News

Vickers-Armstrongs Win Order for Russian Nylon 66 Plant

LARGEST single order so far negotiated at the British Trade Fair in Moscow has gone to **Vickers-Armstrongs (Engineering)** and their West German associates, **Hans Zimmer.** The contract is for a £4 million plant for the conversion of A.H. salt monomer to nylon 66 for industrial yarn and tyre cord. Vickers also revealed that they are currently supplying, together with their partners, through Vickers-Armstrongs (Engineering) a plant for the manufacture of A.H. salt to the design of Zimmer Verfahrebstechnic.

The nylon 66 plant will have a capacity of over 6,000 tonnes a year, and will be supplied largely from Britain by the chemical plant division of Vickers. The manufacture of much of the polymerisation section will be carried out by the Vickers group. The contribution from the West German company will amount to 25% of the men employed and about 7% of the equipment. "The Germans are the chemists and technicians on this job", said Lord Knollys, chairman of Vickers.

The question of long-term payment for the plant has not arisen since the Russians will pay cash on delivery. The plant is expected to be completed early in 1964.

At the same time, Vickers are negotiating the sale of a styrene-butadiene synthetic rubber plant and also of a plant for the manufacture of polypropylene for general textile use. Other things for the future are also being discussed with the Russians about the usefulness to the Ukraine of the sugar beet plant Vickers built there. Vickers have acquired from Techmashimport, the Soviet purchasing agency, a licence for the manufacture of a special machine for chopping sugar beet.

Big New Oil Storage Project for Essex

● PLANS to establish a big new oil storage depot and terminal at Purfleet, Essex, are being laid by **Cory Brothers,** a member of the **Powell Duffryn Group.** It is estimated that storage for 600,000 tons of oil, chemicals and other bulk liquid products will become available.

First stage of the project, costing £1.25 m., involves the construction of a deep-water jetty 750 ft. long and capable of handling vessels of up to 32,000 tons. The tankage capacity at this stage should reach 165,000 tons by the middle of 1962 and rise to 225,000 tons by the end of the year. The installation is planned as an extension to the 300,000 tons of storage operated by Cory Brothers, at Barry, in South Wales, Birkenhead, and Ipswich.

Powell Duffryn, once a substantial colliery owner, has been actively expanding its oil interests in recent years. The company previously held a half-interest with Mobil in the Coryton refinery, but this partnership was dissolved in 1954 and Mobil is not concerned in the present venture.

P.G. Crystallisers for Russia

● THE Chemical Plant Division of the **Power-Gas Corporation Ltd.** (a member of the Davy-Ashmore Group) recently received an order from **Werkspoor N.V.** of Amsterdam for three installations for the crystallisation of high purity urea. Each installation, which produces 100 tons per day of crystalline urea with low biuret content by the Krystal process, consists of two vacuum crystallisers arranged in parallel and complete with all ancillary equipment. These units form part of the supply for three individual urea plants to be built in Russia and delivery is to be made during 1961.

Weir Sea Water Plant for Kuwait

● AN order worth £200,000 for a sea water distillation plant at Kuwait has been awarded to **G. and J. Weir Ltd.** of Glasgow. The installation for the Kuwait Oil Co. will be completed in November and will be commissioned a month later. Kuwait will then be using nearly 4 million gall. of fresh water a day from plants supplied by the firm.

Blaw Knox Fat Splitting Plant for Price's

● CONTRACT for the design, engineering, procurement of equipment, and erection of a fat splitting plant has been awarded by **Price's (Bromborough) Ltd.** to **Blaw Knox Chemical Engineering Co. Ltd.** This plant will employ the well-known Colgate-Emery process which uses high temperatures and pressures to achieve a high degree split. Blaw Knox Chemical Engineering Co. are licensing agents for this process. It is expected that this plant will be completed near the end of this year.

Laporte Extend Hydrogen Plant

● IN 1958 the **Power-Gas Corp. Ltd.** completed a high purity hydrogen plant at Warrington for **Laporte Chemicals Ltd.** The process was based on the continuous catalytic reforming of butane with steam and the plant formed part of a new hydrogen peroxide installation.

The Power-Gas Corp. Ltd. now announce that they are at present installing additional equipment to increase the production of hydrogen by 50%. It is planned to bring the extension into commission this summer.

Distillation Plant for B.P. Tanker

● ORDER for an Aquaflash water distillation plant has been placed with **Buckley and Taylor Ltd.** of Oldham (a member of the Brightside group of companies) by Hawthorn Leslie (Engineers) Ltd. on behalf of the **B.P. Tanker Co. Ltd.** The plant has been designed to operate on either low pressure steam or water taken from a high pressure boiler circulating system as a heat source for sea water. It will be installed on a B.P. tanker and will be capable of producing 25 tons of fresh water daily from sea water.

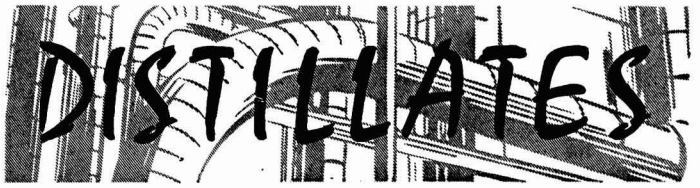
Unique Method of Firing Used in Lime Kiln

● A UNIQUE method of firing is used in a lime kiln—the first oil-fired lime kiln in the Peak District—being built for **Beswick's Lime Works Ltd.,** near Buxton, a member of the Staveley group of companies. Instead of first 'cracking' the fuel in a separate combustion chamber and then feeding it into the kiln as a gas, at Buxton the fuel will be gasified in the kiln itself.

The entire steel casing for this kiln, 72 ft. in height, was delivered by road in only two sections. Assembly took place in half an hour. The two sections—each over 25 ft. long and over 10 ft. in diameter and together weighing 17 tons—were bolted together on the ground. The whole casing was then lifted to a vertical position on its foundation by two cranes.

CAUSTIC TREATER FOR FAWLEY

This vapour phase caustic treater, seen leaving the Scotstoun, Glasgow, works of Mechans Ltd., is one of several vessels being produced there for Foster Wheeler, destined for use at the Esso refinery at Fawley. This vessel is 59 ft. 6 in. high, 8 ft. diam.



★ AN interesting new synthetic fibre, Mediolanum, reaches me from Sandro Donini of Viale Francesco Crispi 13, Milan, the firm that developed it. A cellulose xanthate, this moderate-cost fibre reminds me of staple viscose, but its properties are said to be superior to common types of viscose, making it very much akin to wool. This applies not only to structure, feel and thermal insulation properties, but also to behaviour during dyeing.

Crease-resistance of fabrics made of Mediolanum is remarkable and they give the wearer the same degree of comfort and protection as those made of wool or silk. Not the least interesting feature of the new fibre is the fact that the manufacturing process is extremely simple, which has made it possible to market a protein fibre with superior features to staple viscose and at a cheaper price.

Italian rights on the new fibre have already been taken up by a leading producer of rayon and staple viscose, but patent rights for other countries are still available.

★ ACCORDING to statistics kept by the tanning industry for the last 20 years, 60% of the cattle in the U.K. are infected by warble fly. The overall loss caused by the pest is estimated at between £2 and £3 million a year.

In an attempt to control this pest, Dow Agrochemicals of Kings Lynn are investigating organo-phosphorus compounds which kill the grubs in the animals before they can form swellings and so prevent damage to the hide. The drug being studied is Etrolene which can be given by mouth in the feed as a single dose that will kill insects and other parasites, such as lice, wherever they are in or on the animal's body.

Results obtained by Dow have shown a reduction of 97% in the incidence of warble fly in treated animals. Further trials are to be conducted before administration by mouth can be thoroughly recommended since Canadian workers have shown that there is great variation in the daily feed consumption in individual animals, and their reduction in warble counts showed greater variation than that obtained by Dow.

★ THE editor of a contemporary technical journal related to me how a reader rang him up and told him how much he appreciated the journal, adding, as a sort of backhanded compliment, "I always find the advertisements particularly interesting!" This serves to illustrate that technical advertising plays its part, along with technical literature, meetings, exhibitions, etc., in keeping chemists and other scientists abreast of the latest developments.

Advantage is taken of this fact in a coloured folder which reaches me from Armour Hess Chemicals Ltd., and which represents a novel approach to sales literature, for it consists of a collection of their technical advertisements. The folder, entitled 'Industry and us', illustrates some of the uses for Armour Hess fatty acids and surface active nitrogen derivatives.

★ THE first edition of a quarterly news sheet, *Capsule News*, has been published by R. P. Scherer Ltd., of Slough. The purpose of the new magazine is to provide readers with up-to-date information on Scherer's latest developments in research, new manufacturing processes, etc.

In this first edition, a new drug presentation is described. Known as microcaps, the new capsules make it possible for the gelatin capsule to compete in price with a similar tablet product for the first time, say Scherer. Cost is brought down by the very high rate of production made possible by new rotary-die encapsulating machines. In the new machines, 16 plunger pumps are employed instead of the usual 10, making a production of 70,000 capsules per hour per machine possible.

★ THERE is a wide measure of agreement among experts of the oil exploration laboratories of the larger groups that the theory of the biological origin of petroleum is essentially valid, but Sir Robert Robinson, O.M., past president of the Royal Society, writing in the Shell magazine *Catalyst*, puts forward the conception of the duplex origin of mineral oils. Sir Robert suggests that a primeval hydrocarbon mixture became admixed with organic life on the ocean littoral.

The primeval atmosphere was probably largely methane, carbon dioxide and ammonia and the temperatures rather high. Loss of hydrogen from methane would yield hydrocarbons, and the thermodynamic equilibrium would be disturbed by the escape of hydrogen from the atmosphere. It has been shown that simple amino acids can be produced in the laboratory by the irradiation of such a mixture and quite recently peptides from the same amino acids have been produced by photosynthesis in acqueous solution. The simple non-chlorophyllic organisms could well have used hydrocarbons as a source of energy, and possibly, covered with oil, formed the earliest sedimentary deposits. As life forms evolved more and more of the substance of the organisms found its way into the oil and was transformed into hydrocarbonaceous material. As the life forms approached the present system the formation of *n*-alkanes with an odd number of C atoms predominated.

A purely primeval conception of petroleum is unacceptable because of porphorins, optical activity and the odd C number predominance but the purely biological origin leaves certain organic chemical difficulties unexplained. Hence, Sir Robert submits the duplex theory, which, although incomplete, may serve as a reasonable working hypothesis.

★ LAPORTE Industries' surprise takeover of the Elektrochemische Werke Munchen works in Western Germany (see page 884) is a further sign of the growing interest of U.K. chemical manufacturers in establishing manufacturing facilities on the Continent, following I.C.I.'s Rotterdam project announcement and the I.C.I. chairman's hint of further projects in Europe to come.

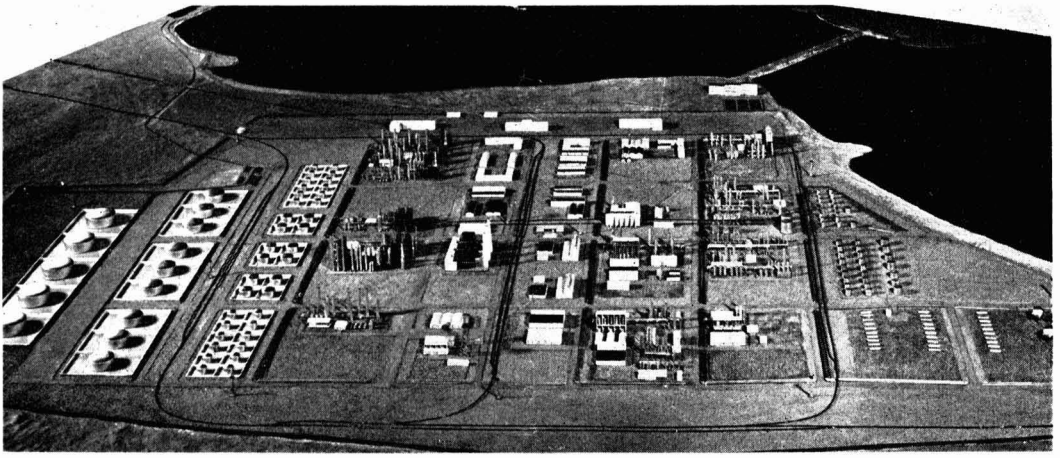
Chemical companies who have the necessary resources are wise to gain a manufacturing foothold in the Common Market area at this stage, although of course these moves come somewhat late when one considers the already heavy entrenchment of American manufacturing interests on the Continent.

★ HISTORY was made last week when, for the first time ever, a woman chairman presided over a meeting of the Royal Society. This distinction went to Dame Kathleen Lonsdale (Professor of Crystallography in University College, London) who took the chair in the absence of the president. On Tuesday this week, during my brief stay in Holland, I met two of the Society's Fellows who were at that meeting: Lord Fleck, honorary treasurer of the Royal Society and president of the Society of Chemical Industry, and Sir Robert Robinson, former president of both societies.

Speaking at the annual dinner of the S.C.I. Overseas Section at Schedeningen, Lord Fleck described Dame Kathleen's chairmanship as being an example of further progress in science and technology. He also reported that the Overseas Section now has more than 500 members in 50 different countries, 10% of them in Holland. He added that membership of the S.C.I., which has been on the decline, was increasing again.

Alembic

Brindisi—Symbol of Italy's Massive Investment in Petrochemicals



Model of Montecatini's new Brindisi site

Expanding Montecatini Claim World's Largest Range of Plastics

WITH a 1960 income of some £200 million, 17% up on 1959—and plants in full production—the Italian Montecatini Group are Italy's leading chemical producers and among the world's largest. Montecatini, or to give the company its full title Soc. Generale per l'Industria Mineraria e Chemica, Anonima, were founded in 1888 to exploit a small copper mine in Tuscany. Their first period of dynamic expansion started in 1910 under the management of Ing. Guido Donegani who remained in control until 1945.

To-day the Montecatini Group controls more than 160 plants, productive units and research institutes in Italy. The group's largest production site has yet to go on stream at Brindisi and by 1965 a Lire 200,000 million expansion scheme will double existing output of chemicals. Already Montecatini claim to produce the widest range of plastics materials in the world and this is to be expanded when new products are introduced at Brindisi.

Montecatini gave Italy its first petrochemicals operations in 1950 when their steam cracking plant started production of olefins for conversion into plastics, plasticisers and solvents. To-day, the group's investments in this field represents 180,000 tonnes of carbon content—as disclosed in CHEMICAL AGE, 20 May by Ing. Piero Giustiniani, joint managing director.

Leadership in plastics is doubtless due to close co-operation with Professor Giulio Natta, director of the Industrial Chemistry Institute at Milan Polytechnic. Extensive work by Natta and his team has led to the introduction by Montecatini of a number of new polymers, the most important being iso-tactic polypropylene. This process has already been widely licensed overseas—the latest licensee being Svenska Esso; other negotiations are in hand.

The group has also licensed its processes to the U.S.S.R. for the production of maleic anhydride, titanium dioxide, acetylene and ethylene from oil. At the end of 1960 a total of 277 plants throughout the world were either in existence or under construction to operate Fauser-Montecatini processes. These processes are tabulated in the following page.

Plants using these processes under construction during 1960 included the following: partial combustion of hydrocarbons, for the U.S.S.R. at Grodno to produce 277,000 cu.m/day of CH_4 equivalent feed from natural gas; synthesis ammonia from natural gas also at Grodno, to produce 99,000 tonnes/year; a 130,000 tonnes/year nitric acid plant for Houilleres at Mazingarbe, France; a 15,000 tonnes/year urea plant at Cherokee, Ala, for Armour and Co.; and a 20,000 tonnes/year unit for the production of acetylene from hydrocarbons for Diamond Alkali at Deer Park, Tex.

This second part of our special survey of the Italian chemical industry reviews the activites of the major companies. First part of the survey appeared in last week's issue

Fauser-Montecatini processes in use in the U.K. are all for Shell Chemical Co. Ltd., producing 99,000 tonnes of ammonia, 127,000 tonnes of nitric acid, and 37,000 tonnes of ammonium nitrate.

These processes now account for the production of 4 million tonnes/year of nitrogen throughout the world.

Post-war installations by Montecatini themselves of these installations total:

Partial combustion of hydrocarbons, 846,000 cu. m/day of CH_4 equivalent feed; Synthesis ammonia, 168,000 tonnes/year; Nitric acid, 254,000 tonnes/year; Ammonium sulphate, 111,000 tonnes/year; Ammonium nitrate, 323,000 tonnes/year; Calcium nitrate, 290,000 tonnes/year; Urea, 110,000 tonnes/year; Methanol, 100,000 tonnes/year; Acetylene-from-hydrocarbons, 31,500 tonnes/year.

Although the use of sulphuric acid as an economic indicator has lost ground, it is interesting to learn that Montecatini's acid make in 1960 totalled 1,237,449 tonnes, an increase of just under 10% compared with 1959. The group's really big expansion projects continue in the heavy organics field, where most of the endeavour is taking place in Southern Italy. Maximum use will be made of newly discovered sources of oil and natural gas. In addition to the large-scale development at Brindisi, details of which were given in CHEMICAL AGE, 20 May, a big development programme is planned at Bussi, where the installations will be fed by the first south-Italian pipeline that will bring methane recently found by Montecatini at Cellino (Abruzzi).

In Sicily, the associated company,

USAGE OF FAUSER-MONTECATINI PROCESSES

Process	No. of Plants	Cu.m./day
Water electrolysis	11	1,117.500 (hydrogen)
Partial combustion of hydrocarbons	34	2,956,000 (CH_4 equivalent)

	Capacity '000 tonnes per day	Nitrogen equivalent
Ammonia	2,721.8	2,251.7
Nitric acid	3,721.8	432.5
Amm. sulphate	1,363.5	286.3
Amm. nitrate	1,410.0	479.4
Calcium nitrate	335.0	51.9
Urea	1,005.7	462.9
Methanol	217.0	—
Acetylene	151.5	—

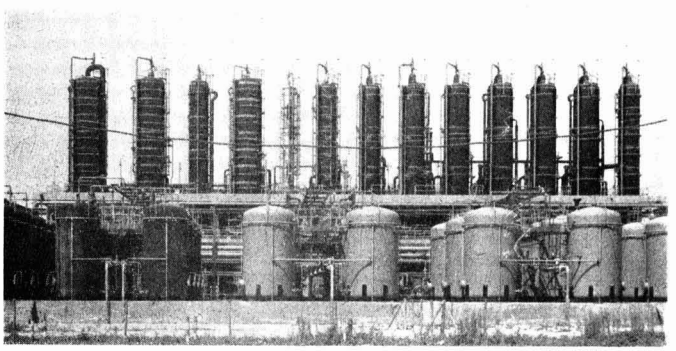
Augusta Petrolchimica are planning big expansions at Priolo. Also in Sicily is the new San Cataldo potash mine, where production last year totalled 3,000 tonnes a day; this is to be boosted to 7,000 tonnes/day. Other potash deposits have been located in Palo where mining will start in 1962, as well as at Racalmuto. The Campofranco potassium fertiliser plants are in full operation and schoenite and potassium sulphate produced will go for the preparation of complex fertilisers, mainly at Porto Empedocle, where output is to be doubled. At the fertiliser works of Crotone, a new unit is in operation for the production of phosphorus.

The associated company Vetrocoke are planning a major expansion in urea. This year plant for the production of titanium oxide will come on stream at Spinetta Marengo; it is planned to raise capacity to 40,000 to 45,000 tonnes/year. Also at this site plans are in hand to treble output of fluorine derivates. The Katschmann process from Chemische Werke Witten is to be used for the production of dimethylterephthalate. The Montecatini subsidiary ACNA (Aziende Colori Nazional Affini) last year came on stream with a 10,000 tonnes/year phthalic anhydride plant and as stated by the group managing director (see CHEMICAL AGE, 20 May, p. 807) Montecatini are to make phthalic as well as maleic anhydride and phthalic plasticisers at their new Brindisi complex.

Montecatini are continuing their search for hydrocarbons in the Algerian Sahara and are associated in this with the French PREPA on one side and Fiat and SNIA Viscosa on the other.

ANIC Plan Vast Petrochemical Plants in Sicily and S. Italy

ONE of the pacemakers in Italy's booming petrochemical industry is E.N.I. (Ente Nazionale Idrocarburi), the vast State-owned oil industry, whose president, Mr. Enrico Mattei, has been creating a stir among the traditional oil companies. Under his aggressive and dynamic leadership E.N.I. have branched into natural gas, petrochemicals and atomic energy. Symbolic of his drive is the 'Methanopolis' he has created at San Donato on the outskirts of Milan. Here in a 14-storey modernistic headquarters—shortly to be duplicated by another 14-storey block—is the nerve-centre of his 'empire'. The existing building houses 1,500 administrative and technical staff; alongside it are the laboratory buildings of the E.N.I. Research Centre, where Professor Dinelli controls a team of 600 graduates and technicians. 'Methanopolis' also houses the 900 staff of SNAM Progetti, the E.N.I. Group project engineering and design company; pilot plant facilities for AGIP Nucleare, and the Group's plastics and synthetic rubber interests. Here, too, is a vast housing estate for E.N.I. executives and payroll staff, tennis courts, swimming pools, shops and even a modern church, with a large screen symbolically executed in Ravenna mosaics.



Part of the ANIC chemical complex at Ravenna

To learn something of the group's vast petrochemical expansion projects, and its research work, CHEMICAL AGE recently visited San Donato. Ing. Gino Pagano, manager of the Chemical Division of the ANIC, the petrochemical subsidiary in which E.N.I. have a 51% interest, described future projects at the Ravenna site on the Adriatic, the new complex at Gela, Sicily, which ANIC say will be bigger than any present-day European facilities, and at Ferrandina, Central Italy, where construction has yet to start.

Costing about Lire 120,000 million, the Gela complex will utilise crude oil produced by the E.N.I. subsidiary, AGIP-Mineraria in a nearby 3 million tonnes year refinery. Scheduled for production are 600,000 tonnes of LPG, 4,000 tonnes of propylene, 15,000 tonnes of polythene, 17,000 tonnes of other ethylene derivatives, solvents, fertilisers and petroleum coke, as well as 110,000 tonnes of sulphuric acid, up to 100,000 tonnes of urea and 65,000 tonnes of ammonia.

On Stream Time

First units likely to be on stream are for olefins, scheduled for the second half of 1962, with the whole complex in production in 1963. Dock facilities at Gela will be able to take 10 ships at the same time; four or five of them up to 30,000 tonnes deadweight for handling liquefied products and four or five, with deadweights of about 10,000 tonnes, for handling dry cargoes.

The power station at Gela will produce 1,100 tons/hour of steam and will generate 150,000 kW of electricity; part of the electricity produced will be sold. The site will be an integrated one based on the recent discovery of natural gas at Gela. Methane will be used for the production of ammonia—a route that provides a product about 10% cheaper than through the production of synthesis gas from oil.

Due on stream about one year later than the Gela complex will be the facilities to be constructed at Ferrandina in southern Italy. These, too, will be based on E.N.I.-discovered natural gas deposits. Part of this gas will be piped to Bari for use as town's gas, and about one-third will be utilised for petrochemicals production. Plants here are still in the programming stage and Ing. Pagano could not disclose the individual products to be made, but he did indicate that initially the site will produce intermediates for plastics and synthetic fibres; second stage of the project will include plastics materials and fibres. Montecatini will also have plants at Ferrandina.

At Ravenna, ANIC last year brought their third synthetic rubber unit on stream and this year will produce around 100,000 tonnes. A fourth unit has now been installed and this month the com-

pany will come on stream with *cis*-4 polybutadiene on a commercial scale. ANIC hold a 51% interest and Wacker Chemie GmbH a 49% stake in Soc. Chimica Ravenna, whose plant to make vinyl chloride monomer and p.v.c. has reached designed capacity. Monomer output is about 30,000 tonnes/year, most of which goes to Wacker Chemie in West Germany, the remainder going to the production of between 10,000 and 12,000 tonnes of p.v.c. at Ravenna.

There are two carbon black plants at Ravenna; the Cabot Carbon Black Italiana unit has been in production for some time with 27,000 tonnes/year, and Phillips Carbon Black Italiana, a company owned jointly by Phillips Carbon Black and ANIC, which is coming on stream now with a capacity of 14,000 tonnes/year. ANIC are to mix carbon black with their Europrene synthetic rubber in a master batch unit at Ravenna, thus eliminating the need for their customers to calender it themselves.

Two principal raw materials used at Ravenna are methane and gypsum rock. Methane is piped in from the Po Valley while gypsum is brought to the plant in truck loads from large deposits some 45 km. away. For the production of GRS rubber, ANIC use a Phillips process, the plant design and construction supervision having been carried out by Brown and Root of Texas.

Production of Acetylene from Methane

Air separation is carried out on a Linde plant which produces oxygen of 98% purity and nitrogen of 99.98% purity. Some 180,000 cu. m. of air/hr. are treated. For the production of acetylene, oxygen is combined with methane at 1,700°C, the process giving acetylene, hydrogen and carbon monoxide, the latter two gases being used with nitrogen in the fertiliser section of the Ravenna complex.

Acetylene is hydrated to acetaldehyde. The partial hydrogenation process of the acetaldehyde and the conversion of the acetaldehyde-alcohol mixture to butadiene were licensed to ANIC by Union Carbide. Butadiene is also produced at Ravenna from butane; the plant for the production of butadiene by dehydrogenation and recovery through furfural absorption, being operated under licences granted respectively by Houdry and Phillips Petroleum.

The Koppers process is used for the production of styrene from ethylene and benzene, ethylene being obtained as a by-product of the butadiene plant.

A mixture of hydrogen and carbon monoxide, the latter being obtainable in the event of a shutdown of the acetylene plant through the partial oxidation of methane, is used for ammonium production. Anhydrous ammonia is obtained in liquid form is a Casale-type synthesis unit. Part of the ammonia is used to produce nitric acid which goes for the production of ammonia nitrate.

The Ravenna urea plant was designed and constructed under licence from Stamicarbon, the urea containing 46% nitrogen. The largest fertiliser plant at this site is for ammonium sulphate, which involves a double exchange between the calcium sulphate which is the basis of gypsum and the ammonium carbonate throughout the carbonation of the ammonia solutions. Calcium nitrate is also produced, as are complex fertilisers, manufactured under the Soc. Potasse et Engrais Chimiques process.

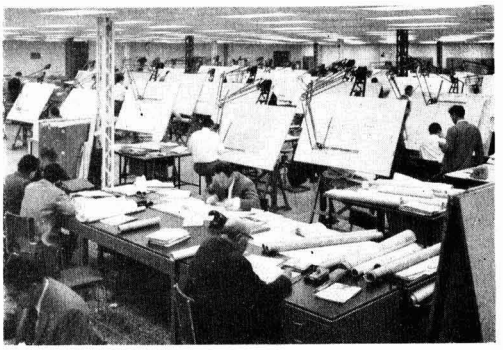
Total Ravenna fertiliser make now tops the 1 million tonnes/year mark, of which 500,000 tonnes is ammonium sulphate, 170,000 tonnes ammonium nitrate, the remainder comprising compounds, calcium nitrate and urea. Dilute calcium carbonate recovered in the ammonium sulphate process is piped to a nearby cement works for the production of 500 tonnes/day of artificial Portland cement. Daily consumption of methane is 1,200 million cu. m.

Like other chemical executives in Italy, Ing. Pagano is not worried about dangers of over-capacity. He feels sure that this will be taken care of by the fact that per capita consumption of plastics fibres and chemicals in large parts of Italy is about the lowest in Europe. When ANIC first announced details of their synthetic rubber and fertiliser capacities at Ravenna (for 50,000 and 600,000 tonnes respectively), critics said the plants were too big, that they would work well below design ratings for many years. The opposite has been the case and continual expansion projects have raised fertiliser production to the 1 million tonnes/year mark and synthetic rubber output to around 90,000 tonnes. Production is fully sold with well over 50% of rubber output going for export, much of it to the U.S.S.R. Since Italy's fixed nitrogen capacity of about 750,000 tonnes/year is almost double the country's present demand, large quantities are being exported, particularly to the Middle East.

E.N.I.'s petrochemical plants are particularly well sited for export sales to the Near and Middle East, both Ravenna and Gela having their own dock systems and raw materials on site.

At San Donato are the group's engineering and research centres. SNAM Progetti, with a staff of 900, provide design and engineering services for the construction of wells, refineries, chemical plants, pipelines, etc. Construction interests are catered for by SAIPEM, while Nuovo Pignone fabricate plant and equipment of all descriptions. Shortly the group will have its own instrumentation company, thus giving them complete control of all operations. Among current projects is the design and construction of refineries at Collombey and Morocco. SNAM Projetti have also provided design and engineering for refineries in Jordan and Tunisia and are currently with SAIPEM handling the construction of 600 wells in the Argentine, with a 4,000 km. pipeline. The pipeline that connects Genoa to Collombey, with a branch line to southern Germany, and which will have a capacity for 19 million tonnes of oil a year, is also being handled by the SNAM Projetti SAIPEM team. This pipeline will be owned by the E.N.I. Group company, Oleodotti Internazionali.

Part of the large design and engineering offices of SNAM Projetti at San Donato



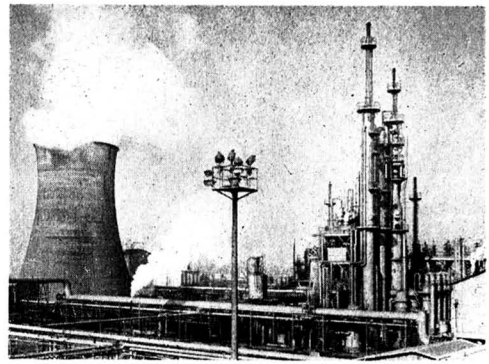
Process for Synthesis of Isoprene

The San Donato research laboratories, headed by Professor Dinelli, have seen the development of a number of processes, including the synthesis of isoprene through propylene and acetone. Technical and physical problems are now being studied. For the polymerisation of isoprene, the laboratories have developed their own catalyst, said to be different from the systems used by Firestone and Goodyear. It differs completely from the lithium and organo-aluminium systems currently being used and already pilot plant quantities of polyisoprene are being made.

In their chemical process work, E.N.I. researchers are seeking to improve current methods with a view to cutting production costs; they are also seeking better synthetic fibres. When the laboratories were opened four years ago, the staff numbered 80; to-day more than 600 are employed. Professor Dinelli has worked at universities as well as in industry, having previously been with Bombrini Parodi-Delfino and Terni.

He has a fresh approach to research problems. Research teams have no individual directors, but one man in each team is appointed as co-ordinator, having no authority to give orders. Research workers will handle a wide variety of projects, ranging from fibres and plastics to the constitution of mineral oils, uranium, etc. In this way, full use is made of the skills of the scientific staff.

EDISON GROUP EXPANDS IN WIDE VARIETY OF CHEMICALS AND PLASTICS



Sicedison's acetylene-from-methane plant at Porto Marghera

CHEMICAL investments made by the Edison Group in the past 10 years have totalled Lire 300,000 million (£174.4 million). This includes the new plants of the Chemical Division of the parent company, Edison, and of the associated chemical companies—Sicedison S.p.A., Industriale Catanese (SINCAT), Applicazioni Chimiche (ACSA), Industrie Chimiche Porto Marghera (ICPM) and Celene.

The Edison Group, Italy's largest producers and distributors of electric power, first diversified into chemicals 10 years ago, when the Edison Chemical Division built its first plants. Previously the group's chemical interests were confined to the production of fertilisers at the APE plant at Vado Ligure and to the 50% interest that Edison acquired immediately after the war in San Marco, producing calcium carbide, calcium cyanamide and ferroalloys at Porto Marghera.

Today chemical activity is in full development. Operating plants are being enlarged; others, completed, are now in a start-up stage; while others, finally, are either being built or designed. The Edison Group claims to be interested in all aspects of chemical production.

The group has fertiliser capacity of 1 million tonnes/year, while for p.v.c. and polystyrene the group has capacity for 100,000 tonnes, or, it is stated, more than 50% of total Italian capacity. Expansion is in hand for both these plastics materials as well as for polythene. Polythene capacity at the end of 1960 was around 16,000 tonnes and work is now in hand to raise this to 30,000 tonnes by the end of 1961, or, it is said, some 30% of total Italian capacity. Polythene is produced at Priolo by Celene, a company owned jointly by the Edison Chemical Division and Union Carbide, whose high-pressure process is used.

The Edison Group claims to be Italy's largest producers of chlorinated solvents, producers being Sicedison and SINCAT. In recent years there have been big increases in the production of chlorine and caustic soda, the group's producers being Edison Chemical Division, Sicedison, APE and SINCAT. Recently a big expansion came on stream for hydrofluoric acid by ICPM.

The Edison Group can also claim to be Italy's largest producers of dodecylbenzene, with 20,000 tonnes/year (Sicedison), although they are not producers of synthetic detergents. ACSA, the company owned jointly with Chemstrand Corporation, has a current capacity at Porto Marghera for 6,000 tonnes/year of acrylic fibres, a figure which is currently rising to 10,000 tonnes.

Greatly expanding end uses are seen for p.v.c. in packaging. Inflatable p.v.c. tents are being used in construction for protective purposes, while in Northern Italy p.v.c. bags are finding a big use in flood control. Being impervious they do not rot as did previously used paper and jute sacks.

Like most of Italy's main plant sites, the Edison Group has concentrated expansion in areas with good port facilities. Porto Marghera is sited on the Adriatic near Venice; Mantua has its own inland dock system and can be reached by ships from Venice, while Priolo on the Sicilian coast is strategically placed to receive phosphate rock from North Africa as well as for exporting to the Near and Middle East.

Porto Marghera. The San Marco plant, in which the group acquired a holding in 1947, produces calcium carbide, calcium cyanamide and silicon. New plants set up at Porto Marghera produce fertilisers: ammonia, acetylene, nitric acid, acetic acid and a range of derivatives.

Basic operation of the Sicedison plant is the electrolysis of sodium chloride for the production of caustic soda and chlorine. With acetylene, chlorine is used for the production of trichlorethylene and perchlorethylene and, principally, for vinyl chloride monomer and p.v.c.-based resins. Acetylene is also used for the production of acrylonitrile in synthesis with hydrogen cyanide, obtained through the direction reaction of methane with ammonia. Other Sicedison products are benzyl chloride, phthalate plasticisers, hydrochloric acid, sodium hypochlorite; plants for p.v.c., plasticisers and benzyl chloride were designed and put into operation with technical assistance of Monsanto Chemical, U.S., who have a 40% holding in Sicedison, the remaining 60% being held by the Edison parent company.

The ACSA plant, jointly owned with Chemstrand, utilises Sicedison acrylonitrile and Edison vinyl acetate to produce acrylic fibres. The ICPM plant at Porto Marghera produces fluorine and its inorganic compounds.

Mantua. Main products of the Edison Chemical Division plant at Mantua are electrolytic chlorine and caustic soda, produced by mercury cells. Sicedison on the same site produce ethylene, propylene and other olefins. Ethylene is used mainly for monomer styrene and ethylene dichloride. Monomer styrene is partly sold and partly used by other Sicedison plants for polystyrene. Ethylene dichloride is an intermediate for p.v.c. Propylene is converted into tetramer propylene which with benzene leads to dodecylbenzene.

Priolo. The plant of SINCAT (owned 100% by Edison) at Priolo utilises the Edison deposits of potassium salts and Sicilian sulphur to produce a range of fertilisers. Italy's largest sulphuric acid plant is sited at Priolo, which also has facilities for the production of phosphoric acid. Feedstock is taken from local Sicilian refineries for the production of ammonia and nitric acid. Potassium salts, particularly kainite, are being processed by a technique developed in the SINCAT research laboratories into potassium sulphate. The company has also developed a highly efficient sulphur extraction process.

Sicilian rock salt is used for the electrolytic production of chlorine and caustic soda, the chlorine being partly utilised in other plants for the production of chlorinated solvents.

In addition to polythene, the Celene plants also produce ethylene oxide and ethylene glycol, propylene oxide and derivatives, as well as various oxo alcohols. Production is based on Union Carbide processes.

Vado Ligure. This APE plant has been modernised and enlarged. Present-day production is for sulphuric acid, phosphate fertilisers, phosphoric acid and complex fertilisers. The plant is also equipped with a unit for the production of chlorine and caustic soda similar to those of Sicedison at Porto Marghera, Edison at Mantua and SINCAT at Priolo.

Developments are in hand at most of these plants. In Sicily alone, the Edison Group expects that its chemical investments will within two years total Lire 165,000 million, or some £87 million.

The Edison Group welcomes the Common Market with its population of more than 200 million as providing greater trading opportunities. Greater competition can be met, it is felt, by the fact that the group has a chain of modern and economically operated plants to which improvements are continually being made. Well organised services help to keep down costs and give greater productivity.

Caprolactam Expansion and P.V.C. Take SNIA Viscosa Further into Chemical Industry

ITALY'S leading synthetic fibre and textile company, SNIA Viscosa (Soc. Nazionale Industria Applicazioni Viscosa) are developing strongly in chemicals. Already their caprolactam process for nylon 6 has been licensed to British Celanese Ltd. in the U.K. and to Allied Chemical Corporation in the U.S., while further negotiations are in hand. The company is also providing assistance in the building of a 3,300 tonnes/year nylon and Perlon fibre plant in Yugoslavia. In addition, research and development work is in hand to extend the use of caprolactam into plastics.

SNIA Viscosa's policy is to expand and diversify all plants in keeping with a policy of completing where possible, production cycles starting from the raw material and working through to the end product. It is also intended to make maximum use of all by-products, which have proved a profitable source of income.

In the chemical sector, the associated S.A.I.C.I. (Soc. Agricola Industriale per la Cellulosa Italiana) last year raised cellulose output by 16.5%, that of sodium lye by 46.4%, that of liquid chlorine by 48.9% and that of sodium hypochlorite by 17.1%. Plans are well advanced for a p.v.c. plant to put these products to use.

Production of the nylon Lilion was expanded in 1960 and towards the end of the year commercial-scale production was started of Velicren, an acrylic fibre. The company will shortly complete construction of a new plant for the polymerisation of caprolactam at Torviscosa, which will provide half of the group's requirements for nylon production, and of a new staple fibre plant. Plant has been completed for the production of carbon disulphide. SNIA also have a stake in the plant at Zaule, near Trieste, of Industria Triestina Applicazione Chimica Organica, for the production of 20,000 tonnes of caprolactam from ammonium sulphate, output of which will total 90,000 tonnes.

An associated company, I.N.T.E.S. (Industrie Tessili Sagrado) is currently installing plant for the production of stretch synthetic fibres, which will come into operation shortly. Vitrofil are perfecting processes in the glass spinning field. In India, South India Viscose, Coimbatore, came into production in April with staple fibre, sulphuric acid and carbon disulphide.

In the group's production of cellulosic fibres last year, the quantity of rayon produced was up 12.4%, while that of staple fibre was down 9.6%; production of remaining fibres rose 13.3%. In protein and synthetic fibres there was a rise of 13.2% in merinova production and a 44.6% increase for synthetic fibres, mainly the polyamides. Polyamide fibre sales were up 25.1% in Italy and 44.8% for export.

Italian production of man-made fibres totalled 200.5 million kg. in 1960, an 8.1% increase on 1959. Viscose rayon production totalled 67.6 million kg., up 11.1%, while viscose staple fibre output was down 1.3% at 84.7 million kg. Production of acetate and cuproammonium fibres rose 5.3% to 13.9 million kg. Merinova output in Italy last year increased 12.7% to 3.1 million kg., while polyamides rose 31% to 25.4 million kg. Italian production of polyvinyl fibres rose 18.2% to 1.7 million kg., while production of polyester fibres was up 69.5% to a total of 3.2 million kg. Commercial scale production of acrylic fibres started in Italy last year, reaching a volume of 0.8 million kg.

It is interesting to record that SNIA Viscosa are taking part in the search for new sources of hydrocarbons. During 1960 the company concentrated its activities in the Puglia and Lucania districts, while an agreement was also signed to participate in prospecting in the French Sahara.

B.P.D. Group Expands in Phthalic Maleic, Olefins and Polythene

ONE of the most widely deversified of Italy's chemical companies is Bombrini Parodi-Delfino, whose head office is in Rome. Products cover a wide range of industrial and agricultural chemicals, ammunition and explosives, metal products, freight wagons, equipment and construction, worsted yarns and synthetic fibres.

Basic chemicals production includes sulphuric acid, phthalic anhydride and maleic anhydride. Other chemicals include *p*-nitroacetophenone, nitrobenzene, *o*-nitrotoluene, *p*-nitrotoluene, dinitroltoluene dinitro-*o*-cresol, pentachlorophenol, sodium pentachlorophenate, BHC, lindane, hexachlorobenzene, parachlorophenylbenzensulphone, alkylaryl sulphonates, fungicides, wetting agents and polyester resins.

Later this year, Bombrini should have on stream their new 6,000 tonnes/year maleic anhydride plant, which operates the Scientific Design process. One of Italy's major phthalic anhydride producers, the company is continually expanding production which is increasingly becoming based on *o*-xylene; this now accounts for well over 50% of phthalic output. Plants are sited at the group's main works at Colleferro, some 30 miles south of Rome. Part of the phthalic output is exported, to Europe and the U.S. As far as maleic is concerned, Bombrini report competition from Japan.

The group's wide range of Selectron polyester resins, also made at Col'eferro, is produced under licence from the Pittsburgh Plate Glass Co.

At Ragusa, Sicily, the associated ABCD company have expansion plans for their olefins plant which produces 50,000 tonnes of ethylene a year, using the Koppers steam-cracking process. ABCD have a 12,000 tonnes/year polythene plant which is to be expanded to 20,000 tonnes. Polythene is produced by the B.A.S.F. high-pressure process.

The Bombrini Textile Division produces a range of worsted yarns and synthetic fibres. Nylon is produced from caprolactam purchased from Farbwerke Hoechst.

The group has developed a range of products for retail sale, including synthetic detergents, DDT insecticide sprays and deodorants. A large pressure-packing aerosol plant is used for Bombrini's own aerosols as well as on a commission basis for a wide range of insecticides, deodorants, cosmetics, paints, etc.

The mechanical division produces impact-extruded aerosol cans and aerosol valves, aluminium containers, non-ferrous extruded rods and sections, as well as the construction of and repairs to passenger coaches, refrigerated cars, tank and freight cars. Under this division comes the provision of process equipment and the supply of complete plants for the chemical, pharmaceutical, food and resin industries.

New Water-soluble Plastic Aids Toxic Chemicals Use

A NEW water-soluble plastics film that can be used for packing weighed quantities of toxic chemicals or other materials that are unpleasant to handle, has been developed by May and Baker Plastics Ltd., Dagenham, Essex.

Although soluble in water, the film is inert to many chemicals and solvents. Many industrial chemicals are used dissolved in water and consequently, when packed in Pevalon H.15 PM as the new film is called, these chemicals need not be touched afterwards but merely dissolved while still in their packs. The base material of the plastic is polyvinyl alcohol so that its inert nature does not interfere with the active chemical.

The film has a matt finish and is produced in a number of thicknesses, the thinnest being 1.5 thousandths of an inch.

I.C.I. Rock Salt Mine

An application by I.C.I. Limited for permission to extend a rock salt mine at Bostock and Moulton in Northwich rural district has been approved by Cheshire County Council. Approval is subject to a reference of the application to the Ministry of Housing and Local Government.

Retiring H.O.C. Group Chairman Discusses Importance of Planning in Heavy Organics Industry

THE importance of a long-term plan to give meaning and direction to a short-term policy was stressed by Dr. M. A. Matthews of Shell International Chemical Co. Ltd., when he gave the address as retiring chairman of the Heavy Organic Chemicals Group of the Society of Chemical Industry on the subject of 'Planning in the Heavy Organic Chemicals Industry'.

There has been an extraordinary rate of growth in the heavy organic chemicals industry. The rate of growth of the U.K. between 1954 and 1959 was 4½% compared with 2½% in industry as a whole, but growth rate of the heavy organics section of the chemical industry was around 10%. The O.E.E.C. countries also present the same picture.

The reason for this growth in heavy organics is the basic infiltration of these chemicals into more and more aspects of consumption caused by versatile new products replacing established materials, but it also depends on more sophisticated consumption such as cars, refrigerators, decorative panels etc.—a process which will continue. The growth rate in the heavy organic chemicals industry may well continue at a level of 10% for a good many years.

Petroleum-based Organics

The introduction of petroleum-based heavy organics is not an explosive process, but a gradual one, Dr. Matthews believes. Non-petroleum-based chemicals still account for a large proportion of heavy organics; petroleum-based chemicals are growing rapidly because relatively there is room for them to do so, but their rate of growth will fall off. In the U.S., the growth rate of petroleum-based organic chemicals is running parallel to organics as a whole. In the U.K. the petroleum-based organics are increasing at a steeper rate but, Dr. Matthews believes, the U.S. picture will be repeated in the U.K. before long.

This extraordinary rate of growth in the heavy organic chemicals industry makes planning difficult, but very important. A long-term plan is essential, but it must not be too detailed since the tremendous rate of growth of the industry and the increasing competition makes the future unpredictable. The further into the future the plan goes, the less specific it must be.

Dr. Matthews, who has had 14 years' experience with Shell, outlined what he considers the ideal approach. He gave three main lines of policy. The main plan must give the general directions in which developments over 10-15 years will take place. It must indicate in broad terms how chosen lines are to be pursued—for example, whether by basic research or the purchase of processes, or by combinations with other firms. Thirdly, the main plan must give a clear idea of the overall rate of growth which is to be aimed at.

Dr. Matthews then went on to discuss the selection of projects. The approach to selection, he thought, should be systematic. This is where a plan of campaign is invaluable since it sets a limit to the number of possibilities. A large number of factors have to be established for each project before selection can be made, such as the markets for the product, its derivatives, the intentions of other firms and their capacities. The choice of location, with its attendant labour and utility facilities must also be taken into account. Working along these lines, a process may take seven years before the initial laboratory research is translated into commercial production. The period can, however, be cut down by good co-ordination between various departments in the company. Speed is essential and undue hesitation in the face of risks may do much harm. Because of this the process of selecting projects should be a continuous one.

For the future, Dr. Matthews thought that production on a purely national basis will not last. Advantage must be taken of large-scale centralised production, for which U.K. is well placed.

D.S.I.R. Report Notes Progress in Sewage Treatment of Detergent Wastes

A FURTHER steady expansion in research activities is reflected in the annual report for 1960 of the Department of Scientific and Industrial Research (H.M.S.O., 4s) which records an estimated net expenditure for 1960-61 of £12.2 million, compared with an actual expenditure of £10.3 million in 1959-60 and £8.9 million in 1958-59. The increase is particularly marked in schemes for supporting post-graduate training and scientific research in universities and colleges of technology.

An important change in administration is aimed at giving greater flexibility in long-term planning. The Five-Year Plan is replaced by a new method of financial forecasting, under which the Council, will agree each year with the Treasury, subject to approval by Parliament, (a) the expenditure for the following year, (b) reasonably firm estimates for the next two years and (c) less definite forecasts for the fourth and fifth years. In this way, estimates can be revised annually.

In reviewing the work of the various D.S.I.R. research stations, the report notes that there is increasing research into air pollution, water pollution by synthetic detergents and pollution by radio-isotopes. The Water Pollution Research Laboratory and the Laboratory of the Government Chemist have been taking part in a technical assessment of a new alkyl aryl sulphonate detergent during a large-scale trial in the Luton area (see also CHEMICAL AGE, 2 July 1960, p. 23, and 30 April 1960, p. 715). This detergent was shown in laboratory tests at the Water Research Laboratory to be more readily decomposed in sewage treatment processes. The results showed that while a higher proportion of the new material, compared with the old one, is removed during treatment at the Luton Sewage Works, this proportion is lower than in the laboratory tests. However, the detergent content of the River Lea, below Luton, as determined by independent authorities, has fallen by about one-third as a result of the experiment, and the amount of foam on the river, to judge from photographs, has appreciably decreased.

Promising Temperature-resistant Polymers Studied at N.C.L.

NEW materials with properties that would open new applications for polymeric materials forms the greater part of the work of the New Materials Group of the National Chemical Laboratory, according to the 1960 report issued by H.M. Stationery Office, price 4s 6d.

One currently important direction of advance is in the search for substances with greater thermal stability than is usually associated with a molecular skeleton of carbon-to-carbon bonds. To this end, particular emphasis is being placed on the boron-nitrogen compounds. The systematic study of the chemistry of borazole and its derivatives seems likely to furnish an answer to the problem of synthesising polymers of the required kind.

The object of part of the work has been to prepare linear polyborazynes. The problem has been to discover types of substituted borazynes which for a number of reasons are incapable of forming the trimeric borazoles and so create conditions under which linear polymerisation can take place.

Among the compounds studied are the highly sterically hindered aliphatic primary amines with boron halides. Apart from their theoretical interest these compounds show considerable promise as pre-ignition suppressors for motor gasoline.

U.K. LURGI PLANT NEARS COMPLETION

S.G.B.'s Westfield Gasification Works to Reach Full Production Soon

OPENING of Britain's first Lurgi high-pressure gasification plant by Her Majesty the Queen on 27 June will mark the official beginning of a gigantic experiment which the U.K. gas industry as a whole, faced as it is with an urgent need to discover cheaper methods of gas production, will watch with keen interest as a new approach to the gasification of low-rank coals.

Being built by the Scottish Gas Board at Westfield, Fife, at a cost of £6.6 million, the plant is at present producing 15 million cu. ft./day of gas. Completion of the second stage of construction in a few months' time will double this output to 30 million cu. ft.—one-fifth of Scotland's present total demand. The high-pressure pipeline at present being built across central Scotland to link Westfield with existing grid systems will enable the Lurgi gas to be distributed over an area of some 4,000 square miles.

The Westfield plant is not only the first of its kind in the U.K. but also the third in the English-speaking world to incorporate the Lurgi process of high-pressure gasification, the others being at Sasolburg in South Africa and Morwell in Australia. An outstanding advantage of the process is its ability to produce large quantities of gas from low-rank non-caking opencast coals which are totally unsuitable for gas-making by orthodox means. The Westfield plant incorporates a number of unique technical features; for instance, it is the first gasworks in the U.K. to use oxygen on a large scale for the production of town's gas.

Apart from the details of the process itself, the plant is noteworthy as a considerable achievement in chemical engineering design and construction. Although the Lurgi process had been employed elsewhere there was little precedent for the assembly of the component process plants and the main contractors, Humphreys and Glasgow Ltd., were faced with the fact that the design of a plant capable of meeting the special requirements of the Scottish Gas Board could not be done by merely repeating a previous formula, but required long and careful preparation work by well co-ordinated design and engineering teams.

Gasification. The plant draws its supplies of coal from the adjacent opencast workings of the National Coal Board, gasification being carried out in three Lurgi vessels with provision for a fourth in the second stage of construction. Unlike the three gasifiers first installed, this fourth gasifier will not be built in Germany but—under an agreement between Humphreys and Glasgow, the Power-Gas Corporation and the Lurgi Co., will be made in Britain: the first of its kind to be fabricated outside Germany.

The main vessel at Westfield is a mild-steel, fusion-welded vessel some 19 ft. high and with an outer diameter of 10 ft. The coal enters through a lock-hopper at the top, steam and oxygen at high pressure being introduced at the lower end; the gas is generated as a result of the reaction of steam and oxygen with the coal at a pressure of about 30 atm. Each gasifier produces upwards of 7½ m. cu. ft./day. Normally, with the present output of the works, two are in use with one as a standby.

Steam Raising. In the first stage of construction two boilers have been installed, each capable of producing 45,000 lb./hr. of steam at a pressure of 450 p.s.i. An unusual feature of the boiler installation is the use of a type of grate, the Ignafluid, which operates on a fluidised fuel bed principle and makes it possible to burn fuel containing a large percentage of fines.

Oxygen Supply. The oxygen units at Westfield are Tonnox liquid-pump units, designed and constructed by British Oxygen Linde, being the first of their kind to be installed by this firm in the U.K. Indeed, this is the first time liquid oxygen pumps have been used anywhere for the Lurgi gasification process, all other plants using gaseous oxygen compressors.

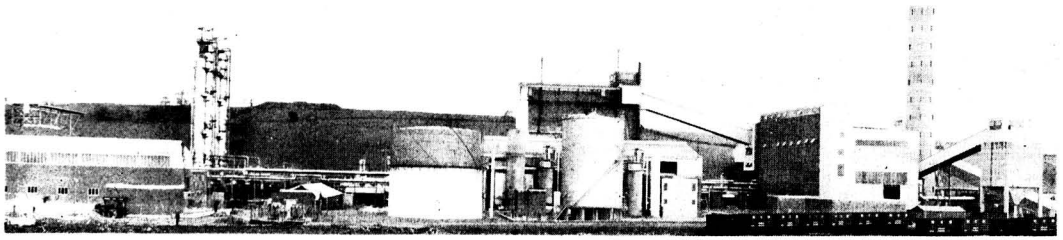
The liquid oxygen fraction is continuously withdrawn and compressed to a pressure of 426 p.s.i. in a pump operating at −183°C. Vaporisation of the liquid oxygen takes place in a heat exchanger, after which it is pre-heated and passed to the Lurgi gasifier as gaseous oxygen at 426 p.s.i.

Purification. Crude gas leaving the gasifiers at 400-450°C is first quench-cooled to about 196°C by tar-water spraying, waste-heat boilers being used to recover low-pressure steam for use as process steam in the purification plant. After passing through further coolers the gas is washed with light oil to remove benzole, the next stage being the simultaneous removal of carbon dioxide and hydrogen sulphide using the hot potassium carbonate process. This is done in the Benfield plant (named after its two U.S. inventors, Benson and Field).

Reducing CO_2 Content

When it leaves the coolers the Lurgi gas contains some 27% CO_2 and 0.8% H_2S; the high carbon-dioxide content must be reduced in view of its effect on the calorific value of the gas. Essentially, the Benfield process involves the absorption of CO_2 and H_2S in a 35% solution of potassium carbonate at high pressure and at a temperature of approximately 110°C. The CO_2 and H_2S react with the potassium carbonate to form potassium bicarbonate and potassium bisulphide respectively; the solution leaves the absorber and, after a reduction of pressure from 325 to 5 p.s.i., passes to a regenerator vessel where conventional steam stripping is carried out at the same temperature.

The acid gases (or waste gases) leaving the top of the regenerator consist of approximately 98% CO_2 and 2% H_2S. After being cooled they pass to a catalytic conversion plant where all hydrogen sulphide is oxidised to sulphur dioxide. The waste gases are then mixed with boiler flue gases and finally pass to the main chimney stack. Plant for the recovery of sulphur from the waste gases will be installed during the second stage of construction.

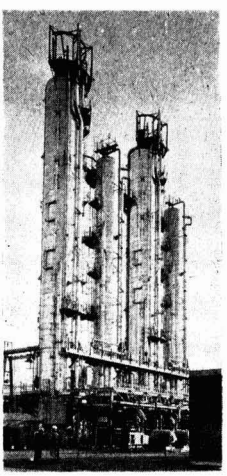


A panoramic view of the Westfield works taken from the south showing from left to right—workshops, Benfield towers, oxygen plant with Lurgi house behind, boiler house, chimney, ash and coal conveyors

The Benfield plant has been designed to give an absorption efficiency of CO_2 and H_2S of over 90%. To meet statutory requirements, a further stage of purification is necessary before the gas passes into the grid main. The Bischoff system of oxide purification has been chosen for the final stages of H_2S removal. In this system the gas passes through two streams each of four towers designed for operation at a pressure of 340 p.s.i.

The purified Lurgi gas has a calorific value of 400 B.Th.U./cu. ft. To meet district requirements the gas at present is enriched to 450 B.Th.U. by the addition of butane, supplies of which are brought in by road from Grangemouth oil refinery, 35 miles from Westfield.

Further Developments. During the second stage of construction now in progress, the fourth Lurgi gasifier will be installed together with a newly developed plant for the reduction of the carbon-monoxide content of the gas. A further steam boiler of the Ignafluid type and plant for the removal of sulphur from the waste gases will also be introduced.



Towers of Benfield Plant

The principal effect of these further developments will be that the total production of gas will be doubled. The effect of the carbon monoxide conversion plant will be to reduce the carbon monoxide content of the gas to less than 8%; it will also help to reduce the specific gravity of the final gas. The carbon monoxide conversion plant will be installed at the outlet of the waste-heat boiler and will treat hot crude Lurgi gas at a temperature of approximately 105°C. This will be the first 'raw gas conversion plant' to be installed outside Germany.

Design and Construction. As intimated at the beginning of this article, the Westfield project was a unique one for the main contractors, Humphreys and Glasgow Ltd., and, as a preliminary to the design of the plant, teams of engineers were sent abroad to technical organisations and manufacturing plants in many parts of the world to analyse, prove and negotiate the most suitable process for a particular duty. The first material result of this research was a scale model of cardboard and wood, pieced together in the London office of Humglas. This was followed later by larger scale models of the individual plants on which every vessel, pipe and valve was accurately positioned.

Despite the fact that the nature of the site called for some tricky civil engineering work, the preparation of the site area, including levelling, piling, and the provision of site construction, roads and services, was completed 12 months after commencement of the contract.

Of all the heavy lifting involved in the erection work, that of the complete vessels for the Benfield plant was the heaviest. Gin poles and double winches having a capacity of 200 tons were used. The construction work continued through two bad Scottish winters. Materials used at Westfield included over 2,000 tons of steel of all kinds, 1,100 tons of pipework, some 42,000 tons of concrete, while services installed include over 25 miles of power cables, more than eight miles of underground ducts, over 1,500 light fittings and more than 200 electric motors.

Commissioning. The commissioning of Westfield was carried out in a surprisingly short time: coal was fed to the gasifiers on 22 December 1960 and gas was first fed to the grid five days later. The large commissioning team included representatives of Lurgi, while the main sub-contractors had their own commissioning personnel on the site. The plant was started up ahead of the contracted date.

Suppliers. The variety of equipment and supplies involved in Stage 1 of the Westfield project is illustrated by the list of suppliers, a selection from which is as follows: Armour Hess Chemicals Ltd., Audley Engineering Co. Ltd., Henry Balfour and Co. Ltd., Keith Blackman Ltd., Frederick Braby and Co., British Drug Houses Ltd., British Ermeto Corporation Ltd., British LaBour Pump Co. Ltd., three of the British Oxygen Group companies, British Rototherm Co. Ltd., Ciba (A.R.L.) Ltd., Constructors John Brown Ltd., Distillers Co. Ltd., three Elliott-Automation companies, Goodyear Pumps Ltd., G. A. Harvey and Co. Ltd., Joshua Hindle and Sons Ltd., Robert Jenkins and Co. Ltd., K.D.G. Instruments Ltd., Richard Klinger Ltd., Mechans Ltd., Mirrlees Watson Co. Ltd., Neckar Water Softener Co. Ltd., Negretti and Zambra Ltd., Newton Chambers and Co. Ltd., Permutit Co. Ltd., Power-Gas Corporation Ltd., Pyrene Co. Ltd., Thomas W. Ward Ltd., Wellington Tube Works Ltd., Widnes Foundry and Engineering Co. Ltd., and G. H. Zeal Ltd.

Output of Chlorine in U.S. Should be 5.7 m. Tons by 1965

OUTPUT of chlorine in the U.S. should be in the region of 5.7 million tons by 1965, when the total U.S. output of chlorine, caustic soda, soda ash and hydrochloric acid will be over 19 million tons. This was predicted by Mr. Leo B. Grant, of Dow Chemical, in a paper given to the Chemical Market Research Association meeting in New York. He foresaw that the chlor-alkali industry, including hydrochloric acid, would exhibit a growth rate of some 4.5% a year over the next five years, with chlorine itself showing a growth rate of only 5% a year compared with the 9.4% growth achieved during the last decade. One reason for the slowing growth of the chlorine industry is the diminishing number of chlorine consuming products with high growth rates.

The pattern of consumption of chlorine within the chemical segment will change somewhat, according to Mr. Grant's predictions. Production of chlorinated aliphatic hydrocarbons is the principal area of growth, but production of metal chlorides will also increase in importance as an end use. The relative amount of chlorine going into ethylene oxide and glycerol manufacture is declining, he says.

Overall usage of chlorine in the chemical industry is expected to increase only by a very slight percentage of the total output during the next five years, to 73.5%, but pulp and paper usage should jump from the present 15% to 17% by 1965, with water treatment and other consumption outlets declining somewhat. For caustic soda, major growth areas are seen to be the aluminium industry, paper, and oil refining. Declining use of the lime-soda process is a significant feature of the caustic soda scene, only 7% being produced by this process in 1959 compared with 20% in 1951, with a likelihood of a further decline to 2% by 1965. This has also led to a decrease in the quantity of soda ash used by the chemical industry.

Statistical Summary of the Mineral Industry

INFORMATION for the six years 1954 to 1959 is given in the latest edition of the 'Statistical summary of the mineral industry'. Published annually, the summary shows world production, exports and imports of all important economic minerals, metallic and non-metallic, including the mineral fuels, coal and petroleum.

The petroleum tables give a comprehensive information on production and trade in crude petroleum, natural gas, asphalt, oil shale and the principal refinery products. The summary also includes fertiliser tables giving details of both unmanufactured and manufactured products.

Copies of the summary are available from H.M. Stationery Office at 27s 6d.

Letter to the Editor

USE OF BLANCOMILO AS RUBBER FILLER

SIR,—In your issue of 20 May (p. 816) you print a letter from the advertising and publicity manager, English China Clays Ltd., in which he claims that "rather misleading" information was made in a reference to the new rubber filler called Blancomilo which is available from our company. This reference was on page 540 of your 1 April issue.

In reply I would like to point out that Berk authorised for publication the reference to Blancomilo only after completion of test work done by a leading consultant in the rubber technology field who was retained by Berk to carry out an independent valuation of Blancomilo.

The commercial china clays used in the experiment as a comparison against Blancomilo were materials known as No. 4 Clay and Stockalite. The actual figures on tear strength obtained, using the same formulation in each case, merely substituting the different clays, were as follows:

	No. 4 Clay	*Stockalite*	*Blancomilo*
Tear strength	10	11.5	20

In each case 75 parts of clay were used to 100 parts rubber.

Series of Tests

It is interesting to note that at the instigation of the producers of Blancomilo, a series of tests was carried out by an independent consultant in France, when Blancomilo was examined in conjunction with china clays normally used in the rubber industry in that country. In this case, Blancomilo was examined against two china clays known as Kaolin T.3, and Vercoryl Standard. In a similar formulation, when again 75 parts clay were used to 100 parts of rubber, the tear strength of the sample containing Blancomilo proved to be in the region of double that of the samples containing the other clays.

These two series of tests were carried out by consultants working entirely independently of each other and the results were very similar in both cases.

In view of the independent evidence that we have in our possession we have no hesitation whatsoever in standing by our claim that Blancomilo has the advantage of imparting to rubber exceptional tear strength characteristics, approximately twice that of normal commercial china clays. So far as expressing this in ultimate terms is concerned, however, there are some variable factors involved which can result in interlaboratory tests giving conflicting results. Thus, we are prepared to stand by the figure given in the information released to you, inasmuch as it refers to tests carried out in the laboratory of our consultant, using that laboratory's equipment, on the formulation selected by our consultant. We would not dispute, however, that another laboratory using their own equipment and not necessarily employing the same formulation could obtain a very different result expressed in real terms.

For example, although a British Standard Test Method is used, we understand that the nicking of the sample under test is critical and a very small variation in the size of the nick will have a considerable effect on the tear strength figure obtained. Our consultant's laboratory is equipped with a machine to do this nicking to a standard size but, of course, another laboratory may well have different equipment which could affect the figures obtained.

Finally, we would like to add that a considerable amount of interest has arisen in the trade in Blancomilo. Some of the largest companies in the country, having very considerable technical service available to them, have expressed interest in the tear strength characteristics of the material which we feel they would not have done if the figure quoted by us had been about average for the china clay normally used by them.

We believe that the claims that we have made are fully justified. If, however, your correspondents still feel unhappy about this we would be very pleased to provide them with a sample of Blancomilo to enable them to examine the material for themselves.

Yours, etc.,

A. N. CAMPBELL-HARRIS,
Publicity Manager
F. W. Berk and Co. Ltd.,
8 Baker Street,
Portman Square,
London W.1.

Drugs Exempt from Purchase Tax

THE Treasury have made an order under the Finance Act whereby a number of additions and extensions have been made to the schedule of essential drugs and medicines exempt from purchase tax.

The additions are as follows: Head II—Bromvaletone; 2:4-Diamino-5-(3:4-dimethoxybenzyl)pyrimidine, whether or not mixed with sulphaquinoxaline; N,N-Dimethyl-N-2-phenoxyethyl - N-2'-thenylammonium *p*-chlorobenzenesulphonate, whether or not mixed with piperazine phosphate. Head III—4-N-Benzylanilino-1-methylpiperidine and salts thereof; 2-Chloro-4-nitrobenzamide; 1:2-Dimethyl-5-nitroimidazole; Dimethyl 2:2:2-trichlorohydroxyethylphosphonate; Methaqualone, and salts thereof; 2-B-Methoxyethylpyridine; Phenelzine, and salts thereof; Primaquine, and salts thereof; Propylhexedrine, and salts thereof; *o*-Salicylamide 2-ethoxyethyl ether, whether or not mixed with phenacetin.

The existing entries in Head III for Aminoacridine flavines and Phenothiazine and mixtures thereof have been extended by 'Aminocridine flavines whether or not mixed with 8-hydroxyquinoline and gamma benzene hexachloride'. Phenothiazine and mixtures thereof with one or more of the following substances, that is to say, hexachlorophene, lead arsenate, organo-phosphorus compounds and the sulphates of cobalt, of copper, of iron and of manganese.

New Process for the Removal of Acid Gas

A NOVEL, non-poisonous catalyst is the key to a new process which is claimed to effect a 30 to 40% increase in the removal of carbon dioxide or hydrogen sulphide compared with the hot carbonate process.

Known as the Catacarb process, the procedure was invented by A. G. Eickmeyer, Prairie Village, Kansas. It consists of passing the gas to be cleaned countercurrently through a potassium carbonate Catacarb solution in which acid gas has been absorbed in an absorber column at 200 to 500 p.s.i. The solution is regenerated in a stripping tower operated at 200 to 600°F. The carbonate solution is re-used after the acid gas has been stripped from it. It is claimed that the catalyst can also be used many times.

Other advantages of the process are a lower consumption of steam and a lowering of capital costs by the use of smaller equipment.

The new process is at present being tried out in commercial application in the U.S. It is hoped that these tests will demonstrate the advantages of the Catacarb process over the hot carbonate and the monoethanolamine processes.

Hoechst to Become Polypropylene Suppliers

A RANGE of polypropylene polymers and compounds will be made available by Hoechst Chemicals Ltd., 50 Jermyn Street, London W.1, "in the very near future". These materials will be supplied to Hoechst Chemicals by I.C.I., whose process is based on know-how owned by Farbwerke Hoechst AG of Germany and the Hercules Powder Company of the U.S.A.

Man-made Fibres Output

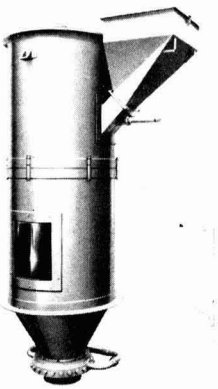
Production of man-made fibres in April reached the modest total by recent standards of 42.17 million lb. according to figures issued by the British Man-made Fibres Federation. This compares with 47.52 million lb. in March and 43.13 million lb. in February, and 49.29 million lb. in April last year, the highest recorded total for April.

EQUIPMENT NEWS

Chemical Plant : Laboratory Equipment : Handling and Control Instruments

MIXING POWDERS BY AIR BLAST

USING blasts of compressed air instead of the usual mechanical methods, the Airmix machine is claimed to give a perfect mix of dry powders in less than 1 min. The machine consists of a vertical, smooth surfaced cylinder with a lower conical section containing the mixing head. Instead of blades or agitators the mixing head in the base contains a series of specially shaped and arranged nozzles through which compressed air is fed from a compressor in 1-sec. or 2-sec. blasts, with a few seconds' interval between each blast. The injected air agitates the powder in a spiral motion and gives a fast and thorough mix. A simple pre-set electric unit controls mixing time and the interval between each



Air-blast mixing machine

blast. Although air is admitted at high pressure, no pressure is built up inside the body; the machine is therefore safe at all times.

The machine is fitted with textile filters that can easily be removed, cleaned and replaced. The Airmix itself can be cleaned in a few seconds with one blast of air. Machines are available with working capacities ranging from 2-800 cu. ft. and the largest machine will mix as little as a few pounds of material without any reduction in mixing efficiency. Modifications can be made to the machine making it possible to use it as a combined mixer and sprayer, so that liquids can be added and thoroughly mixed with the powder.

Details can be obtained from the manufacturers **Wm. Gardner and Sons (Gloucester) Ltd.**, Bristol Road, Gloucester.

RESPIRATOR FOR FINE DUST

A RESPIRATOR which provides protection against dusts as fine as 0.5 micron and smaller, known as the Martindale heavy duty respirator, has been introduced by the protective equipment division of **Martindale Electric Co. Ltd.**, Westmorland Road, London N.W.9. The face piece and filter box are made from lightweight hygienic plastic materials and the complete respirator weighs only 4½ oz. The triangular shape of the filter box ensures unimpaired vision. The plastic face piece can be moulded with the fingers to effect a comfortable seal on any shape or size of face.

The design of the filter box, containing the Ultron (ultra-micron) filter, ensures an initial resistance to breathing of 0.65 in. w.g. at 3 cu. ft./min., at the same time providing highly efficient filtration. The filter also has an exceptionally long life.

REINFORCED THERMOPLASTIC HOSE

MADE of high-grade abrasion-resistant p.v.c. and further strengthened by high-tensile steel wire, Vacuflex hose is available in large sizes from **Recon (Pipelines) Ltd.**, Sheerwater, Woking, Surrey. Any size between 4 and 12 in., in lengths up to 15 ft. or more can now be obtained.

One of the chief advantages claimed for Vacuflex is its flexibility: it can be easily bent around a radius equal to its core diameter. This makes it well suited to ventilation, and dust and fume extraction ducting.

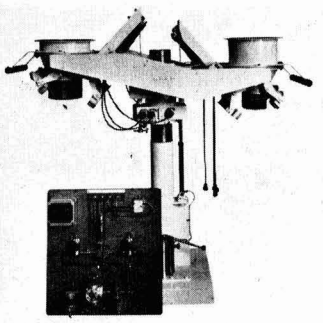
CALCIUM CHLORIDE DRYING TUBE

MADE of polypropylene, the Nalgene calcium chloride drying tube is unbreakable and may be autoclaved. It is designed with one bulb like the usual glass tube, but provides a tubulature at the bulb end and tube fitting at the other end.

Offered by the **Nalge Co. Inc.**, 75 Panorama Creek Drive, Rochester 2, New York, U.S., this versatile drying tube is available in standard 8 in. length, but it can be adapted to 6 in. or 4 in. length by cutting with an ordinary knife.

SACK CLAMP UNIT

INTRODUCED by the sack filling department of the multiwall sack division of **Bowater Packaging Ltd.**, Ellesmere Port, Cheshire, is a pivoting double head sack clamp unit designed to permit the rapid interchange of clamp sizes for filling sacks of varying capacities. This consists of



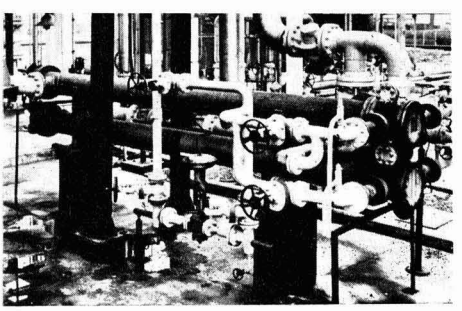
Bowater sack clamp unit

one 56 lb. and one 112 lb. Bowater pneumatic sack clamp, mounted on a hydraulically operated column. The required size of clamp is swung into position beneath the weighing machine discharge hopper and held by hydraulic pressure against a seal on the lower flange of the hopper.

The sack clamps can be foot controlled or fully automatic. All electrical and pneumatic connections are of the quick release plug-in type.

ALUMINIUM ALLOY HEAT EXCHANGER

THE value of aluminium alloys for use in plants handling oil products, H_2S or sea water, is demonstrated by the performance of an all-aluminium heat exchanger, thought to be the first such unit to be installed in a refinery in the U.K., which has recently been inspected and found to be in good condition after its first year in service. The unit, made by the Heat Exchange Division of Wellington Tube Works Ltd. and installed in the gas purification plant of the Mobil Oil Co. refinery at Coryton, has been found not only to have resisted the attack of the hydrocarbon gas—containing 10% H_2S and a trace of water vapour—which passes through the shell side at 220°F, but also to have successfully withstood



Aluminium heat exchanger at Mobil Oil's Coryton works

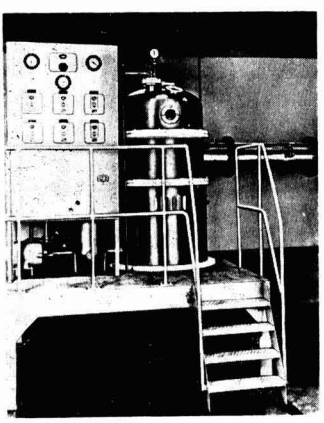
the notoriously corrosive properties of Thames Estuary water which is passed through the tubes at 6 ft./sec. Some light pitting, found on the outside of the tubes, is due to carry-over of particles of rust from other sections of the plant.

The use of sea water as a cooling agent led to the adoption of internally-clad tubes, a product of **Alcan Industries Ltd.**, Banbury, Oxon, who also supplied material for the tube sheets and flanges. The Noral 3S alloy tubes are clad with Noral 72S which is metallurgically bonded to the inner surface. The 72S alloy (1% Zn, remainder aluminium) is anodic to the 3S alloy under the recommended conditions of service and it therefore acts sacrificially in protecting the tube against corrosion. The use of this type of clad tubing is considered to be advisable in applications using natural and untreated waters, including sea water, that may cause pitting of unclad aluminium tubing. The effectiveness of the cladding is well demonstrated in this case.

EVAPORATOR WITH MOVING ELEMENTS

CLAIMED to be capable of evaporating a much greater amount of water per unit area than a non-moving evaporator—and in a fraction of the time—the Centri-Therm has as its basis a stack of rotating cone elements which are supported on a hollow spindle. Each cone element is hollow, with stainless steel walls forming steam jackets supplied with steam through the spindle.

The liquid to be treated is sprayed on the heated inner surfaces of the cone elements at their top edges. Immediately the liquid touches the cone, the centrifugal force developed by the rotation spreads it in a thin layer over the entire inner surface. Since the centrifugal force built up in the Centri-Therm is up to



Centri-Therm evaporator

200 g, the thickness of the layer is only about 0.004 in. and the time taken to cross the surface is very short, just about a second. The centrifugal force also keeps the lower surface inside the cone element free from condensate.

Because of the centrifugal force, the makers state, the conditions at the heating surfaces are ideal both for heat transfer and for evaporation. The instantaneous discharge of condensate by centrifugal force from the steam-heated surface aids condensation, while the thinness and turbulence of the liquid layer ensures rapid heat absorption and virtually eliminates resistance to vapour leaving the layer.

The concentrate from each cone element is gathered around the periphery of the cone element stack and is displaced upwards towards a paring tube which ducts it off. Evaporated vapours are led off under high vacuum through a large side outlet and the steam condensate is collected from the steam jacket by another paring tube.

The Centri-Therm evaporator is marketed by **Alfa-Laval Co. Ltd.**, Great West Road, Brentford, Middx.

NEW DESIGN PIPETTE JARS

PIPETTE jars offered by the **Nalge Co. Inc.**, 75 Panorama Creek Dr., Rochester 2, N.Y., U.S., are blow-moulded in one piece from polythene to provide a solid, leakproof receptacle with a minimum of locked-in stress. Uses include soaking and washing pipettes and other glassware, making stock solutions, storage, etc. The natural resiliency of polythene cushions the lab. ware and prevents scratching, chipping or breakage of fragile contents.

The jars have been redesigned with a slight flare at the top for easier insertion of the pipette basket.

NEW ALUMINIUM CONTAINER

THE Nest-a-Bin, a new aluminium container for the bulk storage or transport of liquid and granular products, consists of two circular halves brought together by a centrally positioned ring. To provide strong jointing the ring is also manufactured in two halves, bolted together and internally tapered to coincide with the edge sections of the bin halves. For the rapid filling and dispensing of granular products, the container has a conical top half with a discharge aperture of 22½ in., the cone angle being 70°. A number of different inlet and discharge valves can be fitted as required. With standard size 'halves' seven complete units with capacities from 220-660 gall. and 54-70 cu. ft. can be assembled.

Suppliers are **Heston Aircraft and Associated Engineers Ltd.**, Heston Airport, Hounslow, Middx.

TOUGH P.V.C. HANDRAIL

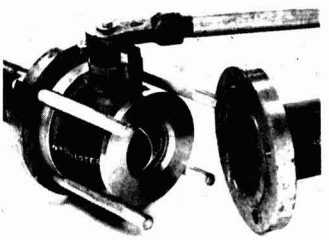
CLAIMED to be particularly well suited for use on factory balustrading, especially around chemical plant, Osmarail is a tough p.v.c. handrail designed to fit the three standard sizes of metal core rail now in general use. Other uses are on cat-walk guard rails and in laboratories. Osmarail is available in 14 different colours, eight of these being British Colour Council recommendations while the remaining six are supplementary colours to match those of similar known products.

Besides being corrosion resistant, Osmarail is claimed to offer good abrasion resistance. It is supplied and installed by experienced teams anywhere in the U.K. on a two to seven-day service.

Osmarail is produced by **Osma Plastics Ltd.**, Grove House, 551 London Road, Isleworth, Middx.

FLANGED BALL VALVES

MINIMUM space requirements, easy handling, positive shut-off, fast operation and speedy maintenance are advantages claimed for the range of flanged ball valves being produced by the **Worcester Valve Co. Ltd.**, 62 Church Road, Burgess



Sectioned view of Worcester flanged ball valve

Hill, Sussex, to augment the ball valve they successfully introduced into this country last October.

Available in 3 in., 4 in. and 6 in. sizes, these valves provide one unit that will serve as either a 150 series (W.O.G.) or a 300 series (W.O.G.) valve where shorter than A.S.A. dimensions are advantageous. The centre section is simply and quickly inserted between two standard flanges (either 150 series or 300 series) and the flanges bolted together. Should either a 150 series or a 300 series A.S.A. dimension valve be required, the centre section can be modified by replacing the end plate with an appropriate "spacer". The valve is also suitable for use with flanges to B.S.10 standard.

The makers state that, because of the many various combinations of seats, O-rings (Buna-N, nylon and p.t.f.e.) and body materials (bronze, carbon steel, stainless steel and aluminium, with other materials also available as specials), the Worcester ball valve can handle almost any media within the pressure-temperature limitations of the sealing materials.

CORROSION-RESISTANT CONTAINER

FIRST of a new range of industrial containers is now available from **Thermo Plastics Ltd.**, Dunstable, Beds. This container, T.P.140, is an open rectangular box which has been specially designed either to nest or stack; it has approximate outside dimensions of 35 in. by 21½ in. by 9 in. and has carrying handles moulded into each end.

The container can be manufactured either in polypropylene or high density polythene and is, therefore, ideal for use in conditions where hygiene and resistance to corrosion are of paramount importance. It is also light in weight and can be easily sterilised.

Overseas News

$4 M. CANADIAN CYCLOHEXANE PROJECT WILL SUPPLY DU PONT NYLON PLANT

CYCLOHEXANE is to be made in Canada by British American Oil who are planning to install new facilities at their Clarkson, Ontario, refinery. The cyclohexane produced there will go to Du Pont of Canada Ltd. for processing into nylon at their Maitland, Ontario, plant. In the absence of a Canadian source, Du Pont have previously imported cyclohexane from the U.S. at a rate of $3 million to $5 million/year.

B. A. Oil plan to manufacture additional quantities of benzene, the raw material for cyclohexane, from feedstocks produced at their Clarkson and Montreal refineries. Construction of the cyclohexane plant at Clarkson, with an ultimate capacity of 15 million gallons a year, is expected to commence early in 1962 and will be completed by the autumn of 1962.

No official announcement has yet been made of the total cost of the new facilities at the two refineries, but it is reported to approximate $4 million.

The project is seen as an important step in making Canada self-sufficient in the production of nylon—from basic raw material to the finished yarn.

Fertilisers from Oil Waste by New Soviet Process

A process for the production of quality 'micro-fertilisers' from waste products of the mineral oil industry is reported to have been developed in the Soviet Union republic of Azerbaijan. The fertilisers have the type designation 'NRV'. Good results are stated to have come from experiments with these fertilisers, but the lack of suitable plant will delay for a considerable time serial production.

U.S. Catalyst Producers May Manufacture in Japan

Wallace and Tiernan Inc. are considering the possibility of manufacturing polythene catalysts in Japan. The outline of the plan is that a joint company should be formed with a Japanese firm, and a pilot plant imported as the first stage. The Japanese company has not yet been decided upon.

U.S.S.R. Synthesise Coloured Polymers

The Ivanovo Chemical Engineering Institute, U.S.S.R. has obtained polycaprolactam using diamines (safranine, chrysoidine, fuchsin, basic brown 2K) or azobenzenedicarboxylic acids as coloured stabilisers of polymer chain growth. The acids were synthesised by diazotising either *p*-aminobenzoic acid or anthranilic acid and coupling the salt of diazonium with one of these acids. An attempt was also made to colour polycaprolactam by polymerising caprolactam in the presence of a coloured polymer, the latter obtained by polymerisation of sebacic acid with hexamethylenediamine and safranine. Colouring additives were used in amounts of several decimal fractions of 1%. The desired intensity of colour, the melting point, and the viscosity of polycaprolactam can be regulated by changing the percentage of the additives. The importance of obtaining coloured polycaprolactam is that it eliminates the necessity for dyeing fabrics and "makes it possible to increase the list of polymers which have direct practical use".

Goodyear, U.S., Produce New Synthetic Latex

A new synthetic latex which provides improved adhesion between nylon or rayon fabrics and rubber or rubberised fabric materials has been announced by the chemical division of the Goodyear Tire organisation. The latex, Pliolite VP-100, is stated to be applicable to tyres, conveyor belts, hose, V-belts, inflatable products and tarpaulins.

Made from vinyl pyridine, styrene and butadiene, at Goodyear's Akron, Ohio, plant, the latex is recommended for tyre cord dips to improve adhesion between the tyre fabric and rubber carcass—particularly in tubeless tyres.

The new latex can be used as the main ingredient in fabric dipping compounds or blended with other synthetic latices. The ratio of Pliolite VP-100 to other latices can be varied to bring out the best properties in any particular application.

New Polyester Fibre Works for Germany

Vereinigte Glanzstoff-Fabriken AG, Federal German synthetic fibre producers, have opened new plant for the production of Diolen polyester fibres on the Cassel site of Spinnfaser AG. The new unit will complement Diolen production from the Glanzstoff works at Obernburg am Main.

Further Sulphuric Acid Plant for Sumitomo

The Japanese Company, Sumitomo Chemical Co., has completed an additional sulphuric acid plant. The new plant has a capacity of 1,200 tonnes of 98% acid per month.

Westinghouse Develop Ultra-low Pressure Gauge

A new method of measuring pressures of less than 10^{-12} atmospheres at the earth's surface has been developed by Westinghouse research laboratories. The device used, known as a photomultiplier ion gauge, was developed as part of an ultra-vacuum research programme supported by the U.S. Atomic Energy Commission's Project Sherwood, a long-term programme aimed at achieving controlled nuclear fusion for peaceful purposes.

The gauge is linear with pressures over the range 10^{-3} to 10^{-10}. This range of pressure is equal to that encountered in space at distances between 50 and 650 miles above the surface of the earth. The new device has already found use in pressure measurements and other experiments directed at understanding the concentration and interactions of the particles found in outer space through the duplication of outer space conditions in the laboratory.

Israel to Manufacture Building Chemicals

Building chemicals, including concrete and plaster additives, the moisture-repellent and quality improving materials not yet in general use, are to be manufactured in Israel by a new company formed jointly by Fertilizers and Chemicals and Sonol Ltd., aided by the experience of the Sonneborn Chemical and Refining Corporation of the United States.

New Phthalic Process Developed in U.S.

A new process that is capable of producing phthalic anhydride, isophthalic or terephthalic acid from *ortho*-xylene has been developed in the U.S. by Catalytic Construction in collaboration with Cowles Chemical. It is reported that 1.1 lb. of phthalic per lb. of *o*-xylene have been obtained in pilot-scale operation of the process, which is described as a continuous, liquid-phase, catalytic oxidation process.

U.S. Firm to Invest in Argentinian Petrochemicals ?

The United States concern American Foreign Light and Power Co. may invest in the Argentine petrochemical industry, the company's president, Mr. Harry Sargent, revealed in a talk with the Argentine President, Senor Frondizi, in Buenos Aires. Stating that he was satisfied with the compensation sum of U.S.$53.6 million decided on by the country's Supreme Court for payment to his company with regard to the property and goods of the ANSEC electricity companies, Mr. Sargent said that his company would invest $45 million of this in one of Argentine's priority industries—petrochemicals, steel and paper.

Big Cuts in U.S. Uranium Prices

The U.S. Atomic Energy Commission has announced big price cuts from 1 July for its enriched and depleted uranium. Mr. Glenn Seaborg, chairman, said the cuts would "lower the cost of nuclear power" for both U.S. and foreign-operated reactors using the American nuclear fuel.

Prices of enriched uranium would be slashed by between 20 and 34%, and depleted uranium would be between 41 and 63% cheaper.

PEOPLE in the news

● **Mr. R. Partington** has been appointed head of the technical service department of the Alliance Dye and Chemical Co. Ltd., Lever Street, Bolton, who are sole concessionnaires for Francolor (Compagnie Francaise des Matieres Colorantes, Paris) in Great Britain. Mr. Partington, who began his career with the Clayton Aniline Co. Ltd., Manchester, joined Alliance from Isaac Bury Ltd., dyers, finishers and embossers, of Salford, where he was works manager.

● **Mr. Douglas Berk,** who was chairman of F. W. Berk and Co. Ltd. from 1942 until his retirement in 1960, and **Mrs. Berk** were the guests of honour at an informal ceremony in London last week when 20 members of the F. W. Berk staff presented them with a transistor radiogram and silver rose-bowl in appreciation of their 55 years' service with the company. The presentation fund was subscribed to by a very large number of Berk employees.

● **Mr. F. G. Pentecost** has resigned from the board of Albright and Wilson following his retirement from the board of A. Boake, Roberts and Co. (Holding) Ltd. **Mr. B. White,** who succeeded Mr. Pentecost as chairman of the latter company in April, has been appointed to the board of Albright and Wilson Ltd. **Prof. D. M. Newitt, M.C., F.R.S.,** until recently Courtauld Professor of Chemical Engineering, Imperial College of Science and Technology, has been appointed a part-time director of Albright and Wilson Ltd.

R. H. Wilson

B.White

● **Mr. R. H. Wilson** has been appointed to the board of CIBA (A.R.L.) Ltd. He joined the company (then known as Aero Research Ltd.) in 1954, was initially associated with the development of Araldite epoxy resins and was appointed general sales manager last year.

● **Mr. Alan W. Baker** has been appointed general manager of Chloride Batteries Ltd., Exide Works, Clifton Junction, Swinton, Manchester, in place of **Mr. C. Pritchett** in order to release him for other duties in technical management within the Chloride Group.

● **Dr. J. A. Ballantine** has been appointed Lecturer in Chemistry in the University College of Swansea for 1961-62.

● At the recent annual meeting of the S.C.I. Surface Activity Group **Sir Eric Rideal** was re-elected chairman. Other officers are: Hon. recorder, **Mr. F. Riley;** hon. treasurer, **Mr. R. C. Tarring;** and hon. secretary, **Mr. M. K. Schwitzer.**

The following are new ordinary members of committee for 1961-62: **Prof. J. T. Davies, Dr. T. H. Morton, Dr. B. A. Pethica** and **Mr. J. B. Wilkinson. Mr. J. T. Richmond** was co-opted by the committee.

● **Dr. R. Beeching,** technical director of Imperial Chemical Industries and recently appointed chairman of the British Transport Commission, resigned from the board of I.C.I. on Wednesday. As reported previously, he will become chairman of the British Railways Board when it is formed.

● **Mr. P. E. H. Charman** has been appointed technical representative of Croxton and Garry Ltd., 27 St. James Road, Kingston-on-Thames, Surrey, following the setting up of a new department to deal with a wide range of raw materials for the paint industry.

● **Dr. Roger A. Bones** has joined the Wayne Kerr Laboratories Ltd. as head of the Contracts Division.

● **Mr. Arthur Abel,** technical service manager of Fisons Pest Control Ltd., Cambridge, one of the technical team manning Fisons Group stand at the British Trade Fair, Moscow, has been asked to lecture on crop protection to members of the Lenin Academy of Science for Agriculture, following a visit to the Fisons stand by members of the Academy. Mr. Abel was a member of a Fisons Pest Control technical mission to U.S.S.R. last year.

● **Dr. James Taylor,** a director of Imperial Chemical Industries Ltd., has been appointed to the board of Pyrotenax Ltd., manufacturers of mineral insulated copper covered cables, of Hebburn, Co. Durham. He succeeds **Mr. M. J. S. Clapham** who has resigned from the Pyrotenax board following his recent appointment to the main board of I.C.I. I.C.I. hold an 18% interest in Pyrotenax.

● **Mr. A. T. Grisenthwaite,** technical department manager with the Power-Gas Corporation, Stockton-on-Tees, is to retire after 44 years' service. With the exception of 18 months, Mr. Grisenthwaite has spent the whole of his working career with the Stockton firm, joining the company when it had only 60 employees.

● **Mr. H. A. Slade,** chief chemist of Detel Products Ltd., South Ruislip, Middlesex, has been co-opted to the board of directors.

● **Mr. Bert Oade** has taken over as North Western area sales representative for Silvercrown Ltd., 178 Goswell Road, London E.C.1, from **Mr. Adrian Walmsley.**

● **Mr. S. G. Deavin** has been appointed deputy chairman of the North Eastern Gas Board with effect from 1 July, in succession to **Mr. G. E. Currier,** who has retired.

● **Mr. John O. Viccari** has been appointed manager of the headquarters sales office of Wayne Kerr Laboratories Ltd. at New Malden, Surrey.

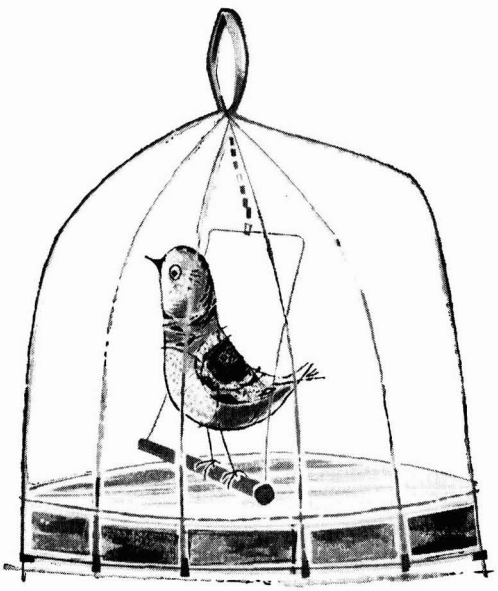
Wills

Mr. Walter Welch, of East Grinstead, Sussex, former chief engineer at the Huddersfield works of I.C.I. Ltd., who died on 15 February, left £8,397 gross, £8,301 net (duty paid £1,872).

Mr. T. V. Prior, director of the Murphy Chemical Co. (British East Africa), and export manager for the Murphy Chemical Co. Ltd., Wheathampstead, who died on 19 March, intestate, left £2,589 net.

Krushchev Visits Trade Fair

Mr. Krushchev, who paid a surprise visit to the British Trade Fair, Moscow, showed a keen interest in chemical exhibits. Here at the D.C.L. stand he talks to Mr. Maulding (right) and Maj. D. A. Blair, a D.C.L. director (left). In the foreground: a scale model of B.H.C.'s Grangemouth petrochemical plant



IT'S A SMALL WORLD

AND MARCHON SURFACTANTS PLAY A BIG PART IN IT

You don't need a little bird to tell you that. Ask any detergent manufacturer and he'll tell you that many of the best known detergents are formulated from Marchon surfactants.

SO_3 SULPHONATED DODECYL BENZENE

Now forms part of Marchon's range of dodecyl benzene sulphonates, and includes high purity sulphonic acids and their sodium salts with minimum inorganic content; especially suitable for liquid detergent formulations. Why not write for data, samples or advice?

Marchon

MARCHON PRODUCTS LIMITED, WHITEHAVEN, ENGLAND. MEMBER OF THE ALBRIGHT & WILSON GROUP OF COMPANIES.

Commercial News

- Laporte Recommend 7½% Dividend
- A.C.C. Offer for Farmers Unconditional
- Greeff–Chemicals' Group Profit Up
- Sandoz Plan Increase of Capital

ACC — Farmers Co.

The board of Associated Chemical Companies Ltd. announces that its offer to acquire the whole of the issued share capital of the Farmers' Co. Ltd. has been accepted by holders of more than 97% of such shares, and that such offer has become unconditional. Forms of acceptance in respect of outstanding shares will continue to be accepted by Associated Chemical.

Ashe Chemical

The directors of Ashe Chemical Ltd. recommend the payment of a final dividend of 11% less tax at 7s 9d in the £, which with the interim dividend of 5% makes a total of 16%. Group profit for 1960, after all charges including tax, is £40,365 (£35,002); U.K. tax being £40,214 (£43,635), and the amount absorbed by dividend after tax being £26,774 (£26,774).

Borax (Holdings)

Group trading profit of Borax (Holdings) for the first quarter of 1961 amounted to £1,130,235 (£1,076,278) making £1,872,382 (£1,940,146) for six months.

The figures include the due proportion of the profits of recently acquired subsidiaries, and were struck after depreciation of £575,521, against £582,351, for the three month period, and £1,106,104 (£1,133,108) for six months.

The net profit for the three months is £733,029 (£759,940) and for the half-year £1,227,450 (£1,346,819).

Greeff-Chemicals

Group profit of £257,111 (£245,001) before taxation is announced by Greeff-Chemicals Holdings Ltd., taxation taking £109,671 (£105,842), the 1959 figures (in brackets) being shown as they would have been if the present basis of accounting had been used consistently in the past. A final dividend of 9% has been declared, making a total of 16½% for 1960—an increase of 1½% over the 1959 equivalent.

The directors have revalued the trade investments at £2,945,475, resulting in a surplus of £1,588,995 over the previous book value and this sum has been added to the general capital reserve. A corresponding adjustment has been made to the book value of the holding company's interest in the operating company.

Laporte

Laporte Industries Ltd. directors are to recommend a final dividend on the issued ordinary shares of 7½% (less income tax at 7s 9d in the £). This dividend is payable on the total of £12,891,510 issued ordinary capital, the interim dividend of 3% already paid having been made on £11,822,760 ordinary capital prior to the recent issue of £1,068,750 ordinary capital allotted as part consideration for the acquisition of Howards and Sons Ltd. and which will qualify for the above dividend.

The group surplus from manufacturing and trading for the year ended 31 March 1961 is £4,529,943 (£4,334,660). Group income for the year, before taxation, is £3,333,525 (£3,147,943).

Coalite and Chemical

A final dividend of 6% by Coalite and Chemical Products for the year ended 31 March 1961 maintains the previous year's 11% equivalent, the minimum forecast at the time of the one-for-two scrip issue.

Group profits contracted from £935,913 to £852,133, after providing £249,736, against £233,023, for depreciation.

After tax of £403,050 (£434,916), the net profit of £449,083 compares with £500,997.

Dow Agrochemicals

All the shares of Dow Agrochemicals Ltd., Kings Lynn, Norfolk, have been acquired by Dow Chemical Co., Midland, Michigan.

Dr. W. E. Ripper will remain managing director of the company, which will continue to market its products in the U.K. and several Commonwealth countries in accordance with existing distribution arrangements.

Kali-Chemie AG

The West German chemical producer Kali-Chemie AG has recommended a dividend for 1960 of 12% on a capital of DM55,000,000. This compares with a 1959 payment of 16% on a capital of DM35,000,000.

Koninklijke Pharmaceutische

A one-for-five rights issue of Fl.1.5 m. (£150,000) in Fl.100 shares at Fl.210 is announced by Koninkliike Pharmaceutische Fabrieken v/h Brocades-Stheeman and Pharmacia, Dutch manufacturers of pharmaceuticals.

Kuhlmann

The French chemical producers Manufactures de Produits Chimiques du Nord, Etablissements Kuhlmann S.A., of Paris, record a net profit for the past financial year of 17.45 million francs (11.94 million) after depreciation of 40.67 million francs (30.45 million) for the year. Net dividend recommended is of 5 francs/share (10%) on a capital of 124,985,000 francs, as against a 1959 dividend of 6.80 francs/share (13.6% on a capital of 64,550,000 francs.

Sandoz AG

The Swiss pharmaceutical and chemical producers Sandoz AG, of Basle, report for 1960 a turnover of 645 million francs, compared with 572 million francs for 1959. Chemicals (as distinct from pharmaceutical products) accounted for 142 m. francs (123 million francs) while pharmaceuticals accounted for 275 million (238 million) and dyestuffs for 228 million (211 million) francs. Total net profit rose from 17.36 million francs to 18.91 million francs over the year. Dividend is to be of 100 francs per share of 500 francs nominal worth (same).

The company are to recommend shareholders to approve an increase in capital from 60 million francs to 75 million francs by the issue of 30,000 new shares, each of 500 francs, at par and with a right to dividend backdated to 1 January 1961. The company further plan to float a bond loan of 60 million francs.

Sauerstoff-Union

Sauerstoff-Union-Gesellschaft mbH is the name of a new company formed in Frankfurt-on-Main, West Germany, for the production and sale of industrial gases, particularly oxygen, the taking up of holdings in oxygen production concerns and the production and construction of and trading in equipment for oxygen industry. The new company will work in co-operation with the Frankfurt-on-Main chemical plant firm Adolf Messer GmbH.

NEW COMPANIES

C. W. FIELD (1961) LTD. Cap. £100,000 in £1 shares. Objects: To acquire the business of distillers of essential oils, makers of fruit and other flavouring essences and of essences for perfumery, manufacturing chemists and grinders of drugs, seeds and spices carried on by C. W. Field Ltd., at Edwards Lane, Speke, Liverpool, and also to carry on the business of soap makers and refiners, etc. Directors: Clarence H. Moors (chartered accountant), C. T. Haimes (company director), J. T. B. Coulson and G. W. Williams. Reg. office: Edwards Lane, Speke, Liverpool 19.

CAMLAB (MEDICAL LABORATORIES) LTD. Cap. £2,500. Manufacturers, exporters and importers of chemical, medical and pharmaceutical products, by-products and preparations for use in research laboratories, etc. Directors: R. P. E. F. Hirsch, 10 Adams Road, Cambridge; A. G. Huckel and P. O. D. Hopps.

ENASCO LTD. Capital £100. To carry on consulting activities in the field of science engineering and technology particularly in the field of chemical, nuclear and petroleum plants, etc. Subscribers: John S. M. Jones (engineer), Ann J. Wilson (secretary). Reg. office: 36 New Broad Street, London E.C.2.

TRADE NOTES

Caustic Soda

A concise guide to the buying, storing, handling and use of caustic soda is issued by Murgatroyd's Salt and Chemical Co. Ltd., Elworth, Sandbach, Cheshire, in the form of a 56-page, illustrated booklet. The introductory section is followed by a description of the methods of delivery, with guidance on customer's bulk storage installations, details of road and rail tankers, procedure for discharge of tankers, the handling and use of caustic soda liquor in drums, and emergency procedure.

Further sections deal with solid fused and flake caustic soda, equipment for handling caustic, protective clothing and first aid, with finally some 26 pages of useful technical data.

Plastics Machinery

Emerson Walker Ltd., marine engineers of Gateshead, are entering the plastics machinery field. An agreement with Martin Rudolph of West Germany, enables the Gateshead firm to obtain the British and Commonwealth manufacturing and marketing rights of the complete range of Rudolph plastics fabricating machines.

Langley Valves

A revised stock list for their stainless steel valves has been issued by Langley Alloys Ltd., Langley, Bucks. Gate valves, 'Y' valves and globe valves are included, materials of construction being Langalloy 3V 18/8/3Mo stainless steel, Langalloy 1V 18/8/1Cb stainless steel, Langalloy 20V 29Ni/20Cr/Cu/Mo stainless, and other alloys.

Protective Coatings

The Lanshield Sakaphen range of protective coatings is described, and their application to a variety of plant and equipment illustrated, in a booklet issued by Wolseley Holdings Ltd., Caton Road, Lancaster. The company's Lancaster plant includes shot blast facilities, a 20-ton electric overhead travelling crane, controlled temperature furnacing facilities, and portable cleaning and spraying equipment for outside contract work.

Change of Name

The corporate name of Esso Export Corporation, 60 West 49th Street, New York 20, N.Y., has been changed to Esso International Inc. as from 25 May. Over the past several years, the corporation has expanded its activities in the field of international trade.

T.W.W. Service

A comprehensive picture of the services offered by the factory planning and installation department of Thos. W. Ward Ltd., Albion Works, Sheffield, is given in a 24-page illustrated booklet. Part 1 illustrates the large contracts which have been carried out for the Atomic Energy Authority at Capenhurst, Sellafield, Springfields, Chapelcross and Dounreay in the fabrication of pipework, plant installation, graphite laying, etc. Part 2 describes the plant and machinery installation service. Typical examples are illustrated, showing how Wards assist in dismantling all types of plant and machinery, as well as its transportation and re-erection.

Reinforced Plastics Production

With the installation, due shortly, of another Daniels 250-ton compression moulding press in their Hayes, Middlesex, factory, and with further presses on order, Osma Plastics Ltd. will be able to speed up the introduction of new items to their range of plastics building products.

Pyrex Glassware

A greatly improved 76-page catalogue of Pyrex scientific and laboratory glassware, tubing and rod is available from the Industrial Sales Department, James A. Jobling and Co. Ltd., Wear Glass Works, Sunderland. It gives descriptions and dimensions of more than 750 items in the standard range, with notes on the chemical and physical properties of Pyrex glass.

Features which make the catalogue easy to use are: division by application into 10 sections, clearly shown in the list of contents; a comprehensive, cross-referenced index, and a simplified line drawing of each type of apparatus against its catalogue entry.

Valves and Expansion Units

The present standard range of all-plastics valves and expansion units offered by Barflo Ltd., 56 Cavendish Place, Eastbourne, is described in a small booklet in English, French, German, Italian and Spanish.

Topane Publications

I.C.I. Heavy Organic Chemicals Division have issued three publications on Topane, the I.C.I. brands of *o*-phenylphenol and sodium *o*-phenylphenate. They are: the use of Topane as a preservative for textiles and ropes; its use as a timber preservative; and a general publication on its toxicology, storage, handling and determination in treated materials.

Tribenzylamine Data Sheet

A data sheet has been issued on tribenzylamine, which is available in pilot plant quantities from Robinson Bros. Ltd., Ryders Green, West Bromwich. Tribenzylamine is water insoluble but has a hydrochloride which is practically water soluble so that it should be of interest as an amine catalyst in organic syntheses.

Karl Fischer Reagent

The second edition of 'Moisture Determination by the Karl Fischer Reagent' has been published as a 16-page booklet by the British Drug Houses Ltd., B.D.H. Laboratory Chemicals Division, Poole, Dorset. The procedure is explained with diagrams and applications are discussed, 118 literature references being given.

Fire-retardant Paint

A formulation for a water paint which has claimed to have excellent fire retardant properties has been developed by the National Resin Division of National Adhesives Ltd., Trading Estate, Slough, Bucks. The paint is of the intumescent type and all data relating to it has been collected into a short report available from the company.

Gas Liquid Chromatography

Primarily intended as a comprehensive brochure to describe the new version of the Pye argon chromatograph, a new 28-page brochure contains details of many techniques which have recently been developed in the field of chromatographic analysis. It is available from W. G. Pye and Co. Ltd., Granta Works, York Street, Cambridge.

Market Reports

SUPPLIES UNDER CONTRACT RESUMED

LONDON There has been little of outstanding importance to record in the market for industrial chemicals. The recent interruption in the flow of deliveries was no more than is usually expected for the period, and a steady movement of supplies under contracts has been resumed in most sections of the market. New business on home account has been mostly for current requirements, while overseas inquiry has been maintained at about recent levels. Copper sulphate is dearer at £82/ton less 2% f.o.b. Liverpool.

A moderate demand for agricultural chemicals has been reported, and in the market for the coal tar products conditions continue steady with cresylic acid and creosote oil in good request.

MANCHESTER The chemical market has been getting back into its stride following the Whitsun holiday break. The past few days have seen a fair resumption of contract deliveries of a wide range of chemicals, including those for bleaching, dyeing and finishing, as well as a wide range of non-textile descriptions. Up to the present, however, it is reported that fresh bookings have been on no more than a moderate scale. Quotations generally have maintained a steady to firm front. Approach of end-of-the-season quietness is in evidence in the market for fertiliser materials.

SCOTLAND Demands for the home market have continued steady with quantities involved on a normal steady basis. Contract quantities have been reasonable well taken up. Prices on the whole have remained steady.

There has been a little briskness in agricultural chemicals trade but this has mostly been in the nature of immediate spot requirements. The export market is still showing interest with a good volume of enquiries.

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.

AMENDED SPECIFICATION

On Sale 28 June

Carbon black. United Kingdom Chemicals Ltd. **799 145**

ACCEPTANCES

Open to public inspection 5 July

Process for the manufacture of fatty acid esters of aliphatic polyhydroxy-compounds. Howards of Ilford Ltd. **872 293**

Ion-exchange processes. Permutit Co. Ltd. **872 295**

Unsaturated halogen-containing esters of phosphorus oxyacids and copolymers thereof. British Celanese Ltd. **872 206**

Ion-exchange membranes. American Machine & Foundry Co. **872 217**

Liquid detergent compositions and the manufacture thereof. Colgate-Palmolive Ltd. **872 099**

Pesticidal compositions containing phosphorus esters. Food Machinery & Chemical Corporation. **872 221**

Diels Alder adducts of hexahalocyclopentadiene and compositions containing them. Hooker Chemical Corporation. **872 223**

Monoazo-dyestuffs derived from cyanuric halides and processes for their manufacture and application. Ciba Ltd. **872 249**

Production of metals by the dissociation of their carbides. Pechiney. **872 056**

Production of hydrogen peroxide. Food Machinery & Chemical Corporation. **872 290**

Derivatives of azabicyclohexane and the manufacture thereof. Wellcome Foundation Ltd. **872 300**

Sulphonylureas and the manufacture thereof. Wellcome Foundation Ltd. **872 102**

Method of joining thermoplastic polymers. Montecatini. **872 326**

Production of stabilised polyamides. Monsanto Chemical Co. **872 328**

Terpolymer compositions. Monsanto Chemical Co. **872 253**

Process for polymerising alpha-olefins. Sun Oil Co. **871 828**

Method for the simultaneous production of hydrogen peroxide and carbonyl compounds. Fine Organics Inc. **871 830**

Method of producing organic hydroperoxides. Fine Organics Inc. **872 104**

Aqueous synthetic polymer dispersions and methods of producing them. Rohm & Haas Co. **872,208**

Thermosetting refractory materials. Canadian Refractories Ltd. **871 965**

Polyester resin and electric conductors insulated therewith. Connollys (Blackley) Ltd. **872 254**

Polymerisation of aldehydes. Du Pont de Nemours & Co., E. I. **872 331**

Heat-hardenable compositions composed of polyvinyl chloride epoxy resin and hardening agent. Ciba Ltd. **872 147**

Derivatives of amino acids and peptides, and synthesis of peptides. American Cyanamid Co. **872 332**

Rubber compositions. Columbia-Southern Chemical Corporation. **871 928**

Manufacture of hydrogen peroxide. Food Machinery & Chemical Corporation. **872 305**

Methods of synthesising 2, 4, 4, 4-tetrachlorobutyric acid. Regie Nationale Des Usines Renault. **871 836**

Process for preparing symmetrical and unsymmetrical carbocyanine dyes and merocarbocyanine dyes. Kodak Ltd. **871 930**

Epoxide compositions and their production. Union Carbide Corporation. **872 306**

Process for the destruction of porphyrin metallo complexes and for reducing the phorphyrin metallo complex content in mineral oils. Gulf Research & Development Co. **872 333**

Purification of poliomyelitis virus. Merck & Co. Inc. **871 838**

Heat hardenable compositions comprising epoxide compounds and dicarboxylic anhydrides. Ciba Ltd. **872 148**

Steroids and the manufacture thereof. Upjohn Co. **872 210**

Polymerisation of olefins. Du Pont de Nemours & Co., E. I. **872 335**

Liquid-fuel compositions. Du Pont de Nemours & Co., E. I. **872 310**

Process for the manufacture of di-imidazole derivatives. Ciba Ltd. [Addition to 814,249.] **872 311**

Beta-lactones. Lepetit S.p.A. **872 155**

Electrolytic process and apparatus. Consolidated Electrodynamics Corporation. **872 312**

Process for improving polyolefins. Farbwerke Hoechst A.G. **872 197**

Flourine-containing derivatives of 1, 3, 5-triazine. Farbenfabriken Bayer A.G. **872 313**

Methods of producing chlorides of metals or metalloids. Stora Kopparbergs Bergslags A.B. **872 198**

Steroids. Searle & Co., G. D. **872 315, 872 316**

Preservation of vulcanisable synthetic rubbery polymers. Monsanto Chemical Co. **872 094**

Steroids and the manufacture thereof. Upjohn Co. **872 201, 872 318, 872 108, 871 811, 872 112**

Phenthiazine derivatives. Rhone-Poulenc. **872 202**

Washing process and compositions therefor. Hedley & Co. Ltd., Thomas. **871 814**

N-substituted azepines and their production. Geigy A.G., J. R. **872 320**

Preparing organo manganese compounds electrolytically. Ethyl Corporation. **872 113**

Monoazo dyestuffs of the azobenzene series. Imperial Chemical Industries Ltd. **872 204**

Preparation of epoxy compounds. Dehydag Deutsche Hydrierwerke GmbH. **872 114**

Alfin catalyst copolymerisation. Richardson Co. **872 163**

Process for lowering the pour point of high boiling point hydrocarbon mixtures, especially lubricating oils. Badische Anilin- & Soda-Fabrik A.G. **872 274**

Halogenated xylene carbinol and diol derivatives. Diamond Alkali Co. **872 182**

Preparation of cyclic acetals and ketals of the 6 δ-methylpregnane series. British Drug Houses Ltd. **871 874**

Ion-exchange membranes. American Machine & Foundry Co. [Divided out of 872 217.] **872 218, 872 219, 872 220**

Benzyl amine compounds and means of obtaining same. Kansas Research Foundation, University of. **872 371**

Phenthiazine derivatives. Soc. Des Usines Chimiques Rhone-Poulenc. **872 164**

Method of manufacturing polyvinyl alcohol having carbonyl groups at the chain ends. Kurashiki Rayon Kabushiki Kaisha. **872 123**

Iminodibenzyl derivatives. Rhone-Poulenc. **872 279**

Curing method for polydiolefin resin. Esso Research & Engineering Co. **872 280**

Production of silicon of improved purity. General Electric Co. **872 282**

Nitrophenol derivatives. Farbenfabriken Bayer A.G. **872 184**

Substituted organosilicon compounds. Midland Silicones Ltd. **872 138**

Polymerisation of isoprene. Goodrich-Gulf Chemicals Inc. **872 283**

Method for the production of casein-containing products. Propack GmbH. **871 909**

Interpolymers and coating compositions containing them. Du Pont de Nemours & Co., E. I. **872 139**

Rubbery composition. Phillips Petroleum Co. **871 911**

Production of chloralkylammonium chlorides. Badische Anilin- & Soda-Fabrik A.G. **872 284**

Process for the production of polysulphides containing hydroxyl groups. Farbenfabriken Bayer A.G. **872 126**

Resin syrups. Monsanto Canada Ltd. **872 185**

Gas chromatography. Perkin-Elmer Corporation. **872 259**

Steroids and the manufacture thereof. Upjohn Co. **872 032**

Polyester film materials. Du Pont de Nemours & Co., E. I. **872 033**

Process for the manufacture of the dimethyl esters of terephthalic and isophthalic acid. Shell Internationale Research Maatschappij N.V. **872 188**

Purification of trimethoxyboroxine. Callery Chemical Co. **872 140**

Process for polymerising alpha-olefines. Bocek, V. **872 142**

Sulphur and fluorine containing phosphorus acid derivatives. Farbenfabriken Bayer A.G. **872 143**

Pyrimidine derivatives. Farbenfabriken Bayer A.G **871 856**

Vulcanisable rubbery composition. Firestone Tire & Rubber Co. **872 036**

Process for the production of oligomers of 1, 3-dienes. Badische Anilin- & Soda-Fabrik A.G. **872 348**

Process for dyeing polyester or polyamide textiles or foils. Farbenfabriken Bayer A.G. **872 349**

Apparatus used in gas chromatography. Perkin-Elmer Corporation. **872 260**

Purification of hydrofluoric acid by distillation. Siemens-Schuckertwerke A.G. **872 263**

Methoxybenzoic acid amides and their preparation. Egyesult Gyogyszer es Tapszergyar. **872 350**

Chlorinated epoxy compounds and insecticidal compositions containing same. Velsicol Chemical Corporation. **872 144**

Process for the manufacture of substituted 2, 4-dioxotetrahydropyridines. Hoffmann-La Roche & Co. A.G., F. **872 190**

Production of thin layers of organic liquids in evaporators. Balzers Aktiengesellschaft Für Hochvakuumtechnik und Dünne Schichten. **872 192**

Acrylonitrile copolymers. Soc. Des Usines Chimiques Rhone-Poulenc. **871 883**

Process for the production of 3 β 12 β-dihydroxy-11-oxo-23-bromospirostane. Boeringer, E., Liebbrecht, I., Liebrecht, J., and Mayer-List, W. **872 129**

Process for the production of alykl-thioboric acid esters. Farbenfabriken Bayer A.G. **872 351**

1-arylalkyl-4-arylpiperazines. Janssen, P. A. J. **872 352**

Process for preparing acetylsalicylic acid anhydride. Warolin, C. J. M., and Billot, P. R. **872 130**

Polypropylene compositions. American Cyanamid Co. **872 131**

Process for the production of graft copolymers. Rhone-Poulenc. **872 132**

Process for the preparation of cyclohexylethyl alcohol Rhone-Poulenc. **872 357**

Plastics Industry Training Grants

The Trustees of the Plastics Industry Education Fund invite, from young men and women now working in the plastics industry, applications for a limited number of training grants towards the cost of full-time study on an approved course leading to a degree, diploma or other equivalent qualification in science or technology, or in industrial design. Approved courses for full-time study include those leading to the Graduateship of the Plastics Institute, degree courses in chemistry, physics and engineering, sandwich courses in similar subjects for the Diploma in Technology (Dip. Tech.) and certain courses in industrial design.

Applications for grants must be submitted in writing to the Secretary, The Plastics Industry Education Fund, 6 Mandeville Place, London W.1, by the 15 July 1961.

DIARY DATES

THURSDAY 8 JUNE

Chem. Soc.—London: The Science Museum, South Kensington, S.W.7. Reception and Conversazione.

FRIDAY 9 JUNE

S.A.C.—London: 14, Belgrave Sq., S.W.1., 10 a.m. Summer Meeting of Biological Methods Group.

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