

Chemical Age

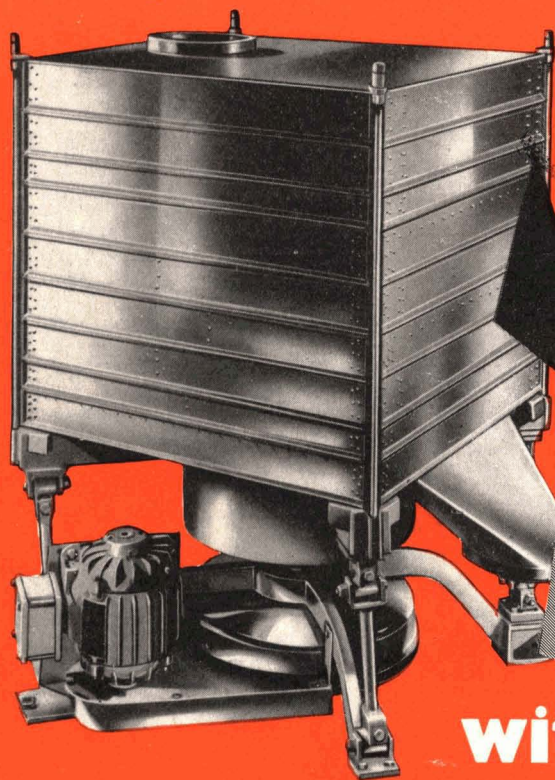
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VOL. 85 No. 2177

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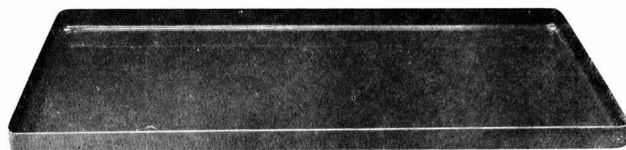
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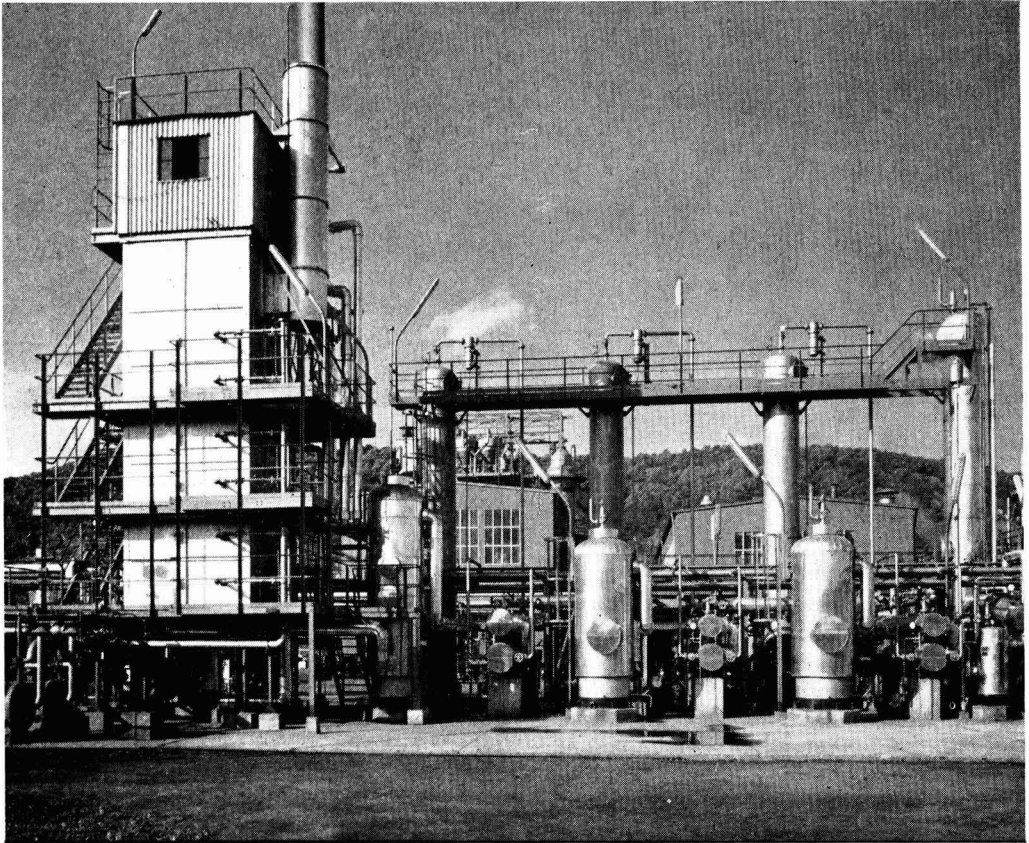
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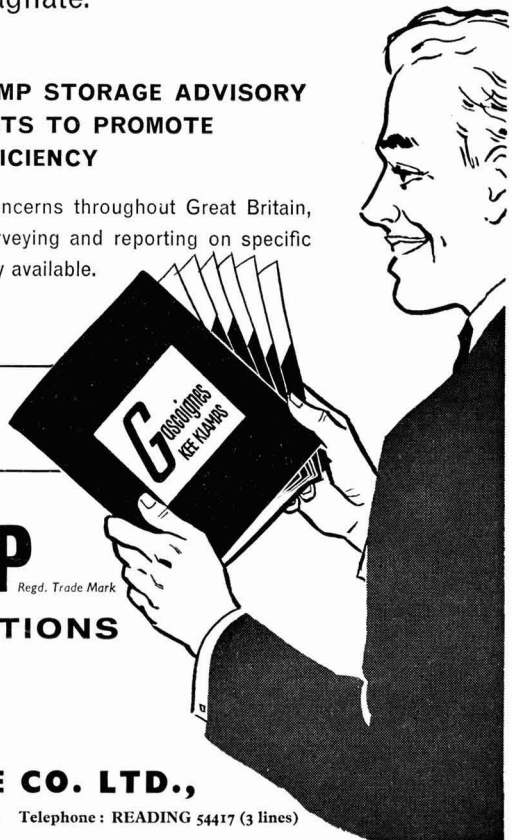
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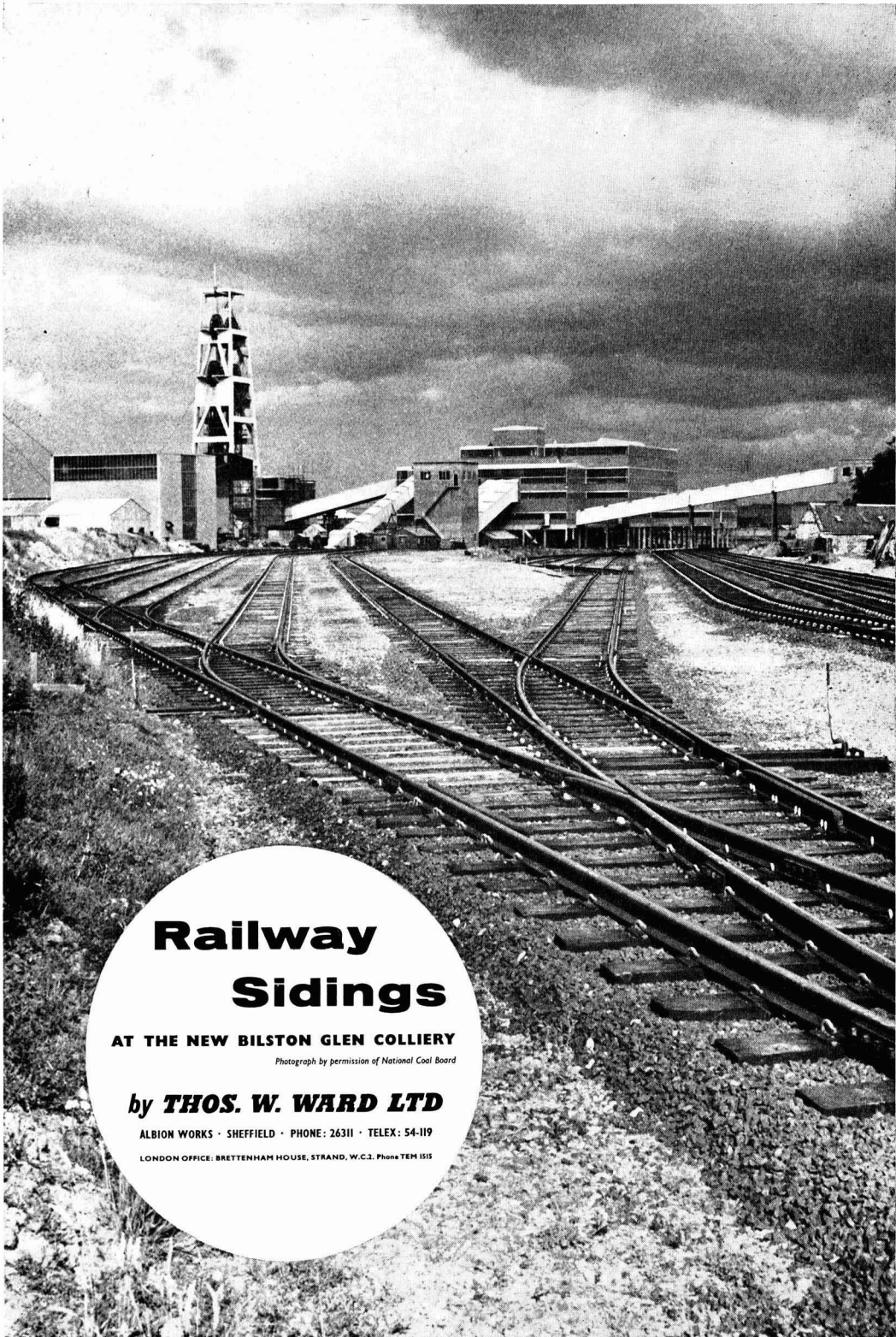
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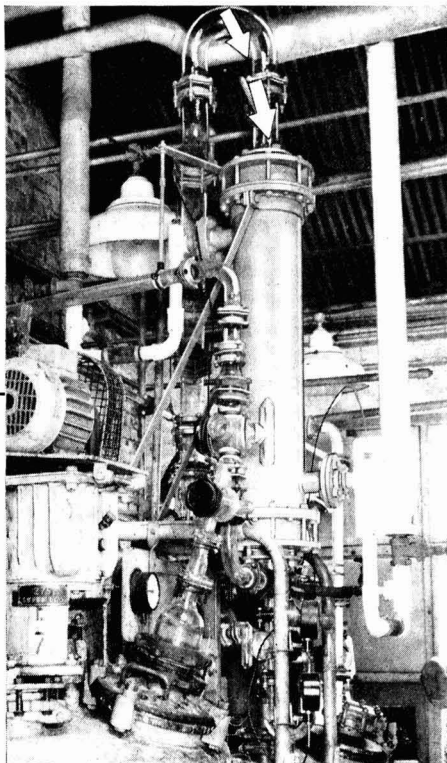
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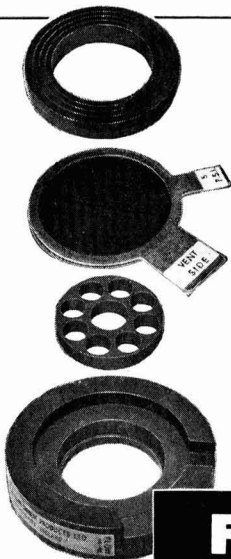
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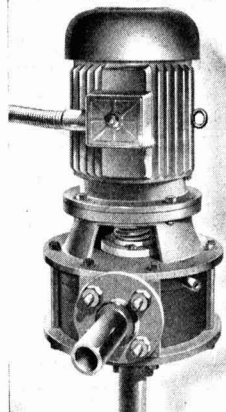
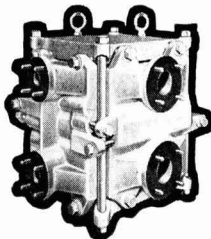
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PHTHALIC ANHYDRIDE

WITH supplies of naphthalene raw material easier than they have been, U.K. producers of phthalic anhydride are looking forward to a period in which they will be able to operate their plants to capacity and meet the continuing strong demand. But they are nevertheless watching closely the interesting developments in Europe, where ortho-xylene has become the principal raw material for phthalic, and in the U.S., where shortages of naphthalene and the necessity for expansion have combined to bring about a conflict of notions about different processes and different raw materials, so that the future pattern of the industry is by no means clear.

It is certain that demand for phthalic anhydride is necessitating a sharp increase in world capacity, which has more than doubled in the past five years and at present is in the region of 1,000 million lb. a year. It has been estimated in the U.S. that by the end of 1961 world capacity will have risen to some 1,650 million lb., but this figure seems rather high, as does also the estimated U.S. capacity of 655 million lb. by the end of 1961. Estimated capacities of the world's other major phthalic-producing countries by the year's end are: Western Germany, 154 million lb.; U.S.S.R., 132m.; Italy, 128m.; U.K., 121m.; Japan, 118m. Taking the U.K. figure alone, it will be seen that, compared with the actual 1960 production figure of 34,100 tons (74.6m. lb.), and allowing the fact that plants have been operating below capacity, 121m. lb. of capacity by the end of this year seems too big a jump.

In the U.K. last year, when consumption, at 35,700 tons, topped production by 1,600 tons, some 17,900 tons of phthalic anhydride went to the production of phthalate plasticisers (representing 45% of phthalate plasticisers production); 15,500 tons went into alkyd resins (30% of alkyd production); and 2,300 tons to polyester resins (26% of polyester production). In the U.S., alkyd resins are the biggest outlet, taking about 45% of total U.S. consumption of phthalic anhydride. Plasticisers account for 35-40% of U.S. phthalic consumption. The third, but fastest growing U.S. outlet is in polyesters, which consumed 30 million lb. of phthalic in 1960—a figure that is expected to double by 1965. Some 70% of the polyesters produced are used for glass fibre reinforced plastics.

There appears to be a similar trend in the U.K. where reinforced plastics are concerned. The U.K. market is around 8,000 tons and should double within two or three years—some producers believe that this high rate of growth will continue for the next five to seven years. Building, commercial vehicle bodies, small boats and aircraft are among the most promising applications.

On the technical and economic aspects of phthalic anhydride production, some thought-provoking points have been raised by Dr. Ralph Landau, executive vice-president of Scientific Design Co. Inc. and Mr. Hugh Harper, managing director, SD Plants Ltd., at the symposium on 'Organic intermediates in the 1960's' held at Manchester University recently. They point to the trend towards the use of naphthalene derived from petroleum rather than coke-oven gas and feel that manufacture of naphthalene from petroleum is much more likely to be economic in the

(Continued on p. 546)

I.C.I. Group Income Rose 20% But Second-half of 1960 Saw Profit Margins Harden

AT £558 million, I.C.I. home and overseas sales in 1960 were up by 9.7% with exports, valued at £96.6 million, up by 10.4%. The rise in total sales in 1959 was one of 9.9%; in that year I.C.I. exports rose by 18%.

Group income before tax, at £88,044,000 was higher by 20.4%, while group net income was up by 13.6% to £47,572,000 (in 1959 group net income was up by 74%). Parent company's net income for 1960 was £39,700,000, an increase of 17.2%. As forecast total dividend is raised by 6d per ordinary £1 ordinary stock to 2s 9d.

The provisional results for 1960 of Imperial Chemical Industries Ltd. show a distinct hardening of profit margins in the second half of the year. Second half

group sales totalled £270 million, £18 million down on the first half of the year, but £11 million up on the second half of 1959. I.C.I. exports in the second half of 1960, however, were, at £49.3 million, £2 million up on the January-June results. Second-half group income of £37,109,000 compared with a January-June figure of £50,935,000; group net income for the latter part of the year, at £19,972,000 was well below the first-half figure of £27,600,000.

Thus while sales in the July to December period were down by only 6.6%, group income after tax was down by 38%. Despite this, earnings were 24.8% for the second half, compared with 28.7% for the whole year.

I.C.I. RESULTS FOR 1960

(In £'000)

	1960	1959	1st Half 1960	2nd Half 1960
Group sales	558,000	509,000	288,000	270,000
Exports only	96,600	87,500	47,300	49,000
Depreciation	37,258	33,138	17,853	19,405
Group income	88,044	73,116	50,935	37,109
Tax	40,472	31,531	23,335	17,137
Group net income	47,572	41,585	27,600	19,972

Scott Bader Produce First U.K. Vinylidene Chloride Emulsions

BELIEVED to be the first U.K. production of emulsions containing a high proportion of vinylidene chloride, is the range available in development quantities from Scott Bader and Co. Ltd., Wollaston, Wellingborough, Northamptonshire.

The process consists of the catalytic copolymerisation of vinylidene chloride and other monomers depending on the product required in a water suspension. Emulsions containing over 50% of the polymer are obtained.

These emulsions are the result of four year's work. Scott Bader believe them to be superior to similar emulsions at present obtainable from Germany, France and U.S. and the prices are competitive.

Scott Bader can produce sufficient to satisfy the needs of the U.K. market, which at present is about 100 tons a year, as well as some for export. It is expected that the market will increase rapidly over the next three years and in fact, one firm, say Scott Bader, can absorb 5 tons a day. The plant will be able to cope with increasing demand.

The applications of polyvinylidene chloride emulsion are almost unlimited. It will coat paper, board and polythene films, making them impregnable to moisture and resistant to corrosion.

The range of products available differs principally in the temperature that is necessary for the purpose of fully integrating the film.

Berk Offer Mineral Brightener for Rubber

BLANCOMILO, a new mineral substance that can impart exceptional brightness and greatly increased tear strength to natural and synthetic rubbers is now available from F. W. Berk and Co. Ltd., Berk House, 8 Baker Street, London W.1.

Called Blancomilo, after the island of Milos where it is mined, it is a siliceous kaolin containing a comparatively large proportion of fine silica particles. In a typical sample, 94% of the particles measured less than two microns. Its brightness was measured at 95-96 (magnesium carbonate = 100) which indicates that its use in white mixtures

may result in economy of expensive pigments.

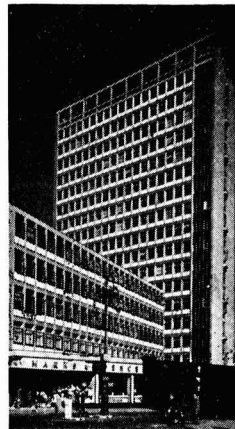
A mixture of Blancomilo (75) with sulphur (2.5) and a prepared master-batch of pale crepe (100), zinc oxide (5), stearic acid (0.75), Santocure (0.9) and diphenyl guanidine (0.3) was prepared on a two-roll mill and vulcanised at 145°C. The tear strength was found to be 20 lb. (B.S. 903), or nearly double the average of two mixtures in which Blancomilo was replaced by commercial china clay, but which were otherwise identical. Other physical characteristics were similar.

5s.-a-year Rise in C.A. Subscription Rate

FOR the first time in five years, CHEMICAL AGE subscription rates have risen. Successive increases in production and other costs have previously been absorbed, but regrettably this is no longer possible.

From 1 April, subscription rates have risen by 5s, the new annual rate for U.K. subscribers being 57s 6d; for overseas subscribers the new rate is 65s. The single copy rate will be 1s 9d (by post 2s).

New London H.Q. for Foster Wheeler



Foster Wheeler Ltd. are now established in their new London headquarters, Foster Wheeler House, Chapel Street, London, N.W.1 (Paddington 1221)

In Parliament

Provision for Pipelines On Railway Property

The Bill which is to be introduced in the next Parliamentary session to give effect to the Government proposals in the White Paper on pipelines will give the railways power to operate pipelines on their property. This was stated by Mr. E. Marples, Transport Minister, in the House last week.

Butyl Import Duty Suspension Now Ended

Temporary exemption of butyl synthetic rubber from import duty from 1 October 1960 came to an end on 1 April and will not be extended. As a result of the exemption, the Commonwealth margin of preference was also suspended, stated Mr. Reginald Maudling, President, Board of Trade, in the House last week, when he added that the Commonwealth margin was exempted because for a period Canadian output was not sufficient to meet U.K. demand; the position was restored as soon as it was found that enough was coming from Canada.

Project News

PETROCARBON CONTRACT FOR RUMANIAN POLYSTYRENE PLANT

A POLYSTYRENE plant for Rumania is the subject of an agreement that has been signed in Bucharest between Masinimport, the Rumanian State enterprise for foreign trade, and Petrocarbon Developments Ltd., the U.K. chemical engineering firm based in London and Manchester. This order, secured against strong international competition, is the first major order for a plastics plant since the signing of the trade agreement between Rumania and the U.K. last autumn. Value of U.K. supplies, including fees for know-how and engineering services, will exceed £800,000.

The plant will produce all types of general purpose and toughened grades of polystyrene, as well as high molecular weight, a variety of special grades, and expandable polystyrene. Also included in the supply is a plant for the continuous production of expanded polystyrene board.

The polymerisation process employed is the Petrocarbon Developments suspension polymerisation process which was developed in the U.K. in the immediate post-war period and has been operated on an industrial scale since 1950. With

the completion of the Rumanian plant the total capacity installed in Europe for this process will be around 120 m.lb./yr.

For the manufacture of expanded board, a machine developed by WMB International AB of Sweden will be employed. This is the only known machine that can produce expanded polystyrene board by a continuous process and is considered the most promising large-scale method of manufacturing such board for the future.

The plant will be highly automated from both the process and the material handling aspects and will be extremely flexible, so that production can be changed rapidly from one grade to another and also permitting production of a number of grades simultaneously.

This plant forms part of the expansion programme for the production of plastics in Rumania and the capacities of the individual sections of the installation were worked out jointly by Petrocarbon and their client in Bucharest. The styrene monomer which forms the raw material will be produced locally in a plant which will be designed and constructed by Rumanian engineers.

New Hydrogen-from-oil Process for I.C.I. Billingham in £6 m. Project

MORE than £6 million is to be spent on modernising a large section of the Billingham works of I.C.I. during the next two years, and a new, highly efficient process for producing hydrogen for synthesis, using light oil instead of coke, will be brought in. At Wilton, capital expenditure this year is likely to be at least £12 million—£2 million more than was anticipated a year ago. Current developments at Wilton, reported previously in CHEMICAL AGE, include extensions to the Perspex plant while an extension to the Propathene (polypropylene) plant, which came into production towards the end of last year, has been sanctioned.

The new process for making hydrogen at Billingham means a switch from coke to light oil as the raw material. The factory's own coke ovens, now nearing the end of their useful life and currently using about 600,000 tons of coking coal annually, will be shut down at the end of this year. Until the new gas-making plants come into operation the coke required will be purchased from the National Coal Board.

At Billingham, production of hydrogen is the first stage in the manufacture of ammonia, fertilisers and many other products of the Division.

As a result of the new process, I.C.I. expect to be able to continue their policy

of reducing home market prices for nitrogen products, including fertilisers, provided that no other major increase occurs in wages, transport costs, taxes, etc. The new process will require a smaller labour force than is at present employed in the gas-making section of the factory. While all the existing employees in the section will be required to undertake new duties, steps are already being taken to avoid any of them becoming redundant.

Preliminary site work at Billingham is already in progress and the new plants will come into use in 1963. Existing plants will continue to operate during the change-over and full production of all Billingham Division products will be maintained while the new plants are being commissioned.

The news of the probable increase in capital expenditure at Wilton was given by Mr. R. E. Newell, managing director of the Wilton Council, at a meeting at Saltburn recently. After referring to recent developments within I.C.I., such as the re-organisation of the board and the company's rights issue to shareholder which would bring in a sum of about £35 million, Mr. Newell said that in the 15 years since Wilton started, £120 million had been invested there while elsewhere in the company, fixed capital investment must have totalled something over £300 million.

New Company Will Operate British Enka Nylon-6 Plant

● SITE for British Enka's nylon-6 plant has now been chosen. It will be at Antrim, Northern Ireland, where the new facilities will eventually employ some 2,000 workers. Following British Enka's best trading year (see p. 553) production plans have been revised and the plant will be operated by **British Enkalon Ltd.**, a new company to be formed jointly by British Enka Ltd. and Algemene Kunstzijde Unie (A.K.U.), Arnhem, Holland.

A.K.U. hold 54.84% of British Enka shares and will have the same proportion in the ordinary capital of the new company; British Enka will hold the balance, which will be offered as a rights issue to existing stockholders, other than A.K.U. British Enka and British Enkalon will have the same managing director and, as far as practicable, their efforts will be co-ordinated.

British Enka obtained a licence to produce nylon-6 from British Nylon Spinners Ltd. in 1956, when a similar licence was granted to British Celanese Ltd. The British Enka licence has been exploited in the Netherlands, Germany, Italy and the U.S., where American Enka are currently raising capacity from 20 million lb. to 35 million lb./year.

I.C.I. have also announced plans to produce 15,000 tons/year of nylon-6 polymer; the company is currently negotiating the purchase of a Soviet phenol-caprolactam process, British Celanese, too, are now planning to make use of their nylon-6 licence, Courtaulds Ltd., their parent company, having acquired in the middle of last year Snia Viscosa's caprolactam process; starting material for this process is toluene which is reduced to cyclohexane carboxylic acid; this is treated with nitroso-sulphuric acid which leads to caprolactam.

Boby Water Treatment Plant for Sturge

● AN £8,500 contract for dealkalisation-base exchange and deaeration plants has been awarded to **William Boby and Co.**, water treatment engineers, of Rickmansworth, Herts., by **John and E. Sturge Ltd.**, Birmingham.

Anderton-Richardson Double Fertiliser Capacity

● DURING the current fertiliser year output capacity of **Anderton-Richardson Fertilisers Ltd.**, Skeldergate Bridge Works, York, has been nearly doubled through the introduction of acidulation and ammoniation reactions in the granulation process at the Howden works on the lines developed at York.

Part of the expansion and works integration programme started by the company when it was formed by merger in 1958, this has enabled future production to be mainly centred at Howden, so releasing much of the York facilities for stock holding, as well as for process

(Continued on page 551)



★ **DISCLOSURE** that Dr. Richard Beeching, I.C.I.'s technical director, would continue to receive £24,000 a year as chairman of the new Railways Board has given rise to more cant and stupidity than I have seen in print for some time. National newspaper readers have been told through comment and correspondence columns that this is too much for one man, that it will unsettle lower grades, that the same amount will have to be paid to heads of other nationalised industries, that Dr. Beeching should sacrifice a high salary for the honour of working for his country, that I.C.I. should subsidise his salary while the Railways Board pays him the usual rate.

Stuff and nonsense! As Mr. Marples pointed out in the House of Commons last week if Dr Beeching can help reduce the crippling losses the railways are now making, he will more than earn his £24,000 a year. Quite apart from that, critics have conveniently overlooked the fact that Dr. Beeching has merely been getting a 'rate-for-the-job.' In being paid for his outstanding administrative ability, Dr. Beeching, like so many other of our top executives, also has to accept extremely heavy responsibilities. Those who say that he should accept a drop in salary while working for the State, fall into the popular trap that the railways are not an industrial undertaking. Nothing could be farther from the truth—they are a vital British industry and to run them at anything approaching a profit calls for the services of a top industrialist.

★ **READERS** may have wondered why when created a baron in the New Year Honours, Sir Alexander Fleck chose the title Baron Fleck of Salcoats in the County of Ayr. For a period during his boyhood he lived and was educated in Salcoats. His father, Mr. Robert Fleck, was a member of Salcoats Town Council from 1886 to 1899 and in March 1954, Lord Fleck became an hon. Burgess of the town.

After receiving the casket, which contained an illuminated scroll on calf vellum, he is quoted as having said: "To be honoured in the home of one's youth is the most gratifying reward of all".

★ **SACKCLOTH** and ashes! Two obvious 'howlers' in one issue of 'CHEMICAL AGE' were not spotted, even though each page is read at least five times before being passed for Press. Gremlins must have been at work on our issue of 18 March, for both mistakes were perpetrated in headlines.

The first, covering the report of a

paper by the operations director of the U.K. Atomic Energy Authority's Production Group proclaimed 'U.S. Nuclear Power Supply Already Significant, Says A.E.A.'s K. B. Ross', when the report clearly showed that the speaker was dealing with the U.K. Our apologies to Mr. Ross.

Mr. S. H. Pinner, manager, Plastics Development Department, of the BX Plastics Ltd. Research Station at Lawford Place, Manningtree, points out the other. On p. 466 of the same issue, appeared a reference to 'desiccant', a word that features in so many spelling-bees—only CHEMICAL AGE wrote about a 'new Sturge *desiccant*'. As Mr. Pinner says—"Chemists of today spell badly enough, without a contribution being made by a distinguished journal".

★ **THREATENED** shut-down of Monsanto's Ruabon chemical works was recently averted when a diver came to the rescue. A blockage in the Patterson filtration plant was the trouble, which was pin-pointed to a 15-ft. deep suction tank containing four pumps, capable of supplying 36,000 gall. of process water an hour to the factory. Strainers at the bottom of the tank were blocked and had to be cleared.

The alternative to using a diver would have been to drain the tank completely. Groping in the dark at the bottom of the tank the diver found the strainers were blocked, due to corrosion. He spent nearly three hours under water, and as a result of his efforts the total blockage was cleared and pumping capacity improved by 20,000 gall. an hour.

★ **A PROBLEM** which, for some time, has obstructed the simultaneous use of dry chemical and foam in fighting certain types of fires, is said to be overcome with the development of a new foam-compatible dry chemical developed by the Pyrene Co. Ltd., 9 Grosvenor Gardens, London S.W.1. While no details of its composition are revealed, it is believed to represent a distinct departure from the usual run of sodium carbonate-based firefighting chemicals, and to include special flow promoting agents. The nature of the waterproofing and flow promoting agents included in standard forms of dry chemical has been such that, when the dry chemical is used with foam, the powder activates a chemical process which decreases the consistency of the foam; this reduces the efficiency and durability of the foam cover.

It is claimed that the new Pyrene

chemical in conjunction with mechanical foam can be used with maximum effect against oil, spirit, alcohol and similar fires. It is further stated that in fires involving highly inflammable liquids such as are encountered in chemical works, oil refineries, etc., the chemical has proved most effective whether applied before, during or after application of the foam.

★ **MOUNTING** U.S. chemical shipments to Europe—last year saw a 50% rise in U.K. imports from this source—have been playing havoc in many sectors of the industry. There is no sign of any reversal; indeed imports will continue to climb as more U.S. plants come on stream this year and next, bringing the vast over-capacities for many products.

Big exports are the only way that U.S. producers can keep large plant units working to anything approaching capacities during the long period in which home demand is building up. One product that has been flowing more freely into U.K. ports in recent months—at an estimated annual rate of 1,000 tons—has been toluene. The price quoted is said to be below the U.K. ex works price and it is thought that the volume of imports will mount rapidly in coming months.

Currently U.S. toluene production is riding high at 326 million gall. (in 1960) from petroleum (to rise to 424 million gall. by 1962); with 39.1 million gall. from coke ovens in 1960 and 4.13 million gall. from tar distillers. This makes a total of 467 million gall. There should be some relief for U.K. producers by the mid-1960's, when U.S. benzene production should be just under the 800 million gall. mark. Although toluene output is also scheduled to rise rapidly by about 1965 vast quantities will be taken for upgrading to benzene; at present this is an attractive proposition with toluene fetching 19 cents/gall., compared with benzene which is quoted at 34 cents/gall.

There can be little doubt, however, that if British toluene producers have to wait until 1965, then much material damage would have been caused to the industry.

★ **A NEW** fertiliser—a mixture of virgin peat, seaweeds, pulverised limestone and fish meals—has been used successfully in the U.S. Developed by Super Organics of Bahama and produced at Freeport, Grand Bahama Island, the product is said to contain all the proteins and minerals required by plant life.

It has a big sale locally in the expanding community of Freeport. This area is being developed by the Grand Bahama Port Authority and has a harbour and oil-bunkering facility for shipping of growing international importance. The Super Organics venture is currently helping to swell the flow of U.S. dollars into this British possession.

Alembic

ORGANIC INTERMEDIATES IN THE 1960's

More Research Needed, Not Imported Know-how, Says A.B.C.M. Director

IT is hoped that those in the British chemical industry and those who frame our laws and run our affairs will see that nothing is done to jeopardise the future of an industry which from 1914 has risen in 45 years to a position in which the value of annual production by the end of 1959 had reached £2,142 million, with direct exports of £292 million, an annual investment in plant of £148 million and expenditure on research of £43 million and which employed as an industry 546,000 people.

Such was the picture of the U.K. chemical industry given by Mr. George Brearley, F.R.I.C., director of the Association of British Chemical Manufacturers, when he gave the Jubilee Memorial Lecture of the Society of Chemical Industry, entitled 'From K.I.D. to Outer Seven', at a symposium on 'Organic intermediates in the 1950's' held by the Manchester and District Section, S.C.I., at the University of Manchester on 24 March.

Mr. Brearley had expressed his hope for official wisdom after he had reviewed the U.S. position with regard to the sale of know-how to Communist countries.

The U.S. Manufacturing Chemists' Association had urged their Government not to sell know-how of chemicals to Russia. They deplored the more liberal policy on the part of other countries in the Western world. The M.C.A. was urging a getting together of other European countries and sought to form a committee for discussing exports of chemical know-how to the U.S.S.R. (see also CHEMICAL AGE, 18 March, p. 445).

If, therefore, licences to use patented know-how became a major feature of international trade of this kind, then safeguards became a vital problem.

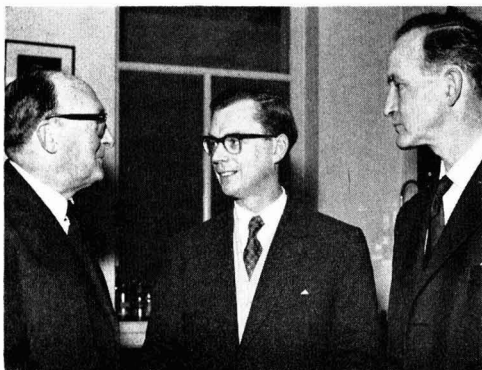
The sale of know-how to Russia could lead to a developing market for U.K. chemicals at a later date.

The temptation to use know-how imported from abroad was no doubt very great, but the vital thing for the U.K., said Mr. Brearley, was to see that we continued to expand and develop our research and did not rely on imported know-how.

Earlier in his lecture, Mr. Brearley had traced the development of the U.K. industry from 1914. It had grown at a more rapid rate than industry as a whole. Whereas over the last 10 years the chemical industry in the U.S. had grown by 53.8% in the U.K. it had increased by 89.6%. But against these figures, Germany's chemical industry had expanded by 374% and that of France by 108%.

Discussing world trade in chemicals

L. to r.: Mr. J. W. Reidy (L. B. Holliday and Co. Ltd.), chairman of the opening session, Dr. G. A. Gamlen (I.C.I.), hon. secretary of the sections and Mr. J. Starr (I.C.I. Heavy Organic Chemicals Division)



expressed as a percentage, it was said that the total had increased as follows: 1938, 2; 1948, 3.1; 1958, 5.0; 1959, 5.4.

The U.K. share of the world export trade, excluding trade between countries of the Communist bloc was: 1938, 6.3; 1948, 7.5; 1958, 0.3; 1959, 9.1%. For the same periods, for chemicals only, the percentages were 19.3, 17.9, 15.2 and 15.0.

Discussing the possible effect of Britain staying out of the Common Market, Mr. Brearley observed that there was no doubt in his mind that our chemical

exports to Continental countries would be adversely affected.

The belief was generally held that there was ample scope now for healthy competition and expansion between various chemical industries of the world, but on the one hand the U.S. dominated with a highly-restrictive tariff policy, and on the other hand there was U.S.S.R. bloc which did not regard world expanding trade as a good thing. With these two policies, said Mr. Brearley, healthy world competition was no more than a pipe dream.

Expanding World Use of Hydrocarbons as Chemical Raw Materials

DEVELOPING use of chemical intermediates from hydrocarbon sources—from the time, until the late 20's when the manufacture of chemicals from simple hydrocarbons other than benzene was rare to the position as it exists today, when the chemical industry is turning more and more to hydrocarbons as starting materials for organic synthesis—was traced by J. R. Blanco, Carrington Research Laboratory of the Shell Chemical Co. Ltd., at the Manchester symposium.

The change-over from the production of the majority of organic chemicals from animal and vegetable products by extraction began when the demand for motor spirit in the U.S. became so great that petroleum refiners developed processes for converting heavy fractions to gasoline by various cracking processes. The gases produced simultaneously were readily fractionated to give C₃ and C₄ fractions rich in propylene and butylene. With these highly reactive olefins available, a range of alcohols and ketones developed.

It was not until 1942 that British Celanese started up an oil cracker designed to produce high yields of light olefins primarily for conversion to acetone. In the same year the first synthetic detergent plant in the U.K. was commissioned by Shell at Stanlow

where Teepol was produced by the cracking of petroleum products.

From these beginnings has developed the present situation in Europe where abundant petroleum fractions suitable for cracking are cheap and available to any chemical manufacturer. Moreover, there is no monopoly on the know-how required for the production of light olefins. Any chemical concern can buy processes and plants and in many cases can also buy processes for the conversion of the hydrocarbon to chemical intermediates.

This means that a chemical subsidiary has to stand on its own feet as a chemical concern and no longer has the advantage of preferential access to raw materials. It has to compete on equal terms with the established chemical industry, which has also to turn to petroleum as a raw material. This situation has led the petrochemical companies to diversify their products and to adapt themselves to the special considerations of the chemical market.

Aromatics Production. One recent shortage that has become apparent in varying degrees throughout the world is that of aromatic hydrocarbons. The relative amounts of aromatics from coal and petroleum sources fluctuates since, for instance in the U.S., benzene from coal tar is largely dependent on the steel



At the I.C.I. symposium, l. to r.: Dr. F. Coffey (I.C.I.), chairman of the evening session, Mr. G. Brearley (director, Association of British Chemical Manufacturers), Mr. J. R. Blanco (Shell Chemical Co., Carrington Research Laboratory) and Dr. D. A. W. Adams (research and development director, Hickson and Welch Ltd., Castleford)

industry. In 1956, about one-third of the benzene used in the U.S. came from petroleum; at the present time the figure is nearly two-thirds and it is expected that the trend will continue, giving an eventual over-supply in the mid-60's when new plants come into operation.

In the U.K. and Europe the coal industry is still the predominant supplier of aromatics. It is estimated that U.K. needs of benzene will be 240,000 tons/year in 1962 and that this will be about 40,000 tons in excess of the supply from coal tar. Substantial quantities of xylenes are already being obtained from petroleum in the U.K.

Most processes for the production of aromatics from petroleum depend on conversion from naphthenes obtained from many crude oils, chiefly by dehydrogenation. Currently, about 80 million tons/year gasoline are subjected to catalytic reforming for the production of motor spirit throughout the world.

An essential feature of catalytic reforming is that any cracking takes place in the presence of excess hydrogen so that no olefins are produced. One typical modern process is platforming by which benzene, toluene and xylenes are produced by using a fixed bed platinum catalyst.

The fact that it is not possible to separate pure benzene, toluene and xylene from platformates by straight distillation owing to the formation of azeotropes, has led to continuous solvent extraction systems being used to produce concentrates containing almost 100% aromatics, particularly as this type of process is now used very extensively for the production of gasolines of high aromatic content and the same plant can be used.

In England the Catarole process is still being operated by Shell Chemical Co. on an expanding programme. The liquid fraction of the cracking is almost entirely aromatic in character containing compounds ranging from benzene to pyrene. A feature of this process is the high yield of benzene relative to other aromatics, whereas catalytic reforming tends to produce predominantly toluene and xylene.

Hydrodealkylation. A new processing technique which will redress the imbalance of the high proportion of toluene and xylene produced by catalytic reforming is dehydroalkylation, a process by which toluene is converted to benzene. (See also CHEMICAL AGE, 4 February 1961, p. 207). On a long-term basis, the potential toluene production from catalytic reforming is enormous, probably exceeding 10 million tons/year. Xylene can also be converted to benzene by hydrodealkylation, if it is economically attractive to do so. There are many versions of the process, but basically it is a catalytic reaction of an alkyl aromatic with hydrogen producing benzene and methane.

Several dehydroalkylation plants are proposing to produce naphthalene (see CHEMICAL AGE, 21 January 1960, p. 145), the position of which is even more acute than that of benzene. U.S. demand for naphthalene is expected to rise to 300,000 tons/year in 1965; about 90% of this will be used for phthalic anhydride. At present, U.S. production of naphthalene-from-coal averages 200,000 tons/year but this is subject to the changing fortunes of the steel industry.

Oxidation Products. Another strong factor encouraging the use of hydrocarbons and therefore of petroleum as a raw material, is the development of direct catalytic conversion processes. Among aromatic derivatives the oxidation of cumene as a route to phenol is now well established. More recently, processes have been announced for the production of phenol by the direct oxidation of toluene and benzene. (CHEMICAL AGE, 20 August 1960, p. 276).

Acrolein. The production of acrolein from polypropylene in good yields by direct oxidation provides an active intermediate which opens up new routes to a whole range of commercial materials. The greater availability of acrolein from petroleum sources will provide an incentive to find uses for it in chemical synthesis both as an intermediate and for the production of polymers and copolymers.

Oxides. The olefinic oxides are parti-

cularly versatile with ethylene oxide far exceeding all ethylene derivatives with a world production of 1 million tons/year. Practically all the newer plants are based on the catalytic oxidation of ethylene with air or oxygen.

Since many ethylene oxide plants are changing over to direct oxidation, many of the old ethylene chlorohydrin units are being turned over to propylene oxide manufacture which is rapidly growing in importance for the production of polyurethanes. In the U.S. \$330 million have been invested in plants for the production of the necessary materials for polyurethanes and the output in 1960 for flexible foams alone was over 50,000 tons.

Bio-degradable Detergents. Among the conventional anionic detergents there has been a significant change in the hydrocarbons used as intermediates for alkyl aryl sulphonates which are the largest single group of synthetic detergents. It has been found that if the dodecyl benzene alkylate used for the production of the detergent is derived from petroleum products then the problem of non-destruction in the sewage treating process does not arise.

Aluminium Alkyls. Although in general hydrocarbons required for chemical synthesis are obtained by the breakdown of petroleum molecules, it is also possible to reverse the process by building up hydrocarbons from simple units. One technique for the building of hydrocarbon chains which will undoubtedly receive much attention in the future is afforded by the chemistry of aluminium alkyls; Ziegler catalysts are good examples. It is also possible to use aluminium alkyls themselves as chemical intermediates.

Higher aluminium alkyls built up by the addition of ethylene to aluminium may be oxidised with small amounts of air to give aluminium alkoxides. On hydrolysis, these give a mixture of straight chain primary alcohols.

A by-product of the process is the exceptionally pure alumina which finds outlet in the manufacture of catalysts. Commercial production of the Ziegler alcohols is planned in the current year by the Continental Oil Co. of the U.S. at the rate of 20,000 tons/year.

Other papers presented at this symposium will be summarised in Chemical Age next week.

Agricultural Chemicals Recommended for Safe Use

Recommended for safe use in the U.K. are: phosphamidon (trade name, Dimecron) included in the Agricultural (Poisonous Substances) Regulations as a Second Schedule Part III substance; and Cornox RK (d'- α -2,4-dichlorophenoxypropionic acid). This acid and its salts need not be included in the Agricultural (Poisonous Substances) Regulations.

U.K. Copper Sulphate Output Up

Production of copper sulphate in January amounted to 3,055 tons, compared with 1,664 tons in the same month last year.

Letters to the Editor

Monomeric Di-epoxides Show Biological Activity

SIR.—In the report of a lecture by one of us to the Manchester Section of the Textile Institute it was stated that di-epoxides are carcinogenic (C.A., 24 December 1960, p. 1049). The letter which commented on this (C.A., 21 January, p. 142) has caused us some misgivings, and we therefore include some recent references on the subject.

Textile publications (1,2) suggest the use of alkyl and alicyclic di-epoxides as agents for the production of minimum-care finishes on cotton goods. The di-epoxides, along with the nitrogen mustards, polyethylenimines, and dimethanesulphonyloxyalkanes are capable of alkylating various cell components and thus possess carcinogenic potentiality (3). Hine and his co-workers (4) report the production of skin tumours in mice by the repeated application of a solution of an aliphatic di-glycidyl ether of average molecular weight 300, and although its activity is low compared with that of 20-methylcholanthrene, it is significant. Walpole and Williams (5) have shown that a similar di-epoxide, glycerol di-glycidyl ether, produces effects akin to those caused by X-radiation in the bone marrow of monkeys and rats as well as tumours, and the same type of toxicity is shown by the di- and tetra-glycidyl ethers of pentaerythritol. Walpole (6) induced tumours in rats by the use of a crude sample of vinyl cyclohexene dioxide, but a purified product failed to give a well defined result.

Non-carcinogenics

The di-glycidyl ether of diphenylol propane, which is very widely used as a precursor of commercial epoxide resins shows no carcinogenic effects when painted on to the skin of mice (4), but it is not used in textile finishing, as far as we are aware.

It is of particular concern that the monomeric di-epoxides which would be of most value in the treatment of textiles, that is those of low molecular weight and thus highest cross-linking efficiency per unit mass, are also the ones which have been shown to possess the most marked biological activity. Furthermore, the recommended finishing procedures involve baking at elevated temperatures which implies an additional hazard due to dispersal of reagent or by-products by volatilisation if treatment is carried out on conventional textile machinery.

Since it is possible that the effects of these substances might not become apparent in man until 20 years or so after effective contact (5) it is of primary importance that the utmost caution should be exercised in their handling and general use until such time, if any, that

it is proved conclusively that they are devoid of carcinogenic and radiometric properties.

Yours, etc.,
JOHN HONEYMAN,
DAVID M. JONES.

British Cotton Industry
Research Association,
Manchester.

1. D. D. Gagliardi and F. B. Shippee. *Text. Res. J.*, 1959, 29, 54.
2. J. Gulligan *et al.* *Text. Res. J.*, 1960, 30, 208.
3. A. Haddow. R.I.C. Lectures and Reports, 1959, No. 4, 10 *et seq.*
4. C. H. Hine. *Cancer Research*, 1958, 18, 20.
5. A. L. Walpole and M. H. C. Williams. *J. Oil Col. Chem. Ass.*, 1959, 42, 694.
6. A. L. Walpole. *Annals New York Acad. Sci.*, 1958, 68, 750.

Dyes for Polyesters

SIR.—'Alembic' in his note on dyes for polyester fibres in your issue of 11 March appears to have allowed himself to have been misled by sales literature. In case his comments should mislead others I think he ought to issue a correction for some of his remarks, as follows:

1. The disperse (not dispersed) dyes were not only the most suitable dyes for polyester fibres when these were first introduced 10 years ago—they still are to-day.
2. The shortcomings of the existing types at that time have been and still are being much improved in all respects, thanks to the efforts of dyemakers, dyeing theoreticians, dyers and machinery makers.
3. The Amacron dyes which are themselves of the disperse type are not new. A range of them was certainly known in this country in 1956

Big Move for Kestner Works

TRANSFER of their London works from New Cross to Greenhithe is planned by Kestner Evaporator and Engineering Co. Ltd. The site at Greenhithe covers 10 acres and is adjacent to the new Dartford Tunnel, so that direct access from and to the North can be made by bypassing London. The works will be easily accessible by rail from Charing Cross. The new works will be brought into operation gradually, starting in June, with completion towards the end of the year. Among other buildings will be an extensive new laboratory with facilities for pilot plant and experimental testing.

Kestner, who produce a wide range of evaporators, dryers and other chemical plant and equipment, including equipment using their Keebush and Keeglas materials, have in their 50 years' existence founded branches in Australia, South Africa and Canada. Head office is at 5 Grosvenor Gardens, S.W.1.

though this does not mean that improvements and additions have not been made to the range that was available then.

4. In addition to the Amacrons at least a dozen ranges of disperse dyes specially suited to the dyeing of polyester fibres are put out by dyemakers in this country, on the Continent, and in America. As examples there are the Dispersol and Duranol ranges of I.C.I., the Eastman polyester range of Tennessee Eastman, the Serilene and Serisol ranges of this company, and others, which have been available to dyers of polyester materials since the introduction of this fibre.

Yours, etc.,

R. K. FOURNESS,

Yorks Dyeware and Chemical Co. Ltd.,
Leeds 3.

Trade with U.S.S.R.

SIR.—I should like to comment on your excellent article entitled 'Fisons/C.J.B. Get Two Soviet Contracts' (C.A., 18 March, p. 449).

Discussions with the Russian negotiators may appear to be lengthy, but they are well worthwhile. If the technical basis is sound, the talks lead to a contract, fair to both sides, and free from ambiguities. Whether in Moscow or in London our negotiations were invariably carried out in a friendly atmosphere and were conducted by competent and experienced technical and commercial experts. Major contracts involving process 'know-how' often take at least as long to negotiate in Western countries.

Negotiations may have been 'tough', but contract negotiations at home or overseas are always 'tough' and rightly so.

Yours, etc.,

F. P. KORN,

Director.

Wycon Services Ltd.,
London W.2.

Forestral Group Acquire Farnell Carbons Ltd.

FARNELL CARBONS LTD., Woolwich, manufacturers of activated carbons, have joined the Forestral group of companies, whose offices are at The Adelphi, John Adam Street, London W.C.2. This acquisition forms part of a programme of diversification being carried out by Forestral and is an extension of existing overseas interests in charcoal manufacture. Forestral have a plant in Kenya which supplies charcoal to cement works, etc., for kiln firing.

Farnell Carbons Ltd. will continue to operate from Woolwich, but the range of manufacture will be extended to cover all types of activated carbons. In particular, the company will supply chemically activated carbon manufactured by Forestral, thus creating a new source of supply for this material in the U.K.

Mr. R. G. W. Farnell will continue to act as managing director and the name of the company will remain unchanged.

Yorkshire Fertiliser Producer's Expansion Projects

(Project News—continued from p. 541)

research and the development of new techniques of producing high-analysis fertilisers, phosphoric acid and ammonium phosphate.

Superphosphate production for both works is to be centred around the new Bradley/Poitte phosphate mill and the increased capacity at Howden. Engineering and maintenance services have been unified to meet the needs of both works.

The company's centre at York will specialise in sales and administration and will remain the base of the soil testing laboratory and advisory services of the Anderton-Richardson Crop Study Unit. In line with the policy of extending influence beyond the home county of Yorkshire, the company has recently built up sales connections in Lincolnshire and East Anglia as well as in several other parts of the U.K.

First U.K. Export Order For Oxygen Process

● FIRST British export order for a complete installation using one of the new oxygen steelmaking processes has been won by **Head Wrightson (Australia) Pty.**, a subsidiary of Head Wrightson and Co. H.W., Thornaby-on-Tees, will supply two 100-ton basic oxygen furnaces and other equipment.

Complete Changeover to I.O.P. at Ardeer

● CHANGES of scene can be expected in the near future at **I.C.I. Nobel Division's** Ardeer site. Now that the whole of Ardeer's nitric acid is being produced by the new intermediate ammonia oxidation process and the concentration process uses magnesium nitrate, the old nitric acid and the sulphuric acid concentration plants, so long a feature of the Ardeer scene, can be demolished.

The new plant described in **CHEMICAL AGE**, 23 July 1960, p. 136, has continued to run satisfactorily since commissioning, and, as a result, demolition of the old atmospheric oxidation plant has started. The old unit has produced close on 1 million tons of nitric acid since it came into operation some 30 years ago.

Plants which operate under positive pressure rather than at atmospheric pressure (in the Ardeer plant oxides of nitrogen pass into the absorption towers at 42 p.s.i.) yield a higher concentration of acid, increase the rate of the reaction and cut down in tower volume required for oxidation and absorption.

The second unit for the concentration of nitric acid using magnesium nitrate has been commissioned and is operating at designed capacity. These new units have come fully up to expectations. They are cleaner and more efficient than the old sulphuric acid dehydration unit.

Designs for a new plant for the denitration of refuse acid at Ardeer are well advanced.

One of the uses of Ardeer nitric acid

is the production of nitroglycerine. A new type of continuous mixing and cartridgeing plant for gelatine explosives, a joint design effort of the Nobel Division and I.C.I.A.N.Z., has completed preliminary trials at Ardeer.

Revertex Award Latex Contract to Blaw-Knox

● CONTRACT for their recently announced synthetic latices plant has been awarded, state **Revertex Ltd.**, to **Blaw Knox Chemical Engineering Ltd.**, 20 Eastbourne Terrace, Paddington, London W.2. To be built in conjunction with International Latex Corporation, Dover Ltd., the plant will be sited at Stallingborough, Lincs. The project is in its early stages and no completion date is available.

International Synthetic Rubber Co. Ltd. have what they describe as the first large-scale latex plant at Hythe. This is producing high solids SBR latex with a capacity of 3,500 tons/year—a figure which last September I.S.R. stated could be doubled by the end of 1960. Scheduled for production by this autumn is a new plant to be built at Droitwich by **Matthew Hall and Co. Ltd.** for **Sto-Chem Ltd.**, who are jointly owned by **Witco Chemical Co. Inc.** and **United States Rubber**. Capacity will be 3,500 tons/year of butadiene-styrene, high styrene, nitrile and acrylic types of synthetic latex.

Phthalic Anhydride

(continued from p. 539)

U.S. than in other countries of the world, because of the very large platinum reforming systems in the U.S. They place the likely future price of petroleum naphthalene at 6½ cents/lb., while prices of ortho-xylene, an alternative raw material, are predicted to fall within the range 4½-5 cents/lb., "and they could go appreciably lower if necessary". They argue that, since it is now feasible to obtain yields from ortho-xylene comparable with those obtained from naphthalene in the U.S., i.e. of the order of 0.85-0.90 lb. of phthalic anhydride per lb. of o-xylene, a differential of 1.5-2 cents/lb. would result in an even greater cost of production differential in favour of the use of o-xylene. The advent of petroleum naphthalene of high purity, on the other hand, has made it easier for the fluidised bed to operate successfully. The fluid-bed process for oxidation of o-xylene has not so far proved attractive, due apparently to low yields and high corrosiveness.

While the phthalic production of some European countries, notably Italy, as well as that of Japan, has been based increasingly on cheap and abundant supplies of ortho-xylene from the U.S., yields from this raw material have not been so high as those from naphthalene.

B.D.M.A. Officers and Executive Committee

At the annual general meeting of the British Disinfectant Manufacturers' Association the following officers were elected for the year 1961: *chairman*, Mr. S. L. Waide, Newton Chambers and Co. Ltd.; *vice-chairman*, Mr. J. K. Wilson, Cooper McDougall and Robertson Ltd.; *hon. treasurer*, Mr. V. G. Gibbs, William Pearson Ltd.

The executive committee is as follows: Mr. T. R. Auchincloss, Jeyes Sanitary Compounds Ltd.; Mr. L. A. Bush, Wm. Butler and Co. (Bristol) Ltd.; Dr. H. A. Crowther, Gaseigne-Crowther Ltd.; Mr. P. Dyson, Imperial Chemical Industries Ltd.; Sir Knowles Edge, Wm Edge and Sons Ltd.; Mr. W. E. Finch, Printer Industries Ltd.; Mr. Wm. Innes, Robert Haldane and Co. Ltd.; Mr. P. R. Milligan, Reckitt and Sons Ltd.; Mr. R. Rigby, Aspro-Nicholas Ltd.

Hon. auditors are Mr. F. C. Seager, Wm. Pearson and Co. Ltd.; and Mr. N. V. Needham, Cooper McDougall and Robertson Ltd. Secretary of the Association is Mr. W. A. Williams, M.B.E.

New Monsanto Tanker Has Glass-Fibre Cab

A new super road tanker, added to the Ruabon transport fleet of **Monsanto Chemicals Ltd.**, has an illuminated 'Monsanto' sign on the cab roof. The cab itself is of glass fibre. Designed for the transport of bulk liquids in the U.K. and on the Continent, the tank unit is of 3/16 in. stainless steel and has a capacity of 2,500 gall.

The solution seems to lie in catalyst development; Scientific Design Co. have recently come up with a new catalyst and, according to Landau and Harper, it is now possible to obtain yields of the order of 85-90 lb. of phthalic anhydride per 100 lb. of ortho-xylene.

In the U.K., it is clear that so long as demand for phthalic anhydride continues to grow, producers cannot afford to remain entirely dependent on the vagaries of steel production and changing coke-oven technology. But there is no sign of any rush to explore the possibilities of the petroleum naphthalene that looks so promising in the U.S. Although petrochemical companies in the U.K. are looking at production of naphthalene by cracking methyl naphthalenes, they are a long way from making any decisions.

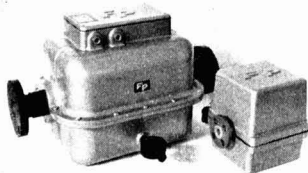
I.C.I. Plastics Take 95% of Methyl Methacrylate

I.C.I. Plastics Division takes 95% of the methyl methacrylate produced at the Cassel Works, Billingham. This was stated by Mr. A. F. C. Speyer, commercial director of General Chemicals Division at a recent dinner. Production of methyl methacrylate had risen by some 12,000 tons/year since 1957.

LOW-FLOW CONTROL INSTRUMENTS

A RANGE of controllers which will automatically regulate flows as low as 1-47 s.c.c./min. of gas or 0.18 c.c./min. of liquid is available in two versions: one maintains a constant flow of gas or liquid through any external needle valve irrespective of down stream pressure variations; the other is for use when the down stream pressure is constant. Both versions are available in either brass or stainless steel. Brass controllers are suitable for use at pressures of 250 p.s.i. and temperatures up to 180°F; stainless steel ratings are 500 p.s.i. and 250°F or 390°F with reduced life.

All these controllers use feedback from the supply or downstream flow line to maintain a constant differential across a spring-loaded diaphragm in the instrument. This, in turn, regulates a valve plunger and thus flow to the needle valve. Manufacturers are **A.E.I. Instrumentation Division**, Mosley Road Works, Trafford Park, Manchester 17.

FISCHER AND PORTER'S NEW ELECTROMAGNETIC FLOWMETER

Rate of flow of fluids not far removed from pure hydrocarbons can be accurately determined with this new low-conductivity electromagnetic flowmeter. Hitherto it has been impossible to use magnetic flowmeters for handling fluids with a conductivity of less than 20 micromhos/cm., but with the introduction of certain design changes Fischer and Porter Ltd., Salterbeck Trading Estate, Workington, Cumberland, have produced this system, which will handle liquids and slurries with a conductivity as low as 0.1 micromhos/cm. Shown here are two models; one with a 2 in. Fibreglass tube, the other with a 3/16 in. p.t.f.e. lined tube

SPRAY DRYING OF DELICATE SUBSTANCES

DRY powder of pre-determined particle size and bulk density can be produced from solutions, suspensions or emulsions with the JWK spray dryer, in which the liquid to be dried is atomised into a drying tower by means of a nozzle. Hot unsaturated air, led in simultaneously, quickly evaporates the moisture contained in the small droplets. The powder is then extracted, either from the conical section of the tower or from a first stage separating cyclone. In both cases it is quickly removed from the detrimental effects of saturated air.

Further extraction of fine particles in the exhaust air may be achieved by secondary cyclones, wet washers or hose

EQUIPMENT NEWS

Chemical Plant : Laboratory Equipment : Control and Indicating Instruments

filters, thus ensuring maximum recovery. These smaller particles are returned to the liquid to be spray dried for recirculation.

Complete industrial plants are available in single tower construction up to a capacity of 4,500 lb./hr. water evaporation; also in 'package' units for experimental or small batch production of between 10 and 20 lb./hr. water evaporation capacity.

This process is claimed to be most suitable for delicate substances, the finished product being dried without alteration in composition or effectiveness.

The JWK spray dryer is marketed by **Engineering Appliances Ltd.**, 3 Buckingham Place, London S.W.1, who state that a testing service is also available to determine the most suitable drying conditions for individual products.

CERAMIC ACID PUMP

DESIGNED to reduce maintenance, the Transkem ceramic pump for acids has a pump casing that is split vertically, the front part integrally cast with the inlet and outlet flanges and supporting feet. The rear half of the casing, carrying the impeller shaft and bearings, can readily be unbolted and swung round on the bedplate, exposing the impeller for inspection or renewal without disturbing the bearing arrangement or disconnecting the pipelines. End float is easily adjusted through a split threaded collar on the shaft. The rear casing is axially located by retaining lugs, thus avoiding any direct contact of the ceramic components.

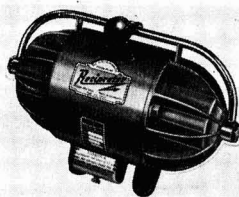
The new pump is marketed by **Transkem Pumps Ltd.**, Sunlight House, Quay Street, Manchester 3—a new sales organisation which is now handling, marketing and servicing for Transport and Chemical Equipment Ltd., Barrhead, Scotland.

manufacturers of various types of ceramic equipment.

VACUUM AND PRESSURE PUMP

THE new Reciprotor combined vacuum/pressure pump manufactured in Denmark is now being offered by **Edwards High Vacuum Ltd.**, Crawley, Sussex, who have been appointed sole U.K. and British Commonwealth agents. Operated by an electromagnetic vibrator from an A.C. supply, the pump is very compact.

The Reciprotor is available in two versions. The type 406G is designed for

**Combined vacuum pressure pump**

continuous operation and provides a free air displacement of 1.62 cu. ft./min., a vacuum of 18 in. Hg and a maximum pressure of 7.8 p.s.i. The type 606G is rated for intermittent operation only but has an improved performance, delivering air at 1.77 cu. ft./min. and attaining a vacuum of 22 in. Hg and a maximum pressure of 10.7 p.s.i.

The pump sells at £25 ex works.

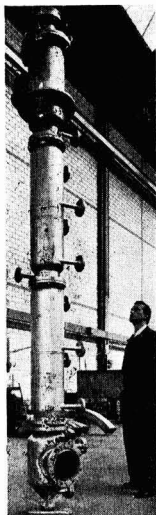
NEW LUWA FRACTIONATOR COLUMN

A FRACTIONATOR which has been developed for the efficient separation of mixtures of high boiling and heat-sensitive substances is available from **Luwa (U.K.) Ltd.**,



Transkem ceramic acid pump, with rear part of casing unbolted and swung round for inspection

แผนกห้องสมุด กรมวิทยาศาสตร์
กระทรวงอุตสาหกรรม



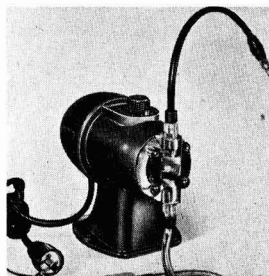
Fractionation column for separation of high boiling point and heat-sensitive substances

Reliance House, 340 Clapham Road, London S.W.9. The company point out that in conventional columns such substances are exposed to the harmful effect of high temperatures at pressures above 20 mm. absolute and cannot be fractionated satisfactorily, if at all.

The new apparatus permits the sharp separation of multi-component mixtures at pressures of about 1 mm. absolute and with minimum pressure drop, a large number of equivalent theoretical plates, high throughput and the shortest hold-up time. The completely new principle depends on alternate evaporation and condensation in a thin film and the device operates continuously as a stripping or fractionating column or in combination. A thin layer evaporator is used as reboiler.

NEW CHEMICAL PUMP

DESIGNED for the pumping of sodium hypochlorite and other chemical solutions, the Diachlor 361 is a positive displacement diaphragm pump capable of delivering from 2 to 20 gall. per 24 hr. by single control adjustment. It can apply against pressures up to 100 p.s.i. without the need for a balancing water supply. All components in contact with chemical solutions are manufactured from special



Diachlor chemical pump

materials designed to resist the action of acids and alkalis; these components are all encompassed within the head of the pump. The head is of clear plastic so that the pumping action can be observed.

Glass-fibre reinforced polyester is used for the body, housing a fan-cooled motor of only 60 w. consumption and available for 200/250 v. or 110 v. Two holes in the base provide rapid screw fixing for a total weight of only 8 lb. The instrument is 10 in. long and 8 in. high.

The Diachlor 361 follows the trend of industry today in being complete with all accessories when sold. These are suction and delivery tubing, point of application fitting, solution strainer assembly, cable and 3-pin 5-amp plug.

Suppliers of the pump are **Diafilter Engineering Co. Ltd.**, 902 Purley Way, Purley, Surrey.

MOBILE ADJUSTABLE MIXER

Chemical Equipment Engineering Ltd., Castle Street, Macclesfield. It is stated to be suitable for the mixing of liquids of all types including dyes, paints, food-

EXTREME mobility and adjustability are special features of a new mixer made by



This mixing unit, used for dyestuffs, has a ½-h.p. motor, a stainless steel shaft and propeller and sells for £120

stuffs, pharmaceutical products, waxes and oils. A stainless steel shaft and propeller are fitted as standard, but these components can be supplied in other metals.

An advantage claimed for this mixer is that its mobility eliminates the capital installation costs of fixed equipment and that the mixer can be taken to any part of the works or store more easily than many drums of products requiring mixing could be moved to static mixing machines.

Mounted on ball-bearing castors, the base frame is fitted with adjustable stops which can be used to lock the unit in a steady position, particularly where this is necessary to cope with uneven floors. The unit can be manufactured with motors up to 5 h.p. and in all cases the motor and rotors are accurately counter balanced and designed to be operated by 'finger touch'. A special keyed locking device prevents turning of the motor on the vertical shaft when operating. This particular model allows up to 2 ft. vertical adjustment of the mixer, but the

makers can make modifications to suit any type of drum. The unit can handle quantities from 2 to 25 gall. at each mixing.

Price of a standard mobile mixer with counter balanced ½ h.p. motor and head giving finger-tip control is £120.

VALVES FOR ACIDS AND CORROSIVES

I.V. Pressure Controllers Ltd., Atlas House, 683 London Road, Isleworth, Middlesex. Principal feature of these valves, which are intended for the handling of acids and corrosive liquids, is the special protective lining, which is claimed to be far cheaper than conventional materials.

Bascodur is a thermosetting synthetic material composed of a special resin base, filler material and other components. It is claimed to have excellent corrosion resistance against acids, alkalis and solvents at the elevated temperatures encountered in the chemical industry. In the Bascodur range of plug valves, stated to be suitable for 150 p.s.i. and 300°F, the body is in cast iron while the body lining, plug and bushing are in Bascodur, a special grade of Bascodur being used for the packing ring. The globe valves, suitable for the same temperatures and pressures, have Bascodur linings for the body, bonnet and valve stem. Other types of valve in the Bascodur range include angle valves and low-pressure gate valves.

PROTECTED ELECTRIC MOTORS

SPECIAL protection against oil, water, chemical fumes and airborne abrasives is afforded by a new range of open type electric motors. Special features of the NewmanSEAL motor include resin protected stator windings, specially sealed bearings, a resin protected rotor and a sealed terminal box. It is being produced in a range from ½ h.p. to 125 h.p. by **Newman Industries Ltd.**, Yate, Bristol. The epoxy resin encapsulation process of protecting the stator windings, recently introduced by Newman Industries, is incorporated in the design.

DIRECTIONAL FUME COWLS

LATEST in the range of Turbo fume removal equipment is a wind-operated directional cowl manufactured from rigid unplasticised p.v.c. Available in a wide variety of standard sizes or manufactured to customers' requirements, the cowl is finely balanced and rotates freely in a specially protected bearing housing attached to the fixed portion of the duct. A dual locking device ensures that while the cowl can easily be removed, it cannot be blown off during gales or high winds.

Further information can be obtained from **Turner and Brown Ltd.**, Davenport Works, Davenport Street, Bolton, Lancs.

SOLE selling agency for Bascodur valves, produced in Germany, has been undertaken

Overseas News

PECHINEY TO INCREASE CAPACITIES FOR CHLORINE AND SOLVENTS

PÉCHINEY plan to raise capacities at their Saint-Auban plant to 350 tonnes/day of chlorine, 40 tonnes/day of perchlorethylene, and 200 tonnes/day of trichlorethylene. The unit's chlorine production will then be one-third of the national total. During the last year Péchiney produced 109,000 (83,000) tonnes of chlorine, 38,000 (25,000) tonnes of p.v.c. and 65,000 (49,000) tonnes of chlorine solvents, as well as other products.

Plastichimie, formed by Péchiney in co-operation with Dow Chemical, U.S., are expected to start production of polystyrene and Saran polyvinylidene chloride in October of this year. The Le Havre plant of Produits du Titane, in which Péchiney are also interested, will double their capacity; this company, together with its parent, Fabriques de Produits Chimiques de Thann et de Mulhouse, raised their titanium dioxide sales by one-third in 1960.

Japanese Firm to Increase Superphosphate Capacity

An additional tricalcium superphosphate plant is to be constructed by Onoda Hiryo. The plant, which will have a capacity of 20,000 tonnes a year, is expected to be on stream by the summer of this year. This increase in superphosphate production will give Onoda a total capacity of 60,000 tonnes a year.

Methylamine Derivatives Plant for Union Chimique Belge

Union Chimique Belge will during 1961 open a unit at their Wandelgem, Belgium, plant for the continuous production of methylamine derivatives, including dimethylformamide. The same company has just started up a 30,000-tonnes plant for the production of aromatics including benzo'e, toluol and xylol.

Petrochemical Plant for Rhine Site

Chemische Werke Kalk GmbH, Cologne, are to build a petrochemical plant between Cologne and Bonn near the Rhineside oil refinery of Deutsche Shell AG at Godorf. Preparatory planning work is already being put in hand. Chemische Werke Kalk, a subsidiary of Salzdettfurth AG, Hanover, have a capital of DM13.3 million and last year had a turnover of some DM160 million, based on soda, fertiliser and alkali production.

Stickstoffwerke Add Plants for Maleic and Fumaric

Österreichische Stickstoffwerke, the Austrian State-owned chemical producers of Linz, have expanded their produc-

tion programme by the addition of maleic anhydride and fumaric acid, as base materials for maleate and polyester resins.

Egyptian Development Organisation Acquires DDT Plant

The United Arab Republic State holding company, Egyptian Development Organisation, has bought up the DDT plant of Kafr el Zayat in the Egyptian region of the Republic. E.D.O. now own 10 chemical companies in the country.

Manitoba Nickel Plant Opened by Premier

Canada's second largest nickel producing centre at Thompson, 400 miles north of Winnipeg, has been opened by the Premier of Manitoba for the International Nickel Co. The site has the world's only fully integrated nickel facilities, combining all the processes of mining, smelting and refining. Output is expected to reach about 75 million lb. of refined nickel a year.

Mitsui Petrochemical Raise Phenol Capacity

The Japanese producers, Mitsui Petrochemical, are to increase their phenol capacity to 3,000 tonnes/month by September, 1962. The plant's present capacity is 1,000 tonnes/month. Mitsui estimate that demand for phenol will be 90,000 tonnes for 1965. It is thought in other quarters that this is an over-estimation.

New Atlas Process for Glycerine and Glycols

A new 'Chemurgic' process developed by Atlas Powder Co. will be used for the production of glycerol, ethylene glycol and other glycols from molasses at a 50 million lb./year plant at Atlas Point, near Wilmington, Del. Atlas Powder already produce sorbitol, mannitol and other polyols at this site. To be completed by the middle of next year the plant will cost \$17 million. M. W. Kellogg will engineer and build the plant; Chemico will construct the necessary hydrogen unit.

The process involves both hydrogenation and hydrogenolysis of the carbohydrate raw material. Sorbitol is used as an intermediate in the reaction.

Japan Quotes Lowest Prices for Korean Urea Tender

Bids for 15,000 tons of nitrogen fertilisers, 10,000 tons of potash fertilisers and 10,000 tons of phosphoric fertilisers have now been received in South Korea, under tenders which are covered by I.C.A. funds. U.S. prices for urea ranged

\$119.30/ton f.o.b. (Sumac) to \$101.45/ton f.o.b. (Central Resources), while French and Dutch bids, f.o.b. were around the \$75-77/ton mark. Japanese f.o.b. prices were slightly above these European prices, although on a C. and F. basis they were lower.

U.S. quotations showed a marked price increase on previous Korean tenders; quantities of European fertilisers offered were less than expected. No U.K. bids were received.

Ugine HCN and Acrylo Know-how for Poland

Facilities to produce hydrogen cyanide and acrylonitrile are to be built by Ugine of France in Tarnov, Poland, under an agreement signed with Polimex, the Polish State trading organisation. Ugine will also provide process know-how. Polimex are negotiating for the building of a plant to produce acrylic fibre.

Grace Bring in New Ammonia Capacity at Memphis

A new 60,000 tons/year ammonia plant of the Nitrogen Products Division of W. R. Grace and Co., at Memphis, Tenn, U.S., has been brought on stream. The new plant uses the steam methane process in which steam is reacted with natural gas to produce hydrogen, the hydrogen being combined with air and purified to form synthesis gas which is converted to ammonia.

The new plant brings the overall ammonia capacity of the Memphis plant to 160,000 tons/year. The additional capacity, completed just before the peak of the fertiliser use season, will go to satisfy in-plant requirements of the raw material for urea production, and outside to customers who have increased their consumption of ammonia.

Hitherto, the urea production plant adjoining the ammonia plant had to obtain a portion of its ammonia requirements from outside sources. Urea capacity, originally 50,000 tons/year, was doubled in 1959, making the Memphis plant the United States' third largest urea plant.

E. German Chemical Plant for Far East ?

The sales director of the German Soviet-zone chemical plant trading company Chemie-Ausrüstungen, of East Berlin, Herr Walter Bannath, has been holding negotiations with regard to the possible supply of East German units to Indonesia. He was later to travel on to Australia, New Zealand and Cambodia.

Chlorine and Chemical Project in Yugoslavia

Construction of a chemical plant to produce chlorine, washing media, detergents, organic and inorganic acids and inorganic plant protection media began this month at Gorno Lisice, near Skoplje, in the Yugoslav republic of Macedonia. To cost between 6,000 million and 7,000 million dinars, the plant will take up production in 1965 with a capacity given as some 17,500 tonnes of electrolytic

salts, 13,300 tonnes of washing media (of which 5,000 tonnes are detergents) and 5,500 tonnes of plant protection chemicals.

Processes and equipment are to be purchased outside Yugoslavia and, according to Yugoslav reports, negotiations have already been completed between the newly formed Yugoslav company Elektro-hemijski Kombinat Biljana and foreign firms with regard to deliveries, although no further details are given.

Aerosol Contraceptive Available in U.S.

An aerosol contraceptive is available in the U.S. for the first time. Called Enko vaginal foam, the product is manufactured by Enko Co. The foam, which is a spermicide, gives further protection by creating actual physical block by the formation of a thin film.

The ingredients include benzethonium chloride, nonyl phenoxyethoxyethylene ethanol, myristic acid, stearic acid, triethanolamine, glycerine monostearate, polyoxyethylene sorbitan mono-oleate and monolaurate, polyvinyl pyrrolidone, polyethylene glycol and deionised water. The formulation includes 10% of fluorinated hydrocarbon propellant.

Japanese Firm to Make Urea-Formaldehyde Foam

Toyo Koatsu are to enter the field of urea foam manufacture. A contract has been signed with Swiss Glin Hemie Co. for the supply of technical data on urea-formaldehyde resin and setting agents, and also know-how on spray machinery.

Private Investment Will Boost Pemex Projects

Petrochemical projects of Petroleos Mexicanos (Pemex), the Mexican State oil industry, will be aided this year by private enterprise investments estimated at more than £5.7 million. U.S. companies are stated to be interested in co-operating with Pemex, particularly in the setting-up of facilities for the production of aromatics.

U.S. Loan for Turkish Insecticide Plant

A \$2.8 million loan from the U.S. Development Loan Fund will allow Turkey to set up a heavy chemical plant at Istanbul. The loan is being made to Korunna, a private company, and will enable the company to produce insecticides from local materials for the first time in Turkey.

The Korunna project will build the first heavy chemical plant in Turkey and one of the largest chlorination plants in the Mediterranean area. By using local raw materials, Korunna will save Turkey some \$3 million a year in foreign exchange.

Urea and Fertiliser Plants for Mexico

Fertilizantes del Bajío, with technical aid from Lummus, New York, are to build a 170 tons/day urea plant in Salamanca. A new carbon black plant in

Salamanca will cost £1.4 million, the same as the urea plant. Both facilities are due on stream in 12 months. Fertilizantes des Istino are to build a plant to produce ammonium and nitrogen compounds, calcium superphosphate, sulphuric and phosphoric acid, at a cost of about £2 million. Pemex hold one-fifth of the capital of this company, whose site is at Coatzacoalcos on the Gulf coast.

It is hoped that urea from these projects will fetch £25 a ton, compared with a cost of £40 a ton for U.S. imports.

Olin Mathieson Adopt Shorter Name

In future the U.S. company, Olin Mathieson, will be known by the name of Olin whenever possible rather than by the more cumbersome name of Olin Mathieson Chemical Corporation. Its legal name, however, will remain unchanged.

Austria Will Have Surplus LPG Next Year

The entire Austrian demand for liquid propane and butane will be able to be covered by a 15,000-annual tonne liquefied petroleum gas plant to be opened at the Schwechat, near Vienna, oil refinery in April. With the introduction next year of a catalytic cracking unit the plant's propane and butane production will rise above this national demand. By next year, too, the Schwechat propylene unit will be in full production and will make Austria independent of imports with its annual capacity of 20,000 tonnes.

U.S. Firm Gets Israel Phosphate Rights

Prospecting rights for phosphates in the Negev, in Israel, have been granted for the first time to a foreign enterprise. Alumina Corporation, U.S., have estab-

lished a subsidiary for the purpose, which will be known as the Israel-American Phosphates Co. The contract, which was signed several months ago in the U.S. by Mr. Menahem Bader, director-general of the Israeli Development Ministry, was recently approved by the Government.

The company will invest at least £450,000 over the next two years in prospecting the vast phosphate reserves in the southern area of Israel. If they prove workable, the company will put up—within four years—a plant for the enrichment and defluorination of at least 500,000 tons of ore a year.

The Israel Government will construct approach roads and will extend the railway network to the plant, provided the company can guarantee a production of 600,000 tons of phosphates a year for ten years. This would create a rail link to Eilat on the Red Sea.

Esso to Build Europe's Largest Lube-oil Plant

Europe's largest lube oil plant—with a capacity of 200,000 tons/year solvent extracted lubricants—is to be built by Esso Standard Societa P.R. Azioni, Genoa, in conjunction with Societa Rasim, Augusta Sicily, and will be sited at Augusta. The capacity will about double current Italian production and the plant is due on stream in 1963.

Italian Sulphur Output Down by 33%

Last year, Italian sulphur production totalled some 81,000 tonnes, or 33.1% below the 1959 level of 121,000 tonnes and about 50% down on 1958. During 1960, some 26,000 tonnes of crude sulphur were exported, 10.1% less than in 1959. Italian exporters last year received an average Lire 17,500 per tonne (Lire 20,900 in 1959 and Lire 23,000 in 1958).

Boom Demand Continues for Swiss Chemicals with Record Sales in 1960

THE Swiss chemical and pharmaceutical industry last year marked up record sales. Exports amounted to more than S.Fr.1,560 million, and constituted 19% of Switzerland's total exports. About one-third of the industry's export sales were in Common Market countries, while members of E.F.T.A. absorbed about one-seventh. Germany was the leading market, followed by Italy, France and the U.K.

Exports of dyestuffs continued to increase, although at a somewhat slower rate than in 1959. As the industry's best customers continue to be other European countries, a failure to reach agreement between the two free trade blocs may force Swiss chemical companies to transfer some of their production lines to factories located in the Common Market.

Exports of pharmaceuticals showed a substantial increase. However, this does not mean that the industry has not to face any difficulties. Over the past few years the governments of many import-

ing countries have followed a policy of fixing prices at an arbitrary level; this development, which first became evident in underdeveloped countries, has now spread to many important industrialised nations. The increasing adoption of measures designed to protect domestic industry has left Swiss pharmaceutical firms no alternative but to renew their expansion of foreign subsidiaries.

In spite of intensive foreign competition exports of auxiliary chemicals for the textile, leather, paper, soap and plastics industries, registered a considerable increase. Expansion of facilities led in certain cases to surplus capacity which led to pressure on prices. Sales of insecticides declined somewhat, especially in Europe.

The Swiss plastics industry also exceeded the 1959 volume of business. Outlook for the industry remains bright since a number of new products which had recently been introduced appear to have found ready acceptance.

North-west I.Chem.E. Meeting and Dinner

In his address at the annual dinner of the North Western Branch of the Institution of Chemical Engineers, Prof. F. Morton referred to the painfully slow progress in the development of chemical engineering in the U.K. from the early days of the foundation of the Institution. The report in our 18 March issue (p. 455) gave the impression that Prof. Morton was referring to the present time, which was not the case. An amendment reached this office too late for the report to be corrected.

On the same page, the heading to the summary of the paper by Mr. K. B. Ross contains a typographical error which gives the impression that Mr. Ross had dealt with the subject of nuclear power supply in the U.S. As is made clear in the text, it was the already significant supply of electricity from nuclear energy in the U.K. that was discussed by Mr. Ross. Also in this report, it should have been stated that the U.K.A.E.A. had 18 reactor years' experience at Calder Hall and Chapelcross, not 18 years of operation. Calder Hall was only commissioned in 1956 and Chapelcross three years later.

Telcon Plastics Formed by B.I.C.C.

BRITISH Insulated Callender Cables Ltd. have formed a new company, Telcon Plastics Ltd. From 1 April 1961, this company, centred at Green Street Green, Orpington, will take over the entire range of activities of the Plastics Division of the Telegraph Construction and Maintenance Co. Ltd. It will continue the manufacture and development of all the plastics products with which the name Telcon is already associated.

The board of Telcon Plastics Ltd. will comprise: Mr. W. C. Smith, chairman; Mr. J. L. Fergus, general manager; Mr. D. Norman-Thomas, and Mr. H. F. Wilson. The company's secretary will be Mr. L. G. F. Sliney.

Obituary

Dr. Heinrich Bommer, vice-director of the Frankfurt-on-Main, West Germany, chemical and metals concern, Deutsche Gold- und Silberscheideanstalt AG (Degussa), has died at the age of 48.

Mr. J. V. Braddock, M.P.S., manager of Glaxo Laboratories bulk sales department, has died at Middlesex Hospital. He was 55. He joined Glaxo staff at the age of 29. In his earlier days with the company he became extremely well known in the north east of England as a Glaxo medical representative.

Dr. F. J. du Toit, leader of the South African trade mission to the Pacific area, has died suddenly after a heart attack in Bangkok, aged 64. He was a director of ISCOR, and chairman of SASOL (the world's largest oil-from-coal plant), and the Steel Sales Co. of Africa Ltd.

I.C.I. Billingham Chairman Warns of Expected Drop in Fertiliser Sales

WARNING that the wet autumn of 1960, which led to a big drop in the winter wheat acreage drilled, would make it almost impossible to recover this spring the setback to fertiliser sales, was given by Mr. W. J. V. Ward, chairman of the I.C.I. Billingham Division at a recent meeting of the divisional council. There were now very large stocks of fertilisers up and down the country and conditions would have to be very favourable if they were to match the record 1959-60 fertiliser year.

Meanwhile fertilisers of all types were still being dumped at prices well below those in the country of origin. Dumping, however, was on a lower scale.

Referring to the decision to seek cheaper sources of hydrogen for their ammonia, Mr. Ward said it was becoming impossible to make gas at an economic price from coke and the division would therefore go over to a process based on oil (see also p. 541).

Demand for methanol and urea had been subdued and export business had

been lost because Billingham Division could not compete on price. The next methanol expansion at Heysham was well advanced and should be on stream by the end of 1961.

Sales of liquid carbon dioxide had exceeded the previous year's record; competition from other producers remained severe.

Although the car recession had affected H.O.C. Works and Plastics Works at Billingham, 1960 turnover for plasticiser alcohols had risen by 18%. H.O.C. overseas sales had risen by more than 50% and the Heavy Organic Chemicals Division was still the world's largest exporter of certain plastics raw materials.

At Mossend Works, output of ammonia was a record in 1960, while Prudhoe also had new records in December and January for the production of ammonia and ammonium sulphate.

Mr. Ward did not expect that Billingham Division would play a major part for the time being in I.C.I.'s projected £100 million facilities at Rotterdam.

Dicalite Filteraids Now Available in Europe

BIG cuts in filtration costs have recently been made possible by the commissioning of a new plant at Ghent, for the production of perlite filteraids, by Dicalite Europe Nord, a subsidiary of Great Lakes Carbon Corporation. The plant incorporates modern manufacturing and control techniques to ensure a consistent high product standard. Dicalite perlite filteraids are marketed in the United Kingdom by F. W. Berk and Co. Ltd., Berk House, 8 Baker Street, W.1.

When crushed and heated under proper conditions, perlite expands to 20 or more times its original volume. Further treatment produces a mass of irregular fragmented particles which interlock to form a virtually incompressible filter cake of 80% to 90% void space, capable of screening particles of less than one micron in size.

An outstanding characteristic of Dicalite perlite as a filteraid is that in many cases it is possible to use 25% less

filteraid than with conventional diatomaceous earth, without any reduction in filtering capacity. In addition, it has proved remarkably efficient in filtering liquids containing a high percentage of dispersed solids. Due to the unusual physical characteristics of its particles, Dicalite perlite is highly resistant to cracking when applied as a pre-coat on rotary vacuum filters. It is essentially inert, insoluble except in strong acids and alkalis, tasteless and odourless.

Control of particle size range and distribution, which affect flowrate and clarity performance, gives the basic differences between the three grades of Dicalite perlite which are now available. Mean particle sizes range from 5 to 11 microns, with relative flowrates from 60 to 130. Filter cake density is controlled at the level found to be optimum for most effective performance, and in general lower than that of diatomite filteraids of comparable flowrates.

A. & W. Ship Makes First Portishead Call

The m.v. 'Arthur Albright' docked at the Albright and Wilson Group phosphorus plant at Portishead last week—the largest in the U.K.—with a cargo of phosphate rock from Tampa



● **Mr. R. J. Brodie** has been appointed general manager of the Howden, Yorks, works of Anderson-Richardson Fertilisers Ltd., whose expansion projects are described in 'Project News', p. 541.

● Directors have now been announced for CIBA United Kingdom Ltd., 96 Piccadilly, London W.1, the company newly formed to co-ordinate the activities of the CIBA group of companies trading in U.K. Chairman is **Dr. Dr. h.c. R. Kämpeli** (Swiss); managing director, **Sir Arthur Vere Harvey, C.B.E., M.P.**; and **Dr. A. Brunner** (Swiss) and **Sir Joseph Napier, Bt.**, have also agreed to join the board. (For details of the new company see CHEMICAL AGE, 18 March, p. 464).

● **Mr. H. W. G. Hignett** and **Mr. Jean M. Dhavernas** have been appointed directors of The International Nickel Company (Mond) Ltd., Thames House, Millbank, London S.W.1. Mr. Hignett remains managing director of Henry Wiggin and Co. Ltd. Mr. Dhavernas is located in Paris and has been closely concerned for many years with nickel markets on the Continent.

● Three new appointments for Boots Pure Drug Co. Ltd. are those of **Mr. R. C. M. Dickson**, a board member since 1959, who becomes retail director, while **Mr. Henry J. Fraser** and **Mr. B. Jefferies** have joined the executive committee of management. Mr. Fraser, Scottish area director, will take over Mr. Dickson's

PEOPLE in the news

post as London director. Mr. Fraser is a member of the Pharmaceutical Standing Committee and the Pharmaceutical Advisory Committee.

● **Dr. Adolf Steinhöfer**, director of Badische Anilin- und Soda-Fabrik AG, Ludwigshafen-on-Rhine, and Prime Minister of the State Government of Baden-Württemberg, has been made an hon. professor of the natural science-mathematics faculty of Heidelberg University.

● **Mr. T. J. Woodthorpe, F.R.I.C.**, works manager at Gosport, Hants, has been elected to the board of Cyanamid

of Great Britain Ltd., Bush House, Aldwych, London W.C.2. Aged 47, he has been in charge of the company's production facilities for the past seven years. He supervised the recent plant installation and start-up of a large-scale fermentation unit for antibiotic production and a general chemicals plant for producing melamine crystal at Gosport. A biochemist, Mr. Woodthorpe worked, in 1944, on the research and production of penicillin for the Wellcome Foundation. He was concerned in particular with the development of the manufacturing process of the antibiotic Polymyxin. From there, he went to Australia as works



T. J. Woodthorpe

manager of the Burroughs Wellcome plant in Sydney, N.S.W., later joining Cyanamid of Great Britain to become works manager at Hirwaun, Wales.

● **Mr. H. J. Penn** has been appointed chairman and **Mr. F. W. Tomlinson** deputy chairman of Murex Ltd. and Murex Welding Processes Ltd, following the recent death of Sir Arthur Smouth. **Mr. H. C. Green** has become managing director of Murex Ltd. and **Mr. J. M. Willey** managing director of Murex Welding Processes.

● **Lord Cohen of Birkenhead** has been elected president of the National Society for Clean Air, in succession to **Sir Hugh Beaver**, chairman of the Government Committee whose report in 1954 led to the passing of the Clean Air Act.

● **Mr. E. F. Choppen** is to rejoin the board of Esso Petroleum Co. Ltd. on 4 April after a year with Standard Oil (New Jersey). He joined Esso 31 years ago as a chemist and was appointed a director in 1959. **Mr. L. B. Johnson**, who has also been appointed a director of Esso from 4 April, has been European financial representative for Standard Oil (New Jersey), resident in London since 1957.

● **Mr. G. T. Britton**, deputy commercial works manager at I.C.I. Billingham Division since 1956, will on completion of a special study in the technical department, become Casebourne works manager in succession to **Mr. C. C. Skou** who is to retire in December. Mr. Britton will be succeeded by **Mr. C. V. W. Brook**, deputy division distribution manager, whose post will be filled by **Mr. H. R. Hunter**. **Mr. D. M. Grudgings**, Clitheroe works manager, who moves to Heysham Works as gas section manager on 24 April will be succeeded by **Mr. C. T. Y. Cowie**, ammonia section manager. **Mr.**

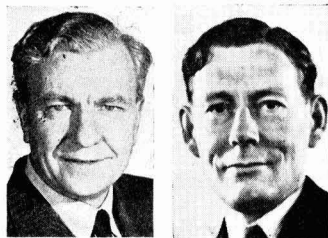
(Continued on page 554)

I.C.I. Main Board Changes Follow Dr. Beeching's Railways Appointment

MR. HAROLD SMITH, who is to succeed **Dr. Richard Beeching** as technical director on the main board of Imperial Chemical Industries Ltd., has been with I.C.I. since 1929 and is now chairman of the General Chemicals Division. From 1 June, Dr. Beeching takes over as chairman of the new British Railways Board and until then will be a part-time member of the British Transport Commission. Mr. Smith, who holds a B.Sc. (chemistry) and M.Sc. (chemical engineering), joined I.C.I. in the research department, Dyestuffs Division, at Manchester. Later he served with the production department and became assistant works manager of the division. In 1950 he headed the division's production department, and became production director in 1952.

Mr. Smith became managing director

of the General Chemical Division in March, 1957, and two years later became the division's chairman. He is a past chairman of Plant Protection, Ltd., and



Dr. J. S. Gourlay Mr. M. J. S. Clapham

a member of the board of I.C.I.'s American subsidiary, Arnold Hoffman, Inc.

His new post as technical director becomes operative on 1 June, and his position as a director of I.C.I. from 23 March.

Mr. M. J. S. Clapham, chairman of I.C.I. Metals Division, succeeds **Dr. J. S. Gourlay** as an I.C.I. overseas director, Dr. Gourlay becoming a Group 'A' director, alkali and general chemicals. Mr. Clapham joined I.C.I. Metals Division in 1938, was seconded to Tube Alloys (Atomic Research) during the war, and became division chairman in January last year.



Dr. R. Beeching



Harold Smith

Commercial News

British Enka

Group net loss of £40,088 compared with a net profit of £243,093, has been recorded for 1960 by British Enka Ltd. No dividend is being paid, as in 1959. Overseas competition forced cuts in tyre yarn prices during 1960 and demand has also fallen. Because of the company's changed circumstances, plans for the production of nylon-6 have been revised (see 'Project News', p. 541). The parent company, Algemene Kunstzijde de Unie, Arnhem, is investigating the whole range of British Enka operations to see what steps should be taken to make the business profitable. Production of transparent paper is not expected to contribute any profits before the end of the second half of next year.

Annual meeting will be held at 20 Aldermanbury, London E.C., on 2 May at 10 a.m.

Hickson and Welch

At the annual meeting of Hickson and Welch (Holdings) Ltd. held in London on 24 March, Mr. Bernard Hickson, chairman and managing director, said that group turnover for the first four months of the current financial year had been maintained, but as was general in the trade profits margins were lower. In spite of that he looked forward to the maintenance of dividends at the present rates.

I.C.I.

I.C.I. group sales to customers at home and abroad during 1960 were valued at £558 million, a 9.7% rise on the 1959 figure of £509 million. Group pre-tax income totalled £88,044,000 (£73,116,000) a rise of 20.4%, after depreciation of £37.2 million (£33.1 million) and profit-sharing £8.5 million (£7.1 million). After tax of £40,472,000 (£31,531,000), group income rose by 13.6% to £47,572,000 (£41,585,000). Group income applicable to I.C.I. was £45,194,000 (£39,315,000), while the parent company's income was £39,700,000 (£33,856,000). The f.o.b. value of exports from the U.K. in 1960 rose by 10.4% to £96.6 million (87.5 million).

Final dividend of 1s 6d is to be paid on ordinary, as forecast, making with the interim of 1s 3d, a total of 2s 9d (2s 3d) for the year. The annual meeting will be held at Wigmore Hall, Wigmore Street, London W.1, on 18 May.

B.P.-California

B.P. California Ltd., the company formed to produce *o*-xylene (9,500 tons), *p*-xylene (11,000 tons) and ethylbenzene (8,100 tons) at the Isle of Grain, Kent, has now been registered as a private company with a capital of £500,000 in 250,000 'A' and 250,000 'B' shares. Subscribers are the British Petroleum Co. Ltd., who hold 75,000 'A' and California Chemical S.A., Geneva, a sub-

- British Enka May Explore New Fields
- I.C.I. Increase Group Sales Nearly 10%
- Geigy AG to Raise New Capital
- Shawinigan Sales Up, Earnings Down

sidary of California Chemical (owned by Standard Oil of California), who hold 75,000 'B' shares. Both companies have the right to appoint and remove four directors.

Secretary of the company, which has its registered office at Britannic House, Finsbury Circus, London E.C.2, is Mr. Thomas MacDonald of B.P.

African Explosives

Tororo Industrial Chemicals and Fertilizers, associated with Uganda Development Corporation, have signed a managing agency agreement with African Explosives and Chemical Industries (East Africa) which will initially run until the end of 1967. After that year it will be renewed on a yearly basis.

Canadian Chemical Co.

Annual report of Canadian Chemical Co. Ltd. for 1960 shows net sales of \$27,685,468 (\$26,272,766). Net income was \$2,674,264, or 53 cents/share (\$3,319,005, or 66 cents/share). The increase in sales was not sufficient to offset higher costs. Increasing competition reduced some sales margins and earnings in the second half of the year were affected adversely by the recession in some sectors of North American business activity. Part of the increase in costs is attributed to some interference with current operations because of construction work which was in progress at the Edmonton plant throughout the year. The resulting plant expansion, which will increase the maximum output of primary petrochemicals by about 40%, came into operation last February.

General Aniline

General Aniline and Film Corporation, U.S., report record sales for 1960 of \$159,800,000 (\$159,000,000) and a net profit of \$7,200,000 (\$7 million), or \$9.00 (\$8.83) per 'A' share. General Aniline spent some \$6,900,000 on research and development in 1960.

J. R. Geigy

J. R. Geigy AG, Basle, announce a 1960 net profit of S.F.11,760,000 (S.F.10,490,000); a gross dividend per share of S.F.120 on a capital of S.F.30 million is proposed. It is planned to raise capital to S.F.36 million on a one-for-five basis.

World turnover of the Geigy Group last year reached some S.F.865 million, or 17% up on 1959. Geigy exports rose by 18%, as compared with an increase for the Swiss chemical industry as a whole of 16%. Some 34% of the company's exports went to the Common

Market and 13% to members of E.F.T.A. In 1960 new overseas subsidiaries were formed with the names of Geigy Mexicana S.A. and Geigy (Chile) S.A.C. The Geigy Chemical Corporation, U.S., are undertaking plant expansion at Ardsley, New York, Cranston, Rhode Island and McIntosh, Ala.

Pechiney

Péchiney propose an unchanged dividend for the 1960 financial year of 9½ plus the issue of one share for each 20 shares. Turnover in 1960 was N.F.963 million, or 22½% more than in the previous year, while a turnover of N.F.1,100 million is expected in 1961. Volume of sales increased by some 20% and sales prices by 2½% over last year. Export sales made up 30½% of the total turnover; they stood for the year at N.F.281 million (N.F.250 million). Chemical sales also rose by 27%.

Shawinigan Chemicals

Shawinigan Chemicals Ltd. and their subsidiaries, Shawinigan Products Corporation, New York, Shawinigan Ltd., London, and the McArthur Chemical Co. Ltd., had higher consolidated sales in 1960, but net earnings amounted to \$1,845,896 or 4.8% below 1959. A strike early in the year and expenses connected with the commissioning of new plant contributed to higher costs, and this was followed by a sharp cut in selling prices, particularly in the plastics field, during the last quarter, with the result that profit on operations was reduced 23% compared with 1959.

Highlights of the year included: start-up of a new sodium cyanide plant at Shawinigan after some years of original research.

Among associated companies, earnings of B.A.-Shawinigan Ltd. in Montreal East showed a modest increase and the company completed a third increase in plant capacity for phenol and acetone and started a fourth; earnings of Shawinigan Resins Corporation, Springfield, Mass., were improved over 1959; and Hedon Chemicals Ltd. in the U.K. reported markedly higher sales and earnings.

Rexall Drug

Record sales and earnings for 1960 are reported by Rexall Drug and Chemical, U.S. Sales rose 6.8% to \$242,557,169 (\$227,015,721), while net earnings were up 6.9% to \$9,359,694, or \$2.33/share (\$8,753,194, or \$2.30/share). Another good year is expected for 1961, despite heavy expenses with the company's chemical programme and foreign activities.

TRADE NOTES

Agent for Harmon Colours

Kingsley and Keith (Chemicals) Ltd., Rex House, 38 King William Street, London, E.C.4, have been appointed sole distributors for the Harmon Colour range of inorganic pigments produced in the U.S. by the parent company, Allied Chemical. Recently Harmon have developed a number of highly specialised light fast pigments which have outstanding heat resistance and brilliance.

Pigments which are of special interest to the plastics industry include Indofast brilliant scarlet, Indofast yellow greenish lake, Indofast orange, Thio fast red, Quindo magenta and Indofast violet. Further specialities of the range are the concentrated dry dispersions of these pigments in p.v.c., cellulose acetate or other resins. Use of these dispersions can overcome problems in the colouring, for example, of rigid p.v.c. or in other similar difficult applications.

Flexibox in Holland

As part of a drive to improve export business, the Flexibox organisation is to form a new company—Flexibox N.V.—to handle sales of Flexibox mechanical seals in the Benelux countries. The new firm has been formed jointly by Flexibox Ltd. and their parent Dutch agents, Technisch Bureau Vaillant and Sluiterman. They will operate from Noorsinde 18a, The Hague.

Dutch Resins and Pigments

F. W. Berk and Co. Ltd., 8 Baker Street, London W.1, are now able to supply the products of the Dutch associated firms Kunstsharsfabriek Synthese N.V., and Remmert-Holland N.V. Kunstsharsfabriek Synthese produce a full range of synthetic resins for surface coatings, printing inks, etc., under the trade names Setal (alkyd and epoxy ester), Setaliet (pure and modified phenolic), Setamine (urea and mela-

mine) and Setarol (polyester). A range of polyester pigment pastes and H.D. nitro-cellulose chips is also available.

Remmert-Holland produce a complete series of dry inorganic and organic pigments, and water-dispersible pastes for colouring all types of emulsion paints.

The Dutch companies operate interlocking resin and pigment research laboratories where balanced recommendations can be made for the solution of manufacturing or application problems. The Remmert standard report covers tests of tinting strength, covering power, light fastness and shade matching of customers' samples against comparable Remmert pigment.

Surface Active Agent

A technical data sheet on Creto cationic surface active agent has been published by Croda Ltd., Snaith, Goole, Yorks. Creto, a quaternary ammonium compound, is a non-bactericidal product. In its capacity as an antistatic agent, it can be used to prevent static build up on many plastics article surfaces. It can also be used as a permanent antistatic by blending with some polymers before they are moulded.

Copolymer Emulsions

Vinamul N6815 has been added to the standard range of vinyl acetate: 2-ethylhexyl acrylate copolymer emulsions produced by Vinyl Products Ltd., Butter Hill, Carshalton, Surrey. All three members of the range are now in regular bulk production. A new service bulletin, No. 6, dealing with emulsion paints based on the Vinamul N6800 range, has been published.

TEL Consumption Rise

U.K. consumption of tetraethyl lead in January totalled 2,292 tons, compared with 1,964 tons in January 1960.

People in the News

(Continued from page 552)

G. H. Pace, gas section manager, Heysham, has been moved to Billingham technical department.

● **Mr. Edward F. Beyer, Jr.**, has been appointed a vice-president of the Overseas Chemical Division of W. R. Grace and Co., New York. He will fill a new position which is the result of the expansion of the activities of the division and will be responsible for liaison with the parent company, the domestic divisions of the Chemical Group, and the Overseas Chemical Division's headquarters in Cambridge, Mass. Mr. Beyer will be located at Grace headquarters at 3 Hanover Square, New York 4.

T. B. Clark, new joint managing director of I.C.I. Heavy Organics Division. Owing to an error in transmission, the illustration in C.A., 18 March, p. 462, was of Dr. J. Clark, of the I.C.I. overseas department



● **Mr. F. L. Waring**, managing director of the Coalite group of companies, has been elected chairman of the Association of Chemical and Allied Employers. A past chairman of the Yorkshire Section of the Institute of Fuel and the immediate past-president of the Association of Tar Distillers, he was also recently elected vice-chairman of the Chemical and Allied Industries Joint Industrial Council.

Draft Common Names for Pesticides

Draft common names recently submitted for comment by the British Standards Institution include the following: 'barban', 4-chlorobut-2-ynyl N-(3-chlorophenyl)carbamate; 'diallate', S-2,3-dichloroallyl N,N-diisopropylthiocarbamate; 'endosulfan', chlorosulfodan, 'chlorsulfoden' or 'chlortricyclen', 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzo[e]dioxathiepine 3-oxide.

DIARY DATES

THURSDAY 6 APRIL
R.I.C.—Chatham: Medway Coll., Maidstone Rd., 7.0-7.30 p.m. 'Isotopes in industry', by W. G. Bushbridge.

S.A.C.—London: Feathers, Tudor St., E.C.4, 6.30 p.m. Discussion, 'Principles involved in collaborative studies'.

S.C.I., R.I.C. & Plastics Inst.—Southampton: Univ., 7.30 p.m. 'Recent developments in Delrin', by Dr. G. F. C. Barrett.

FRIDAY 7 APRIL
S.C.I.—London: 14 Belgrave Sq., S.W.1, 6 p.m. 'Present trends of development in chemicals from petroleum in France', by P. A. Laurent.

Market Reports

FERTILISER DEMAND STILL AT HIGH LEVEL

LONDON While active trading conditions have been maintained in most sections of the industrial chemicals market the movement of supplies to users has contracted with the approach of the Easter holiday. At the time of this report prices are unaltered and steady. The demand for fertilisers has continued at a high level and pressure for deliveries is likely to be experienced during the coming weeks.

The position of the coal tar products is little changed and the market is firm.

MANCHESTER While there has been little falling off in the demand for heavy chemicals, quieter trading conditions are, as usual, anticipated over the period covering the Easter break. Leading industrial users in the home section are already mostly well covered for supplies

over the second quarter. The textile and allied industries and other industrial outlets are taking steady deliveries of a wide range of products and generally satisfactory reports are forthcoming regarding the demand on overseas account, particularly for dyestuffs, plastics, and pigments. Quotations are held pretty well throughout the range.

SCOTLAND Not a great deal of change has taken place during the past week in the Scottish heavy chemical market. In some sections a slight falling off in demand can be reported, whilst on the other hand some have been fully maintained. The export market is still providing reasonable interest, although there is room for improvement. The activity in agricultural chemicals is now showing improvement particularly in demands for the coming season.

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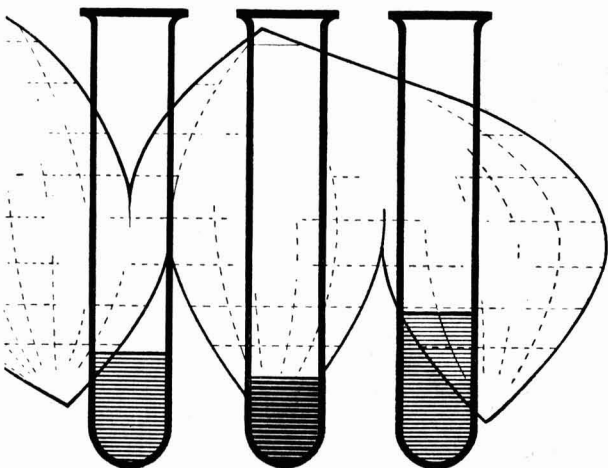
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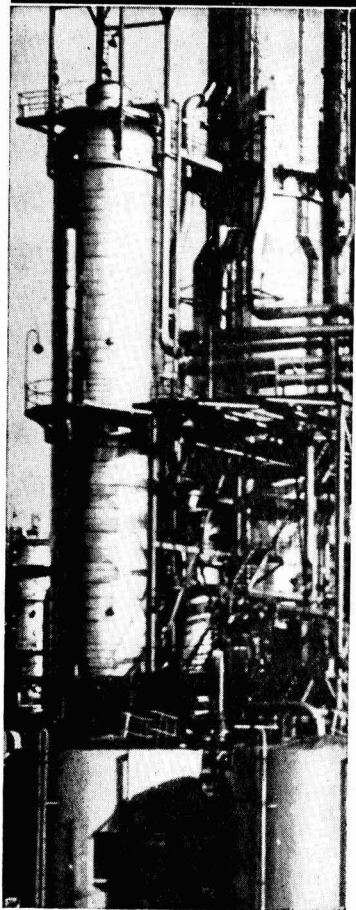
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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any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

ACCEPTANCES

Open to public inspection 26 April

- Steroids Ormonoterapia Richter S.p.A. **866 565**
Preparation of diborane. National Distillers & Chemical Corp. **866 522**
Foam suppressing compositions. Williams, W. P. (Socony Mobil Oil Co. Inc.) **866 447**
Synthetic fibres. Union Carbide Corp. **866 390**
Process for the production of monomeric neutral esters of phosphorus having a co-ordination number of 3. Farbenfabriken Bayer AG. **866 566**
Oxidation of acrolein dimer. International Minerals & Chemical Corp. **866 391**
Pharmaceutical compositions containing endocellular particles derived from foetal tissue. Laboratories Millot, Velley, G. C., and Mous-salli, M. **866 483**
Process for the production of elastomeric plastics. Farbenfabriken Bayer AG. **866 392**
Organotin compounds. Metal & Thermit Corp. **866 484**
Ammonium nitrate. Canadian Industries Ltd. **866 393**
Process for the selective hydrogenation of acetylene. Dow Chemical Co. **866 637**
Process for the copolymerisation of esters containing unsaturated fatty acid groups. Shell Internationale Research Maatschappij N.V. **866 485**
2-Halo-1,4-quinones. Farbenfabriken Bayer AG. [Divided out of 866 434.] **866 435**
Optically active quinolizine and a process for the production thereof. Wander AG. **866 394**
Process for the manufacture of vitamins of B₁₂ group. Hoffmann-La Roche & Co. AG. **866 488**
Process for the selective hydrogenation of unsaturated compounds present in C₄-fractions. Farbenfabriken Bayer AG. **866 395**
Isocyanate compositions having stability against discoloration. Du Pont de Nemours & Co., E. I. **866 396**
Desulphurisation of heavy petroleum oils. Esso Research & Engineering Co. **866 397**
Elastomer recovery process. Shell Internationale Research Maatschappij N.V. **866 490**
1,2,6-Substituted piperidones-(4) and the salts thereof. Boehringer & Soehne GmbH, C. F. **866 448**
Preparation of cyano compounds. Shell Research Ltd. **866 344**
Preparation of vitamin A intermediate. Nopco Chemical Co. **866 398**
Impact-resistant rubbery graft polymers and blends. Goodyear Tire & Rubber Co. **866 667**
Ether-acetals and a process for the manufacture thereof. Hoffmann-La Roche & Co. AG, F. [Divided out of 866 692.] **866 693**
Denaturing of potable alcoholic liquids. Smith Ltd., T. & H. [Divided out of 866 604.] **866 605**
- Open to public inspection 3 May**
Process for the purification of titanium tetrachloride or zirconium tetrachloride. Laporte Titanium Ltd. **866 771**
Catalytic reforming of hydrocarbons. British Petroleum Co. Ltd., Moy, J. A. E., and White, P. T. **867 182**
Preparation of titanium carbide from low-grade titanium ores. Union Carbide Corporation. **867 204**
Azo-dyestuffs of the benzene-azo-2,3-hydroxy-naphthoic acid amide series, insoluble in water and process for their manufacture. Farbwerke Hoechst AG. **866 781**
18-Nor-steroids and D-homosteroids. Ciba Ltd. **867 208**
Method of producing N-substituted products of 2, 4-diamino-1, 3, 5-triazine. Groth, L. [Addition to 794 398.] **867 226**
Sulphonamides and preparations containing them. Ciba Ltd. **866 785**
Manufacture of hydrocyanic acid. Compagnie De Saint-Gobain. **867 227**
Chloramphenicol compositions with reduced toxicity. Vilax, J. E. **866 787**
Process for preparing physiologically effective salts of the aminoalkyl derivatives of homophenothiazine. Protiva, M., and Hach, V. **866 791**
Production of phthalocyanine colouring matters. General Aniline & Film Corporation. **867 035**
Azo-dyestuffs and their copper complex complex compounds. Farbenfabriken Bayer AG. **866 914**
Production of polyacrylonitrile filaments. American Cyanamid Co. **866 982**
Art of producing acrylonitrile polymers. American Cyanamid Co. **866 983**
Process for the preparation of gluconic acid monohydrate. Koninklijke Industriële Maatschappij Vorheen Noury & Van Der Lande N.V. **867 183**
Process for the production of dialcohols. Ruhrchemie AG. **867 229**
Process for the production of dimethylols. Ruhrchemie AG. **867 230**
Process for the purification of a hydrogen-containing gas. Lindes' Eismaschinen AG. Ges. **866 919**
Dyeable polymeric products and their preparation. Montecatini Soc. Generale Per L'Industria Mineraria E Chimica. [Addition to 810 023.] **866 920**
Process for the manufacture of quaternary phosphonium compounds. Farbwerke Hoechst AG. **866 926**
Manufacture of polymeric materials. Imperial Chemical Industries Ltd. **867 234**
Method for producing copolymers of non-conjugated drying and semi-drying oils. Etablissements Robbe Freres. **867 275**
Manufacture of polymeric materials. Imperial Chemical Industries Ltd. **867 235**
Process for the preparation of norcamphidine and its 2-substituted homologues. Knoll Aktiengesellschaft Chemische **866 802**
Polymerisation. Du Pont de Nemours & Co., E. I. **866 768**
Process for the manufacture of tetrafluoro-benzoquinone-1,4. Farbwerke Hoechst AG. **866 810**
Stabilised halogen containing polymers. Farbenfabriken Bayer AG. **866 936**
Cyclic olefines. Studiengesellschaft Kohle. [Addition to 848 951.] **867 016**
Piperazine salts. Pfizer & Co. Inc., Chas. **866 815**
Removal of acetylene from air. Engelhard Industries Inc. **866 816**
Insecticidal compositions and phosphorylvinyl phosphates for use therein. Monsanto Chemical Co. **866 817**
Catalytic reforming of petroleum hydrocarbons. British Petroleum Co. Ltd., Porter, F. W. B., and White, P. T. **867 185**
Treatment of polyethylene and like polyolefins. Grace & Co., W. R. **866 819**

- Solvent compositions, and resin solutions and compositions comprising resins dissolved in solvent compositions. American-Marietta Co. **867 278**
Fluorocarbon substituted triazines and condensates thereof. Minnesota Mining & Manufacturing Co. **867 279**
Non-blocking polymeric mono-olefin compositions. Union Carbide Corp. **867 280**
Composition for combating rodents, particularly rats and other noxious animals, and a process of preparing the said composition. Bakteriologisch Laboratorium Ratin A.S. **866 837**
Sulphonamides and method for preparing same. Ciba Ltd. **866 838**
Synthetic protein-lipid complex and method of producing same. British Glues & Chemicals Ltd. **867 190**
Catalyst and method of manufacturing same. Kralovopolska Strojirna, Zavody Chemickyh Zariadeni, Narodni Podnik Brno. **867 247**
Siloxane elastomers. Imperial Chemical Industries Ltd. **866 998**
Pyrimidines. Imperial Chemical Industries Ltd. **866 842**
Sulphonamidopyrimidines. Imperial Chemical Industries Ltd. **866 843**
Vinyl chloride copolymers. United States Rubber Co. **866 846**
Method for the preparation of nitro-triphosphoric acid esters. Benckiser GmbH, Joh. A. **867 195**
Production of anhydrous barium chloride. Magnesium Elektron Ltd. **867 196**
Di-1,2,3,4-diepoxybutane and method for the production thereof. Abildgaard, K. **867 197**
Fungicidal compositions. Bataafse Petroleum Maatschappij N.V. **867 285**
Manufacture of organic orthosilicates. Imperial Chemical Industries Ltd. **866 766**
Process for the production of trans-1, 2-dihalo-genoethylenes. Knapsack-Griesheim AG. **867 198**
Production of anhydrous sodium sulphate. Badische Anilin- & Soda-Fabrik AG. **867 199**
Method of oxygen recycle in ozonisation. Tovo Koatsu Industries Inc. **867 152**
Crystalline methylstyrene polymer and method of making same. American Cyanamid Co. **866 760**
Stabilisation of polyester fibres to ultra violet light. General Aniline & Film Corp. **867 262**
4-Meta-hiazanone-1-oxides. Sterling Drug Inc. **866 761**
Production of ballast-free potassium ammonium nitrate. Badische Anilin- & Soda-Fabrik AG. **866 856**
Manufacture of low-pressure polyolefins. Petrochemicals Ltd. **867 027**
Condensation products and process for producing them. Farbenfabriken Bayer AG. **867 156**
Manufacture of thermoplastic materials. Shell Internationale Research Maatschappij N.V. **867 028**
Nitro dyes for keratinic fibres. Soc. Monsanto-L'Oreal. **867 220**
Imidazole dyestuffs of the anthraquinone series and their production. Badische Anilin- & Soda-Fabrik AG. **867 160**
Polymerisation. Koppers Co. Inc. **867 161**
Production of 2,5-diarylamino-3,6-dihydroterephthalic acid esters. Badische Anilin- & Soda-Fabrik AG. **866 762**
Process for preparing 3-nitro-azocyclo-alkanone-2-N-carbochlorides. Stamicarbon N.V. **867 268**
Preparation of α -nitrolactams. Stamicarbon N.V. **867 269**
Halogenation of synthetic rubber in latex form. Esso Research & Engineering Co. **866 878**
Method of polymerisation of vinyl esters. Kurashiki Rayon Kabushiki Kaisha. **866 881, 866 882**
Polymeric materials comprising low-pressure polyolefins. Petrochemicals Ltd. [Addition to 803 557.] **866 883**
Process for the manufacture of aliphatocephal and its acetate. Hoffmann-La Roche & Co. AG., F. **867 166**

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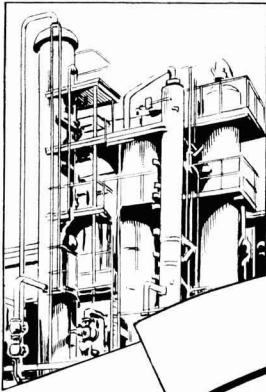
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