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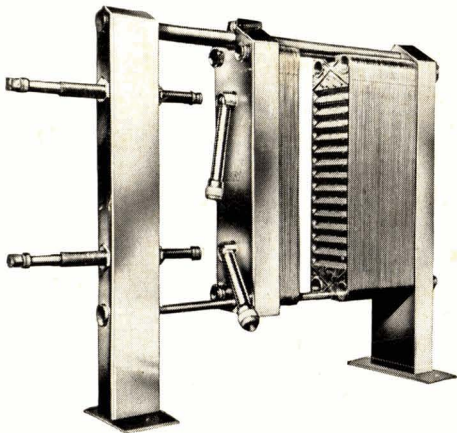
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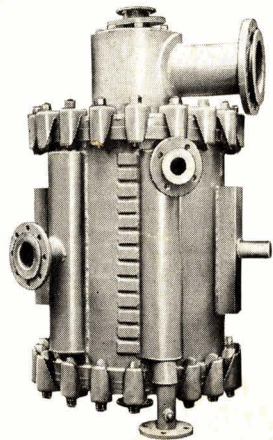
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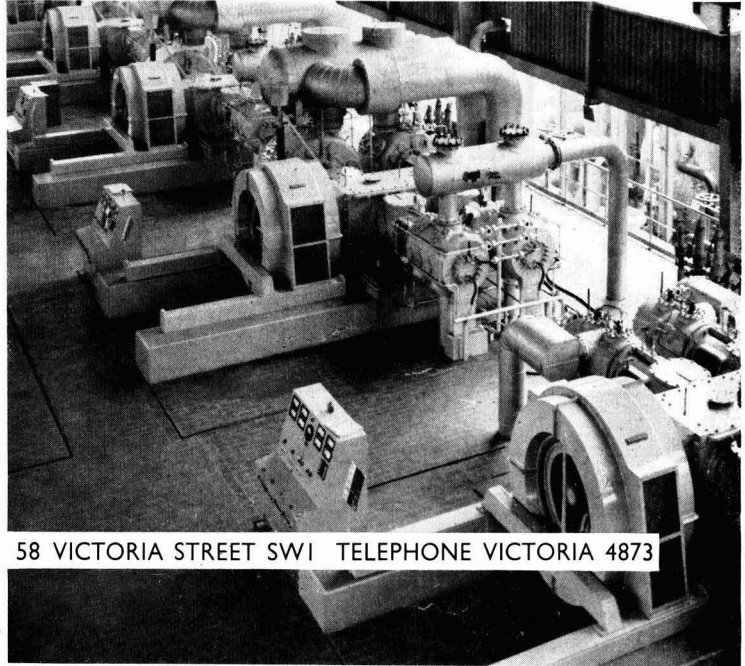
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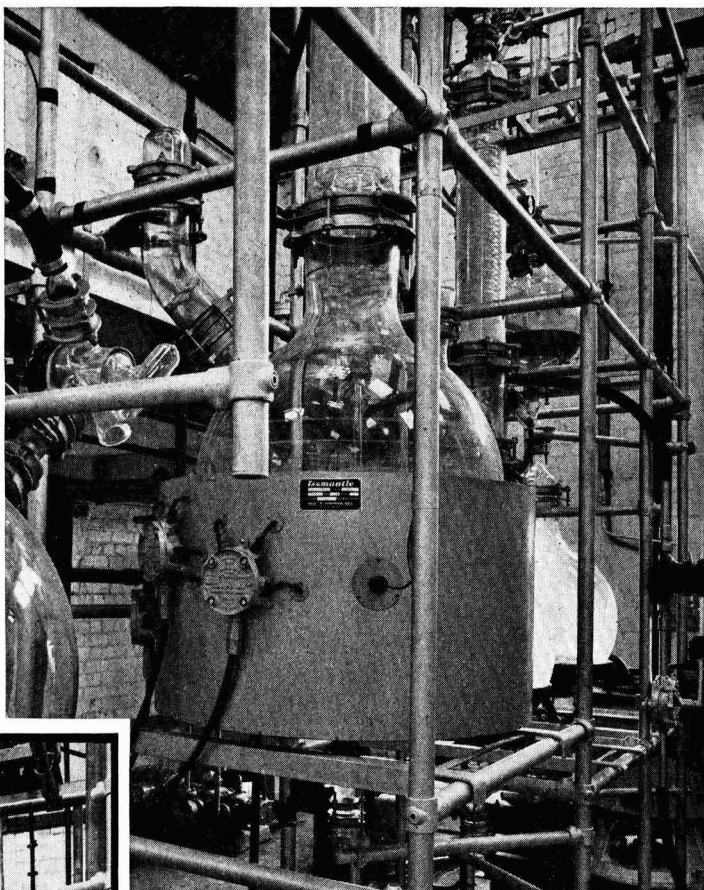
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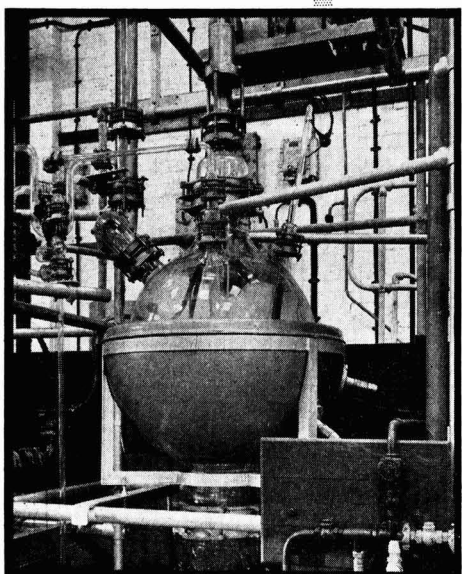
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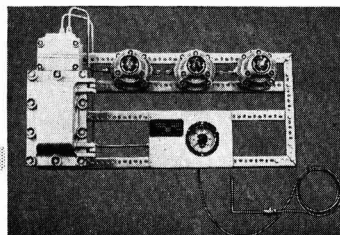
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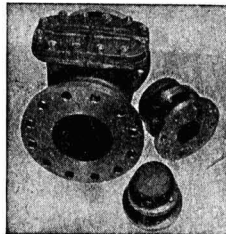
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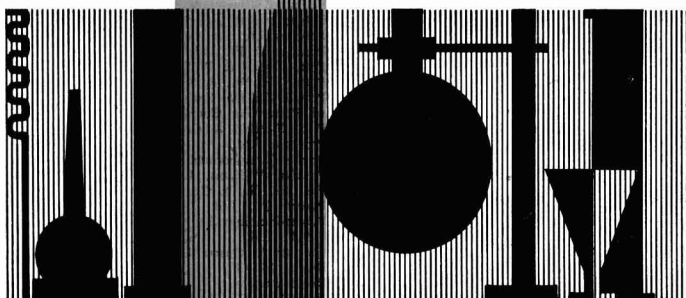
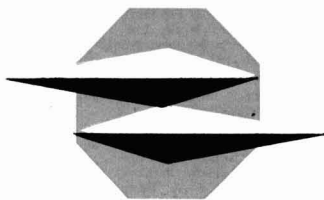
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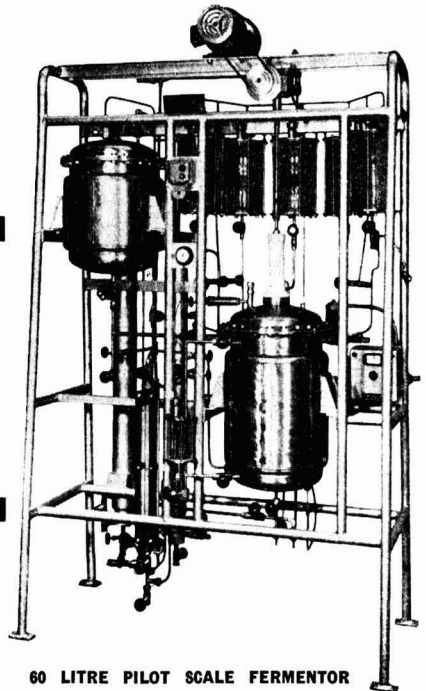
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OUTLOOK FOR OIL

LIKE the chemical industry, oil companies operating in Britain found increasing competition in 1961 with profit margins generally reduced. The prospect for the immediate future is shadowed by the entry of new companies both in refining and marketing.

The long-term view, however, is one of expansion. 'Shell' Transport and Trading and Esso Petroleum, both of whom published their annual reviews last week, are optimistic of future trends in the use of energy. Shell believe that a 100% rise in the use of oil over the next 15 years is likely. The demand will therefore be for an additional 20 million barrels of finished products a day, or an extra 1,000 million tons of oil a year.

To meet such a huge demand will call for a flexible approach on the part of the big oil companies, particularly since the next year or two are likely to be highly competitive. Shell expect that expansion to meet this long-term rise in doubling of demand will call for expenditure of more than £80,000 million, of which £20,000 million is likely to be spent over the next five years.

There is no doubt that a great deal of this money will be spent on new U.K. refineries and pipelines, for while part of the expanded output can be met by expansion, a number of large fully-integrated refineries will doubtless be required. Regent Refinery will provide the first refining competition for the established companies with their fully-integrated large scale Welsh project. All the indications are that Regent and their U.S. parents will push ahead rapidly with this refinery.

Last year saw a slow-down in expansion of oil consumption which had a world total of 1,120 million tons, a rise of 70 million tons, or 6.5%. Demand for oil in the U.K. rose by 7%, while consumption in Europe was up by some 13%. Consumption of natural gas also increased faster last year than demand for total energy. In North America, natural gas already satisfies 30% of the energy market. Elsewhere its development is still at an early stage, but a rise of more than 20% in total sales was recorded by Shell in 1961.

The discovery of major new oil fields in the Sahara and Libya and the activities of new producers in a number of areas have substantially increased the potentially available crude oil so that in spite of the overall picture of rising oil consumption, the industry throughout the world has been faced with an abundance of crude oil seeking markets. This, with an excess of tanker tonnage and of refining capacity has depressed earnings.

The Soviet Union's vigorous efforts to find markets in Europe both for crude oil and products has aggravated the situation.

In many parts of the world, the oil industry has integrated into chemicals, attracted by vast markets and a cheap, captive supply of raw materials. This with the chemical industry's own moves into petrochemicals on a large scale has helped to create vast over-capacities. Both oil and chemical producers in this country are currently having second thoughts and projects are being delayed or postponed until rising demand helps to mop up more surplus capacity and until a wider European market is available. Programming of new plants is now vital if the worst evils of over-production are to be avoided; this is where the National Economic Development Council could play a valuable part.

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Hoechst sales and profits up— big expansions completed

DURING 1961 Farbwerke Hoechst AG recorded a turnover of DM2,876 million, or £255 million, a rise of 6.4% over 1960, quantitative sales having risen by some 11% over the year. Hoechst had a 1961 share of 12% (11.7%) in total West German chemical production. Last year's Hoechst export sales were of some DM911 million (£50.9 million) or 14% of total West German chemical exports.

Hoechst investments in 1961 totalled DM446 million, of which some DM230 million were financed by depreciation. In 1962 it is planned to spend some DM400 million on investments. Some DM120 million were spent on research last year; almost 200 new products have been introduced to the company's programme over the past three years, while 45% of all 1961 turnover came from the sale of products developed over the past 10 years.

Hoechst's net profit in 1961 was of DM126 million, or £11.2 million (1960: DM107,300,000 or £9.5 million). As previously reported a 1961 dividend of 18% (same) and a raise in capital from DM700 million to DM770 million is recommended.

All branches of production were concerned last year in the increase of turnover. For the first quarter of 1962 turnover is above that for the corresponding 1961 figure, despite a poor development in the fertilisers field. For 1962 as a whole a further turnover increase is expected.

Capacity developments

Capacity developments in Hoechst's German plants include the following: the running on stream at Frankfurt of the third stage of the chlorine expansion programme; the current running-on of a new chlorine electrolysis unit at Knapsack (Knapsack-Griesheim AG); construction at Knapsack of a third phosphorus furnace; opening at Duisberg of a new oxygen plant; construction of new capacities for pesticides; expansion and rationalisation of dyestuffs and intermediates capacities; completed expansion over the planned level of the Frankfurt high-temperature pyrolysis unit; new capacities for waxes, fibres, carbon electrodes and plastics on stream; opening of a new Frigen plant; and planned capacity increases in the plastics fibres and foils sphere. Status of orders for the Uhde GmbH subsidiary is said to be good.

In 1961, three new participations were taken up in Germany. Bobina Faserwerke GmbH was formed with American Celanese at Bobingen (Hoechst hold majority of DM50 million founders' capital) to produce the new fibre Travis. With the same U.S. partner, Ticona Poly-

merwerke GmbH was formed in Kelsterbach (capital: DM 10 million) for the production of the Hostaform acetal resin; here, too, Hoechst hold a majority. A 50/50 partnership with Linde's Eismaschinen concern, Wiesbaden, in the Hüttensauerstoff GmbH oxygen company for supply of steelworks, based in Essen was also taken up.

The following facts are given for various branch and subsidiary companies of Hoechst:

Kalle AG, Wiesbaden (Cellophan, plastic foils, photographic and textile chemicals): Turnover, including that of Kalle holdings, for 1961 was DM358 million, 18.9%, of which came from exports.

Behringerwerke AG, Marburg/Lahn (pharmaceuticals): Turnover, including that of holdings, for 1961 of DM53 million, including 18.4% export share.

Knapsack-Griesheim AG, Knapsack (chemicals): Turnover of DM605 million, including that of holdings, and export share of 21.4%.

Spinnstofffabrik Zehlendorf AG, Berlin (textiles) (60% holding): Turnover for

1961 of DM57,200,000; business harmed by further cellulose price fall and political situation; company bought up remaining shares of Berlin plastics firm Berliner Plastic-Werk GmbH, whose production is bought by Kalle, during 1961.

Ruhrchemie AG, Oberhausen (33.33%): In satisfactory year, turnover rose to DM196 million. This total is for 12 month period 1960/61; current 1961/62 financial year with development hindered due to fertiliser market situation.

Abieta Chemie GmbH, Gersthofen (50/50 with Hercules Powder): Good results.

Süddeutsche Kalkstickstoff-Werke AG (15%): Capital rose from DM32 million to DM35 million; 10% dividend paid for 1960.

Friedrich Uhde GmbH, Dortmund, chemical plant producer (77½%): Satisfactory 1961 result. Capital rose from DM5 million to DM7½ million.

Sigri-Kohlefabrikate GmbH, Meitingen (carbon products) (50%): Good results.

Hoechst Chemical Corp., West Warwick, U.S.: Dyestuffs capacity increased.

Fongra Produtos Quimicos S.A., Brazil: Most of third expansion programme completed in 1961.

All foreign holdings: In 1961 some DM18,400,000 was spent on foreign investments. Turnover of foreign holding companies rose to DM338 million, (25% up on 1960), after deduction of parent company shipments.

Acetal resin patent granted to Celanese, Du Pont suit to go ahead

THE U.S. Patent Office has granted a composition-of-matter patent to Celanese covering broad areas of acetal copolymer resins. The patent has both composition and process claims.

Celanese's brand of acetal resin, Celcon, produced in a 25 to 30 million lb. plant (see (CHEMICAL AGE, 4 March 1961, p. 369) which came on stream early this year at Bishop, Tex. is the cause of a dispute with Du Pont who also hold a composition-of-matter and process patent for their acetal resin, Delrin.

The controversy between the two companies rests on the difference between the homopolymer and the copolymer. The main problem in developing acetal polymers has been finding a means of maintaining the stability of the molecular chain under heating and ageing. Du Pont's method is to seal off the end of a homopolymer chain. Celanese use a monomer to tie up the chain at random points along its length.

Delrin is a linear polymer made from pure formaldehyde and produced by solvent polymerisation. Celcon is made from trioxane, the cyclic trimer of formaldehyde. The Celanese patent covers polymerisation of the trimer with 0.1 to 15 mole % cyclic ether having at least two adjacent carbon atoms, such as ethylene oxide or 1,3-dioxolane.

In granting the patent to Celanese, the

Patent Office has in fact recognised two patentable routes to acetal resins. The new patent, however, does not affect the suit which Du Pont filed against Celanese a year ago. Du Pont say they intend to bring the suit to trial as soon as possible.

Shell postpone diene rubber plant

DECISION to postpone construction of their proposed polydiene synthetic rubber plant at Carrington has been taken by Shell Chemical Co. Ltd., although they have not abandoned the project. Site preparation was due to start last year and production was scheduled for 1963.

Other plants at Carrington are nearing completion. Production of high and low pressure polythene and polypropylene is due to start early this year.

Large additional plants for the manufacture of ethylene and polythene were brought into operation in 1961 at the West German plant of Rheinische Oelwerke G.m.b.H., in which the Royal Dutch/Shell Group have a 50% interest. Construction has also progressed well on the polypropylene plant at Woodbury, N.J. in the U.S.

The polyisoprene unit at Pernis is nearing completion, as is the plant at Marietta, Ohio.

Project News

I.C.I. TO PRODUCE PHTHALATE ESTERS AT FRENCH SITE

A CONSIDERABLE expansion of Cereclor chlorinated paraffins production is planned at Baleycourt, near Verdun, where these products have for some years been produced on behalf of I.C.I. General Chemicals Division by Produits Chimiques de Baleycourt. Capacity is to be doubled.

I.C.I. also plan to make phthalate esters at this site from their Heavy Organic Chemicals Division's alcohols and Dyestuff Division's phthalic anhydride.

This is revealed by Mr. B. R. Goodfellow, of the company's European Council, writing on I.C.I. plans in Europe in the April edition of the *I.C.I. Magazine*. Mr. Goodfellow says that although Rotterdam is the company's choice for large plants where scale is important, with access to a main port and oil or gas as raw materials, there are good reasons for the company having other and lesser sites for secondary operations which are best conducted near to the markets.

The developments at Baleycourt are expected greatly to strengthen I.C.I.'s position in the rapidly growing p.v.c. plastics trade in the French domestic market. Baleycourt is well located for French industrial markets, and the site has room for considerably more development of a similar kind. Mr. Goodfellow adds "We have little doubt that we shall in due course develop similar sites in other parts of West Europe." (See also page 640.)

The two plants now under construction at Rotterdam—for acrylic moulding powder and acrylic sheet—will be completed by the end of 1963. They will be similar to those already operated in the U.K. by Plastics Division. Design, which will incorporate the latest developments, is being undertaken by the division, and the work is being carried out in conjunction with the staff of the local site organisation, which consists almost entirely of Dutchmen. Construction is due to start this year by Dutch contractors.

Shell refinery gas for Ellesmere Port gas works

REFINERY gas from Stanlow is being piped by Shell Refining Co. Ltd. to the Ellesmere Port works of the North Western Gas Board. The gas is reformed at Ellesmere Port.

Gas supplied by Shell is substantially dry and free from sulphur. Special gas treating plant was erected for this purpose at Stanlow, to the design of Bataafse Internationale Petroleum Mij, NV; engineering and construction were handled by the refinery staff.

The plant can produce over 200 tons/day of treated gas. The gas is first contacted with aqueous amine solution and

after passage through a knock-out is scrubbed with caustic soda. It finally passes through a drying column containing two beds of alumina. Optimum performance of the drying column is maintained by regeneration of the desiccant.

This is the second such Shell unit, the first, at Shell Haven, delivering gas to the Romford works of the North Thames Gas Board.

Contract placed for Jordan phosphate site

CONTRACT for the excavation and gaining of phosphate has been placed with Turriff Construction (Overseas) Ltd. by Jordan Phosphate Mines Co. Ltd. The contract involves a total of 2 million cu. m. at a site near Amman.

I.C.I. turbo-alternator order for Winsford salt plant

ORDER has been placed with W. H. Allen Sons and Co. Ltd., Bedford, by I.C.I. for a 3,290-kW pass-out back-pressure turbo-alternator for installation in their alkali division's new vacuum salt plant at Winsford, Cheshire. The machine will run at 8,000 r.p.m. and will drive an A.E.I. brushless alternative at 1,500 r.p.m. through an Allen-Stoekicht epicyclic speed-reduction gear unit. The

alternator will be of the water-cooled closed-air circuit type, with side coolers, supplying power at 3.3 kV for a three-phase, 50-cycle supply at 0.915 power factor, in parallel with the public supply and the existing I.C.I. works system.

Steam conditions will be 645 p.s.i. and 390° C., up to 25,500 lb./hr. of steam being available for process, at a pass-out pressure of 200 p.s.i., with the balance of up to 65,000 lb./hr. total flow going to exhaust at 23 p.s.i.

Gas pipeline contract awarded by E.M.G.B.

THE East Midlands Gas Board has ordered some 3,500 tons of 24-in. diameter steel pipes 40 ft. in length for its Scunthorpe to Doncaster pipeline from the South Durham Steel and Iron Co. Ltd.

Open days at Warren Spring Laboratory

Warren Spring Laboratory, Stevenage, is holding open days on 18 and 19 June. Those wishing to visit this newest of D.S.I.R. laboratories should apply to the director, Warren Spring Laboratory, Stevenage, Herts. On show will be work aimed at developing new ways of controlling chemical engineering processes.

New Uphall factory for Motherwells

A new factory for manufacturing chemical industry equipment and plant is proposed for Uphall, West Lothian, by Motherwell Bridge and Engineering Co. Site is the workshops of Scottish Oils Ltd., Middletonhall, Uphall, owned by Scottish Oils Ltd.

Fraser-built titanium oxide plant opened by South Africa's Economic Affairs Minister

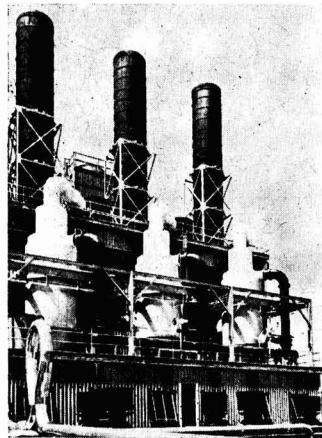
THE recently completed titanium oxide plant of South African Titan Products (Pty.) Ltd. was officially opened

on 13 April by the Hon. N. Diederichs, South African Minister of Economic Affairs and Mines. South African Titan Products are a joint subsidiary of British Titan Products and African Explosives and Chemical Industries.

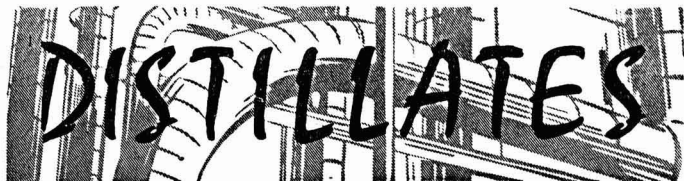
As stated in CHEMICAL AGE, 23 July, 1960, page 129, the cost of the 10,000 tons a year plant was in the region of £3 million and the contract for detailed design, procurement and construction of the complete factory was awarded to W. J. Fraser and Co. Ltd., of Romford, Essex, and of Johannesburg, South Africa.

Sulphuric acid and steam for the new plant will be supplied by African Explosives and Chemical Industries and the ilmenite will come from the neighbouring mines at Umgababa which are already supplying very substantial tonnages to British Titan Products' plants in this country.

The effluent from the factory is being discharged out to sea at a depth of 110 ft. by a pipeline constructed by Collins Submarine Pipelines Overseas Ltd.



Close up of reactor vessels and pipelines



★ It has been clear for some time that I.C.I. have made up their mind to set up manufacturing operations at strategic sites on the Continent. From what has been said recently, the company is making a very careful analysis of markets and raw materials before choosing sites. The policy is to have sites cleared and ready so that once a decision is made to manufacture a certain product, the gap between the start of construction and on-stream is cut to the minimum.

I cannot help feeling that I.C.I. have been painfully slow off the mark, although it can be said that they have been busy investing vast sums throughout the Commonwealth. Until the initial decision was made, however, many valuable years were allowed to pass—years in which both European and American producers were not slow to develop chemical plants.

It is interesting to learn that in future—and as licences expire on things such as polythene and Terylene—I.C.I. will put up their own manufacturing plants in Europe, capitalising themselves on their know-how and retaining the profits within the company. Presumably one of the first processes likely to be developed in this way is that for synthesis gas. Such plants, making full use of the large-scale natural gas deposits in Holland, France and Germany, could lead I.C.I. either into business as suppliers of raw materials to Continental producers or into actual nitrogen fertiliser production in Europe.

★ IN law and politics and, more recently, in science, Lord Hailsham has always been a controversial figure. Controversy does not make for popularity, but there is not enough of it in this era of welfare-state molly-coddling. As the Duke of Edinburgh has demonstrated, controversy shakes the complacent, stimulates thought, provokes action and catalyses new ideas.

Having roused the tobacco industry with his strictures on the evils of smoking, Lord Hailsham last week turned his attention to the growing number of professional and qualifying institutions, to the positive plethora of initials—ranging through the alphabet from A.B. (Bachelor of Arts) to Z.S. (Zoological Society). Much of what he had to say at the annual dinner of the Royal Institute of Chemistry has been said before with singularly little effect. Presumably when someone as eminent as an unscientific Minister for Science proposes to rationalise the “jungle of professional institutions,” more than usual notice is likely to follow.

Offence will doubtless be taken by

many. But I for one cannot help feeling that some sort of enquiry along the lines suggested would not be out of place. The professional bodies should be taking notice of the Treaty of Rome and its implications which provide for an interchange of employment between E.E.C. member countries. If Britain were to join the Common Market, what would be the position of the French chemist who wished to work as a public analyst in England, a country where an R.I.C. qualification is demanded?

★ BAYER of Leverkusen who are building new British headquarters for their U.K. pharmaceutical subsidiary (see page 646) will next year celebrate their centenary. In the drug world, Bayer are probably best known for their discoveries of aspirin and their work on sulphonamides. For his work in the latter field, Professor Domagk was awarded a Nobel Prize.

I was interested to learn of the service offered by the main contractors for the British company's new head office. The C.A.S. Group describe it as a “unique package deal” covering the finding of sites, design and building and the carrying out of all negotiations to completion. Their work is carried through on a lump sum price with a fixed completion date and on long term leases at an economic rental if required.

Of course, C.A.S. have the advantage of working in the general contracting field and not in the more complex world of chemical processing.

★ A COLOUR film on the gaining of phosphate rock that was shown in London last week by the British Sulphur Corporation to mark the introduction of their third magazine—*Phosphorus and Potassium*—was of special interest. It was shot in the world's main phosphate areas by Colonel J. A. M. Langley during his work on the preparation for B.S.C. of the six volume ‘World Survey of Phosphate Deposits.’

It was a first-class piece of filming, the more remarkable because it was taken by a one-armed cameraman, Colonel Langley. Shown at the same time was an older colour film by the American Potash Institute.

B.S.C.'s new journal is in the same authoritative mould as its companions, *Sulphur and Nitrogen*. The first issue contains surveys of market trends, applications and technical developments. Among items of interest is the report that world potash production rose 5½% in 1961 to 9.9 million tonnes K₂O, with the U.K. importing 439,000 tonnes K₂O,

compared with 422,500 the year before. In the U.K. it is stated that in addition to Armour's probing of potash deposits in Yorkshire, Fisons and I.C.I., who have now been joined by International Minerals and Chemicals, are still in the exploration field and have not given up as had previously been reported.

★ BRITAIN'S next refinery, the large 100,000-plus bbl./day project of Regent Refining Co. will, it is confidently believed in oil circles, be pushed ahead as quickly as possible. Bechtel International are widely reported as being the appointed main contractors. Products will include petrol, distillates fuel oils and heavy fuel oils.

This £30 million fully integrated refinery will be built in Wales at Pwllchrochan, near Pembroke, just across the water from the Esso refinery at Milford Haven. B.P. have an oil terminal at Angle near the mouth of the estuary. When the new Regent refinery is completed, Milford Haven will thus become one of Europe's largest oil ports second only to Rotterdam, where three refineries are operating and a fourth—that of Gulf Oil—is now under way.

Regent Refining are a wholly owned subsidiary of Texaco of the U.S. The associated, Regent Oil Co. is jointly owned by Texaco and Caltex—Caltex being under joint ownership of Texaco and Standard Oil California.

★ MORE efficient use of chlorine dioxide by the pulp and paper industry has been made possible by research at Buckeye Cellulose Corp., Memphis 8, Tennessee, U.S., according to Dr. J. C. Paulson, their senior research chemist. In a paper given at the 141st national meeting in Washington, of the American Chemical Society, Dr. Paulson reported that the disappearance of chlorine dioxide in the bleaching process had been successfully traced for the first time.

Dr. Paulson said the new knowledge of the reactions involved in chlorine dioxide bleaching and the degree to which the chlorine dioxide reacts with the various pulp components would permit accurate determination of the amount of chlorine dioxide available for reaction with coloured bodies. He was able to trace the disappearance of chlorine dioxide in the bleaching process by following the concentration changes of chlorite, chlorate, chloride, and residual chlorine dioxide in the reaction mixtures.

Alembic

CHEMICALS IN CZECHOSLOVAKIA

Big expansions planned for all sections of industry

DEVELOPMENT of the Czechoslovak chemical industry is proceeding at an unprecedented pace and in the 12 years 1948-60 chemical production rose 291% compared with 270% for Czech industry as a whole. Contributing to this expansion were a number of major developments of the industry including the following.

Production of inorganic products was expanded in the chemical works at Pardubice, Ostrava, Bratislava, Ústí nad Labem, Neratovice, Lovosice, Kolín, Nováky and Zilina. In synthetic fertilisers a new factory was erected at Lovosice, and production expanded at Ostrava. Accompanying this there was an expansion in oil refining and associated chemical operations, in the processing of tar and benzene and of rubber. A number of new projects connected with the manufacture and processing of synthetic rubber, plastics, synthetic alcohol, nitrogen fertilisers, sulphuric acid, sodium hydroxide, phenol, etc., are nearing completion.

POST-WAR OUTPUT OF CZECHOSLOVAK CHEMICALS

(in thousands of tons)

	1948	1960	1961†
Sulphuric acid	215	533	603
Hydrochloric acid	—	76.0	83.3
Sodium hydroxide	37.7	114.8	134
Calcium carbide	—	104.1	106.3
Methanol	—	43.5	48.6
Nitrogen fertilisers (as N)	29.4	139.8	145.8
Phosphate fertilisers (P ₂ O ₅)	54.3	146.9	168
*Man-made fibres	22.4	62.3	69.4
P.v.c. (in tons)	—	10,122	19,600
Plastics materials (total, including resins)	—	69.6	79.5
Dyestuffs	—	5.2	—
Paints and enamels	—	61.6	—

* For 1948 and 1950 figures are given only for viscose acetate and viscose rayon.

† Data for 1961 are preliminary values.

Some 35% of the total output of the Czechoslovak chemical industry is now comprised of basic organic raw materials and intermediates derived from ethylene, acetylene, etc., while the optimisation and expansion that is planned for the production of basic inorganic products envisages an investment amounting to some 16% of the total capital investment in the chemical industry. Share of the chemical industry in total Czechoslovak industrial production, which amounted to 7.8% in 1955, will be increased to more than 10% by 1965.

So far as basic chemicals are concerned, Czechoslovakia's programme is aimed at broadening the production range to produce products previously imported. Although a large increase is planned in the production of basic inorganic chemicals, the biggest rise will



The main chemical producing centres

be in organics. This will be provided for in the construction of new plants for organic syntheses, making chemicals not previously made and raising existing capacities. In the case of synthetic phenol, for instance, 1965 production is planned to exceed the 1960 output by sixfold, or almost 10 times more than in 1955.

Substantial increases are also planned for ethylene chemistry, synthetic rubber, caprolactam, dimethylterephthalate, etc. The range of agricultural chemicals is to be broadened, production of insecticides being based on DDT, gamma-BHC, chlorinated polycyclic hydrocarbons and organic phosphates.

Plastics materials have been one of the country's swiftest growing industries, with production rising from less than 9,000 tons in 1955 to almost 20,000 tons in 1955 and almost 69,000 tons in 1960. Per capita consumption of plastics is scheduled to rise 4.3 kg. in 1962 to 13-14 kg. by 1965, or to an output of around 200,000 tons a year. Thermoplastics will take a lion's share of the expansion, with a comparatively slower development for thermosetting resins.

To secure its raw materials, Czechoslovakia has long-term agreements on deliveries, or direct interests in the mining of sulphur in Poland, potash in East Germany and crude oil in the Soviet Union. In coming years, millions of tons of crude oil will flow through the 'Fellowship' pipeline, first Czechoslovak section of which was completed last year and came into operation in January 1962. This development not only gives Czechoslovakia self-sufficiency in petrol, lube and fuel oils, it makes possible the construction at Bratislava, terminal point of the pipeline, of a large petrochemical industry, including the erection of new works or enlargement of existing facilities for the production of synthetic rubbers, synthetic fibres, plastics materials, solvents, synthetic detergents, etc.

Indigenous raw materials include bituminous and brown coal, providing the basis for the carbonisation and gasification industries, as well as natural gas,

pyrites, salt, gypsum and a number of other minerals containing barium, fluorine and rare elements.

Development of the Czechoslovak chemical industry will not, however, end in 1965. Even today it is clear that the production of 1 million tons of sulphuric acid, more than 500,000 tons of fertilisers, in terms of plant nutrients, more than 100,000 tons of man-made fibres, about 200,000 tons of plastics materials and 3 million tons of fuels planned for 1965 will, it is reported from Prague, be substantially increased by 1980.

New B.S. for Boric acid, turpentine, lanolin

A NEW British Standard published, B.S.3476, specifies requirements for technical grades of boric acid and boric oxide. For both compounds requirements are laid down for purity and odour. The standard also contains a clause relating to acidity of boric acid. Two appendices describe methods of test.

Copies can be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1, price 3s each (postage extra to non-subscribers).

The requirements for three types of turpentine—gum spirit, wood and sulphate—are specified in a new edition of B.S.244 and 290. Requirements given are specific gravity, refractive index, distillation, non-volatile residue, residue after polymerisation, flash-point, and in the case of sulphate turpentine, sulphur.

Copies available, price 4s each (postage extra to non-subscribers).

The new B.S.3488 covers technical anhydrous lanolin. The standard specifies the requirements and methods of test for anhydrous lanolin or technical wool fat intended for uses other than medical or pharmaceutical.

This B.S. is priced at 4s 6d (postage extra to non-subscribers).

Obituary

Herr Ludwig Kruek, until 1960 a director of Schering AG, West Berlin, has died at the age of 80.

I.C.I. plan more agents, depots, offices, plant sites and technical service in Western Europe

THERE is now an I.C.I. office in every country in Europe, except Finland and Iceland. In addition there are more than 100 agents and in preparation for the large increase in sales these organisations are being strengthened by recruiting more local staff and by increasing the numbers of those temporarily seconded from I.C.I. in Britain.

This is stated by Mr. B. R. Goodfellow of the company's European Council writing in the April edition of the *I.C.I. Magazine* on 'I.C.I. go into Europe—the plans take shape.' Mr. Goodfellow also discloses plans to make phthalate esters in France (see 'Project News').

The scope of technical service on the Continent is being extended and many of the specialists sent in missions are men with international reputations. Laboratories have been set up in several countries to help customers and to familiarise them with new applications. Since speedy delivery is more important than ever, some divisions have already set up bulk depots and stock points in Western Europe; there will be more of them.

Time to learn

The company's new representatives in Europe will be nationals, and they must be given time to learn I.C.I. methods and to learn English. Equally, more of the U.K. sales control and technical service staff who are based in Britain and dealing with European matters will learn European languages.

Transport is one of the key's to I.C.I.'s trading with Europe, the Channel being a serious obstacle to trade in heavier cargoes. Some products cannot be made as cheaply in Britain because of the natural gas reserves in France, Holland and Italy. This is an unequalled starting material for acetylene derivatives, nitrogen fertilisers, methanol and cyanides.

In Norway and the Alps, hydro-electric power is available at half the price at which thermal or nuclear power can be made in the U.K. For massive users of power, such as chlorine plants, those advantages cannot be ignored. Thus, if I.C.I. take any part in making products for which nearness to markets or cheap raw materials is of overriding importance, the company had to manufacture on the Continent.

"We are confident of our ability to seize manufacturing opportunities of these kinds," adds Mr. Goodfellow. The company probably had more experience of planning, erecting and operating chemical plants overseas than any other company in the world. I.C.I.'s technical

staff and their skills were as good as the best and the company had the best and most up-to-date processes or access to them.

While their previous overseas works, mostly in the Commonwealth, had often been the first chemical units in their field, I.C.I. were now embarking on a game with big opponents who had already taken up immensely strong positions. "We shall have all the handicaps of a new team playing an away match." I.C.I. would have to learn much and take risks before they could become firmly established. Some of the company's experience of things done differently, and perhaps better, on the Continent would be fed back to improve the company's ways in the U.K.

Before production could be started on the Continent, markets had to be surveyed and growth estimated; competitors' activities studied and forecasts made of what they were likely to do; site advantages had to be studied, taking into account raw materials, water supply, effluent disposal, labour availability, location of markets, etc. The Americans had been doing that for some time.

Now, above all, it was important to keep ready to move quickly so that as soon as technical and commercial calcu-

lations threw up an opportunity for starting production in Europe, I.C.I. could go ahead at once to get a plant built. That was why priority had been given to preparing a site on which unborn projects could be located.

Rozenburg, near Rotterdam, had been selected for I.C.I.'s £100 million investment, because there were three big existing refineries, plus large supplies of natural gas nearby. The port was also efficient and had good handling facilities as well as access to inland waterways, road and rail transport. There was adequate fresh water and the tideway could take effluents.

In addition to the need to serve existing markets in Europe with 'on-the-spot' plants, there was the expectation that the company's research effort would lead to great discoveries of new products and processes.

For instance, polythene and Terylene were now licensed all over the world and large fees received. Those fees would expire in time and licensees would then retain all the profits. In the future it was hoped that if I.C.I.'s new inventions were of the kind which would require plants in Europe as well as in Britain, the European plants would be put up on the company's own sites; they would be operated by I.C.I., who would retain the profits within the company.

Mr. Goodfellow concluded by saying it was now old-fashioned to think of Europe and Britain as separate territories. Every major scheme on which I.C.I. were working had to take Europe into account. It was the European Council's job to consult constantly with divisions to ensure that the decisions taken were the right decisions for Europe as a whole.

Warren Spring develop new heat exchanger

A NEW type of heat exchanger, claimed to be 25 times more efficient than the conventional air-cooled exchanger, has been developed by workers of the Warren Spring Laboratory of the Department of Scientific and Industrial Research. The equipment is described in the Laboratory's annual report published this week and available from H.M.S.O., price 4s.

In an attempt to improve overall heat-transfer coefficients obtainable with air-cooled exchangers, an experimental laboratory-scale condenser has been built in which the tubes are immersed in an air-water froth. Cooling occurs in two stages; in the first the water surges around the tubes, which are wetted by a turbulent and frequently renewed thin film. The heat-transfer coefficient of this film is high, approaching that of submerged boiling. In the second stage the film is carried from the tubes in a constantly moving froth where, although the rate of heat transfer is lower, the area over which it occurs is large. Although the amount of water required is roughly equivalent to that used with cooling towers the high powered pumping equipment which forms an important part of the cost of the cooling tower system is not needed.

The study of the transient behaviour of a distillation column to examine the possibility of control by computer has continued, and the collection of data necessary for programming of a small analogue computer has been completed. The control of columns for the separation of multi-component mixtures and the optimisation of chemical reactors are being investigated in co-operation with a firm engaged in manufacturing and developing computers.

Practical work at Warren Spring on the development of the Fischer-Tropsch synthesis as a method of obtaining oil from coal and chemicals from coal was brought to an end in 1961, having reached the stage at which it is convenient to implement the recommendations of the Wilson Committee on Coal Derivatives that the technological work should be wound up. The Laboratory is, however, keeping in touch with developments in this field.

In accordance with further recommendations of the Wilson Committee, basic research on catalysts has continued, and the research programme has included studies of the catalytic properties of iron oxides, silver and binary mixtures of alumina and other metallic oxides,

U.K. BENZENE DEMAND SHOULD TOTAL 400,000 TONS BY 1965

THERE has been a significant change in the uses to which crude benzene is put, in the U.K., since 1956. Benzene was an important raw material before the invention of the internal combustion engine, but in 1950, nearly three quarters of the benzene produced was used as motor fuel. The pattern of the changing use of benzene is shown by the graph.

Total consumption of crude benzene over the past 10 years has remained fairly steady. The reason for its increased use in industry can partly be accounted for by the recent expansion in the steel industry and the resulting increased coking capacity. Benzene produced in this way is particularly suitable for industrial purposes, and production from this source increased by 20 million gall. between 1950 and 1960. During the past year there has also been a spectacular increase in aromatics produced from petroleum feedstocks. Production of benzene from coal has fallen steadily.

Demand for benzene from various sections of the chemical industry has continued to grow, and this demand is being met solely by expansions in the petrochemical industry. U.K. demand for 1962 is forecast at 240,000 tons, 40,000 tons in excess of expected supply from coal. By 1965 the demand is expected to have risen to 400,000 tons and further expansion in the petrochemical field is envisaged. Shell, Esso and Mobil are likely contenders, while B.P. California and British Celanese already have petrobenzene plants.

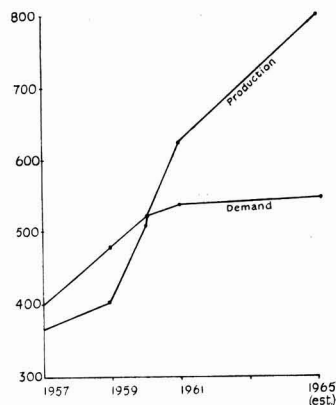
The Government have stated that they intend to remove the preference duty on indigenous light hydrocarbon oils not later than 1964, which means that producers of coal-tar benzene will lose their effective subsidy. This will almost certainly result in a cut in production of benzene from coal further aggravating the position of coal-tar benzene.

From all parts of the world come reports of steady increases in benzene production to meet the rising demand. Japan is rapidly expanding its benzene industry both from coal and petrochemicals. In 1955 total production was 18.2 million gall. This year petroleum feedstocks are expected to account for over 10 million gall., and coal for about 26 million gall. The total is therefore expected to be in excess of 36 million gall., a 100% increase on the 1955 figure.

Russia, formerly an exporter of benzene to the U.S., is now reported to be using all the benzene she can produce. Statistics are unobtainable, although it is believed that there has been an increase of 250% on the 1929 production figure. A big expansion in the Soviet chemical industry has been announced for this year's planning, and U.S.S.R. may well turn to foreign sources for supplies of benzene.

In an attempt to meet their own heavy demand and to break in on an increasing world market, plans are being made to increase production of petroleum benzene drastically in the U.S. during the next three years. Benzene is currently in extremely short supply in the U.S., and late last year could fetch up to 10% higher than the listed price. In 1962 supply will be in excess of home demands while by 1965 a considerable surplus is estimated.

Present production capacity is estimated at 854 million gall. Big markets are forecast for U.S. benzene for the next few years, particularly in Europe and many petrochemical firms have new plant under construction. But some have seen the red light and a few plans have already been postponed. Most foreign contracts for the sale of benzene are for from three to five years and at the end of that period many European firms will have completed their own expan-



U.S. benzene production and demand (million gall.)

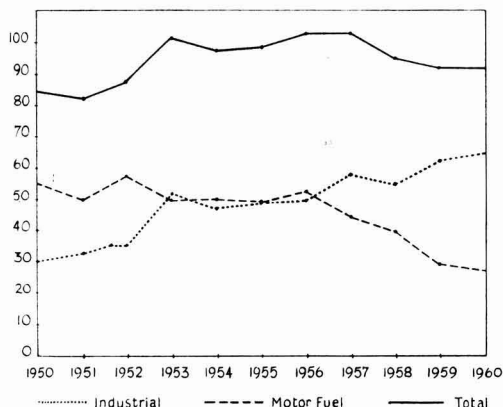
sions. As Europe's production capacity from petrol feedstocks continues to grow, export of U.S. produced benzene will become tighter. The growing surplus in the U.S. has not yet made much impact on European prices, which still remain fairly high. Some current prices are indicated below in U.S. cents:

U.S.	U.K.	Belgium	France	Italy
40	49	46	50	30

To protect its future, the petrochemical industry in the U.S. is carrying out research into further uses for benzene derived chemicals, and many new outlets for benzene will have to be found by 1965 if there is not to be a big drop in price. It is estimated that the present price of 40 cents per gall. may well have dropped to under 30 cents by the end of next year. Belgium has already had to cut her price for Dutch and German markets, and many European countries aim to produce sufficient benzene for domestic needs within the next few years. Unless there is a tightening of the expansion programme within the next few months, the U.S. may well have a big surplus of unsaleable benzene by 1965.

Leverhulme Memorial Lecture given by Prof. Frazer

The Seventh Leverhulme Memorial Lecture was given by Professor A. C. Frazer, Head of the Department of Medical Biochemistry and Pharmacology, Birmingham, and chairman of the Food Industries Research Association at the Donnan Laboratories of the University of Liverpool on 5 April. The present Lord Leverhulme attended the meeting.



Consumption of crude benzene in U.K. (million Imp. gall.)

Bayer annual report

Price cuts worth £12 million hit profits in 1961

ACCORDING to the annual report Farbenfabriken Bayer AG, of Leverkusen, turnover of the parent company and 100%-owned subsidiaries last year totalled some DM3,018,500,000 (£268 million), or over 7% more than the DM2,218,500,000 (£250 million) recorded for 1960. To be added to the 1961 turnover is a refund of DM33,200,000 turnover tax in respect of exports, paid for the first time last year; total turnover for 1961 was therefore DM3,051,700,000.

The rise in turnover compares with one of as much as 14.6% for 1960 over the previous year, indicating a slowdown of turnover increase to one-half of its former level during 1961. The sluggish price development is shown by the fact that sales by volume rose by some 11.3% over last year.

Turnover for the whole Bayer group—i.e. Bayer plus all companies with a 50% or more Bayer holding—rose by 11.2% from DM3,260 million to DM3,620 million (£321 million).

Increased exports

Bayer exports increased by 9.2% over the year, the parent company and branches thus accounting for one-quarter of all Federal German chemical industry exports. Share of exports in total turnover rose over the year from 44.8% to 46.3%. Some 59.3% (1960: 57%) of all Bayer exports went to other European countries, 26.5% (25.1%) of the whole going to fellow-members of the Common Market and 21.2% (22.5%) to EFTA-bloc countries. The share of total turnover coming from sales to all Common Market countries, including West Germany itself, remained at the 1960 level of 66.4%.

Total turnover included 45% chemicals, 25% dyestuffs and fibres, 15% drugs and pesticides and 15% photographic products. Total chemicals turnover represented 12.4% of West German chemical industry turnover as a whole.

Export sales rose more sharply than home market turnover. Supply to the inorganic basic chemicals and chrome products market rose, partly as the result of new capacities, but Bayer found it possible to increase tanning agent sales satisfactorily—particularly overseas—while sales of ion-exchange resins also rose considerably. Business in rubber auxiliaries, especially in anti-ageing media, increased. Notable progress was attained in the development of stereospecific polydienes.

Steepest turnover increase was in the plastics, mainly with isocyanate compounds, though thermoplastics and condensation plastics sales also developed satisfactorily. Expansion of plastics raw materials capacities is to be continued to meet demand, particularly for iso-

cyanates, polyesters and polyethers, nylon-6, and polycarbonate.

Dyestuffs turnover was up, though the rate of increase was lower than that recorded in 1960; exports to non-European countries developed better than home sales.

Capacity for fully-synthetic fibres and yarn was doubled, the extra capacities starting work at the beginning of 1962. New capacity was put up for drugs and pesticides, further expansion is currently in hand or planned for drugs while the building of new pesticide capacities at Dormagen continues and should be completed by mid-1962.

Bayer, in fact, have expansion plans for all their production branches during the current year.

Investments in 1962 for Bayer and 100% subsidiaries all told were some DM498,100,000 (DM403,800,000), the parent company itself accounting for DM442,100,000. Investment stresspoints were the Leverkusen and Dormagen works, with expansion of plastics and plastics base capacities and at Uerdingen, as well as expansions in the synthetic rubber, rubber auxiliaries, pesticides and starting products, synthetic fibres and photochemicals.

Investment stresspoints this year are to be plants for plastics, plastics base, intermediates, dyes, synthetic fibres and photographic products manufacture and chlor-alkali electrolysis. Over last year some DM133,300,000 was spent by Bayer on research and a further DM42,600,000 on participations in other companies.

Net profit of the parent company for 1961 was DM132,300,000 or £11.7 million (same). Recommended dividend is 18% (same). A fall in sales prices over 1961 of 4.5%, following a drop of 1.8% over the previous year, meant a loss of about DM135 million, or some £12 million, over the year, estimate Bayer.

Bayer holdings

By last year the number of Bayer group holdings had risen to 80 majority holdings of 51-100%, of which 64 were held by the Canadian holding subsidiary Bayer Foreign Investments Ltd. and 16 by Farbenfabriken Bayer including Agfa, 24 25-50% holdings, and 11 holdings of under 25%.

Erdöchemie GmbH (owned together with BP Benzin und Petroleum) used their light-fraction cracking plant in 1961 to full capacity and units for further processing to most of its capacity. A plant for the production of di-isobutylene and tri-isobutylene from C₄ fractions was opened to work to a Bayer process in October last.

While investments in Erdöchemie rose last year to DM296,000,000 (DM250,000,000), it is planned to spend

a further DM340,000,000 over the coming years, on plant enabling annual cracking of up to 700,000 tonnes of light benzene and processing of the olefins produced.

Progil-Bayer-Ugine, of Paris, one-third of which is held by Bayer Foreign Investments and whose development is running according to plan, started last year at Pont-de-Claix the production of polyethers and 'Desmodur L', an isocyanate for lacquers, and at the start of 1962 introduced output of 'Desmodur T'; turnover has developed satisfactorily and the firm is already the biggest producer for polyurethane plastics base materials in France.

In the U.S., Mobay Chemical Co., Wilmington, continued to fulfil expectations, capital being increased from \$20 million to \$21.5 million; TDI capacity rose to 18,000 t.p.a. and expansion continues. Verona-Pharma Chemical Corporation, of Union, N.J., increased dyestuff turnover after a turnover fall in 1960. Chemagro Corporation, New York, expanded the pesticide plant in Kansas City.

Bayer do Brasil Industrias Quimicas S.A., worked to full capacity and now produces 90 tonnes/day of sulphuric acid. Bayer de Mexico Industrias S.A., Santa Clara, opened new dye capacities at the end of 1961. In the Argentine, Anilsud-Fabrica Argentina de Anilinas S.A. expanded production with new azo-dyestuffs.

Elsewhere, Colour-Chem. Ltd., Bombay, started construction of a phthalocyanine blue unit. In Persia, the construction of a pharmaceutical plant for Bayer Pharma Iran AG was started, the plant due on stream this year.

Bayer in 1962

Turnover for the first 1962 quarter for Farbenfabriken Bayer was rather above that for the corresponding 1961 period, due particularly to sales of fibres, drugs and pesticides. Share of exports in total turnover was 46%. Bayer believe that 1962 sales will continue to rise by volume, leading to a rise in value unless pressure on prices worsens considerably. If the increased cos.'s, particularly the further rise in labour costs, remain within the tolerable limits and can be compensated for to a large extent by rationalisation measures, a satisfactory result is expected for 1962.

Fire damages H. & W. nitrobenzene plant

PLANT for the distillation of nitrobenzene was damaged by two explosions, each occurring within a few minutes of each other, at the Castleford, Yorks, works of Hickson and Welch Ltd. on Sunday, 15 April. A 3,000-gall. tank containing nitrobenzene was breached with spillage of liquid. One other tank was involved and there was slight damage to nearby buildings.

There were no casualties and the fire was soon brought under control.

R.I.C. ANNUAL MEETING IN LONDON



Sir William Slater, R.I.C. president, and Lady Slater, receive Dr. A. D. Jenkins (Gillette Industries) and Mrs. Jenkins (left). Right, l. to r., Dr. C. Simons (Weddell Pharmaceuticals), Dr. D. S. Morris (Parke Davis and Co.), and Dr. R. M. Evans (Glaxo Laboratories)

President talks of exciting careers in agricultural chemistry

TOO few chemists entered the field of agricultural research, partly because it did not follow automatically on their undergraduate studies, partly because industry had so many attractive openings, partly because their teachers worked in other fields to which they were attracted and partly because they were unaware of the great possibilities for exercising their newly won skills in agricultural research.

This was stated by Sir William Slater, F.R.S., president of the Royal Institute of Chemistry and former secretary of the Agricultural Research Council, at the annual R.I.C. conference held at the School of Pharmacy, London University on 12 April.

Sir William was giving the opening address in a symposium on 'Chemistry in the service of agriculture'. This was followed by two discourses—by Professor Helen Porter, F.R.S., *Professor of Plant Physiology and director of the A.R.C. Unit of Plant Physiology at Imperial College*, and by Dr. S. K. Kon, deputy director and head of the Nutrition Department, National Institute for Research in Dairying.

In addition visits were paid to the National Chemical Laboratory, the laboratories of the Nestlé Company, Rothamsted Experimental Station, Yardley and Co. Ltd., etc. The R.I.C. annual dinner was held at the Dorchester on 12 April and on 13 April, Shell Refining Co. Ltd., 'Shell' Research Ltd. and Shell Chemical Co. Ltd. entertained members and guests at a reception and dance at Claridges Hotel, London.

Sir William promised any chemists entering agriculture that they would find an endless succession of fascinating problems and a great reward in knowing that

they would be helping to feed the world's teeming population.

There was in agricultural research still a vast uncharted world awaiting exploration by the chemist, full of excitement and adventure. Chemists deciding to enter it must, however, be prepared to accept a new mental discipline. As chemists they would have been concerned with non-living material, with reactions over which they had control. In almost every branch of agricultural research, they must learn to think as biologists; to remember always that they were dealing with living organisms, with reactions which they could not plan and over which they could have little control.

There was a danger in the chemist ignoring the fact that he was investigating a biological process. Sir William pointed out that the living cell carried out chemical reactions with incredible efficiency, without the use of high temperatures and pressures; often with the reacting substances at low concentrations, following a bewildering series of steps to the end-product. The result was achieved by enzyme catalysis and by selective absorption, which brought the reacting groups of the substance into immediate contact.

The chemist had a major place in any study of the intact plant or animal, but he could not take that place unless he was prepared to learn something of the anatomy and physiology of the organism that he was studying.

Agriculture needed chemists of every kind, working together in teams—the physical chemist, the organic chemist, the analytical chemist and, most important of all, the biochemist, in that he was the link with the biologists who must make

up the balanced group.

Sir William began his paper by tracing the history of the chemist's contribution to agriculture, referring to Van Helmont's experiments in the growth of plants; Glauber's work; Woodward in 1699; Priestley in 1771; Scheele; De Saussure in 1804; and Davy's textbook on agricultural chemistry in 1813.

The publication by Liebig of his British Association address of 1840 began the modern approach to the study of plant nutrition. One major outcome of Liebig's work and writings was his influence on Lawes and Gilbert, resulting in the setting up of the world's first agricultural research institute at Rothamsted. Sir William recorded that the cost of that institute was met by Lawes from the profits arising from the manufacture of superphosphate. That was the first of the long record of instances in which the chemical industry had joined forces with agriculture to their common benefit.

Some of the scientists' most spectacular contributions to agriculture had been the evolution of entirely new materials and techniques which had brought about revolutions in agricultural practice. The fixation of nitrogen from the air and the discovery of new and powerful insecticides and selective herbicides had gone far towards doubling crop yields.

Successful apparatus show in Liverpool

THE 15th exhibition of scientific apparatus under the auspices of the Liverpool section of the British Association of Chemists was held at the Donnan Laboratories of Chemistry, University of Liverpool, on 4 and 5 April.

Formally opened by Professor R. A. Morton, Johnston Professor of Biochemistry at Liverpool, the exhibition was well attended by scientific personnel from a wide area around Merseyside and was highly successful. It occupied three large laboratories in the Donnan building, with about 50 exhibitors showing a wide range of apparatus.

The equipment and products covered the chemical and pharmaceutical fields as well as a variety of allied process industries, including food.



E. Le Q. Herbert, R.I.C. past-president, left, with Sir Harry Melville, secretary, Department of Scientific and Industrial Research. Dr. H. J. T. Ellingham (right), who retires later this year as R.I.C. secretary and registrar, is shown with J. R. Ruck Keene, general secretary, Chemical Society

Science Minister calls for rationalisation in the 'jungle' of professional bodies

SUGGESTION that the time was coming when there would have to be some sort of rationalisation in "the jungle of professional institutions" was made by Lord Hailsham, Minister for Science, when he proposed the toast of 'The Royal Institute of Chemistry' at the annual dinner held at the Dorchester, London, on 12 April. Sir William Slater, R.I.C. president, presided.

Lord Hailsham said that most of the institutions were more or less self-regulating, except for the chartered institutes such as the R.I.C., where there was the supervisory jurisdiction of the Privy Council. In addition, there was the whole alphabet of letters habitually placed after names, each representing different degrees of qualifications in different institutions.

But who, he asked, would undertake the formidable task of rationalisation? The Privy Council could not do this alone and unaided. The ideal solution would be for the professional bodies themselves to organise some sort of enquiry. But they showed no signs of doing that and some bodies evinced more inclination to differ than to cooperate.

Lord Hailsham was sure that the letters themselves, the degrees themselves, would convey more status and prestige if they were intelligible and represented comparable ranks of skill, knowledge and proficiency. He was also convinced that the professions would be stronger if some kind of organic pattern were to underlay the "proliferation of life forms which reproduce and flourish in this strange pre-scientific field".

Earlier in his remarks, Lord Hailsham spoke of the great gulf between the academic scientist and the chemist working in industry. He did not think this gap could be entirely bridged. He declared that academic men should know what the practical men were about. It was not to the public good that they should stand staring at each other "across mutual abysses of incomprehension; I have an idea that on the Continent things are differently arranged".

The industrialist, or the scientist in industry, was, after all, interested in the type of graduates and post-graduates turned out by the universities in the terms of their usefulness.

Lord Hailsham said it was with this point in mind that, in his capacity as Lord President of the Council, he had found himself driven to accept the "blandishments" of the R.I.C. to provide in the Institute's bye-laws for the new grade of membership—the Licentiate. This was not an easy decision to make; it led him to consider the need for rationalisation among professional bodies.

Sir William, responding to the toast, pointed out that the Royal Institute of Chemistry provided the bridge that linked university and industry, for in its ranks were chemists working in all walks of life—academic, Government service, research associations, industry and consultancy. He stressed that the knowledge and experience of the institute of the part played by chemists in those spheres would always be at the disposal of the Minister.

Sir Harry Jephcott, chairman of Glaxo Laboratories Ltd. and a past-president of the R.I.C., proposed the toast 'The Guests', to which Mr. Austen H. Albu, M.P., chairman of the Parliamentary and Scientific Committee, responded.

R.I.C.'s new secretary and registrar will be Dr. R. E. Porter

THE next secretary and registrar of the Royal Institute of Chemistry will be Dr. R. E. Porter, lecturer in organic chemistry at Southampton University and retiring member of the R.I.C. Council. A Fellow of the Institute, Dr. Porter's selection for this important post was announced at the annual meeting held at the School of Pharmacy, London University, on 13 April.

He will take office on 1 October, succeeding Dr. H. J. T. Ellingham who has been secretary and registrar for nearly 18 years. The services of Dr. Ellingham, whose work for the profession of chemistry and the R.I.C. was recognised by the award of an O.B.E. in the 1962 New Year Honours, will continue to be available until the end of the year.

Officers elected for 1961-62

Vice-presidents: E. H. Coulson (County High School, Braintree); Professor Sir Christopher Ingold, F.R.S. (University College, London); and Professor R. L. Wain (Wye College, London University).

Hon. treasurer: Professor H. Burton Queen Elizabeth College, London University).

Council: Professor C. C. Addison (Nottingham University); Dr. E. N. Allott (Lewisham Group Laboratory); Professor H. M. N. H. Irving (Leeds University); Miss Mamie Olliver (Connaught Food Products Ltd.); and Dr. M. A. T. Rogers (Burnham, Bucks)—Council nominees; and P. F. Corbett (Shell-Mex and B.P. Ltd.) and Dr. H. M. Glass (British Standards Institution).

In his report as hon. treasurer, Professor Burton stated that under the terms of the will of the late Dr. Scott, the R.I.C. Benevolent Fund would shortly benefit by a sum of about £18,000, being the residuary of the estate. This was their second largest bequest and he was pleased to announce that when invested it would represent additional income of some £900 a year.

The report and accounts were unanimously adopted.

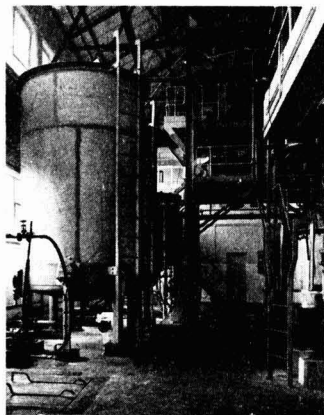


L. to r., Mrs. Turnbull, A. J. Turnbull (Nestlé Co. Ltd.) and T. M. D. Ball (D.C.L. Chemical Division)

Plymouth works is first in world to produce edible lipoprotein

PRODUCTION of the first new food for about 300 years—since Sir Walter Raleigh brought the potato to Britain—is claimed by British Glues and Chemicals Ltd., whose subsidiary international Protein Products Ltd., have started at their new Plymouth factory commercial output and sale of edible vegetable protein.

The Chayen impulse process, whereby protein is recovered in concentrated and palatable form and, in addition, high-grade oil and carbohydrate by-products



A section of the Plymouth plant

obtained, was demonstrated in September, 1959, at a pilot plant in the development department of British Glues and Chemicals Ltd. at Bermondsey, London. Last week the prototype factory at Plymouth became the first in the world to manufacture commercially edible lipoprotein (protein/oil complex marketed as Lypro, a bland spray-dried powder).

The development was marked by a formal ceremony, performed by Lord Tenby and attended by representatives of many countries. Guests at this and other functions during the week sampled a wide range, equally attractive to eye and palate, of food and drink in which Lypro was the main ingredient. The food included native diets, such as maize cakes, mealies and fried fare, as the lipoprotein-producing plants are designed primarily for under-developed and other countries having under-fed peoples or malnutrition problems.

Virtually any vegetable or plant source can be used for protein manufacture. Paradoxically, it is mainly the countries suffering most from protein malnutrition that are chief sources of high protein oilseeds, now exported largely or processed for their oil content, leaving a

high-protein cake used only for cattle feeding and fertilisers.

Mr. I. H. Chayen, managing director of British Glues and Chemicals Ltd., developed his method of cell rupture, which does not spoil the cellular contents, in 1947, and subsequently research has culminated in the large scale commercial success demonstrated last week.

It was decided to put up initially two plants in Plymouth, the first to produce protein in the form of Lypro for the food industries and the second to make isolate for pharmaceutical and speciality food products. The peanut was selected as the first raw material as it is the main oilseed grown in tropical and semi-tropical countries and has long been accepted as human food.

The Lypro prototype plant has a current capacity of 1,000 tons/yr., and the isolate plant, ready for commissioning, will produce 750 tons/yr. A plant to produce 2,000 tons/yr. of Lypro will cost about £300,000 and provide for the protein supplementation of 120,000 people at a cost of about 1s person/week, the company told CHEMICAL AGE. The optimum unit of economic working will produce 8,300 tons/yr. at a capital cost of about £750,000, providing the necessary additional protein for half a million people at a cost of about 8d person/week.

The Lypro plant is largely automatic and about 30 persons, less than half of them skilled or technicians, are supplying the requisite labour.

With chemical exports up in 1961 West German industry seeks more State aid

WEST GERMAN chemical exports were last year valued at DM6,500 million, compared with DM6,200 million in 1960, while imports dropped over the year by DM91 million to some DM2,690 million. Despite the rise in exports of DM300 million, the rate of increase fell to only 4.5% for 1961 over 1960, compared with an increase in 1960 of some 13.6%. The share of chemical products in total Federal German exports fell off from 12.9% of the whole in 1960 to 12.7% last year.

In 1961, exports of some chemicals fell below the 1960 levels. Thus, exports of inorganic and organic chemicals fell in value from DM1,440 million to DM1,388 million and those of nitrogenous fertilisers from DM284 million to DM262 million. Leading branches of the industry whose exports rose over the year included the plastics industry, foreign sales of which rose, as stated in CHEMICAL AGE, 17 March, from DM837 million to DM898 million, pharmaceuticals rose from DM596 million to DM673 million and the tar dyestuffs from DM455 million to DM483 million.

Exports of pharmaceuticals, despite their dynamic rise over the year as a whole, fell off noticeably in rate of increase in the second half of the year, particularly in the case of unprepared pharmaceuticals.

The increase in exports to the Common Market continued, sales to the C.M. accounting for 25.9% of total exports, compared with 25.8% in 1960. Exports to E.F.T.A. held to their 1960 level, but their share in total exports fell from 28% to 26.8%, due solely to lower imports on the part of the U.K.

Exports to Communist-dominated countries fell from 6.5% of the whole in 1959 to 5.2% in 1960 and to only 4.3% last year. Exports to North and Central America rose slightly to DM511 million and those to Asia by 5% to DM923 million, while sales to South America rose from DM399,700,000 to DM477,200,000, or to 7.4% of all exports. Exports to South America have thus risen by nearly 50% within four years.

The fall in imports by some 3% was due mainly to lower imports of chemical raw materials, whose share of total chemical industry imports fell from 10.2 to 8.6%. Imports from other Common Market countries of all chemical products rose from DM809 million to DM915 million over the year, while those from E.F.T.A. countries dropped from DM646 million to DM600 million, and those from the U.S. from DM830 million to DM711 million, the fall due, however, partly to steep price reductions.

For the foreseeable future, no change of trends in chemical industry foreign trade is expected, although competition on the home and international market may intensify further. The U.S. and Japan in particular are expected to supply increased competition for the West German industry.

West German chemical producers must dispose currently of at least one-quarter of their production abroad, states the German Association of Chemical Manufacturers. Mentioning the need to exploit new markets, particularly outside Europe, the association calls for more direct co-operation from the State, today more necessary than ever.

New chemicals

Two I.C.I. products for urethane lacquers from Dyestuffs Division

TWO new I.C.I. products for polyurethane lacquers are described in the pamphlet 'Polyurethane surface coatings' issued by Dyestuffs Division.

Daltolac 12BA is a newly developed polyester resin that is said to give more flexible lacquers. It is a solution in butyl acetate of a polyester resin that is substantially linear in structure. It can therefore be used for mixing with highly cross-linked resins; this application as a plasticising resin is expected to be the main outlet.

Suprasec KN will give urethane lacquers with drying rates of the same order as those of nitrocellulose lacquers. It is a solution of an organic polyisocyanate in butyl acetate and gives very much faster curing lacquers than earlier isocyanates. Although highly reactive, Suprasec KN is a high-molecular weight polyisocyanate which has a very low vapour pressure and therefore presents minimum toxic vapour hazard in use.

Novel application for special silicone rubber

A special silicone rubber has been formulated by the Nobel Division of I.C.I. for a novel application by Ioco Ltd. It serves to impregnate woven glass fabrics of specific construction used to make laminated press pads having outstanding resistance to heat and pressure.

Use of the new pads, which have very long life, is expected to cut production costs of laminate manufacturers, especially where automatic or semi-

automatic processes are used. Makers of p.v.c. and p.v.c. copolymer sheets, decorative laminates and rigid laminates based on thermosetting resins will benefit, it is stated, from the advance.

Vinyl water paints

A technical service report on their vinyl water paints, the use of which instead of oil-bound distempers is claimed to save considerably in both material required and application costs, is available from Vinyl Products Ltd., Butter Hill, Carshalton, Surrey.

New acrylic dyes

The Calcozine acrylic dyes, a new range of cationic dyestuffs for acrylic fibres, are now available to industry through the U.K. distributors, D. G. Bennett Chemicals, 11a St. Johns Hill, London S.W.1. Manufactured by American Cyanamid, the Calcozine acrylic dyes are said to show good fastness to washing and light; they can be applied in most types of equipment without the use of a retarder.

Antistatic agent is corrosion inhibitor

A new textile processing agent, Cirrasol NAS, introduced by I.C.I. Dyestuffs Division, combines excellent antistatic corrosion-inhibiting and wetting properties. It can be used as a corrosion inhibitor in solutions of anionic and non-ionic surfactants, in mineral and vegetable oil emulsions.

Turner and Brown link with Matthews and Yates for expansion of sales

SALES outlets of Turner and Brown Ltd., chemical plant engineers, Davenport Works, Bolton, have been considerably expanded by a closer integration with their associate company, Matthews and Yates Ltd., Swinton, Manchester, manufacturers of Cyclone fans.

As a result of this agreement Turner and Brown products will in future be handled by any of Matthews and Yates' regional offices at Birmingham, Bournemouth, Cardiff, Glasgow, Leeds and London. The anticipated increase in sales resulting from this arrangement will be catered for by a new factory in Bolton that is now under construction. Completion date is scheduled for June of this year.

For some years Turner and Brown, experts in the fabrication of rigid p.v.c., have manufactured in collaboration with Matthews and Yates, a range of p.v.c. fans known as the Turbo-Cyclone. These fans have established a ready

market in all types of fume removal plants and installations where corrosive fumes are encountered. Both companies are members of the Standard Industrial Group.

Pay rise for Courtaulds' workers

CHEMICAL labour force of Courtaulds Ltd. will share in the wage increases granted by the company to their 17,000 process workers and 2,000 skilled employees. The new agreement, due to be announced this week, will give increases of 4½%, giving process workers a rise of 2½d an hour from 21 April.

Courtaulds' manual workers and those at British Nylon Spinners, jointly owned with I.C.I., are to have an extra three days added to their two weeks' annual paid holiday. B.N.S. are due to reply to a pay offer on 26 April.

American Potash change to chloride process for TiO₂

THE chloride process will be used in the new titanium oxide plant being built at Mojave, Calif., as a joint venture of American Potash and Laporte Industries (see CHEMICAL AGE, 26 November 1960). Laporte, who hold a 15% interest in the 25,000 ton plant, will, it is reported in the U.S., supply the basic know-how for the process, on which they are said to have worked for many years. Ampot's engineers have played a part in the application of the process, to which both companies have equal rights.

The decision to switch to a chloride process from the sulphate route, which was originally planned, was taken because it was felt that the chloride process would yield a better grade of product.

At present, Du Pont are the only U.S. titanium oxide manufacturers who use the chloride route.

New U.K. headquarters for F.B.A. pharmaceuticals

NEW British headquarters of F.B.A. Pharmaceuticals Ltd., subsidiary of Farbenfabriken Bayer AG, Leverkusen, are to be built at Haywards Heath, Sussex. Mr. Brian E. Hebert, F.B.A.'s general manager, says the new premises will provide the company with much needed extra space for its growing commercial interests, not the least being adequate storage room for pharmaceutical products.

In due course it is hoped that a certain amount of manufacturing will take place at Haywards Heath and ground space exists on the site for the installation of pilot plant.

Main contractors are C.A.S. (Contractors) Ltd., who built the Lederle Laboratories at Gosport for Cyanamid of Great Britain and who last year completed a £1.5 million development at Queenborough, Kent, for Abbott Laboratories Ltd.

Anglo-American chemical to operate at Birtley

THE Kawecki Chemical Company, Boyertown, Pa., U.S., and Durham Chemical Group Ltd., Birtley, Co. Durham, are to form a joint company at Birtley to produce master alloys for the grain-refining of aluminium and other metals. Kawecki are one of the principal producers of master alloys in the U.S., while the Durham Chemical Group, with their subsidiary and associated companies, have long been active in the inorganic and metallurgical field.

The new company, in which Kawecki and Durham will be equal partners, will be operated by the Durham Chemical Group, but the full technical resources of Kawecki will be available. A site has been chosen and it is planned to start production during 1962. The name of the new company is under discussion.

Overseas News

EASTMAN DEFINE STRUCTURE OF NEW POLYALLOMER FAMILY

THE structure of a class of polymers called polyallomers by Eastman Chemical Products Inc. (see *CHEMICAL AGE*, 3 February, p. 198) has now been defined. Polyallomer chains consist of polymerised linear segments of each of the monomers used. However, polyallomers are not physical blends of homopolymers, Eastman says, but neither do the terms 'block polymer' or 'copolymer' describe the compounds adequately.

Apparently the highly crystalline structure of polyallomers is due to the long segments of homopolymer. The new materials, Eastman says, can be tailored to overcome many of the deficiencies found in crystalline homopolymers.

Patent applications made by Eastman include coverage for composition of matter, catalyst system and process. Full-scale techniques for the commercial production of polyallomers have been developed, using a process which is described as medium pressure. Propylene-ethylene polyallomers are the first members of the group to become available commercially and will be marketed in the company's Tenite line. The company expect that polyallomers of propylene with isoprene or butene-1 will be added before long.

They are confident that the new materials will compete in fields now served by other plastics.

C.I.L. name site for new chlor/alkali plant

Dalhousie, N.B. will be the site of the new \$5 million plant of the Chemicals Division of Canadian Industries Ltd. for the production of chlorine and caustic soda. Details of the design are being developed and it is expected that construction will start by mid-summer.

The Dalhousie works will be well situated with respect to major users in the Maritime Provinces pulp and paper industry and will be served by rail, road and year-round water transport facilities. This will be C.I.L.'s third chlor/alkali facilities, others being sited at Shawinigan, Que., and Cornwall, Ont.

B.A.S.F. nitrogen plant for Turkey

A B.A.S.F.-designed nitrogenous fertiliser plant with capacity for 36,000 tonnes/year of ammonia has been completed at Kuetahya for Azot Sanyii of Turkey.

Big falls in Italian mercury prices

Increased output and the appearance of Soviet mercury on the Western market led to substantial falls in mercury prices, it was reported at Monte Amiata's annual meeting in Rome. Increased U.S. demand was met from existing stocks and brought no benefit

to Italy's export trade which fell by as much as 39% last year. Sales in Italy, however, were said to be reasonable.

Favourable factors in 1961 were the abolition of the Italian manufacturing tax on mercury and the decision of the Italian Nuclear Energy Committee to include in their programme the construction of a reactor utilising mercury as a coolant.

Ethyl Corp. to build new caustic/chlorine plant

Ethyl Corp. are to build a new electrolytic caustic/chlorine plant at their Baton Rouge plant. Chlorine from the new unit will be on stream next spring and will be used captively by the company.

Capacity of Aquila's Trieste refinery to be more than doubled, with unit for lube-oils

AQUILA, in whom Compagnie Française des Petroles hold a controlling interest, are investing 5,000 million lire in expanding their Trieste refinery. This scheme, involving increasing capacity from 1,200,000 to 3,000,000 tonnes/year, includes provision for the following new plants: (a) a topper with a capacity of 1,800,000 tonnes/year; (b) a vacuum-distillation plant of 240,000 tonnes/year of intermediate products needed for producing lube-oils; (c) a plant for refining products turned out by the vacuum plant; (d) a plant for the extraction of paraffin; (e) a plant for decolouring of refined and deparaffined oils by means of catalytic hydrogenation; (f) a de-asphalting plant.

U.K. interests plan Swiss refinery

The refinery that E.N.I. are constructing at Collombey for Raffineries du Rhône, which it is planned will provide 40% of Switzerland's estimated consumption of 3 million tonnes/year, is likely to have competition from a new refinery planned for Olten. A feasibility study is in hand by British Petroleum, Shell, Esso and Avia of Switzerland. This project would be linked with a branch line from the South European Pipeline.

Toyo Rayon complete caprolactam plant

Production will begin next month in the new five-tonne-a-day caprolactam plant based on the photochemical pro-

Austrian firm to double methanol output

Oesterreichische HIAG-Werke AG are currently carrying out expansion of their methanol plant at Fischamend. Capacity is to be raised from 8,000 tonnes/year to between 15,000 and 16,000 tonnes/year, thus enabling this one plant to be able to cover the whole Austrian methanol demand. Although this is currently equal to about 12,000 annual tonnes, it is growing fast, and only small quantities, if any, of Fischamend methanol will be able to be exported from the increased capacity. Methanol production, to be complemented by the new capacities by the end of 1962, is based on natural gas.

Fall in U.S. output of trichlorethylene

U.S. output of trichlorethylene last year totalled 310.5 million lb., compared with 352.8 million lb. in 1960. Imports totalled 38 million lb. down on the 1960 figure of 59.1 million.

Tunisian duty-free quota for nitrogenous fertilisers

The Tunisian duty-free import quota for pure nitrogen, in the form of nitrogenous fertilisers, has been fixed for 1962 at 2,500 tons.

cess. An additional 5-tonne a day capacity is scheduled for completion in June and a further 20-tonne capacity will be ready within the year. The photochemical process involves the reaction of nitrosyl chloride and cyclohexane to produce cyclohexanone oxime. The reaction is catalysed by light from a high-powered mercury lamp.

By the end of the year, Toyo Rayon's total production of caprolactam will be 150 tonnes a day, including the existing 120-tonne-a-day plant which utilises the phenol route.

Goodyear aid for P.V.C. plant at Ferrandina

Goodyear Tire and Rubber Co. and Manifattura Ceramica Pozzi have drawn up a 10-year contract for the construction of a 40,000 tonne-a-year p.v.c. plant at Ferrandina. The new plant will form part of a Lire 30,000 million petrochemical complex which the Italian company is building. Goodyear will supply know-how and technical assistance.

Pozzi will produce acetylene from methane under licence from Badische Anilin- und Soda-Fabrik.

Overseas news

Snia Viscosa will shortly double capacity for caprolactam

OUT of a total output of 222,000 tonnes of artificial and synthetic fibres in Italy in 1961—10.4% up on 1960—54.4% or 120,500 tonnes were accounted for by Snia Viscosa, it is revealed by the company's annual report.

Snia's output of rayon remained at the same level while production of staple increased by 14.7%. An even more substantial increase was recorded for synthetic fibres, mainly polyamide fibres.

In spite of the increased production, output was not able to keep pace with sales which rose from 11,300 tonnes to 126,700 tonnes—13.8%. There was a substantial increase in home sales of rayon (22.5%) but exports declined by 17.9%. Good results are reported in the sale of synthetic fibres, an increase of 40.2% being recorded.

Snia Viscosa have improved the quality of acetate rayon, which has been gaining ground, and have stepped up the output. The production of synthetic fibres, particularly Lilon, is expanding continuously. Potential capacity has already reached 1,200 tonnes a month and will be expanded still further before the end of the current year.

The company have also started operating their first plant for the production of Sniamide nylon-6 resin.

The increasing demand for polyamide fibres and plastics has necessitated an expansion in raw material production. The first caprolactam plant went on stream recently with a capacity of 10,000 tonnes a year, a figure which will be doubled within a few months.

Ammonia plant for Pittsburgh plate glass?

It is reported that the U.S. company, Pittsburgh Plant Glass, are considering the construction of an ammonia plant in conjunction with a Dutch firm. P.P.G. have been examining a number of sites in South Carolina. It was revealed by the Charleston, S.C. development board last December that a company, which they did not name, would build a \$25 million ammonia plant with a capacity of 160,000 tons a year at Bushy Park industrial area.

Indian titanium oxide plant in production

The Travancore (India) TiO₂ plant, wholly manned by Indian personnel, has begun manufacture of rutile (superior grade of titanium dioxide) as from 20 March. The plant, 54% of the shares in which are held by the Kerala Government, now manufactures daily five tons of rutile and five tons of anatase (ordinary variety of titanium dioxide).

Rutile is used in manufacturing paints, rubber, plastics, textiles, linoleum, rayon, paper, and other industries. The plant, now being expanded, is expected to produce both rutile and anatase together to the tune of 18 tons/day by next year, and it is also proposed to build a 50 ton/day rutile plant by about 1965.

The Travancore TiO₂ plant began production of anatase in 1951. Part of the output has now been changed over to rutile. Present rutile production is estimated at about 1,800 tons, as compared with 2,000 tons annually imported by India. Manufacture of rutile by the factory—at present the only one of its kind in the country—is expected to result in a foreign exchange saving of £375 to £450 million a year.

Half of Parisian current gas consumption will be supplied by Saharan natural gas

GAZ de France have placed an order with Soc. d'Exploitation de des Hydrocarbures d'Tassi R'Mel, for 335,000 tonnes of liquefied gas (some 420 million cu. m.) a year as from 1964. This will represent about one-half of the current annual gas consumption in the Paris region.

As the Arzew gas liquefaction plant of Cie. Algérienne du Méthane Liquide was planned only to supply U.K. demand—also starting in 1964—further expansion is necessary. This will be financed by Gaz de France. The liquefied gas will be transported to France in a 25,000 tonne tanker.

U.K. and French orders now cover almost the current capacity of the Hassi R'Mel-to-Arzew gas pipelines—of 1,500 million cu. m./year. Algerian consumption of natural gas is due to rise from 200 million cu. m. in 1961 to 600 million in 1963. Capacity of the gasfield-to-port pipeline is currently being doubled by the installation of pumping stations.

Strasbourg refinery to go on steam early in 1963

Work is progressing on the new refinery at Herrlisheim, near Strasbourg. Construction started in September 1961 and the refinery is due to be commissioned during the first half of 1963. It will have the capacity to process approximately 3,300,000 tons of crude oil/year and is estimated to cost some NF260 million (about £20 million).

Japanese aid for Pakistan chemical project

A joint Japanese-Pakistani concern is reported to be ready to erect a heavy chemical plant at Gharo, West Pakistan, at a cost of some \$11 million, some \$7 million being in the form of Japanese credit. With an annual capacity of some 60,000 tonnes, the Gharo plant is due to come on stream in mid-1965.

Avisun cut price of polypropylene film

Avisun Corp. have announced a reduction in price of 1 cent a lb. of two gauges of their Olefane polypropylene film. One mil. and .87 mil. film are now 63 cents a lb. The price reduction follows the recent cuts announced by polypropylene manufacturers (see 'Overseas News,' last week).

Israel is world's biggest producer of 'heavy oxygen'

Some nine-tenths of the world supply of so-called 'heavy oxygen' now comes from Israel, it is reported. One gramme of 'heavy oxygen,' which is marketed by Yeda Research and Development Co. Ltd., is stated to cost some U.S.\$600.

The participants in the project, Societe Francaise des Petroles BP, Compagnie Francaise des Petroles, and Antar Pechelbronn each hold one third of the equity capital but the total financing of the refinery and processing capacity will be about: S.F. BP. 39%; C.F.P./C.F.R. 47%; and Antar 14%.

Crude will be supplied from the Mediterranean via the South European pipeline, construction of which will be completed by the beginning of 1963.

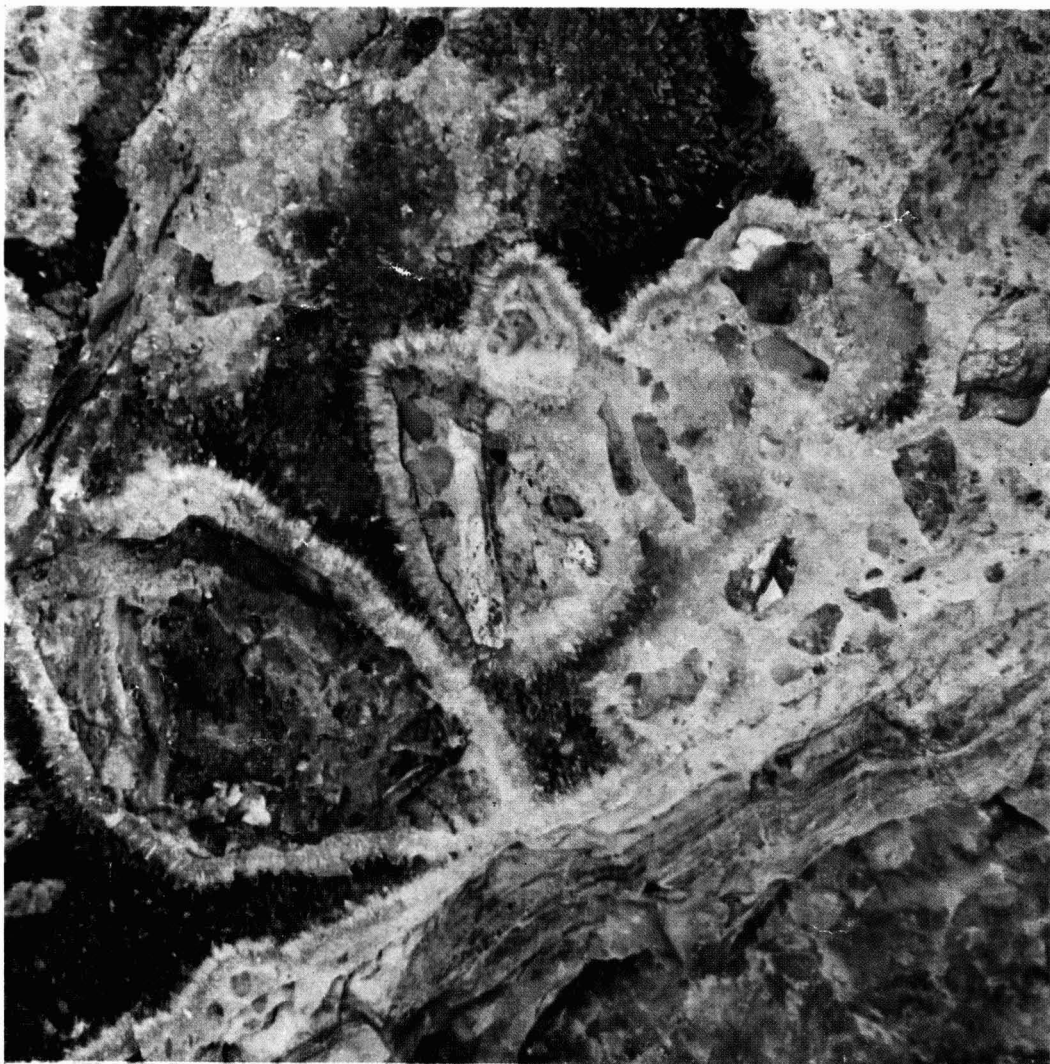
Big alkali plant planned for Argentina

Construction is planned of a U.S. \$20 million alkali plant at San Antonio Oeste, Province of Rio Negro, capable of meeting Argentina's entire demand for soda ash. A new company, Pittsburgh Cidasa Productos Quimicos, is to be set up for this purpose with 51% of its capital held by Pittsburgh Plate Glass International (a subsidiary of the Pittsburgh Plate Glass Co. of the U.S.A.) and 49% held by Compania Industrial de Alcalis.

New chemical industries planned in El Salvador

The president of the Instituto Salvadoreño de Fomento Industrial (INSAFI), Sr. Ramón de Clairmont Dueñas, told the El Salvador press recently it was hoped to interest foreign investors in the institute's industrial plans. New industries INSAFI was trying to promote included chemicals, textiles and plastic goods.

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● **Mr. Ian Fergusson**, chairman and managing director of Evans Medical Ltd., Speke, Liverpool, and a director of Glaxo Group Ltd., is retiring from both companies on 30 September. **Dr. F. S. Gorrill**, deputy managing director of Evans Medical Ltd., will succeed him.

● **Mr. Arthur C. Dennis** has been appointed general sales manager of A.P.V.-Paramount Ltd., the stainless, heat resisting and special alloy steel founders of Crawley, Sussex. Mr. Dennis was formerly with the Osborne Foundry and Engineering Co. Ltd. of Sheffield.

● **Mr. J. Wooler**, chairman and joint managing director of William Briggs and Sons, has, on medical advice, relinquished those positions, but remains on the board. **Mr. G. A. March** and **Mr. R. G. Bruce**, joint managing directors, have been appointed chairman and deputy chairman, respectively. **Mr. J. S. Smith**, secretary, has been appointed a director.

● **Dr. K. R. Westertep** has been appointed director of the Delfzijl, Holland, joint Dutch-U.S. petrochemical company, NV Petrochemie A.K.U.-Amoco.

● **Mr. J. A. Petrie, Jr.**, and **Mr. J. W. Smith**, vice-presidents of Kellogg International Corp., London, have been appointed vice-presidents of the parent company, the M. W. Kellogg Co., New York. Mr. Petrie has been a member of the Kellogg organisation for 25 years and since 1950 has been active in the management of K.I.C., particularly in the area of contract sales. He is assistant



J. A. Petrie



J. W. Smith

to the president and a director of K.I.C. as well as being a vice-president. The appointments of **Mr. R. J. Wolf** and **Mr. R. B. Smith** as senior vice-presidents and **Mr. B. W. Jesser** and **Mr. M. J. Carnesale** as vice-presidents are also announced by the M. W. Kellogg Co., a subsidiary of Pullman Inc., Chicago.

● **Dr. Eduard Oehl**, of Munich, has been nominated as vice-chairman of the Essen, West Germany, chemical company Wasag Chemie AG to succeed the late **Dr. Otto Sarrazin**.

● **Mr. P. J. Beswick** has retired from the board of Beswick's Lime Works Ltd., but remains with this subsidiary Staveley Industries Ltd., 1 Chester Street, London, S.W.1, as consultant. Managing director from 1923 of the firm which bears his name, Mr. Beswick remained in this capacity when Staveley acquired the company in 1947. **Mr. David H.**

PEOPLE in the news

Anson, who joined Beswick's Lime Works as deputy works manager in 1958, has been appointed technical director.

● **Mr. A. Watson**, formerly president of the Soap, Candle and Edible Fat Trades Employers' Federation and co-chairman of the J.I.C. for the industry, on 31 March retired from the position of personnel and finance director of Lever Bros. Ltd., Port Sunlight. He had been in the service of the Unilever organisation for 38 years.

● The following officers and committee members were elected at the annual general meeting of the British Disinfectant Manufacturers' Association: chairman, **Mr. W. Deans** (The Killgerm Co. Ltd.); vice-chairman, **Mr. R. Rigby** (Nicholas Products Ltd.); honorary treasurer, **Mr. T. R. Auchincloss** (Jeyes Sanitary Compounds Ltd.); executive committee, **Mr. E. Barton** (Reckitt and Sons Ltd.), **Mr. L. A. Bush** (Wm. Butler and Co. (Bristol) Ltd.), **Mr. H. A. H. Crowther** (Gascoigne-Crowther Ltd.), **Mr. R. E. Dexter** (The Sanitas Co. Ltd.), **Mr. P. Dyson** (I.C.I.), **Sir Knowles Edge** (Wm. Edge and Sons Ltd.), **Dr. G. C. Gibbons** (Domestos Ltd.), **Mr. F. C. Seager** (William Pearson Ltd.), **Mr. M. W. Wright** (The Cooper Technical Bureau) and **Mr. S. L. Waide** (Newton Chambers and Co. Ltd. (ex officio)).

● **Mr. A. W. Blenkinsop** has been elected chairman of the Newcastle section of the Oil and Colour Chemists' Association, and **Mr. A. A. Duell** vice-chairman. Hon. secretary is **Mr. J. A. Willey**, 40 Broxholm Road, Newcastle upon Tyne 6.

● Managing directors of Citric India Ltd. and promoters of that company's new citric acid plant are **Mr. S. P. Patel** and **Mr. M. R. Patel**. Other directors of the company are **Mr. M. R. Ruia**, chairman, **Mr. C. M. Khatam**, **Mr. J. P. Patel**, **Mr. A. Kilachand**, **Mr. S. R. Vakil** and **Mr. A. Manje**.

● **Sir Edwin Herbert**, director of Imperial Continental Gas Association and other companies, has been appointed chairman of Courtaulds Investments Ltd., the investment trust that was announced during I.C.I.'s bid for Courtaulds. Other directors are: **Mr. A. H.**

Carnwarth, a managing director of Baring Brothers, Courtaulds' financial advisers; **Mr. D. F. McCorrach**, joint managing director of Alliance Trust; **Mr. A. W. Knight**, Courtaulds finance director; and **Mr. D. R. B. Mynors**, a director of Courtaulds.

● **Mr. Charles Hulbert** has been appointed polyester resin consultant and south-west country resident in a non-exclusive services capacity by the Perox Chemicals Co. Ltd., 100 Endlesham Road, London S.W.12, the company recently formed with works at Sheerness, Kent, for the production of methyl ethyl ketone peroxide and other peroxy compounds. Mr. Hulbert was formerly in charge of polyester resin technical services for Scott Bader and Co. Ltd.

● **Mr. F. P. Doyle**, head of the chemistry department of Beecham Research Laboratories Ltd., Brockham Park, Betchworth, Surrey, has been appointed research director. He succeeds



F. P. Doyle

Dr. J. Farquharson who has resigned from the board on medical advice. Dr. Farquharson will later become special consultant to the Beecham Group research director.

● **Mr. D. J. Mason** has been appointed commercial manager of the feed milling department of W. S. Barron and Son Ltd., Gloucester, a member company of Simon Engineering Ltd.

● **Mr. W. H. Nankivell**, chairman of Samuel Courtauld and Co. Ltd., having reached retiring age, is resigning from the board and the board of Courtaulds Ltd. He will be succeeded as chairman of Samuel Courtauld by **Mr. D. R. B. Mynors**, deputy chairman.

● **Mr. S. R. Chetwynd Archer**, a joint general manager of Whessoe Ltd., Darlington, has been appointed a director.

● **Mr. H. Senior**, managing director of Cascelloid Ltd., is resigning at the end of May to become financial director of British Xylonite Ltd., the parent company.

● **Mr. M. A. Fiennes**, chairman and managing director of Davy-Ashmore Ltd., has been appointed a director of Simon Engineering Ltd.

● **Dr. C. H. Lea** has been appointed chairman and **Mr. N. D. Sylvester** vice-chairman of the Oils and Fats Group of the S.C.I., Liverpool section.

Commercial News

A.P.V.

Group profit, before tax, for the A.P.V. Co. for 1961 was £900,300 (£750,235). A dividend of 12½% (11¼%) was declared. Turnover for the year was £7.4 million (£7.1 million).

Directors propose that the company should become a holding company and change their name to A.P.V. Holdings. A new subsidiary to be called A.P.V. Co. will take over operating activities.

The order intake has declined during recent months by comparison with the same period of last year, according to the chairman's statement.

F. W. Berk

Profits from the general chemical activities of F. W. Berk and Co. Ltd. dropped 29% in 1961, mainly due to rising costs and falling margins. Profits from sand and gravel increased to £160,000 before tax. Pre-tax group profit over the past five years was: 1957, £358,884; 1958, £393,683; 1959, £524,583; 1960, £684,787; 1961, £617,473. The Coating and Industrial Dryer Divisions were markedly successful in 1961 says Mr. C. H. Tanner, chairman, and general exports showed an encouraging increase accounting for some 11% of total turnover.

Abbey Chemicals had done particularly well. Although associated companies were contributing to published profits, they were retaining about half of their earnings. The Common Market should provide additional opportunities, both in exports and imports. Berk's team of technical sales and service staff was being increased to meet the higher standards now demanded both at home and abroad.

Provided general business conditions remain stable, Mr. Tanner expects sales volume to be maintained in 1962 despite severe competition. The board is putting greater stress on research and development, as well as publicity.

British Celanese

A new joint company has been formed by British Celanese Ltd. of the Courtaulds Group and Rowlands Products Inc., U.S., under the name of Roceel. It will manufacture two-colour pattern extruded acetate sheet (see CHEMICAL AGE, 17 February, page 287).

Wm. Boulton

Net trading profits of William Boulton for 1961 increased from £91,340 to £116,640. The dividend is raised a further 5% to 25%.

Dunlop Rubber

Group net trading balance of the Dunlop Rubber Co. Ltd. for 1961 was £24,798,000 (£23,233,000). Sales were valued at £265 million (£275 million); if the 1961 figures had included sales and results of Dunlop Japan, the sales figure would have been maintained. Deprecia-

- A.P.V. to form new holding company
- Berk's profit from chemicals falls 29%
- Mercury producers' profit doubled in 1961
- Higher profits for Saint-Gobain and S.B.A.

tion accounted for £8,756,000 (£8,123,000) and net profit after tax was £7,079,000 (£6,662,000).

Rio Tinto-Zinc

The new private company, Rio Tinto-Zinc Corporation Ltd., has been registered with nominal capital of £100. This represents a move in the proposed merger between Consolidated Zinc Corporation and Rio Tinto.

Tharsis Sulphur

Net profit of Tharsis Sulphur and Copper for 1961, after tax and depreciation was £181,916 (£196,705). U.K. tax took £76,080 (£77,434) and depreciation was £153,652 (£151,874). Dividend is 12½% (same).

A.K.U.

Net profit of Algemene Kunstzijde Unie (A.K.U.), Arnhem, for the first quarter of 1962 was Fl.6.3 million, or £620,000 (Fl.5.5 million or £543,000). First quarter sales totalled Fl.92.3 million, or £9.1 million (Fl.86.4 million, or £8.5 million).

A/S Borregaard

Total sales from the plants of A/S Borregaard in Norway, Sweden and Austria were valued at Kr.1,224 million, or £61.2 million in 1961 (Kr.1,084 million, or £54.2 million in 1960). Net profit was Kr.6.4 million, or £3.2 million (Kr.11.5 million, or £5.7 million). Dividend is 8% (10%).

Borregaard are planning to raise new loans to help finance a large investment programme. Among the group's production last year were 140,000 tonnes of chemicals, nearly 90,000 tonnes of refined and hardened marine oils, 318,000 tons of cellulose and 10,000 tonnes of paper.

Hoechst

Farbwerke Hoechst AG are to recommend an unchanged dividend of 18% for the 1961 financial year at their coming annual meeting.

Monte Amiata

For 1961, Monte Amiata, mercury producers, Rome, had a net profit of 354,261,498 lire (182,965,166 lire). Dividend is 200 lire/share (100 lire). (See also 'Overseas news').

Péchiney-Pompey

Péchiney and Acieries de Pompey, steel producers, have formed a new company,

Péchiney-Pompey, for the alkaline treatment of minerals. The new process is to be applied in the steel as well as in the aluminium industry in which Péchiney is interested. It will make it possible to use low grade minerals which so far cannot be exploited industrially.

Reichhold Chemicals

Sales of Reichhold Chemicals Inc. in the first quarter were a record, exceeding \$27 million (\$23,790,000). Profits for the period are not yet known, but were higher than a year ago.

Saint-Gobain

Profit of Saint-Gobain, Paris, in 1961 was NF44.6 million, or £3.2 million (NF39.96 million, or £2.8 million). Turnover last year was worth NF1,214 million or £88 million (NF993 million, or £72 million). The directors state that a comparison with 1960 cannot be made due to changes in the company's structure. Business was 7% higher in 1961.

Soc. Participations Chimiques Saint Gobain is the name of a holding company set up in Luxembourg by Compagnie de Saint Gobain, Paris. Capital is the equivalent of U.S.\$20,000.

S.B.A.

Gross profit for 1961 of Soc. Belge de L'Azote et des Produits Chimiques du Marly (S.B.A.) totalled B.Fr123.3 million, or £880,000 (B.Fr1.3 million, or £580,000). No dividend is to be paid. Losses carried forward were written off in the new capital scheme, which brought in B.Fr148.6 million of new money through a capital issue.

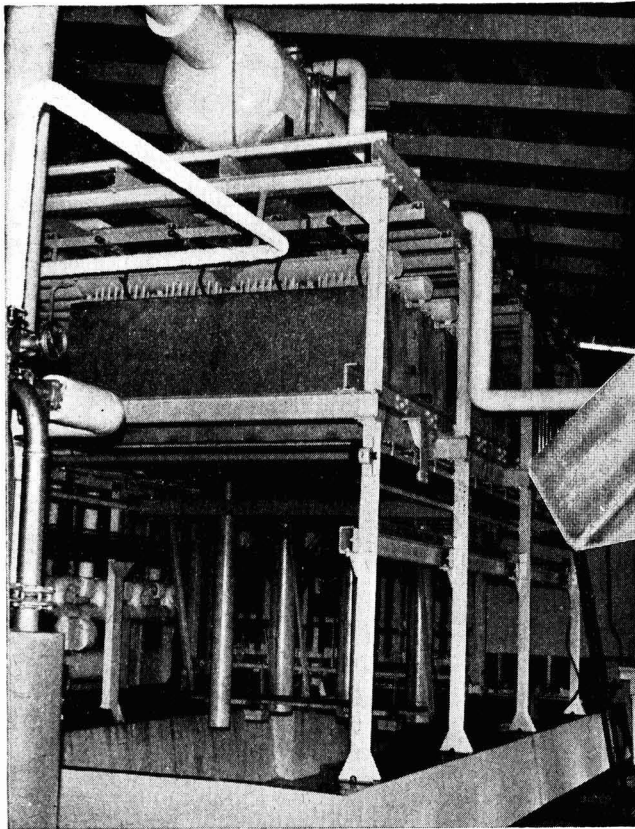
Exports of nitrogen fertilisers were consistently difficult, but better results obtained from plastics and drugs. The chemical engineering business made considerable progress.

Zwanenberg-Organon

Net profit of NV Koninklijke Zwanenberg-Organon in 1961 was Fl14.4 million, or £1.4 million, Fl13.1 million, or £1.3 million. Dividend is 17% (same but on lower capital). A 5% bonus was also paid in 1960.

INCREASE OF CAPITAL

FARBWERKE HOECHST AG, Frankfurt-on-Main, are to recommend to shareholders on 17 May an increase of capital from DM700 million to DM770 million, the new shares to have dividend rights as from 1 July and to be issued at a rate of 1:10 and at 275% face value.



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By permission of the Controller, H.M. Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 5s including postage; annual subscription £12 10s.

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

AMENDED SPECIFICATION

On sale 16 May

Polymerisation process. Distillers Co. Ltd. 813 905

ACCEPTANCES

Open to public inspection 23 May

Mixtures of ion-exchange resins. Raleigh, I. 897 006
 Insecticidal compositions. Fisons Pest Control Ltd. 896 942
 Production of aldehydes. British Celanese Ltd. 897 217
 Process of producing foamed carbamide resins of low specific weight. Spumalit-Anstalt, Kreidle, W. H., and Rutter, K. 897 218
 Polyglycidyl ether resins. Pittsburgh Plate Glass Co. 897 290
 Monoazo-dyestuffs containing phosphoric acid ester groups and process for their manufacture. Farbwerke Hoechst AG. 896 947
 Ammonia-formaldehyde reaction products. Etablissements Lambiotte Freres. 896 875
 Polyether-thioether glycols. Farbenfabriken Bayer AG. 896 999
 Tetra-hydrothiamidine-thione derivatives. Farbenfabriken Bayer AG. 896 936
 Cyclopropanophenanthrene compounds and process for their manufacture. Syntex SA 896 986
 Fibre-forming acrylonitrile polymer compositions. Chemstrand Corporation. 897 310
 Alkyl-toluenes. Aries, R. S. 897 301
 Hydrazine derivatives and a process for their manufacture. Westminster Bank Ltd. 896 987
 Manufacture of leuco sulphuric acid esters of vat dyestuffs. Farbwerke Hoechst AG. 896 937
 Biphenyl derivatives. Francesco Vismara S.p.A. 897 393
 Silicone rubber-forming compositions. Wacker-Chemie GmbH. 897 305
 Process for preparing vulcanised elastomers containing alpha-olefin polymers and copolymers. Montecatini. 896 939
 Method of preparing nitro-2,3-dihalo-1,2,3,4-tetrahydroanthraquinone and mononitro-anthraquinones. American Cyanamid Co. 896 911
 Acid esters of aryl carbinols. Angelini, F. [trad. as Aziende Chimiche Riunite Francesco Angelini]. 897 251
 Process for the production of vanadyl trihalides and organic halides. Du Pont de Nemours & Co., E. I. 897 187
 Process for the production of cyanine dyestuffs. Farbenfabriken Bayer AG. 897 195
 Process for the production of cyanine dyestuffs. Farbenfabriken Bayer AG. 897 197
 Processes for the production of 11 α -hydroxy-steroids. Merck AG. 896 913
 Compositions containing polypropylidone. Minnesota Mining & Manufacturing Co. 896 915
 Pigments and pigment compositions of the quinacridone series. Imperial Chemical Industries Ltd. 896 916
 Production of polycarbonates. Columbia-Southern Chemical Corporation. 897 201
 Multi-stage polymerisation process. Du Pont de Nemours & Co., E. I. 897 395
 Manufacture of polymeric materials. Imperial Chemical Industries Ltd. 897 203
 Process for the production of fluorine compounds of uranium. Commissariat A L'Energie Atomique. 897 268
 Germicide and detergent composition containing same. Dow Chemical Co. 896 894

Manufacture of polymeric materials. Imperial Chemical Industries Ltd. 896 901
 Phospholipids containing arachidonic acid. Calmic Ltd. 896 903
 Precipitated calcium carbonate. Imperial Chemical Industries Ltd. 897 205
 Production of unsaturated aliphatic nitriles. Distillers Co. Ltd. 897 226
 Polymer-in-monomer syrups, their production and the production of thermoplastic resin articles therefrom. Du Pont de Nemours & Co., E. I. 896 905
 Process for the preparation of furan derivatives. Ciba Ltd. 897 095
 Production of N-carboxy-alpha amino acid anhydrides. Courtaulds Ltd. 896 906
 Fluidised bed catalytic reforming. British Petroleum Co. Ltd. Housam, E. C. and Knight, W. N. N. 897 237
 Epoxide-containing esters, their preparation and resinous compositions containing them. Union Carbide Corporation. 896 971
 Stabilisation of halogenated aliphatic hydrocarbons. Columbia-Southern Chemical Corporation. 896 953
 Tricyclic compounds and a process for the manufacture and conversion thereof. Hoffmann-La Roche & Co. AG, F. 897 328
 Method of preparing chlorinated diphenyl derivatives. Soc. D'Electro-Chimie D'Electro-Metallurgie et des Acieries Electriques D'Ugine. 897 149
 N-heterocyclic compounds. Geigy AG, J. R. 897 052
 Method of separating acrylamide. Soc. D'Electro-Chimie, D'Electro-Metallurgie et des Acieries Electriques D'Ugine. 897 209
 Process for the production of high molecular weight polycarbonates. Farbenfabriken Bayer AG. 897 114
 Bis azo dyes. Aziende Colori Nazionali Affini Acna Spa. 896 909
 Indoles. Richter, Gedeon Vegyeszeti Gyar R. T. 897 115
 Quarternary ammonium anthraquinone dyestuffs and a process for preparing same. Mitsubishi Chemical Industries Ltd. 896 972
 Preparation of substituted phenoxazines. Smith Kline & French Laboratories. 897 157
 Phosphonic acid esters. Farbenfabriken Bayer AG. 896 956

Sulphochlorinated polyolefines having a good tackiness and process for their manufacture. Farbwerke Hoechst AG. 897 081
 Deodorising phosphorodithioate compounds. American Cyanamid Co. 897 332
 Process for the production of epoxide resins. Henkel & Cie. GmbH. 897 096
 Separating mixtures or organolead and organo-aluminium compounds. Ethyl Corporation. 897 334
 Esters and process for their manufacture. Ciba Ltd. 897 162
 Copolymers. Rhone-Poulenc. 897 335
 Process and apparatus for flash concentration of polyolefin solutions. Phillips Petroleum Co. 897 271
 Ether of methyl reserpate and salts thereof and a process for their manufacture. Ciba Ltd. 897 063
 Therapeutic cyanophenoxazine derivatives. Smith Kline & French Laboratories. 897 158
 Recovery of pure phthalic anhydride from crude product obtained in the oxidation of naphthalene. Badische Anilin-&-Soda-Fabrik AG. 897 210
 Stabilisation of polyolefins. Polymer Corporation Ltd. 897 098
 Production of penicillin compounds. Pfizer & Co. Inc., Chas. 897 046
 Process for the production of 6-methyl-3-keto- $\Delta^4,5$ -steroid compounds. Soc. Farmaceutici Italia. 896 980
 Production of acrylonitrile cyclic dimer. Du Pont de Nemours & Co., E. I. 897 275
 Polymerisation of acetylene compounds. American Cyanamid Co. 897 099
 Method for manufacturing polyvinyl ethers. Mitsubishi Chemical Industries Ltd. 896 981
 Process for the production of polyvinyl chloride and copolymers containing vinyl chloride. Chemische Werke Huls AG. 897 340
 Pyrrolidones and a process for the manufacture thereof. Hoffmann-La Roche & Co., AG, F. 897 278
 Aralkylation of aromatics with styrenes. Socoony Mobil Oil Co. Inc. 896 864
 Thermoplastic rigid and shock-resistant materials based on vinyl chloride polymers. Rhone-Poulenc. 897 341
 Process for polymerising alpha-olefins and catalysts therefor. Montecatini. 897 033
 Polymerisation. Union Carbide Corporation. 897 282
 Aminoalcohols and process for their manufacture. Ciba Ltd. [Divided out of 897 162.] 897 163

Market Reports

GOOD PRE-HOLIDAY DEMAND FOR CHEMICALS

LONDON Home trade demand for industrial chemicals has been fairly active but the approach of Easter has brought some contraction in the movement of supplies to users. Prices are mainly unchanged and steady at recent levels.

The demand for fertilisers is high and the improvement in weather is likely to bring about pressure for deliveries. There has been a steady flow of export inquiry with buyers seeking competitive quotations.

The coal tar products show little change on the week and prices are well held.

MANCHESTER Chemicals and allied products are on the eve of a quiet pre-holiday spell, but on the whole business has been maintained around its present level. Home and overseas orders have increased moderately, with little complaint from sellers regarding the oft-asked against old commitments, alkali and most other bread-and-butter lines with a few exceptions being taken up in reasonably good quantities. Light and heavy tar products have been generally

in quiet steady demand. Fertiliser compounds have had a brisk seasonal trade.

SCOTLAND Short time is still being reported from some sections of the textile trade, but from opinions expressed from various quarters, it would appear that this industry as a whole is still enjoying the upsurge experienced last week. This applies to the chemical industry generally, and a good volume of business has been experienced by most branches of the trade. The recent spell of fine weather has resulted in the expected demand for fertilisers, etc., and a continuance of this is anticipated. There has been a noticeable falling off of exports over the last few weeks, but the period just past has been attended by some lively interest and quite a lot of worthwhile business has been quoted for.

Will

Mr. Frank Arnold Greene, consulting chemical engineer, past president, Institution of Chemical Engineers, left £15,770 net (duty £1,580).

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TRADE NOTES

U.A.M. Pipe Division

The newly-formed U.A.M. Pipe and Ducting Division? (of the Universal Asbestos Manufacturing Co. Ltd.) will initially handle Union pitch fibre pipes made by Union Fibre Pipes (Great Britain) Ltd., and Aspect p.v.c. pressure pipes made by Allied Structural Plastics Ltd. Later it may become responsible for other products of the group which can be used for pipes, ductings or conduits. The division will be centred at Tolpits, Watford, Herts.

Pentachlorophenol agents

Dominion Tar and Chemical Co. Ltd., Montreal, have appointed Chemicals Trading Co. Ltd., 18-20 Creechurch Lane, London E.C.3, as their sole U.K. distributors of pentachlorophenol flakes, technically pure. Supplies are now available.

Carbon black prices

Carbon black prices were reduced last week by both Cabot Carbon Ltd. and Philblack Ltd., with bulk prices generally ¼/lb. cheaper.

Epiflex jointing

Details of their product Epiflex, which, they state, due to a special method of formulation, always remains flexible and by virtue of combined properties of corrosive resistance and resilience pro-

vides an ideal expansion jointing material for floors in industry are available from E. Haworth (A.R.C.) Ltd., 40 Buckingham Palace Road, London S.W.1.

Pro-fax polypropylene

New literature describing the three high-impact types of Pro-fax polypropylene, designed to enhance its low-temperature performance without changing the properties needed for successful injection-moulding, blow-moulding, and extrusion applications, has been published by the Hercules Powder Co., 910 Market Street, Wilmington 99, Del., U.S.

Chitting house insecticides

Known as Bladafum, a new insecticide to combat aphids in potato chitting houses has been introduced by Baywood Chemicals Ltd., 37-41 Bedford Row, London W.C.1.

Durez phenolic resin

Copies of technical data sheet No. 1102 covering Durez 19900, a thermoplastic phenolic resin having a medium melting point and supplied in a crushed form, are obtainable from Omni (G.B.) Ltd., 35 Dover Street, London W.1.

Laporte Chemicals

Descriptions and main uses of their major chemical products are featured in an attractive catalogue issued by Laporte Chemicals Ltd., Luton, Bedfordshire.

DIARY DATES

TUESDAY 24 APRIL
Inst. Plant Eng.—Cardiff: S. Wales Inst. Eng., Park Pl., 7.30 p.m. 'Water treatment & chemical cleaning' by B. Whitehead.

WEDNESDAY 25 APRIL
O.C.C.A.—London: Criterion Restaurant, W.1. A.g.m.

S.C.I.—London: 14, Belgrave Sq., S.W.1, 6.15 p.m. A.g.m. & 'Foods low in phenylalanine' by Dr. L. I. Woolf and Dr. F. A. Robinson.

THURSDAY 26 APRIL
Inst. Plant E.—Chester: The Blossoms, 7.15 p.m. 'The application of maintenance experience to new design' by E. Mabbs.

Inst. Plant E.—Newcastle upon Tyne: Roadway Hs., Oxford St., 7 p.m. 'Pressure vessel breakdowns' by J. L. Harding.

S.C.I.—London: 14, Belgrave Sq., S.W.1, 6 p.m. A.g.m. & 'The chemical basis of cell properties' by Sir Cyril Hinshelwood.

FRIDAY 27 APRIL
C.S.—Dundee: Chem. Dept., Queen's Col., 5 p.m. 'Principles of radiation chemistry' by Prof. F. S. Dainton.

C.S.—St. Andrews: Chem. Dept., St. Salvators Col., 5.15 p.m. 'Applications of nuclear magnetic resonance in structural organic chemistry' by Dr. L. M. Jackman.

I.E.E.—London: Savoy Pl., W.C.2. Symposium on Flame-proofing, intrinsic safety & other safeguards in electrical instrument practice.

Plas. Inst.—Birmingham 3: James Watt Memorial Inst., Gt. Charles St., 6.30 p.m. 'Plastics in the motor industry' by K. C. Waldon.

S.C.I.—Cardiff 7: Univ. Col., Cathays Park. 'Chemistry & space flight' by R. A. Wilson.

New chemistry block for Reading University

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PREVIEW ISSUE—June 16

This issue will give our subscribers an opportunity to read about the exhibits and to plan their visits in advance.

REPORT ISSUE—June 30

Details of those exhibits about which advance information was not available will be published in this issue together with a 'round-up' of every new item of equipment.

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