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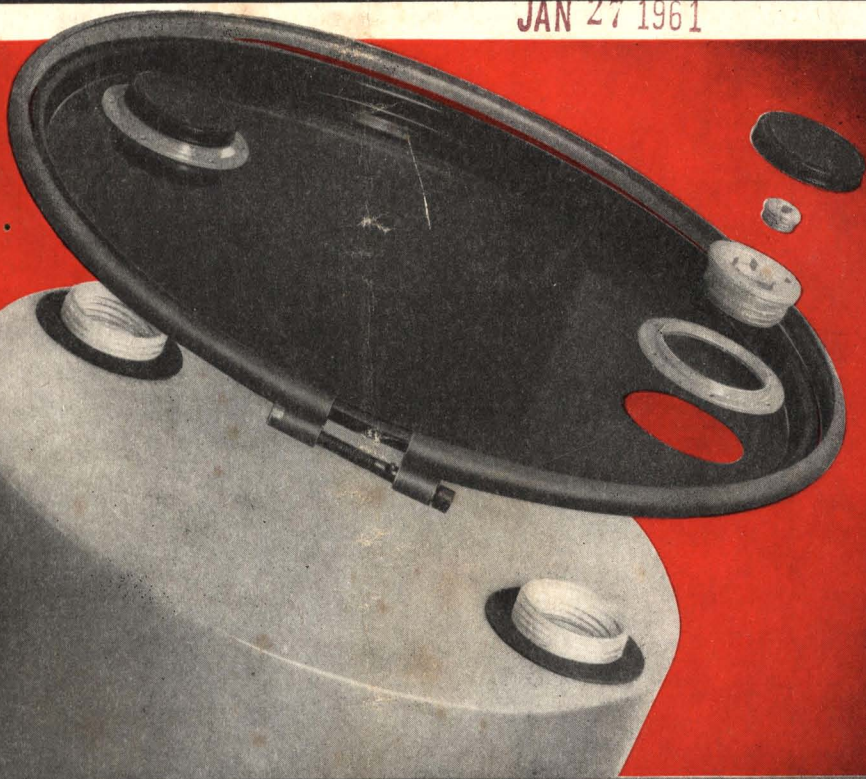
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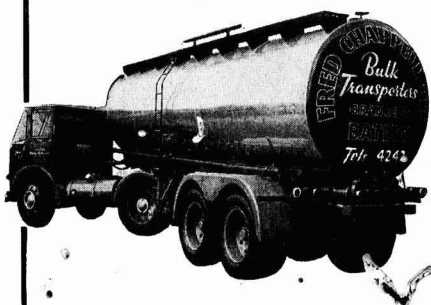
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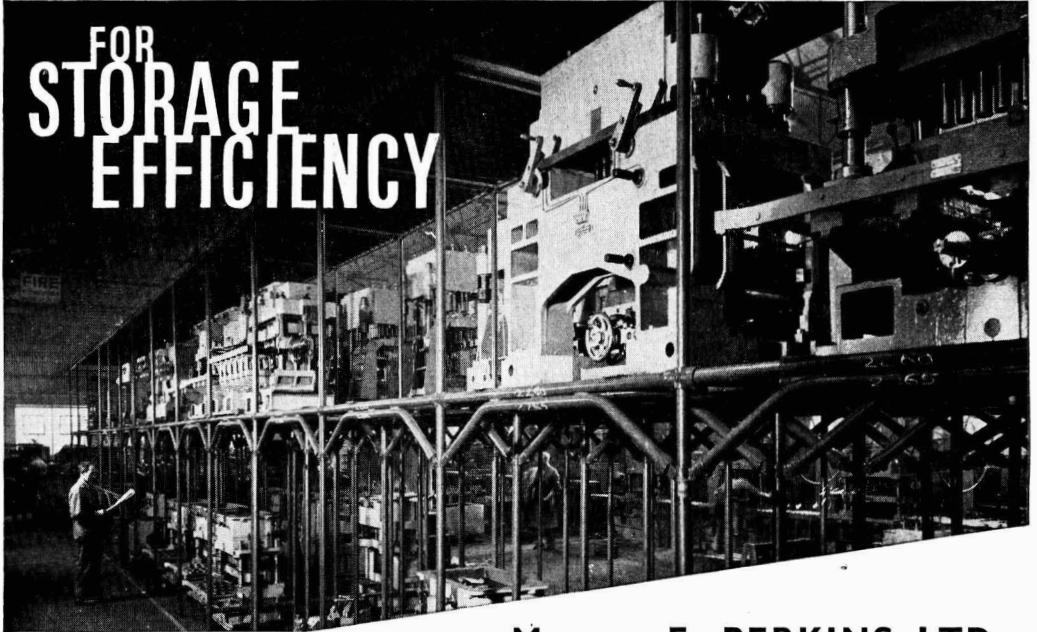
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CHEMICAL AGE

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U.S. 'INVASION' OF EUROPE

START of 1961 marks the third 10% cut in the Common Market's internal tariff on manufactured goods, plus the beginning of a move towards aligning the external tariff to outside nations. There is a fairly widespread sentiment that 1961 might well see Britain linking with the European Economic Community along with other members of the European Free Trade Association, if not as direct members of the Six, then as part of a broader customs union.

While British chemical producers can look forward to a year of stiffer competition in their best export markets, the U.S. industry has assured itself of a large slice of the most rapidly expanding market in the world. This has been achieved by a large-scale penetration of the chemical industry of the Common Market countries either in the form of wholly-owned subsidiaries of U.S. parent companies or in two-way links with other U.S. firms or with Continental manufacturers.

Statistics on the subject are rather sketchy, but there can be no doubt as to the extent of the 'invasion'. Our survey of chemical developments in the Common Market, published in this issue, clearly shows that U.S. investments are a dominant feature. In one field alone—that of carbon black—eight development projects scheduled for 1960-61 all involve U.S. capital and know-how. Two are joint U.S.-European ventures; three are sponsored by individual U.S. companies; and for the remaining three, U.S. companies have combined.

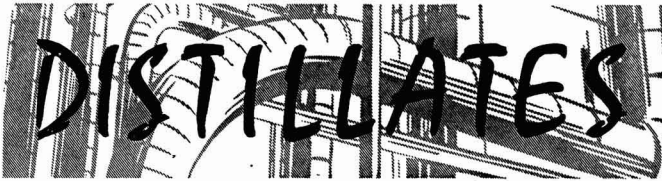
Over the whole of Europe, U.S. investments in chemicals totalled \$400 million in 1959, compared with \$100 million in 1950. According to the Department of Commerce, sales by U.S.-owned plants in Europe were worth more than \$1,000 million in 1959. Since 1959 when the Treaty of Rome established the Common Market, U.S. American chemical companies have concentrated their foreign investments in this area in preference to other parts of the world.

Reason for this massive interest in the C.M. is obvious. The external tariff of the Six is likely to shut U.S.-produced chemicals out of the area. Subsidiary or affiliated plants in the European Economic Community give American companies a vital stake in the area, assuring their sponsors a slice of the profits available.

U.S. investment is greater in France, Italy and the Netherlands than in Federal Germany. It is Germany, with the Continent's most highly developed chemical industry, that is the most concerned about rising competition from U.S. ventures within the C.M. area. Carbon black is again a good example. Until the U.S. 'invasion', Degussa of Frankfurt had the European market to themselves. They are still the only important West German producers, but must now compete within the Common Market with U.S.-sponsored plants that are springing up all over Europe (three each in France and Italy and two in Holland), with a total capacity approaching 170,000 tonnes a year by the end of 1961.

It should not be thought, however, that the German industry is totally opposed to U.S. penetration. The view taken is realistic and ventures which bring new technology and new products to Europe are welcomed.

(Continued on page 8)



★ **HAVE** British chemical producers 'missed the bus' in the Common Market? Lack of large scale U.K. participation in the fantastic development of this area prompts this question which is heard in many chemical industry circles. A glance at our special Common Market survey, which pinpoints the massive U.S. penetration of the 'Six' will doubtless lead many more to ask the same question.

There is obviously some truth in it. British firms have missed some golden opportunities by not setting up more production units on the Continent, but the U.S. producers have a much greater incentive to do so. The alternative to not getting into Europe with their own plants, is to see their exports dwindle. The British company, on the other hand, will always find sales in the Common Market, even if the total falls; also there is the strong feeling that before long Britain will in some form or another associate with the 'Six'.

In the meantime, I was pleased to learn (see p. 14), that a relatively small British firm has with a German partner set up plant to supply Germany and later the whole area with their zinc dust. It is in fact mainly the smaller British firms, usually those with highly specialised products, who have shown most interest in Europe as a base for production.

★ **THE** New Year starts with an interesting experiment for Mr. T. T. Morgan, a polythene plant design engineer at I.C.I. Wilton Works. Next week he starts an 18-month assignment with the Celanese Chemical Co., in the U.S. He will work on the design and construction of new plants in the U.S. and will study American methods in these fields in the process industries.

This secondment is an experiment. If successful, it could be a possible forerunner to further periods spent outside Britain by I.C.I. staff. A scheme such as this has obvious merits for a British company.

★ **HIGHER** freight rates from U.S. Pacific ports to U.K. ports effective from 1 January have led to increases in U.K. prices of borax and boric acid (see p. 8), which come into effect on 1 February. Importers strongly resisted attempts to gain even higher freight rates. Their efforts were successful and imposition of part of the rise has been deferred for three months and it will be reconsidered at the end of March. It is quite likely that the companies concerned will again be able to postpone a further rise, with a prospect of a 'battle' every three

months, for each deferment, if granted, would only be temporary.

Full effect of the freight charges originally sought would be to create a steep differential for rates from U.S. Pacific coast to U.K. ports compared with shipment to Continental ports. Labour difficulties in U.K. ports and a longer turn round are said to add to the costs of exporting to this country.

★ **If** you happened to visit Slaithwaite, near Huddersfield, around Christmas time you might have thought that some one had been literally 'painting the town red', for a barrel of magenta dye fell off a lorry and the powder got blown about by the wind so that streets, houses, gardens and cars received a liberal coating of it. A man with a distinguished head of silvery hair was converted to an angry red-head. Washing hanging out to dry, and birds hanging around for worms, were similarly incarnadined.

Responsibility for this Yuletide 'rolling out of the barrel' rests with British Road Services, whose lorry was carrying the dye. Which must be a relief to I.C.I., to whom the dye belonged, since the remarks of those who suffered from the incident were most unseasonal.

★ **DOES** the chemical industry need more technicians? According to a survey conducted by the Ministry of Labour (see p. 22) there are 1½ technicians to every qualified scientist or engineer in the chemical and oil refining industries, while in the engineering industry the proportion is rather more than 5 to 1. In industries like metalworking and shipbuilding, of course, the technician is the backbone of all practical operations; a man who knows his onions without what he would regard as 'high-faluting' degrees and diplomas, and whom engineers fresh from college or university come to respect for his common sense and unerring instinct based on long association with his craft.

In the chemical industry, of course, the situation is rather different; with highly technical processes calling for scientific understanding, there is a tendency for personnel to be divided rather more sharply into the fully qualified and the unqualified. But still the technician has his place, whether in laboratory, drawing office or on the process floor, while in servicing and maintenance work he is indispensable.

I feel that, to relieve the burden on technological and scientific personnel, the chemical industry stands to benefit by

having a greater proportion of workers of intermediate capabilities, whether they are called 'technicians' or by any other name.

★ **A** CLOUD on the horizon—or it is a desert mirage? Whatever the conclusion, it seems an unusual way to refer to the possibility of importing methane from the Sahara. But then, it was Mr. E. H. Browne, deputy chairman of the National Coal Board, who was speculating on the nature of the Saharan methane deposits—so perhaps, cloud or mirage, the attitude is understandable. However, the Coal Board does not seem unduly worried; today 95% of the gas used in the U.K. is made from coal and the demand for electricity is now 50 million tons a year and this might well about double within the next 15 years, and, Mr. Browne believes, whatever happens in the marginal markets the coal industry will inevitably remain the main supply of energy in the U.K.

The Rt. Hon. Alfred Robens, chairman-designate of the National Coal Board, has also had something to say about alternative sources of energy. Should any crisis arise in oil supplies, he said, it would be impossible to turn quickly back to coal, and it must be the first duty of the Board, now that it is no longer a monopoly supplier of fuel, to take care of customers who have sustained the industry. Mr. Robens went on to say that "those who turn too lightly to oil, without weighing the consequences, must take the responsibility of their own action, for they cannot expect the existing customers of the Board to be put at a disadvantage because they get into difficulties".

★ **It** looks as though a plant to enable Nyasaland to capture 10% of the £250 million world market in essential oils is to become a victim of racial unrest in the Federation of the Rhodesias and Nyasaland. Since his arrival in Nyasaland last August, Mr. J. S. Douglas, a scientist specialising in essential oils and hydroponics, has penned several articles on the prospects of setting-up a large-scale industry in a country that has no industry.

For the past 10 years he has done research on plant cultivation for essential oils in India and other parts of Africa. The Nyasaland Government's offer of employment on research had to be withdrawn when Mr. Douglas was refused a residence permit by the Federal Department of Immigration.

Mr. Douglas is married to an African. But without his expert knowledge it seems that Nyasaland will not have the chance of entering the essential oils market.

Alembic

Project News

Humglas Gain Indian Contract for Naphthalene-chemicals Plant

CONTRACT for the design and construction of a chemical plant in India has been awarded to **Humphreys and Glasgow Ltd.**, Carlisle Place, London S.W.1. The plant, to be built at Bulsar, 120 miles from Bombay, is to be constructed for Atul Products Ltd., an Indian company, and is an extension to an existing chemical works.

Humphreys and Glasgow have gained the contract, which is worth about £1,300,000, for the detailed engineering, procurement, supervision of erection and assistance in the commissioning of the plant. It will produce naphthalene-based products to be used in the preparation of dyestuffs.

The manufacturing programme includes 24 different products, but a feature of the plant will be its standard range of reaction vessels which will allow for variations to be made in the programme as sales demand.

Maximum use will be made of equipment manufactured in India to conform with the current regulations of the Indian Government.

Design work on the new Atul plant will begin this year and it is expected to be complete in 1963.

Ardeer Cordtex Plant Beats On-stream Schedule

● **CORDTEX** fuse plant of the acids department of Ardeer works, **I.C.I. Nobel Division**, is now in production, some five months ahead of schedule. The project was handled by the division engineering department; project manager was Mr. H. S. Bensted and Shanks and McEwan were the principal contractors.

The extension incorporates four Cordtex spinning machines; core of the fuse is provided by pentaerythritol from the division's Dumfries plant which is nitrated, stabilised and dried at Ardeer.

Sites of U.K.-designed Soviet Detergent Factories Revealed

● **SITES** of the two factories to manufacture detergents which **Constructors John Brown Ltd.** are to design and equip in Russia in association with Marchon Products have been revealed as Shebekino, a small town near Kharkov, and Volgodosk, near Rostov on the Don. Site work is scheduled to begin in just under two years' time, and the commissioning should be completed towards the end of 1963. Russian labour will be used, with C.J.B. providing a supervisory service.

Commissioning will be largely carried out by Marchon Products Ltd. The design

of the plants which will be carried out by C.J.B. is based on Marchon's know-how. Those appointed so far to visit the U.S.S.R. on behalf of C.J.B. are Mr. T. F. Findlator, who is projects manager, and Mr. R. T. Stuart, projects engineer.

As reported in **CHEMICAL AGE**, 15 Octo-

ber 1960, p. 623, the £3 million contract is with **Techmashimport**, the U.S.S.R. state enterprise centred in Moscow, which is responsible for chemical plant projects throughout the U.S.S.R.

Fison's Ammonia Project in "Preliminary Stages"

● **LOCAL** newspaper reports in recent weeks have stated that the major ammonia project planned by **Fisons Ltd.** will be built in Wales in co-operation with **Esso**. No definite plans have been made; the project is in the preliminary stages and negotiations are still in hand with a number of companies, including **Esso**.

Chemical Firms Entertain Careers Masters at London Convention

IT is a good thing for schoolboys to know of careers opportunities in the chemical industry, but contact should be between industry and schools' careers masters; it should not take the form of visits to schools by representatives of industry, with the object of direct recruitment among sixth form pupils. It is very easy for a schoolboy to be given a misleading impression of industry.

This point was made by Sir Miles Thomas, chairman of **Monsanto Chemicals Ltd.**, when he addressed the Public Schools Appointment Bureau's careers masters' convention covering the chemical industry, held in London, 2-6 January. Sir Miles added that the industry would like very much to have more contact with careers masters, and would be prepared to arrange factory visits, which would be on an informative rather than a recruitment theme.

The convention was based at the Londoner Hotel and, as well as a number of talks by well-known chemical industry personalities on opportunities in the industry, the programme included visits by the delegates, who included a number of public school headmasters as well as careers masters, to a number of production, research and development facilities of leading chemical companies. The companies acting as hosts to the convention were **Albright and Wilson Ltd.**, **Courtaulds Ltd.**, **The Distillers Co. Ltd.**, **Fisons Ltd.**, **Imperial Chemical Industries Ltd.**, **Monsanto Chemicals Ltd.**, **Shell Chemical Co. Ltd.** and **Shell International Chemical**.

The discussion meetings opened on 3 January, when, following Sir Miles Thomas' introductory talk, Sir Owen Wansbrough-Jones, director in charge of research, **Albright and Wilson**, discussed research work in the chemical industry and the type of entrant needed. He outlined the various forms of research found in the industry and their relative importance, and went on to describe the sort of life the young research worker could expect to lead. Working conditions and salary were factors not to be ignored, while the research worker also needed technical help and good equipment.

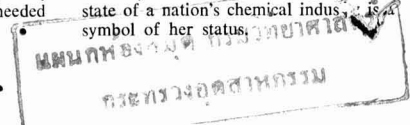
Speaking of the tendency for graduates to stay and do research at the universities where they were trained, and to obtain higher academic qualifications, Sir Owen said this had its advantages. But the training received in larger industrial firms and in Government research establishments imparted a very sound experience. Of 'sandwich' course training for those who could not graduate through a university, Sir Owen said it was too early yet to see how valuable this type of training would be, but he himself had great hopes that it would prove successful.

Another speaker expressed a less cautious opinion on 'sandwich' courses when he said that he was not a tremendous believer in them. This was Mr. C. F. Kearton, managing director of **Courtauld's Ltd.**, who on Wednesday addressed the Convention on the 'Opportunities in Chemical Manufacture.'

Mr. Kearton is a chemical engineer, a member of a profession which he described as being for "chemists who are not very good chemists." In answer to a question, he later amplified this by saying that a good chemist is most concerned with the nature of molecules and their reactions, whereas the chemical engineer is fundamentally concerned with the elegance of a process.

"The chemist is rather important," said Mr. Kearton and amply illustrated this by enumerating developments in many fields for which the chemist has been directly responsible. Among them he mentioned fertilisers, of which 1,779,000 tons were made last year, and which have helped make the U.K. more able to satisfy her own food demands than ever before. More man-made fibres than wool are now used in the U.K. and the introduction of synthetic rubber has increased the market for natural rubber and stabilised prices—to mention only a few of the consequences of chemical research.

It has been said that the state of a nation's welfare can be determined by her sulphuric acid production. It would certainly now be true to say that the state of a nation's chemical industry is a symbol of her status.





Barony for Fleck in New Year Honours

Sir Alexander
Fleck (Baron)

SIR ALEXANDER FLECK, K.B.E., D.Sc., LL.D., F.R.S., has been created a Baron in the New Year Honours List, for public services. Sir Alexander is chairman of the Advisory Council on Research and Development, Ministry of Power, and of the Nuclear Safety Committee. President of the Society of Chemical Industry, he was formerly chairman of Imperial Chemical Industries Ltd.

Apart from this new honour for Sir Alexander, there are notably few personalities from the chemical and allied industries mentioned in the List, while chemists engaged in research or education are also sparsely represented.

KNIGHTS BACHELOR

C. H. Andrewes, deputy director, National Institute for Medical Research; **G. H. Beharrell**, chairman, Dunlop Rubber Co. Ltd.; **D. H. Mason**, director, Reckitt and Colman Holdings and other companies (for political and public services in south-east England and London); and **A. H. Wilson**, deputy chairman and managing director in charge of research and development, Courtaulds Ltd. Mr. Wilson was chairman of the Coal Derivatives Committee.

C.B.

H. A. Sargeant, deputy chief scientist (B), War Office.



A. H. Wilson
(Knight Bachelor)

G.B.E.

Sir Ellis Hunter, chairman and managing director, Dorman Long and Co. Ltd.

C.B.E.

T. M. Jones, chairman, Wales Gas Board; **C. E. T. Mann**, formerly director, Rubber Research Institute of Malaya; **E. F. Newley**, deputy director, Atomic Weapons Research Establishment, Aldermaston; **G. E. Watts, M.A., B.Sc., Ph.D., F.R.I.C.**, principal, Brighton Technical College; **H. Woods**, H.M. deputy chief inspector of factories, Minister of Labour.

O.B.E.

J. Black, works manager, Mossend, Imperial Chemical Industries Ltd.; **R. Garnersey**, manager, Carrickfergus works, Courtaulds Ltd.; **N. R. Hood**, director, British Paper and Board Industries Research Association; **G. D. Ireland**, chief engineer, Windscale and Calder works, U.K.A.E.A.; **A. Jackson**, lately Director of Chemistry, Malaya; **F. Sparkes**, senior principal scientific officer, Road Research Laboratory, D.S.I.R.; **C. F. Theadon**, administrative secretary, West African Institute for Oil Palm Research.

M.B.E.

W. J. Neal, chief fire officer, Atomic Energy Research Establishment, Harwell; **C. Sanders**, senior experimental officer, A.E.R.E., Harwell.

Vinyl Acetate Anti-dumping Application Withdrawn

THE application for the imposition of anti-dumping duties on vinyl acetate (monomer) imported from Italy and Switzerland, which the Board of Trade has been considering (see CHEMICAL AGE, 15 October, p. 24), has been withdrawn, the B.o.T. has announced.

As mentioned in our 'Distillates' column, 3 December, the Free Trade Union opposed the application for anti-dumping duties, and challenged the claim that the imported monomer was being sold in the U.K. at prices well below those of the Swiss and Italian domestic markets.

'Limited' Price Rise for Borax and Boric Acid

PRICES of borax and boric acid will rise by 10s per ton from 1 February state Borax Consolidated Ltd. and Borax and Chemicals Ltd. This follows a rise of ocean freight charges which was foreshadowed last November. The companies have been successful in their efforts to get the amount of the increase temporarily reduced from the level originally proposed; the rise has therefore been limited to 10s/ton.

It is stressed, however, that only part of the increase in freight rates has been deferred—until the end of March, when the shipping companies will review the position. If the companies are not successful in their efforts to have the increase now scheduled for 1 April cancelled out, a further revision of prices may be inevitable, state Borax Consolidated.

Meantime orders are being delivered at today's prices—with first call on available supplies to contract buyers—until 1 February.

Price Cuts for Shell Polyethylene Glycols

PRICE reductions affecting three grades of polyethylene glycol—the 200, 300 and 400 grades—were brought into effect by Shell Chemical Co. on 1 January. The reductions amount to £10/ton.

Shell recently increased their output as a result of expansion at the Carrington, near Manchester, plant. Un'con Carbide Ltd. also produce polyethylene glycols at Hythe, near Southampton, where a £3 million ethylene and derivatives plant was brought on stream early in 1960. Total sales of polyethylene glycols in the U.K. are believed to be in the region of 3,500-4,000 tons/year.

A big outlet for polyethylene glycols is in the manufacture of transparent cellulose film. They are also used in the production of brake fluids, in the manufacture of pharmaceuticals and as intermediates in the textile processing and cosmetic industries.

Polymers and Plastics in Coatings

A short course on 'Developments in the use of polymers and plastics in surface coatings' will be held on 24 and 25 February at the Bradford Institute of Technology. Fee for the course is £2 5s.

U.S. 'Invasion' of Common Market

(Continued from page 5)

such cases, particularly in petrochemicals, U.S. companies frequently co-operate with European producers. Not welcome on the Continent would be any large-scale production by U.S. firms of 'bread-and-butter' chemicals which can equally well be manufactured by Continental companies.

The danger to the British chemical industry in this big build up on the Continent is three-fold: loss of valuable export business in Europe; greater competition in the remaining markets of the world; and, with big capacities for some chemicals due on stream in the C.M., the possibility of off-loading these products in the U.K. in order to keep plants working as fully as possible.

Britain is a member of the seven-nation E.F.T.A. club, but these countries do not form a closely-knit whole with common frontiers as does the C.M. Although we get E.F.T.A. tax advantages compared with C.M.

producers, the big chemical manufacturers of the Common Market can cut these drastically with lower freight charges over shorter more direct road hauls.

The big hope for 1961 then is that in some form or another Britain will join the European Economic Community.

Nobel Aims to Develop Trade in Chemicals

A SUB-COMMITTEE has been set up by I.C.I. Nobel Division at board level to study aspects of increasing the division's chemical business. Dr. James Craik, division chairman, who is to retire on 31 March, declares "We aim to become an expanding division—if not with explosives then with chemicals."

Dr. Craik adds that under the recently announced I.C.I. divisional reorganisation, Nobel would no longer be linked with Metals Division, but with Billingham, Winton Council and S.A.I.

Busy Year for I.C.I. Tees-side Plants

Higher Sales and New Expansion Projects

TRADITIONAL New Year messages to staff from heads of I.C.I. Tees-side divisions refer to higher sales in 1960, a number of new plant projects and hint at further large capital investment plans.

Mr. W. J. V. Ward, Billingham Division chairman, says that 1960 was a good year with almost all the works enjoying steady and high outputs. Sales held their own.

"A better year than 1959 both for output and turnover—in spite of increasing and often severe competition at home and overseas. That is how *Dr. S. W. Saunders*, chairman of Heavy Organic Chemicals Division, describes 1960. This year the first plant at Severnside will come into operation and he adds "plans will be prepared for larger additions as well as for new plants for production in 1962". Their research work is showing some very interesting results; schemes for further manufacturing expansion are being examined and efficiencies are steadily rising.

Mr. J. C. H. McEntee, chairman of Wilton Council, declares "we have before us a substantial programme of new capital construction, which may well be even greater than that of 1960". At Severnside excellent progress has been made with the early stages of a mounting construction programme.

Nearly all the external plants were at full capacity in 1960 declared *Dr. C. J. Bridger*, Billingham Division external factories manager. More efficient operation on the synthesis plant was the reason why Dowlais Works exceeded the record output of 1958 before mid-December.

Total output at Heysham of methanol and ammonia in 1960 was easily a record. Construction of a further methanol extension was started, including two more modern gas plants based on oil. There was a considerable increase in Heysham output of Nitro-Chalk 21 fertiliser.

Mossend output was a record and the works continued the long accident-free record which started in 19 February 1957. (As stated on p. 8, Mossend works manager has been awarded the O.B.E.)

Prudhoe plants did not run as steadily as usual and outputs did not equal previous records. There was a particularly striking rise in output of catalysts at Clitheroe in the last half of the year; this trend it is expected to continue.

Although output of nylon polymer for use by British Nylon Spinners and I.C.I. Plastics Division, was slightly below the record for 1959, Billingham nylon works had its busiest year, said *Mr. W. E. Humphreys*, nylon works manager. This was because quantities of intermediates are now being sent to the nylon works at Wilton—this will continue during 1961 to an increasing extent.

The expansion now under way at Wilton and to a smaller extent at Billingham should be completed in 1961. Con-

sumption forecasts indicate that the expanded production capacity is already fully committed. Major alterations to certain plants should be completed this year, enabling quality improvements to be made.

Mr. A. Burness, manager of Plastics Division Tees-side works, says that at the end of 1960, the works were at maximum output for Perspex, where output was up by almost 50%. Call for Diakon and nylon was at a lower level than had been hoped; the car trade was one of the major outlets for Diakon and in view of the recession here, the new plant which had been operating very well had been throttled back for some time; despite that output was doubled. Nylon compositions had also been affected, but not to the same extent, and here there had been nearly a 50% rise in output.

Olefin Output

Outputs of all olefin products remains high and many plants operated to full capacity throughout 1960, although ethylene capacity has not been fully occupied, declared *Mr. F. Wrigley*, Wilton's olefin works manager. There was much activity on planned maintenance overhauls, shutdowns and modifications, some of them of a major nature. A number of modifications have been concerned with new products or extended capacity to produce old ones, such as in the case of the ethylene glycol and *p*-xylene plants.

Polythene output at Wilton totalled about 78,000 tons in 1960 exceeding the 1959 figure by 18%, stated *Mr. L. P. Bayly*, polythene works manager. No. 4 plant had started, but its very large capacity had not all been absorbed by sales; this surplus capacity was expected to continue at least during early 1961.

The works was busy teaching licensees of the I.C.I. process and had recently dealt with Mexicans, Yugoslavs, Japanese

and Italians. In the next few months they were expecting Indians, Czechs, Poles, Rumanians, Germans and Russians.

Highlight of the plastics works at Wilton, according to manager *Mr. A. Burness*, were record outputs for Perspex and U.F./W.F. Production from the Alkathene compounding plant had risen gradually and the former P.F. resin plant was to be used for Propathene compounding; new equipment was being installed for start-up early in the New Year.

Output continued to increase on the Bukaton plant and prospects for this range of products in 1961 appeared brighter. The record output of 1959 was surpassed by urea formaldehyde and the revival in demand should continue.

Dr. G. Collin, Wilton nylon works manager, stated that the nylon IV expansion should be fully operative late in 1961, enabling 23,000 tons of nylon to be made annually. This extension is not sufficient, according to latest B.N.S. forecasts, and plans are well in hand for raising production by a further 25-30%.

That expansion, however, threatens to outrun available supplies of the starting material, benzene, and another raw material source has been developed at an economic cost. Cyclohexane, the first-stage intermediate, is available in Texas and trial quantities have been shipped in a tanker from Port Arthur to Dordrecht, off-loaded into storage there, and transferred to a tanker capable of navigating the Tees to Thornaby and from thence by road tanker to Wilton.

A 2% increase in chemical efficiency and a substantial increase in production above design helped cut polymer costs and gave a significant improvement in quality.

So far as other Dyestuffs Division plants at Wilton are concerned, there was a continued interest in *a*-naphthylamine.

(Continued on next page)

1960 Highlights for I.C.I. on Tees-side

- ▶ New plants planned for heavy organic chemicals
- ▶ Billingham output of Perspex and nylon compositions up 50%; Diakon output doubled
- ▶ High olefin outputs, with ethylene not fully occupied
- ▶ Polythene output up 18% to 78,000 tons, but there is surplus capacity. Big interest in overseas licensing
- ▶ Wilton nylon capacity to rise to 23,000 tons/year by 1961, with 25-30% expansion planned. Switch to cyclohexane as starting material
- ▶ World naphthalene shortage cuts Wilton phthalic output
- ▶ Third stage Terylene intermediate plants now on stream
- ▶ Polypropylene pilot spinning plant, due for commissioning early this year, will precede series of production units

RECORD FERTILISER DELIVERIES REVEALED IN FEDERATION'S ANNUAL REPORT

DURING the 1959/60 fertiliser year, record deliveries of nitrogen, phosphates and potash were made in the U.K. The good cereal harvest of 1959 gave farmers the confidence to apply more fertilisers to their crops. Production figures for 1959/60 for ammonium sulphate, according to statistics produced by the British Sulphate of Ammonia Federation Ltd., showed an increase of only 1% over the previous year compared with 6% for 1958/59, but production of other forms of nitrogen showed an increase of 12.4% (9.9%).

The 40th annual report for the year ended 30 June 1960 records that more ammonium sulphate was used in the manufacture of granular compound fertilisers in the U.K. than in any previous season. This included a considerable tonnage of Continental sulphate which was dumped in the U.K. before action could be taken by the Board of Trade.

Continued delay in the availability of full production from a new nitrogen plant, scheduled for operation in 1958/59, resulted in a lower U.K. total nitrogen production than had been forecast at the beginning of the season and caused further demands to be made at short notice on the supplies of the Federation.

There was no major change in the fertiliser subsidy on 1 July 1959, but the subsidy on sulphate of ammonia was then raised from £9 18s to £9 19s 6d per ton in view of the increase from 20.8 to 21% in the guaranteed nitrogen content of the product. The 1960 spring price for ammonium sulphate was reduced by 3s per ton, but much larger reductions—as much as 11s per ton—were made in the off season in order to induce the farmer to take early deliveries. The new price scale had the desired effect and more farmers than ever before took a larger proportion of their spring requirements well before the peak spring season of use. The use of straight sulphate of ammonia, which remains the cheapest form of nitrogen fertiliser available to the British farmer, increased in spite of the many competitive forms of nitrogen fertiliser available.

Exports of ammonium sulphate in the year 1959-60 totalled 240,396 tons (235,349 tons in 1958/59 and 304,895 tons in 1957-58).

A large proportion of the by-product sulphate marketed by the federation is used in the manufacture of granular compound fertilisers. Different techniques in granulation processes require sulphate of different specifications. Considerable experimental work has been done at a plant scale to produce crystals to meet these new requirements. By chemical control and by modifications to

the method of operation of by-product sulphate plants it has been possible to vary the shape and size of the crystals to meet the specifications required by the customer. The work is continuing and is being extended.

Laboratory and plant scale tests on the use of corrosion resistant alloys and resin based materials have continued and, particularly in the case of resin/glass laminate pipes, their use is increasing. A satisfactory method has been developed which gives accurate and reproducible results for the determination of small quantities of aluminium in saturator liquors.

Work on the application of automatic acidity control to the indirect process continued to give encouraging results and an installation designed to withstand the severe conditions of this process is now being set up.

World Production of Fixed N for All Purposes ('000's metric tons*)

	1958/59	1959/60
Sulphate of ammonia	3,089	3,121
Calcium cyanamide	322	310
Nitrate of soda	240	227
Nitrate of lime	415	430
Amm. nitrate for use as fertiliser ...	1,144	1,345
Lime amm. nitrate types ...	1,639	1,722
Amm. and solutions as direct/indirect fertiliser	1,301	1,516
Urea for fertiliser use	519	597
Other forms of nitrogen	2,615	3,061
Total production	11,284	12,329
Increase % on prior years	9.1	9.3
* 1 metric ton = 0.9842 long ton.		

World Consumption of Fixed N for All Purposes ('000's metric tons*)

	1958/59	1959/60
World total all forms	11,147	12,348
Increase % on prior year	10.8	10.8
World total in agriculture	9,364	10,283
Increase % on prior year	11.0	9.8
Use in agriculture by Continent:		
Europe (inc. U.S.S.R.)	4,412	4,717
America	2,720	2,895
Asia	1,893	2,303
Africa	282	319
Oceania (inc. Hawaii)	57	49
* 1 metric ton = 0.9842 long ton.		

N Content in All Nitrogen Fertilisers (metric tons of 2,204.6 lb.)

	1958/59	1959/60
Sulphate of ammonia	196,900	202,300
Other forms	148,800	218,900
Total nitrogen	345,700	421,200

Total Production of N Fertilisers in U.K. (long tons of 2,240 lb.)

Year	England and Wales	Scotland	Northern Ireland	Total	Of which Sulphate of Ammonia as such
1958	1,459,700	171,400	1,600	1,632,700	1,098,000
1959	1,626,100	151,400	1,700	1,779,200	1,015,000

Sulphate of Ammonia Only (long tons of 2,224 lb.)

Fert. Year	England Wales and Channel I.	Scotland	N. Ireland	Total
1958/59	722,000	145,000	56,000	923,000
1959/60	747,000	144,000	57,000	948,000

I.C.I.'s Busy Year on Tees-side

(Continued from page 9)

while a change in the feed-stock has cut the catalyst usage and lowered the overall costs. The production of Nonox ZA in the *a*-naphthylamine plant had become a profitable addition to the rubber chemicals sales range. Output of Lissapol was the highest by a considerable margin since the plant started in 1951.

The phthalic anhydride plant was now 'tamed', but the actual tonnage made during the year was limited by the worldwide shortage of naphthalene. Consistent and high rates well in excess of flow-sheet have been established and the high 1961 demands for phthalic should be met.

Mr. J. Watt, section manager in charge at Bain Works, reports that for the first time the chlorine and caustic soda plant was called on to work at maximum capacity. Output in the third quarter of 1960 was a record.

Flowsheet capacity of the Terylene plants was fully used in 1960 says Dr. J. Y. Baxter, works manager at Wilton. In the early part of the year, needs for polymer exceeded capacity, but following

completion of the third plant, it was now possible to accept commitments for the sale of polymer of I.C.I. licensees in France and Italy. Commissioning of stage-three intermediate plants for the production of terephthalic acid and dimethyl terephthalate started in the fourth quarter and despite some technical difficulties good progress was made.

Fibre capacity had been enlarged and new products had been added to the range. A further increase was expected in demand for both filament yarn and staple products and further spinning machines will be installed. Polypropylene yarns will be produced.

Preparations are in hand for the erection of a plant for the production of polypropylene products for use in the cordage industry. The commissioning of a pilot plant for the spinning of polypropylene filament yarn is expected in the first quarter of the year. Quantities will be produced for market appraisal; the first of a series of polypropylene production units will be commissioned later.

Chemicals in the Common Market



This special survey reviews the big growth plans of the chemical industries of the main Common Market countries: Belgium, France, Italy, Netherlands and West Germany. Brief notes are given where projects involve processes of particular interest

U.S. COMPANIES SHARE IN FAST EXPANDING MARKET

THE six countries of the European Economic Community last year produced chemicals worth a total of \$11,500 million, as against an output value of only \$6,600 million in 1953. This represents a production increase over the period of 74%, as against a world rise of only 54%. Of the 1959 total Federal Germany produced \$4,900 million, France \$3,000 million, Italy \$2,400 million.

Last year Common Market output of petrochemicals totalled some 830,000 tonnes, while only four years before output did not exceed 200,000 tonnes. This is a sharper increase by far in output rate than was recorded in the 1955-59 period for the rest of western Europe. In Italy and France petrochemical capacity increased over the period by more than 600%. In the 1959-61 period

(i.e. for projects due to open before the end of 1961), Federal Germany is investing \$250 million in petrochemicals, France \$225 million and Italy \$195 million.

In 1959 some 50% of the chemical exports of the combined Common Market area went to non-C.M. countries within the O.E.E.C. framework. About the same proportion of the chemical exports of these countries went to the C.M.

U.S. investment in the Common Market chemicals field is heavy and has grown steadily since 1957 when the area began to take shape. At present some 500 U.S. chemical companies have subsidiaries in the six countries; of those about 100 are based in Federal Germany. In 1959 sales by U.S.-owned chemical plants in Europe were valued at \$1,030 million, compared with \$822 million in 1957.



Stress-points disclosed by this survey are:

1. Mammoth 'invasion' of Europe by an estimated 500 U.S. chemical companies.
2. Biggest current investments are in petrochemicals: olefins, polyolefins, synthetic rubber, etc.
3. Eight carbon black projects, all involving U.S. capital, will give the C.M., excluding Germany, more than 175,000 tonnes capacity by end-1961.
4. Other major fields for development include: titanium oxide, chlorine, and pharmaceuticals.

BELGIUM: Petrochemical Complex Takes Shape at Antwerp

A NUMBER of chemical plants are to be opened in Belgium over the coming years, most of them financed partly or wholly from abroad. Good transportation facilities and a suitable geographical placing have made the country particularly suitable for the setting-up of branch companies by U.S. firms wishing to enter the European market and a spate of new subsidiaries based in Belgium was announced in 1960.

One of the home concerns with progressive future plans is the Union Chimique Belge. This company was engaged in 1960 in the erection of a new plant for the production of maleic anhydride and phthalic anhydride and benzene rectification, while raising phthalic anhydride capacity of their Schoonaarde plant by 75% over 1960. Cupric chloride output at the Union's Wondelgem works is to be increased by one-third.

Société Chimique de Selzaete have an S.B. licence to build a 5,000 tonnes/year maleic anhydride plant at Selzaete that is due on-stream by early 1962.

Starting in 1961, Amoco Fina Co.—a joint subsidiary of the Belgian Petrofina oil company and the Amoco Chemicals Corporation, U.S.—are to produce and market petrochemicals in Antwerp. The Common Market area will be the plant's

market. Also to be opened in Antwerp in 1961 is the polythene plant of another Belgo-U.S. firm, Cobenam. Erected as a joint venture of Union Carbide and the Belgian concern Petrochim, the plant will produce 15,000 tonnes of high-pressure polythene per year. It is Petrochim (full title: Société Chimique des Dérives de Pétrole), who opened a second ethylene oxide works in Antwerp during 1960.

Monsanto Belgium, a company set up by Belgian Sidac—as largest single shareholder—Monsanto of the U.S. and other U.S. interests, will in 1961 start production of polyvinyl butyral foils at a plant at Ghent.

A coal-chemicals plant is being considered for the Limburg province of Belgium by the regional body, the Flemish Economic Council. One advantage of this would be the aid it would give to the crisis-stricken national coal-mining industry.

Recent introductions to the country's chemical output have been the monosodium glutamate plant opened by the Raffinerie Tirlemontoise sugar-refining company at Ruysbroeck, near Brussels, and a plant for dissolved acetylene brought on stream by Oxyhydrogène Internationale in Belgium.

The Société Belge de L'Electrochimie

Chemicals in the Common Market

de Gand have a new process for producing calcium cyanamide for use as fertilizer, which makes it possible to reduce manufacturing costs by 80%. An important feature of the process is that the pressure in the vessel in which the reaction with nitrogen takes place is raised from 1 atm. in existing installations to 70-100 atm. Capacity of the plant is thereby increased sixfold while heating requirements are reduced to 75%.

In the pharmaceutical industry a new project has been announced for the Bornem area, to the north of the capital. Here Parke Davis and Co., U.S., are planning to open a branch. Almost \$1 million are to be invested in the unit, which will cover the Benelux area.

Upjohn, another U.S. pharmaceutical firm, have formed a Belgian subsidiary with a capital of B.Fr.7,500,000. Some 97% of the capital is held by the Upjohn Overseas Corporation and the rest is divided equally between Upjohn of England Ltd., Upjohn International Operations Inc., Upjohn Inter-American Corporation, Upjohn Co. of Canada Ltd., Tuco (Pty.) Ltd., and the Upjohn Co. (Aust.) Ltd. In the same field Glaxo Benelux has been formed in Brussels with a capital of B.Fr.5,000,000. The capital is divided equally between Glaxo Laboratories Ltd., U.K., and Union Chimique Belge. Aim of the new concern is the processing of pharmaceuticals and other chemicals.

opportunities for setting up of a large-scale petrochemical industry are seemingly limitless. Refinery gas, natural gas and mineral oil are very much the raw materials of tomorrow in France, and both French and foreign interests have important plans under way.

As many as six chemical companies are now directly concerned with the processing of Lacq gas. The Société Nationale des Pétroles d'Aquitaine are undertaking capacity expansion which by the end of last year had brought their annual output up to 1,352 million cu. m. of natural gas, 426,000 tonnes of sulphur, 18,300 tonnes of propane, 22,000 tonnes of butane and other gas derivatives. Last year, only a year after their foundation, they recorded a turnover of Fr.18,000 million—a figure expected to rise considerably in the near future. The Aquitaine-Chimie company have increased capacity to give an annual output of 24,000 tonnes of acetylene and 65,000 tonnes of ammonia by the end of 1960. Methanolacq, also in expansion, report a capacity of 33,000 tonnes of methanol, while Azolacq process Aquitaine-Chimie ammonia to fertilisers and urea and Acétalacq produce acetylene, both at rising levels. A company has now been formed by Péchiney, Saint-Gobain, and the Banque de Paris et des Pays Bas under the name of Vinylacq for the production of plastics in the Lacq area, most of the output to be of vinyl chloride from an acetylene base.

FRANCE: Petrochemicals Loom Large in French Development Projects

DURING the first nine months of 1960, output of the French chemical industry topped the record levels of 1959, with increases in both inorganic and organic chemicals. Largest gains were made by sulphuric acid, with first nine months production up 101,000 tonnes above the 1.4 million tonnes of the same period of 1959. Soda ash production totalled 627,400 tonnes (557,000); primary nitrogen, 524,850 tonnes (484,800); calcium carbide, 335,000 tonnes (266,500); chlorine 241,700 (200,000).

In the organic sector, methanol output rose by almost 66% to 49,900 tonnes, from 30,400. Production of other organics over the first nine months of 1960 was: acetone, 35,640 tonnes (29,500); synthetic

phenol, 39,250 tonnes (29,700); and phthalic anhydride, 21,850 tonnes (19,000).

In 1960 production of ethylene and plastics will be double that for 1956. In 1961 French production of main organic products will, it is officially estimated, rise by 40 to 45% and that of plastics by 30%. For 1960 output of organic chemicals will be 15 to 16% higher than in 1959.

A study of France's chemical future must consist almost entirely of details of petrochemical projects. With the natural gas deposits at Lacq in southwestern France, the planned Sahara-France pipeline and the considerable oil refining capacity of Metropolitan France,

Péchiney's Expanding Interests

Apart from their Lacq interests, Péchiney play an important role in the development of France's chemical industry. Together with Dow Chemie, the Swiss subsidiary of Dow Chemical, they have formed a company called Plastichimie for the production of polystyrene and p.v.c. by Dow processes. A plant being built at Ribecourt, near the works of Société des Produits Chimiques de Ribecourt which recently became the 100% subsidiary of Péchiney, is expected to be opened in 1961 for operation by the French parent company. A new cracking unit was brought on stream in 1960 at the Naphtachimie plant of the Péchiney group, thus raising ethylene capacity from 18,000 annual tonnes to 48,000 tonnes a year. With a polyisobutylene plant at Lavera, Naphtachimie will be Europe's second producer; the company holds a licence from U.S. Cusden.

Before the end of 1960 a low-pressure polythene unit was brought on stream at the Lillebonne works of the Péchiney subsidiary Société Normande des Matières Plastiques; initial output is given as 7,000 tonnes. A further subsidiary, Société des Fabriques de Produits Chimiques de Thann et Mulhouse, intend to increase titanium oxide capacity from 27,000 to 49,000 tonnes a year.

Details are expected soon of production plans of Produits Chimiques Péchiney-Saint Gobain, a company formed by two of the important chemical producers. Initial capital is Fr.100 million and the company will gradually

Carbon Black Expansion in Common Market

COMPANY	SITE	CAPACITY ON STREAM	
		(Tonnes)	
Cabot France (Godfrey L. Cabot Inc.)	Berre	35,000 44,000	1960 1961
Cie Française du Carbon Black (Phillips and Continental Carbon)	Bordeaux	21,000	1961
United Carbon (United Carbon Co. Inc.)	Port Jerome	11,000	1961
Cabot Italiana S.p.A. (Godfrey L. Cabot Inc.)	Ravenna	15,000	1960
Columbian-Continental Europe S.p.A. (Columbian Carbon Co. and Continental Carbon)	Trecate	26,000	1961
Phillips Carbon Black Italiana S.p.A. (Phillips and A.N.I.C.)	Ravenna	12,000	1961
Continental-Columbian Carbon Nederland N.V. (Continental Carbon and Columbian Carbon Co.)	Botlek	12,000	1960
Ketjen-Carbon N.V. (Konij Ijke Zwavelzuurfabrieken v/h Ketjen N.V. and Godfrey L. Cabot Inc.)	Botlek	24,000	1960

take over the sales, distribution and eventually the production of chemicals and minerals by the two groups, with the notable exception of petrochemicals. Saint Gobain are to raise capital to finance a vast modernisation programme. In particular output of organic chemicals is to be developed through the joint Saint-Gobain-Shell Company, Cie des Produits Chimiques et Raffineries de Berre.

Two schemes, both connected with petrochemicals, are projected for Donges, near Nantes. One is a chemical plant to be opened by California Atlantique, a recently-formed subsidiary of California Chemical (a Standard Oil of California company) and Société Petrochimique de l'Atlantique; initial output will be 8,500 tonnes of paraxylene which is to be sold to the synthetic fibre producers Société Rhodiaca. In 1962, a nitrogenous fertiliser plant is to be opened at the same place by Société Chimique de la Grande Paroisse with an initial capacity of 250,000 tonnes. Raw materials will be Laeq gas and refinery gas from the nearby oil plant of Antar S.A.

Ugilor in 1960 finished an expansion programme to bring annual production up to 2,000 tonnes of acrylates, 6,000 tonnes of prussic acid, 6,000 tonnes of acrylonitrile and about 5,000 tonnes of methacrylates plus other products. For acrylonitrile Ugilor are to use the new amoxidation process developed by Distillers, in which propylene is reacted with ammonia and oxygen using a catalyst.

With trade in petroleum products, petrochemicals and other chemicals as its aim, a French subsidiary of the U.S. Philips Petroleum concern has been formed under the title Philips Petroleum International France S.A. The Canadian company, Polymer Corporation, have purchased a site near Strasbourg where a synthetic rubber plant will be built; other facilities are planned.

Synthetic Rubber

Most other major future projects involve, at least in part, overseas backing. At Berre, Société des Elastomères de Synthèse, a concern formed by the Shell-Saint Gobain group, the Cabot-Texas Butadiene group and the Michelin tyre concern, will in 1961 open a plant for the production of some 50,000 tonnes of SBR and 25,000 tonnes of polybutadiene annually. In association with El Paso Natural Gas, Compagnie Française de Raffinage, are to make polythene and other plastics materials from feedstock from the French firm's Normandy refinery. The polythene unit is due on stream in 1963 with an initial output of 20,000 tonnes-a-year; Raffinage are raising ethylene output from 30,000 to 80,000 t.p.a.

The Progil-Ugine-Bayer concern, formed in Paris by Bayer Foreign Investments Ltd. (50%), Progil (25%) and Ugine (25%) will this year open a works at Pont-de-Claix near Grenoble for the production of isocyanates, polyesters and polyethers for the foam, adhesives and surface coating industries. At the end of

Chemicals in the Common Market

1960, Schenectady de France, a subsidiary of Schenectady Varnish of Canada Ltd., opened a plant at Béthune for the manufacture of industrial plastics and synthetic resins.

Three carbon black plants are currently planned in France. United Carbon have formed a French company to build a plant near Rouen to produce 11,000 tons of carbon black a year; cost is an estimated \$5 million. A second unit is to be opened at Bec d'Ambes by Compagnie Française du Carbon Black S.A. with an initial output of 21,000 lb. a year. Third carbon black plant is that of Cabot France at Berre, where capacity in 1960 was raised to 35,000 tonnes/year; output is due to be further increased to 44,000 tonnes.

A venture to produce boric acid is in hand by American Potash and Chemical Corporation and Ugine. A new company, Seurobor (Société Européenne du Bore) will come on stream this year at Pierre Benité, near Lyons, with a plant to produce boric acid from imported mineral borates. Capacity is not known; distribution will be handled throughout Europe by Borax and Chemicals Ltd., subsidiary of American Potash.

A joint subsidiary has been formed by

Armour and Co., Chicago, and Société de Synthèse and bearing the name Société Chimique Armour-Bezons for chemical production aimed at Common Market buyers. At Niort, Deux-Sevres, Reichhold Beckacite are to build, under Scientific Design licence, a 400 tonnes/month maleic anhydride plant. Compagnie Française des Matières Colorantes have raised their maleic capacity at Villers-St. Paul.

Air Liquide are to double capacity at a new oxygen plant at Richemont, Lorraine.

A plant for the production of aniline is to be built at Carling, in the French Department of Moselle, by Compagnie Française de Matières Colorantes—a subsidiary of Etablissements Kuhlmann—in co-operation with the local concern Houillères du Bassin de Lorraine. Working with a catalytic hydrogenation process, the unit will produce 1,200 tonnes of aniline per month as initial capacity as from the second half of 1962.

Also at Carling, Houillères works of the Union Sidérurgique Lorraine plan coke oven plants for ammonium sulphate and other products. The latter concern is to have a high-purity benzole plant at Homécourt.

HOLLAND: Big Petrochemical and Fertiliser Plans for Rotterdam Industrial Area

ONE of the minor members of the Common Market but one of those with the most dynamic chemical developments is Holland. As well as being the home of several progressive chemical manufacturers, it is now becoming—like its Benelux neighbour Belgium—a favourite base for U.S. chemical concerns seeking links with Europe. The most noticeable fact about Dutch chemical growth is the extreme importance of the immediate Rotterdam area. With 'Europoort' to become Europe's biggest harbour and the Dutch Government really active to develop the Rotterdam industrial areas, many of Holland's new chemical plants are being constructed and brought into operation in either the Pernis suburb on the New Maas Waterway or in the Botlek dock district.

The two most important such plants opened in the summer of 1960 were the styrene-butadiene rubber plant built by Shell Nederland Chemische Fabrieken N.V., of The Hague, and the synthetic fertiliser plant opened by the Utrecht concern Albatros Superfosfaatfabrieken N.V.—both of them in Pernis. The former has an initial capacity of 60,000 tonnes of SBR., while the latter produces what it calls nitro-phospho-sulpho fertiliser by a process developed by the manufacturers and the Tennessee Valley Authority, U.S.

Royal Dutch/Shell have started construction of a polybutadiene-polyisoprene synthetic rubber plant that is due on stream at Pernis by 1962-63. The group

is also to participate with Montecatini to form N.V. Rotterdamse Polyolefinen Maatschappij for the production of polypropylene.

Two carbon black plants have been opened in the Botlek complex in mid-1960, one by Ketjen-Carbon—a company in which the Amsterdam concern Koninklijke Zwavelzuurfabrieken v/h Ketjen N.V. are interested—producing 24,000 annual tonnes and the other by the Columbian Carbon-Continental Carbon company, Continental-Columbian Carbon (Nederland) N.V., with half that capacity.

Among projects to be opened in the Rotterdam district in the future is a £3 m. titanium oxide plant due on stream in 1962 by a joint subsidiary of the two Dutch concerns N.V. Billiton Maatschappij and Albatros Zwavelzuuren Chemische Fabrieken N.V. Working with imported ilmenite and sulphuric acid produced by the Albatros company, the plant will receive operational assistance from Glidden Internationale S.A., a subsidiary of the Cleveland concern Glidden Co. Nederlandsche Dow Maatschappij, a Dow subsidiary, are engaged in building a styrene-butadiene latex plant in the Rotterdam Oil Port, which will be completed in the spring. Not far from Rotterdam, in the coastal town of Dordrecht, E. I. Du Pont de Nemours are planning to manufacture synthetic fibres, while Hercules Powder Co.—already with a subsidiary in The Hague—are to form a further company for the production and marketing of chemicals. Hercules

Chemicals in the Common Market

plan to produce over 30 million lb. of resin-based compounds annually in Holland for the paper and paint industries. The Dutch State coal-mining and coal chemicals company, Staatsmijnen, plan to spend £500,000 on building a phenol-from-toluol factory in Botlek in cooperation with Dow Chemical.

Many of the other future chemical projects in Holland have foreign backing. The Italian Montecatini concern, who for 40 years have had a holding in the Compagnie Néerlandaise de l'Azote, of Sluiskil in the Dutch province of Zeeland, are now to build a new chemical plant there for which their associated company will supply raw nitrogenous materials. Unilever-Emerly N.V., a company formed last year by Unilever N.V., Rotterdam, and Emery Industries Inc., Cincinnati, plan to spend almost £700,000 on a fatty acids processing plant at Gouda, acids to come from the neighbouring plant of Gouda-Apollo and oxygen from a factory to be erected in Gouda for the purpose by N.V. W.A. Hoek's Machine- en Zuurstoffabrieken, of Schiedam.

More U.S. Investments

In the third quarter of 1960 a hydrocarbon chemicals plant was opened by Neville Cindu Chemie N.V., a 50-50 subsidiary of Neville Chemical Co., Pittsburgh, and Teerunie N.V., Uithoorn. The Algemene Kunstzijde Unie-B.J.F. Goodrich link-up, N.V. Chemische Industrie A.K.U.-Goodrich, have a butadiene works under construction in Arnhem. At the end of 1960, A.K.U. joined with the Pittsburgh Plate Glass International, Geneva, to build a plant in Holland for the production of glass yarn and glass fibre. A.K.U. are also negotiating a site at Delfzijl where a new chemical plant is scheduled for completion by early 1961.

Further foreign interests are seen in the formation of Carolan Holland N.V. in Veenendaal by Carola S.A. Inc., Panama City, and J. Blackwood Caron, Rochelle, Illinois, for the production of synthetic fibres, and of Alchemica N.V. in Schoonebeek by Scado-Archer-Daniels N.V., Zwolle, and Mr. W. A. M. ter Doeschate, of Zwollerkerpel. In the pharmaceutical field, the Norwich Pharmacal Co., New York, have taken over a considerable holding in the Amsterdam pharmaceutical concern, Orgahell N.V., who have recently completed a new plant at Mijdrecht where production has begun.

Pennsalt Chemicals, Pennsylvania, are to take up a major holding in N.V. Fabriek ban Chemische Produkten, Vondelingenplaat, near Rotterdam, where plants will be built for the production of tertiary and dodecyl mercaptan and other organic sulphur compounds. Existing units are for the production of oxalic acid, dyestuffs and plastics foil. Currently, Harshaw Chemical, Cleveland, are bidding for L. van der Hoorn Chemische-Technische Industrie, N.V., Utrecht; it is planned to rename the company Harshaw van der Hoorn N.V.

The Dutch subsidiary of the Du Pont de Nemours concern, Du Pont de Nemours (Nederland) N.V., announces that it is to build a new production unit on a site in Dordrecht. The site is near that on which work began last year on the construction of a works to produce Orlon acryl fibre. The new unit, the first of its kind in Europe, will process acetal resins of the Delrin type imported from the group plant at Parkersburg, in West Virginia. The plant is expected to be ready for production mid-1962, when it will begin with the finishing and colouring of the imported Delrin polymer. Sales will be through the Swiss group subsidiary, Du Pont de Nemours International S.A., of Geneva.

The Rotterdam firm of N.V. Transicol, a subsidiary of Heyden Newport International Corporation, New York, plans to build a production unit at Geertruidenberg, for the manufacture of paramethane hydroperoxide, a catalyst for the synthetic rubber industry. The plant is due to be brought into use early in 1961.

Chemische Industrie Uithoorn N.V., Uithoorn, are to extend their production unit by the building of a 5,000-tonnes-a-

year phthalic anhydride plant. The company, a joint subsidiary of the asphalt firm, Utrechtsche Asphalt, and the ferrous metals company, Koninklijke Nederlandsche Hoogovens en Staalfabrieken N.V., is to open the new plant in mid-1962. This is the third phthalic anhydride unit to be opened by 1962 in Holland. Staatsmijnen, who already produce 2,700 tonnes of phthalic anhydride a year, will in April run a new plant, with an annual capacity of 5,000 tonnes, while February 1961, will be the opening date for a 1,200-tonnes unit being built at Schoonebeek by Alchemica N.V., a newly formed subsidiary of the Scado-Archer-Daniels concern of Zwolle.

Staatsmijnen are also to start building shortly Holland's first formaldehyde (solution 40%) facility at Beek. Capacity will be 25,000 tonnes/year, enough to cope with all local demands, plus mounting consumption. Caprolactam facilities (now 6,000 tonnes/year) are being expanded, with that of urea, and both high- and low-density polythene.

Mekog of Imjuiden (two-thirds Royal Dutch/Shell and one-third Royal Netherlands Blast Furnaces) will come on stream in 1962 with 160,000 tonnes/year of diammonium phosphate at Rotterdam, Algemene Kunstzijde Unie are to erect a styrene monomer plant.

(To be continued)

A.B.C.M. Booklet Answers Chemical Exporters Queries on E.F.T.A. Rules

A NEW booklet that should do much to dispel doubts and queries as to export regulations under the European Free Trade Association has been published by the Association of British Chemical Manufacturers, 86 Strand, London W.C.2 (price 3s 6d, post free). Entitled 'Origin Rules, Certification and Segregation of Stocks', the booklet explains the type, intention and scope of the E.F.T.A. origin rules both on the basis of 'value' and 'process' for chemicals and allied products falling in chapters 27-39 of the Brussels Tariff Nomenclature.

The booklet stresses that while for exports of chemicals it will often be necessary to know whether or not the purchased chemical starting material was made in the area, there are few cases where this information will be needed for exports which are not themselves chemicals. For example, knowledge of the 'origin' of dyestuffs is not required when considering the 'origin' of dyed textile piece goods.

Section of the booklet dealing with the provision of information on origin of chemicals purchased for use in the manufacture of products for export to E.F.T.A. was included mainly because of a large number of inquiries received from A.B.C.M. members for information on this point. Such inquiries are unnecessary, but the association will be pleased to deal with readers' inquiries on the extent to which knowledge of the 'origin' of the chemicals they use is

essential to the origin of the chemicals which they export.

The booklet reports meetings held in London and Manchester in the summer of 1960.

U.K. Zinc Dust Pioneers in C.M. Venture

A NEW joint Anglo-German company, in which Amalgamated Oxides (1939) Ltd., Victoria Works, Dartford, Kent, have an interest has started production of Zincoli amalgamated oxides in West Germany. Other partners of the joint subsidiary, which is named Stolberger Zincoli GmbH für Zinkstaub—are Stolberger Zink AG, Aachen. Zincoli superfine zinc dust was developed by the British company some six years ago and has found rapidly increasing use with zinc rich paints and inorganic zinc dust paints.

The new company has built plant to the design of Amalgamated Oxides at the Münsterbusch works of Stolberger Zink. It is planned to satisfy the already extensive and still expanding German market and, as and when desirable, to meet the needs of other Common Market countries which are at present covered from the Dartford works.

Each parent company has two representatives on the board of the new organisation. For Amalgamated Oxides these are Mr. A. S. Ashby and Leslie O. Kekwick, who is vice-chairman of Stolberger Zincoli.

Aikman Nitrogen Report

World Production and Usage of Nitrogen Rises 9%

WORLD production and consumption of nitrogen continues to expand at a more or less uniform rate. Production during the fertiliser year 1959-60 at 12,294,000 tons being up 9%, while consumption at 12,083,000 tons is up by a similar figure. This is stated in the annual nitrogen report of Aikman (London) Ltd., published this week in the November 1960 edition of *Nitrogen*.

For 1960-61, Aikman estimate world nitrogen production at 13,592,000 tons and consumption at 12,833,000 tons.

The gap between production and consumption has narrowed to 2.2% and the

nitrate was again close to 200,000 tons of nitrogen and exports from Chile were about the same figure, but in common with other products this fertiliser was forced to accept lower prices in all markets.

Aikman understand that I.C.A. funds amounting to some \$30 million have been earmarked in Korea for nitrogenous material under a tender shortly to be issued. In India, 41,000 tons of ammonium sulphate were recently sold at £13 18s/ton f.o.b. in bags. A further large tender was expected by the end of 1960.

Nitrogen Production and Consumption ('000 Tons N)

	1959/60		1960/61	
	Prod.	Con.	Prod.	Con.
China ...	240	520	300	550
France ...	660	580	780	620
Germany, E. ...	380	310	430	340
Germany, W. ...	1,273	847	1,325	880
Italy ...	667	425	700	445
Japan ...	1,029	764	1,200	800
Netherlands ...	461	273	465	280
U.K. ...	530	550	620	580
U.S. ...	3,678	3,630	4,000	3,750
U.S.S.R. ...	860	900	950	1,000

carry forward of stocks to 1961-62 is more satisfactory from the producers point of view, leading, possibly, to a hardening in world market export prices.

In their June report (C.A., 23 July, p. 13), Aikman called for the setting up of an exchange market on which nitrogen products could be sold as in the case of most other commodities. They now feel that the time is not ripe for such a market because producers are increasingly selling through appointed agents in countries of destination. This method of selling does not appear logical to Aikman unless solid agreement can be achieved among producers on prices and quotas.

Ammonium sulphate is ammonium sulphate according to specification and price therefore is the only ruling factor on what origin is bought. Nitrogen is different from industrial products such as motor cars which can only be sold through appointed representatives or agents, each individual car having its own merits to be exploited.

Production in 1959-60 of Chilean

Summary of World Nitrogen Production and Consumption ('000 Tons N)

	1957/58		1958/59		1959/60		1960/61	
	Prod.	Con.	Prod.	Con.	Prod.	Con.	Prod.	Con.
Western Europe ...	3,954	3,066	4,248	3,393	4,606	3,741	4,995	3,931
North America ...	3,288	3,035	3,675	3,480	4,002	3,712	4,334	3,840
Central and South America ...	227	329	234	343	281	385	314	434
Africa ...	17	98	22	100	25	118	35	136
Australasia ...	25	43	25	42	26	43	27	47
Middle East ...	47	195	49	224	54	224	65	252
Asia ...	1,301	1,753	1,501	1,892	1,542	2,065	1,857	2,228
Eastern Europe ...	1,441	1,446	1,586	1,645	1,758	1,795	1,965	1,965
Total ...	10,300	9,965	11,340	11,119	12,294	12,083	13,592	12,833

Hormones, Cortisone Exempted from P.T.

THE Treasury have made an Order extending the Schedule of essential drugs and medicines exempt from Purchase Tax. These include:

Chlorphenesin, with certain conditions.
Hormones and synthetic compounds with hormone activity, having the carbone ring systems of androstane, aestrone, oestr-5(10)-ene, or progesterone, and combinations of two or more of those.

Selenium sulphide.
Barbituric acid and thiobarbituric acid, derivatives and salts thereof.

Cortisone and analogous steroid hormones and esters thereof.

All drugs and medicines previously exempt under the revoked Order remain exempt under the new Order, which relates to goods which are despatched on sale by registered traders to unregistered traders or appropriated to retail trade or similar purposes by a registered trader on or after 19 December 1960.

Record Exports of Fertiliser Nitrogen

WORLD exports of all fertilisers in 1959-60 totalled 2,502,000 tonnes N, a rise of 15.3%. According to *Nitrogen* (No. 8) this large rise is of great importance to West European producers, particularly in view of excess nitrogen capacity and the relatively poor results of 1958-59. Ammonium sulphate was still the most important single fertiliser in world trade, just over 4.5 million tonnes being exported from the 10 leading producing countries. Ammonium nitrate has now become established as a serious competitor, West Germany's share of export markets having expanded in 1959-60 from 26% to just over 40%.

There was a big increase in world exports of urea, from 167,000 to 307,000 tonnes.

U.K. exports of nitrogenous fertiliser in 1959-60 totalled 51,300 tons N, mostly as ammonium nitrate.

World nitrogen production during 1959/60 is placed at 12.4 million tons (almost 9% up), while consumption rose to 12.1 million tons (up 9%), reflecting greater usage in practically all countries. A notable feature was rising demand for ammonium phosphates to meet needs of producers of high analysis mixtures.

New plant projects scheduled for completion in the fertiliser year 1960/61 in the Western world have a total capacity of 500,000 tonnes N; in the U.S.S.R., East Europe and China, it is estimated that 550,000 tonnes N capacity

will come on stream. At the current rate of consumption, such additions are not thought excessive. Excess capacity of up to 20% in West Europe, Japan and the U.S. will probably be reduced if consumption in the Middle and Far East continues to expand.

U.K. production of nitrogen rose by 13%, the largest of the major producers in West Europe. Fertiliser deliveries exceeded the equivalent of 400,000 tons N; industrial nitrogen estimated by British Sulphur at 140,000 tons N was also appreciably greater. Sales of lime ammonium nitrate were at a record level; ammonium sulphate sales were also high, boosted by heavy imports. It is stated that I.C.I.'s objection to dumping of ammonium sulphate was followed by price rises by suppliers in West Germany, Belgium and Italy.

U.K. expansion plans include I.C.I.'s 100,000 tons/year ammonia plant on Severnside as the first stage of a larger project; Fisons plans for a £5-£6 million ammonia plant; and the belief that an oil refiner is also looking into the possibility of ammonia production based on refinery gases.

Obituary

Mr. Cecil Blagden, for 24 years a director of Victor Blagden and Co. Ltd., the London chemical merchants, died at his home in London recently, aged 60. He was a past chairman of the British Chemical and Dyestuffs Traders' Association and a member of the Institute of Directors. He was the son of Mr. Victor Blagden, founder of the company, who died earlier this year.

The death has occurred at the age of 68 of Prof. H. T. S. Britton, Professor of Chemistry and Director of the Washington Singer Laboratories, in the University of Exeter from 1935 to 1957, and Professor Emeritus since 1957.

Overseas News

AMPOL PETROLEUM STUDY PROPOSALS FOR NEW AUSTRALIAN REFINERY

PROPOSAL to build a refinery at Port Alma, Queensland, is being considered by Ampol Petroleum Ltd. Pending a decision, which depends on economic studies now in progress, and which is expected to be arrived at by the end of March, an option on a 400-acre site has been granted by the Queensland Government.

Ampol Petroleum already have a 25% interest in a large lubricating oil refinery to be constructed at Kurnell, N.S.W., at an estimated cost of £A13 million. The company has a 41.49% holding in a joint venture with B. F. Goodrich, U.S.-B. F. Goodrich Australia Pty, whose plant started production early last year.

New U.S. Company Formed to Build Bromine Plant

Arkansas Chemical, a new company formed by Houston Chemical and Great Lakes Chemical of the U.S., are to build a bromine plant near El Dorado, Ark. A substantial part of the output will be sold to Houston for the manufacture of ethylene dibromide. Great Lakes will buy the rest of Arkansas bromine for resale, and for the production of ethylene dibromide, methyl bromide and other methyl-containing products. The plant is expected in stream early in 1961.

New Israel Process for Enriching Phosphate Ores

A new process for enriching phosphate ores for fertilisers has been developed by the Negev Phosphates Co. of Israel. It is claimed that the process produces a uniform product containing 38% phosphorus pentoxide.

The Government of Israel has signed a contract with a U.S. company giving them prospecting rights to part of Israel's phosphate areas. The company has undertaken to spend at least \$250,000 on prospecting work over the next two years and, should the deposits justify it, to invest \$8 million on construction of a plant to produce at least 500,000 tons annually.

Natta Produces New Class of Polymers

A new class of stereoregular polymers has been produced by Prof. G. Natta and co-workers. The polymers are optically active and have two asymmetric centres in each monomeric unit which are produced in a sterically regular way by an optically active catalyst used in the polymerisation. This is the first example of the synthesis of optically active polymers from symmetrical monomers, according

to Prof. Natta, who describes them as tritactic. The starting point for the polymers is an ester of a substituted butadiene carboxylic acid such as sorbic acid and β -styrylacrylic acid. A structure analogous to the *trans*-1,4-polybutadiene is produced.

Pan-American Sulphur Prices Increased

Pan American Sulphur have increased their prices by \$2 per long ton. The new prices are \$23.5 for bright sulphur and \$22.5 for dark sulphur, f.o.b., Coatzacoalcos, Veracruz, Mexico. This brings the price of Mexican sulphur closer to the cost of U.S. sulphur at \$25 per ton for bright sulphur and \$24 for dark sulphur. Higher costs for fuel, labour and supplies, plus last year's royalty increase are responsible for the price change.

Formaldehyde Project for Holland

Staatsmijnen in Limburg (the Dutch State Collieries) are to establish a factory for the production of formaldehyde at Beek (Limburg). The capacity of the factory will be 25,000 tons/year of formaldehyde in 40% solution, more than the present consumption in the Netherlands. Formaldehyde has hitherto been imported for the manufacture of plastics, paints and glues.

Kellogg to Develop Power Plant Based on Fuel Cell

Under a \$764,000 U.S. Navy contract, M. W. Kellogg and Co., New York, will design and build a prototype sodium amalgam-oxygen fuel cell rated at 75 kW. The reason for the Navy's contract is not disclosed.

Sumitomo Obtain Montecatini Polypropylene Licence

Sumitomo Chemical Co. of Japan have signed a technical assistance agreement with Montecatini, Milan, obtaining from the latter a licence for the production of polypropylene fibre and resin. Sumitomo are the fourth company in Japan to get Government approval to produce polypropylene.

The company intends to produce 5,000 tonnes/year of resin and 5,000 tonnes/year of fibres.

Fire at Leverkusen Works Causes £ $\frac{1}{4}$ m. Damage

*Two workers were killed and 13 others injured in explosions at the Leverkusen works of Farbenfabriken Bayer AG,

Germany, recently. Damage is estimated to total some £250,000. As we go to press, the cause of the explosions has still not been established.

The explosions caused a blaze which could be seen for miles around; firemen were unable to enter the area at first because of the danger of further explosions, but the fire was eventually brought under control.

LPG Sales Should Show 10% Rise in U.S. this Year

Sales of liquefied petroleum gas in the U.S. during 1960 should, according to Phillips Petroleum, total 9,860 million gall., an increase of 10.5% over 1959. Main reason for the big increase is said to be greater usage in the chemical industry. Not including synthetic rubber producers, the industry used more than 3,000 million gall. in 1960, 20% up on 1959. Synthetic rubber is expected to consume 550 million gall., a 7% rise.

Commercial Solvents Acquire Italian Drug Firm

Two Italian drug companies, Hoffman-Lampis, S.p.A. and FIART, S.p.A., have been acquired by the U.S. company, Commercial Solvents. The two firms manufacture and distribute ethical drugs throughout Italy. Commercial Solvents now own 80% of both companies. A new international subsidiary, CSC International Ltd. has been set up and will handle all the Commercial Solvents' foreign operations.

Chemico to Construct Japan's First Acetylene Plant

Japan's first acetylene facility and a methanol plant are to be constructed by Chemical Construction Corporation. The acetylene plant will employ the B.A.S.F. process. The two projects are those of Kyowa Gas Kagaku K.K. subsidiary of Kyowa Hakkō Company and Nippon Mining.

Using national gas as raw material, the 27 tonnes-a-day acetylene plant will provide off-gas for 100 tonnes of methanol daily. Chemico's methanol process will be used. The new plant is expected to be completed in Nigeria in mid-1962.

Soviet Bloc's Synthetic Rubber Expansion Plans

Soviet synthetic rubber capacity—estimated at 600,000 tonnes a year by 'Kautschuk und Gummi'—will rise 750,000 tonnes in 1961 and 2,010,000 tonnes in 1966. In East Germany, capacity will rise from a current yearly level of 90,000 tonnes to 110,000 tonnes by 1965. Polish capacity will increase from a 1960 level of 25,000 tonnes to 60,000 tonnes by 1968 and 70,000 tonnes by 1970. Czechoslovakia, with the same current level as Poland, will raise its capacity to 30,000 tonnes by 1963 and 130,000 tonnes by 1970. Roumania will start production in 1965 with 50,000 annual tonnes. Communist China is credited with a current capacity of 30,000 tonnes, which will eventually rise to 60,000 tonnes.

Fire No. 3 at Monsanto Phthalic Plant

For the third time within a week, Monsanto Chemicals Ltd. had to call the town fire brigade to a fire in the phthalic anhydride plant at their Newport, Mon. works. But the works fire brigade had the fire under control before Newport fire service arrived and the fire was described as being only a small blaze.

The initial fire at the plant occurred on 14 December and on 18 December there was a further serious blaze, accompanied by explosions. The cause of the last fire at the plant on 20 December was said by Mr. G. V. Taylor, the works manager, to have been caused by some inflammable deposit left in a container, chemically reacting when the vessel was brought into use after being left idle for some time.

D.C.L.-Czech Co-operation on Leukaemia Drug

A NEW drug which, it is stated, appears to possess remarkable characteristics including some properties which may be of help in the treatment of certain types of leukaemia, is being developed by The Distillers Co. (Biochemical) Ltd. An agreement has been signed between Distillers Co. and a Czech pharmaceutical organisation under which both parties will collaborate in the research and development of the new drug.

The process of manufacture, not yet completely determined, employs fermentation techniques. The research is as yet at a very early stage and there is no intention of marketing the drug until it has been thoroughly tested.

U.K. Firm Distributes Italian P.T.F.E. Products

SEMI-MANUFACTURED products of polytetrafluoroethylene, produced in Italy, are now being offered by Joseph Weil and Son Ltd., Friars House, 39-41 New Broad Street, London E.C.2. The products include rods, tapes, sleeves, bars and tubes, and are produced by Weil's principals, Marengo s.p.a. from Algoflon p.t.f.e. manufactured by Montecatini.

The tubes are available with normal wall thicknesses and also in special thin-walled grades suitable for electrical insulation work. A wide range of sizes is offered and requests for special sizes can be dealt with. Literature is available from Joseph Weil and Son.

Billingham Education Officer Dies After Car Crash

Mr. Keith J. Torrington, education officer of I.C.I. Billingham Division, died in Middlesbrough General Hospital after a recent road accident. He was 35 and had been education officer for four years. Also injured in the same car were Dr. C. J. Stairmand, a section manager in the engineering development's department at Billingham and Mr. William King, of commercial works, Billingham, the driver.

Caprolactam May Yield 1 Million T.P.A. Ammonium Sulphate

CONCERN that increasing quantities of ammonium sulphate produced as a by-product of caprolactam—1 million tons are expected by end-1961—might have a disturbing effect on market prices is expressed by Aikman (London) Ltd., 49 Egerton Gardens, London S.W.3, in their annual report on the nitrogen industry. This report is now published in *Nitrogen*, one of the journals of the British Sulphur Corporation.

Aikman state that although the quality is not up to the standard of synthetic material it is suitable for mixing. The residual ammonia from the caprolactam process cannot be recovered in any other form and since the sulphuric acid is used as a catalyst in the process, the cost of ammonium sulphate is very cheap and its value is in the recovery of the cost of producing caprolactam. The report adds that three caprolactam plants are to be built in the U.K., three more in the U.S. and four elsewhere in Europe. (See also C.A., 10 Dec., p. 985.)

Elsewhere in the same issue of *Nitrogen* (No. 8, p. 34), it is stated that key characteristics of the lactam polymerisations have been summarised by Dr. R. Action, Foster Grant Confederation, as being an equilibrium reaction with large amounts of by-products

involved; yields vary from 95 to 100% depending on molecular weights of the lactam and including the partial recovery of the by-products.

Sulphuric acid has been used to start the reaction, the acid also serving as both catalyst and stabiliser. Ammonium sulphate is formed as a by-product, quantity produced depending on whether liquid or gaseous phase reaction is used.

Ammonium sulphate is recovered in the caprolactam operations of Allied Chemical Corporation, Hopewell, Va. Caprolactam expansions have been announced by Allied Chemical (rising to 140 million lb./year), E. I. du Pont de Nemours, Badische Anilin und Soda Fabrik and Staatsmijnen in Limburg, V.E.B. Leuna-Werke 'Walter Ulbricht,' Leuna, East Germany also plan an eventual caprolactam output of 35,000 tonnes/year and will raise nylon output to 30,000 tonnes, Leuna Werke caprolactam plans envisage the production of about 120,000 tonnes a year of ammonium sulphate. Komplex, Budapest, are seeking to install a 5,000 tonnes/year caprolactam plant, while in India Manubhai Industries and Von Kohorn International, New York, plan caprolactam (10 million lb./year) and nylon facilities in Bombay.

pH and Strength of Washing Medium Important in Stretford H₂S Removal Process

FURTHER details of the Stretford process for removing hydrogen sulphide from refinery gas, natural gas, coal gas and air, and producing pure non-toxic sulphur, have come to hand since the process was described in *CHEMICAL AGE*, 22 October 1960, p. 664. As was stated at that time, successful development of this very useful process has led to the joint application for world-wide patents by the North Western Gas Board and Clayton Aniline Co.

The washing medium of the Stretford process is an aqueous alkaline solution of a commercial intermediate containing salts of one or more of the anthraquinone disulphonic acids. When using this solution for the removal of hydrogen sulphide from gases the following three stages are involved:

- The removal of hydrogen sulphide from the gas stream by the alkaline washing medium.
- The reaction between the hydro-sulphide ions formed in the washing stage with a carbonyl radical of the anthraquinone disulphonic acid which gives sulphur and a reduced form of the reagent.
- The regeneration of the original anthraquinone disulphonic acid from

the reduced form by oxidation with air.

The initial removal of hydrogen sulphide from the gaseous phase depends on the rate of absorption of hydrogen sulphide in the alkaline washing medium. For this purpose a high pH is necessary, but this should not exceed 9.5 or the reaction between the sulphide and the hydrosulphide ions with the anthraquinone disulphonic acid in stage (b) will not go to completion. In practice, a pH of 8.5 to 9.5 is used.

The anthraquinone disulphonic acid must be present in sufficient excess to ensure complete oxidation of the hydrogen sulphide absorbed. A concentration of 0.2 to 0.5% is normally used, and the quantity of solution circulated is such that the anthraquinone disulphonic acid concentration is three or four times that of the equivalent hydrosulphide concentration.

For the foregoing description of the process we are indebted to the quarterly magazine of W. C. Holmes and Co. Ltd., Turnbridge, Huddersfield, who are to manufacture the process under licence. Five other chemical engineering companies have also been granted licences to exploit the process.

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TRADE NOTES

Isotopic Fatty Acids

Fatty acids uniformly labelled with carbon-14, produced from *Chlorella*, are now available from the Radiochemical Centre, Amersham, Bucks. The products are CFB.36, stearic C-14 (U) and CFB.37, palmitic acid C-14 (U). Price per mc of both is £200 and both have a specific activity of 50 mc/mM. The methyl esters have been separated by gas-liquid chromatography.

Titanium and Corrosion

No. 3 in the I.C.I. series of booklets on wrought titanium deals with corrosion resistance. Following some notes on where to use, and where not to use titanium, a series of tables give details of the behaviour of titanium in a range of pure substances and industrial liquors. The booklet is issued by I.C.I. Metals Division, P.O. Box 216, Birmingham 6.

U.K. Instruments in U.S.

Hilger and Watts Ltd., 98 St. Pancras Way, Camden Road, London N.W.1, have appointed Gelman Instrument Co. as the sole American distributor of products made by Hilger's Infra-Red Development Division. The American company will sell infra-red gas analysers made by Hilger and other electronic instruments.

Crosfield Development Products

A publication entitled 'Development Products' is the first of a new series of six monthly issues in which Joseph Crosfield and Sons Ltd., Warrington, Lancs, intend to give details of new products which they are developing and which they hope will eventually reach large scale manufacture. Tables set out the name of each product, its suggested uses, and the quantities in which it is available.

Weir-U.S. Valve Agreement

Weir Valves Ltd., 95 Coltness Street, Queenslie Industrial Estate, Glasgow E.3, have changed their name to Weir-Pacific Valves Ltd., following the signing of a manufacturing agreement with Pacific Valves Inc., Los Angeles. Under this the company will make and market the U.S. firm's range of valves for the oil and chemical industries.

New Solvent

Shell Chemical Ltd., 170 Piccadilly, London W.1, announce the introduction of methyl oxitol acetate to their range of glycol ether ester solvents. This solvent is of interest to the surface coating industry. It is claimed that its high dilution ratio, evaporation characteristics, powerful solvency and agreeable odour make it a useful solvent particularly for polyester resins in polyurethane coatings.

Acrylic Emulsion for Paper Coating

A new technical service report, T-12, on Vanamul R2912, a low cost acrylic copolymer emulsion which has been developed for the paper coating industry,

has been published by Vinyl Products Ltd., Butter Hill, Carshalton, Surrey. It is claimed that the incorporation of this emulsion into starch or casein bound coatings improves pick smoothness, wet-rub resistance, flexibility and varnish hold-out, among other properties. The report is based on experimental work carried out in Vinyl Products laboratories.

Change of Address

The Firth Cleveland Group have acquired additional offices at 7 Cleveland Row, St. James', London S.W.1, WH1 3100. The new offices will be occupied by the Home Sales Divisions of Simmonds Aeroaccessories Ltd., Firth Cleveland Instruments Ltd., and Surform (Firth Cleveland Tools Ltd) and Home and Export Sales Departments of British Lead Mills Ltd., Seculate Ltd., and Richard Hill Ltd.

Weatherable Polythene Film

A new grade of weatherable polythene film is now being marketed in the U.K. by Durham Raw Materials Ltd., 1/4 Great Tower Street, London E.C.3. SR 300, produced by Du Pont of the U.S., is expected to be of particular interest to builders and manufacturers of agricultural and horticultural equipment and builders' sundries due to its resistance to damage by sunlight. Du Pont's claim a life expectancy of five times that of standard polythene film for SR 300. The film has good light transmitting properties and can be used as an alternative to glass in certain applications. The cost of SR 300 is 1.76d per sq. ft. It is sold only in bulk, in batches of 25,000 sq. ft. or multiples thereof.

DIARY DATES

TUESDAY 10 JANUARY

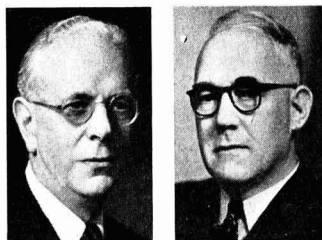
- I.Chem.E.**—Manchester: College of Science & Tech., Jackson St., 6.30 p.m. 'Selection of prime movers in the petroleum chemical industry', by H. H. Meyer.
S.A.C.—Wolverhampton: Coll. of Tech., Wulfruna St., 7 p.m. 'Trace analysis using the polarographic technique', by Mrs. B. Lamb.
S.C.I.—London: 14 Belgrave Sq., S.W.1., 6 p.m. 'Some industrial uses of plastics', by G. A. Rawcliffe & Dr. T. Love.

WEDNESDAY 11 JANUARY

- Plastics Inst.**—Cardiff: Angel Hotel, 6.30 p.m. 'Injection moulding', by G. Campbell.
Plastics Inst.—Stroud: Tech. Coll., 7 p.m. 'Plastics in packaging—present & future trends', by D. B. Bowman.
S.C.I. with Soc. Applied Bacteriology.—London: 1 Wimpole St., W.1., 2.15 p.m. Meeting on 'Quantitative microbiology'.
C.S., R.I.C., S.A.C. & S.C.I.—Bristol: Univ. Chemical Dept., Woodland Rd., 6.30 p.m. 'Analysis of plastics', by Dr. J. Haslam.
C.S.—London: R.I., Albemarle St., W.1., 7.30 p.m. 'Some problems in the chemistry of gallotannins', by Prof. R. D. Haworth.
Inst. Metals.—London: 17 Belgrave Sq., S.W.1., 6.30 p.m. 'Metallurgical research at high pressures', by Dr. J. E. Hilliard.
R.I.C.—Cambridge: Technological Research Stn., Spillers Ltd., Station Rd., 7.20 p.m. Scientific film show.
S.A.C.—Bristol: Section a.g.m. followed by meeting with R.I.C. on 'Polarography'.

● **Mr. R. B. Clarke** has been appointed administration officer of the technical division of the British Oxygen Co. Ltd. **Mr. E. F. Burgess** succeeds him as secretary.

● **Mr. J. Arthur Reavell, M.I.Mech.E., M.I.Chem.E., F.Inst.E., F.I.M.**, chairman of the Kestner Evaporator and Engineering Co. Ltd. and the Kestner group of companies, has retired from the chair after 53 years with the company, and assumed his appointment as the company's first president. On 5 January he sailed for South Africa where he will be staying for two months. He founded the Kestner company in 1908. Being about that time closely concerned with the embryo chemical and chemical engineering industries. He met M. Paul Kestner, who later granted Mr. Reavell rights to exploit the potentialities of the Kestner climbing film evaporator in the British Empire, but with the proviso that any company formed should embody the name Kestner in its title.



M. A. L. Banks (left) and R. B. Southall, two new directors of British Hydrocarbon Chemicals Ltd. (C.A., 24 Dec., p. 1057)

● **Mr. W. E. O. Walker-Leigh**, who has been a director of Cooper, McDougall and Robertson Ltd. since 1937 and managing director since 1939, retired from the board on 31 December. He has been appointed executive chairman of Productos Veterinarios Cooper, S.A.I.C., the Argentine subsidiary company of Cooper, McDougall and Robertson Ltd., and will act as counsellor for the parent company's other South American interests. From 1 January **Mr. C. M. Carr** will be sole managing director.

● **Mr. Adrian C. Furse-Roberts**, treasurer and secretary, and **Mr. Samuel W. McCune III**, general sales manager, have been elected members of the board of directors of the Du Pont Company (U.K.) Ltd. It is stated that the appointment of Mr. Furse-Roberts is in line with the company's policy of having an ever-increasing number of British personnel in responsible positions. Mr. Furse-Roberts joined Du Pont Co. (U.K.) in 1957 as comptroller. Two years later he became deputy treasurer and in 1960 was promoted treasurer and secretary.

● **Sir Cyril Hinshelwood, O.M.**, past president, Royal Society and Nobel Laureate for chemistry, has been awarded the Society of Chemical Industry Medal for 1961. The medal, a senior S.C.I. award, is presented every two years for

PEOPLE in the news

conspicuous services to applied chemistry by research, discovery, invention or improvements.

● **Mr. C. W. S. Taylor**, departmental manager of CIBA Laboratories Ltd., Horsham, retired at the end of December after 37 years with the CIBA organisation. At a farewell ceremony he was presented with a tankard by the chairman, **Sir Arthur Vere Harvey**, and with an antique bureau and an electric clock by the general sales manager, **Mr. C. H. Smith**, on behalf of all his many friends and well-wishers at CIBA.

● **Mr. P. W. Seligman** has been appointed deputy chairman of the A.P.V. Co. Ltd., while retaining his present position as a managing director. **Mr. H. P. N. Benson** has also been appointed a managing director.

● **Mr. Ernest W. Wyatt, B.A.**, secretary of Howards and Sons Ltd., and Howards of Ilford Ltd., has been appointed a director of Howards of Ilford.

● At a party held in London by Bush Beach and Segner Bayley Ltd., suppliers of industrial chemicals, awards were presented by **Mr. D. A. Gates**, chairman and managing director, to four directors whose individual service as director and employee exceeded 25 years. The directors included **Mr. J. F. A. Segner**, who was appointed to the board in September, 1959, when Frank Segner and Co. Ltd., F. S. Bayley, Clanahan and Co. Ltd. and Bush Beach and Gent Ltd., were reformed into the one company. Mr. Segner was a director of Frank Segner in 1924

and of F. S. Bayley, Clanahan in 1933. **Mr. W. C. Wiggins**, who was appointed in September, 1959, and had been a director of Bush, Beach and Gent Ltd., since October, 1951, also received an award, as did **Mr. W. E. Powell**, appointed in September, 1959, and previously a director of Bush Beach and Gent Ltd., since August, 1951, and **Mr. S. Farrow**, a director since August, 1955, of the London Fumigation Co. Ltd., a member company of the B.B. and S.B. Group. On the same occasion six employees were each presented with a watch for 25 years' service.

● **Mr. A. L. Bloomfield**, chief chemical engineer of A. Boake, Roberts and Co. Ltd., retired recently after nearly 45 years continuous service with the company. Mr. Bloomfield has been directly concerned with every major technical development in both aromatic and industrial chemicals in the company. There are no plans to replace Mr. Bloomfield at the moment owing to reorganisation within the company. The appointment of **Mr. John Dean** as deputy manager of research and development covers part of chemical engineering duties.

● **Vice Admiral Sir Charles Hughes Hallett**, chairman, and **Mr. W. J. Arris** have resigned from the board of Gas Purification and Chemical Co. Ltd. Both felt it was vital that the board be strengthened by the appointment of three new members with wide general experience to fill vacancies. This view was not accepted by the board.

● **Dr. J. W. Woolcock**, technical director of I.C.I. Heavy Organic Chemicals Division, on 1 January became responsible for technical and techno-commercial information and liaison on petrochemicals particularly overseas. From the same date it succeeded as technical director by **Dr. C. Cockram**, formerly production director. **Dr. H. E. North**, formerly production manager, joined the board on 1 January as production director.

● Following the retirement of **Sir Hugh Beaver** from the board of Arthur Guinness Son and Co. Ltd., **Lord Boyd of Merton** has become sole managing director. From 1957 to 1958 Sir Hugh was president of both the Federation of British Industries and the Institution of Chemical Engineers; he was chairman of the Committee on Air Pollution from 1953 to 1954.

Seen here at the Bush, Beach and Segner Bayley presentation party are, l. to r., directors W. C. Wiggins and J. F. A. Segner; D. A. Gates, chairman; Miss M. Bushell, secretary to the director and divisional manager; and W. E. Powell, director



Commercial News

British Industrial Plastics

Fresh capital is to be raised by British Industrial Plastics, probably by a 'rights' issue of ordinary shares, according to a statement made by Mr. C. H. Glassey, chairman of the group, in presenting the accounts to 30 September, 1960.

Since the last ordinary financing in 1958 the group has spent about £1,275,000 on capital account. Capital commitments at the year end were £324,000.

In 1959-60, the group achieved a record increase in turnover, from £7.8 million to £9.2 million which was instrumental in improving the margin of profit on sales to 12.3%, compared with about 10% in each of the four preceding years.

Fisons/Evans Medical

A share and cash take-over bid amounting to £6.8 million has been made by Fisons Ltd. for Evans Medical, the pharmaceutical concern who have subsidiaries in Europe, Africa, India, Australia and South America and are the appointed distributor in the U.K. of American poliomyelitis vaccine. This is the third recent take-over bid by Fisons; their earlier bids for Crosse and Blackwell and for British Drug Houses met with failure.

Terms of Fisons' offer are one £1 share plus 30s cash for every three of Evans' 5.2 million 5s ordinaries and a four-for-three share exchange into Fisons' 4½% preferences, plus 1s a share in cash, for holders of Evans 6% preferences.

Evans Medical directors, headed by Mr. I. V. L. Fergusson, advise their 4,000 shareholders to take no action pending consideration of the offer by the board.

Associated with Evans Medical are George Holliday and Co. Ltd. and Charles Midgley Ltd. The company also established the Burma Pharmaceutical Industry, and has subsidiaries in Europe, Africa, India, Australia and South America. Evans Medical have a fine record in biological research. Total net assets of the group are £3.7 million.

Fisons Ltd. are particularly keen to expand further into pharmaceuticals; they already control Bengers Laboratories Ltd.

Dutch Merger

A merger is planned by the Royal Netherlands Salt Industry, Hengelo and the Ketjen Royal Sulphuric Acid Works, Amsterdam. Under the scheme a holding company would be formed with shares of the two concerns being exchanged for

- **B.I.P. Plan to Raise Fresh Capital**
- **Fison's £6.8 M. Bid for Evans Medical**
- **Dutch Acid and Salt Firms to Merge**
- **Record Sales and Profits for U.S. Borax**

shares in the holding company on the basis of F11,000 worth of Ketjen shares equally F1500 of Royal Netherlands Salt shares, both figures representing nominal values. Negotiations are still in the early stages.

Royal Netherlands Salt are to propose a 15% (same) cash dividend for 1960 plus 5% in stock. Ketjen propose a 12% cash dividend (same) for 1960.

Houdry

Houdry Process Corporation, Philadelphia, are to pay a regular dividend of 50 cents per share plus an extra dividend of 50 cents per share. Consolidated earnings for 1960 will be about \$2.90 per share (\$2.45 per share).

U.S. Borax and Chemical

American operating company of Borax (Holdings) Ltd., United States Borax and Chemical Corporation had record sales and earnings in the year ended 30 September. Sales were up 7% to \$66.65 million (\$62.19 million) and net income was higher by 14% at \$6,920,209 (\$6,048,249), equal to \$1.50 (\$1.29) per common share.

Market Reports

NAPHTHALENE & PYRIDINE IN GOOD DEMAND

LONDON The movement during the first week of the new year has been of moderate dimensions with the industrial chemicals market showing no particular feature. Nevertheless there has been a fair volume of fresh inquiry on home and export account in circulation, with overseas buyers seeking competitive rates.

For the most part quotations remain steady at recent levels, and at the time of this report there has been no news of home market price changes apart from the reduced prices of I.C.I. Arcetons and solvents which were notified in last week's issue of CHEMICAL AGE, lower prices for polyethylene glycol and a rise of borax and boric acid prices.

The fertiliser market is seasonally quiet, while in the coal tar products section demand continues to be fully maintained particularly for such items as tar acids, naphthalene and pyridine.

Demand for industrial borax continued strong throughout the year, particularly in export markets. Sales of consumer borax sold under the 20 Mule Team trade mark were above last year's record levels. Tonnage sales of potash were up, but the profit margin remained unsatisfactory due to low prices. Full benefits of the 1 July price increase will be reflected in 1961.

A record \$1,652,575 was spent on research, with stress on boron compounds. The research effort made significant contributions to earnings by improving processes for existing products; it is hoped that new products now in varying stages of development will also lead to future profits.

Polycarbona Chemie

Polycarbona Chemie-GmbH has been formed in Hamburg with an ordinary capital of DM5 million. Joint owners are Rheinpreussen AG and Ruetgerswerke AG, who each hold 50% of the capital.

INCREASE OF CAPITAL

SHELL CHEMICAL (AUSTRALIA) PTY. LTD. Increased from £500,000 to £2 million.

MANCHESTER A quietly steady contract movement of a wide range of chemical products to the textile and allied industries and other leading outlets has been reported, but so far only a moderate weight of new business has been placed. Quotations generally have been maintained.

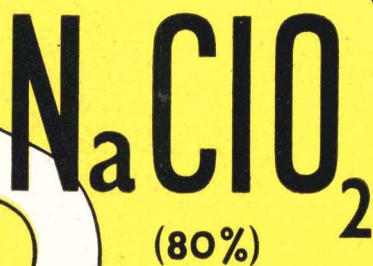
Most light and heavy coal tar products are being taken up in fair quantities and in the market for fertiliser materials an early increase in activities in superphosphate and other lines is looked for.

SCOTLAND With the New Year holidays, trading has been quieter on the Scottish heavy chemical market. There has been, however, some activity mostly pertaining to urgent requirements to fulfil production programmes. Some interest has also been shown in forward booking for 1961. A fair volume of inquiries from overseas has been received.

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NEW PATENTS

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

ACCEPTANCES

Open to public inspection 15 February

Separation of gases or vapours by diffusion. Simon, F. E., Arms, H. S., and Peters, R. E. 861 115

Preparation of uranium trioxide. United States Atomic Energy Commission. 861 191

Pigments. Armour Chemical Industries Ltd. 860 868

Method for improving materials containing cellulose fibres and products produced from such materials. Jens Villadsens Fabrikker AS. 860 992

Apparatus for the manufacture of expanded cellular polymeric materials in elongated configurations. Du Pont de Nemours & Co., E.I. 861 299

Soya phosphatides and therapeutic compositions containing them. Upjohn Co. 860 888

Sensitisation of photographic silver halide emulsions. Kodak Ltd. 861 194

Preparation of mono-quanyl-substituted 1,1,2-triphenyl-ethylenes and mono-quanyl-substituted 1,2,2-triphenylethanes. Merrell Co. W. S. [Addition to 797 345.] 860 869

Production of hydrolysed starch syrups. Corn Products Co. 861 195

Dyestuffs of the perylene tetracarboxylic acid series and process for their manufacture. Farbwerke Hoechst AG. [Addition to 837 326.] 860 889

Process of recovering tungstic oxide substantially free from molybdenum compounds. Kasey, J. B. 860 890

Process for the manufacture of finely divided polyethylene of predetermined particle size. Technoplast-Spindler AG. 860 993

Glass compositions. Compagnie de Saint-Gobain. 860 893

Manufacture of antistatic photographic films. General Aniline & Film Corp. 861 134

Blowing agent for foam materials. Farbenfabriken Bayer AG. 861 056

Disazo-dyestuffs insoluble in water and process for their manufacture. Farbwerke Hoechst AG. 860 995

Process for the production of propanediol derivatives. Egyesult Gyogyyszer Es. Tapszberger 861 022

Protective agents against the settling of micro-organisms, and against fungi, algae, protozoa and insects. Benckiser GmbH., J. A. 861 043

Alumina. Kabel Es Muanyaggyar. 860 896

Process for making 2-oxalodiones. Dow Chemical Co. 861 044

Water-soluble cationic condensation products and the preparation thereof. Borzon Co. 861 024

Process for converting crude perylene-3,4,9,10-tetracarboxylic acid diimide into a commercially useful products. Farbwerke Hoechst AG. 861 218

Production of barium oxide. Laporte Chemicals Ltd. 860 969

Decomposition of calcium sulphate in rotary kilns. Weychert, S., and Milewski, J. 860 952

Manufacture of phthalazinium compounds. Ciba Ltd. 861 219

6-Methyl steroid compounds. British Drug Houses Ltd. 861 007

Stabilised unsaturated polyester compositions. Ferro Chemical Corp. 860 939

Mixing of an organic material with a nitrating acid. Meissner, J. [trading as Meissner. J. [firm of]]. 860 953

Manufacture of composite materials. Imperial Chemical Industries Ltd. 861 220

Recovery of sulphur. Osaka Gas Kabushiki-Kaisha. 860 954

Polymer compositions. Monsanto Chemical Co. 861 348

Beta-amino lower-alkyl carbamates. Dow Chemical Co. 861 045

Pharmaceutical compositions and methods for producing phenylcyclohexane compounds. Parke, Davis & Co. 861 350

Foamed phenolic resinous materials. Imperial Chemical Industries Ltd. [Addition to 791 144.] 861 156

Prevention of corrosion. Imperial Chemical Industries Ltd. 860 958

Radiation alkylation process. Esso Research & Engineering Co. 861 183

Process for preparing precipitated products. Wyandotte Chemicals Corporation. 860 959

Diphenyl derivative. Imperial Chemical Industries Ltd. 860 940

Herbicides. Bugges Insecticides Ltd. 861 210

Fungicidal and insecticidal compositions. Esso Research & Engineering Co. 860 942

Thiophosphoric acid esters. Farbenfabriken Bayer AG. 860 944

Paints and like surface coating compositions. Jensen & Nicholson Group Ltd. 861 223

Manufacture of calcium borates. United States Borax & Chemical Corporation. 861 331

Hydrofining process. Esso Research & Engineering Co. 861 200

Moulded synthetic detergent compositions. California Research Corporation. 861 052

Production of foam. British Plaster Board (Holdings) Ltd. 860 883

Process for the preparation of 4, 4'-bis (benzimidazol-2-yl) stilbene. Sterling Drug Inc. 861 240

Plant for calcining and sintering cement or similar carbonates. Polysius GmbH. 861 083

Preparation of perfluoro-olefines. Du Pont de Nemours & Co., E. I. 861 271

Preparation of tertiary aliphatic methyl amines. Armour & Co. 860 922

N, N'-bis (3-methyl-cyclohexyl)-p-phenylene. Diamine and rubbers containing same. American Cyanamid Co. 860 923

Process for the manufacture of dibenzazepine compounds. Hoffmann-La Roche & Co. AG, F. 860 907

Method of and apparatus for supplying acetylene gas and a solvent to storage containers. Svenska Koltiebolaget Gasaccumulator. 860 902

Gas liquefaction apparatus. Hughes Aircraft Co. 861 111

Carboxylic acid nitriles. Badische Anilin- & Soda-Fabrik AG. 860 909

Purification of halogenated salicylanilides. Unilever Ltd. 860 910

Preparation of pure trialkyl borates. United States Borax & Chemical Corporation. 860 911

Polyethylene compositions and their production. Eastman Kodak Co. 861 277

Solid 'Oxo' Cube Phenol May Solve Packaging and Transport Problems

PHENOL is a troublesome and time-wasting chemical to handle. At present the standard method of handling the chemical is to prepare it as a liquid and pipe it into galvanised steel drums where it solidifies and can only be removed by remelting. This is a messy process demanding the use of hot water tanks. However, chemical manufacturers are studying the prospect of packaging phenol as a solid in containers lined with aluminium foil. It is hoped that this method will speed despatch and make the product easier to handle at the receiving end.

Aluminium foil is ideally suited to the handling of phenol; it is unaffected by it even at 212°F. One proposal for dealing with the problem is to reduce the material to a solid during manufacture and pack it in foil-lined fibre drums. The foil lining would allow the phenol to slide out smoothly in one piece when the container was inverted. It would also avoid any risk of the phenol saturating and weakening the drum walls.

A more radical method of using the unique properties of aluminium was suggested by Mr. J. Pilditch, managing director of Package Design Associates Ltd., when he addressed the Association of British Chemical Manufacturers' recent packaging conference. His suggestion was that the high cost of heating and cooling phenol might be alleviated by shipping it 'like an Oxo cube' in solid blocks packed in foil laminated boxes (see also C.A., 12 Nov. 1960, p. 817). This method would probably be cheaper than packaging in foil-lined drums. It would also speed handling since users need only strip off the box instead of opening and inverting the con-

tainer. Although the possibilities and technical problems involved were not explored, it is understood that the suggestion caused some interest.

Foil-lined drums are already used by the chemical and food industries for semi-liquid products. If the system proves acceptable for phenol, it may be applied to a wider range of chemicals of similar type.

M.o.L. Survey Reveals Demand for Technicians

A Survey by the Ministry of Labour of the proportion of technicians to other workers employed in the engineering and chemical industries in the U.K. reveals that nearly 18% of employees were engaged on managerial, administrative and clerical work, and 71% were craftsmen, semi-skilled or unskilled workers. Industries showed considerable variations in the proportion of technicians to employees; in the chemical and oil refining industries the proportion was about 1½ to 1, and in the engineering industry somewhat higher than the average at 5 to 1. Only 4½% of the technicians were women.

The overall shortage, as a ratio of current vacancies to existing manpower strength, was 7.7%, rather less than that of qualified scientists and engineers in these industries in 1959 when it was 9.6%.

The survey showed that nearly 14% of technicians had a Higher National Diploma or Higher National Certificate, or were members of a professional institution. Nearly 17% had an Ordinary National Certificate or a City and Guilds Final or Intermediate Certificate.

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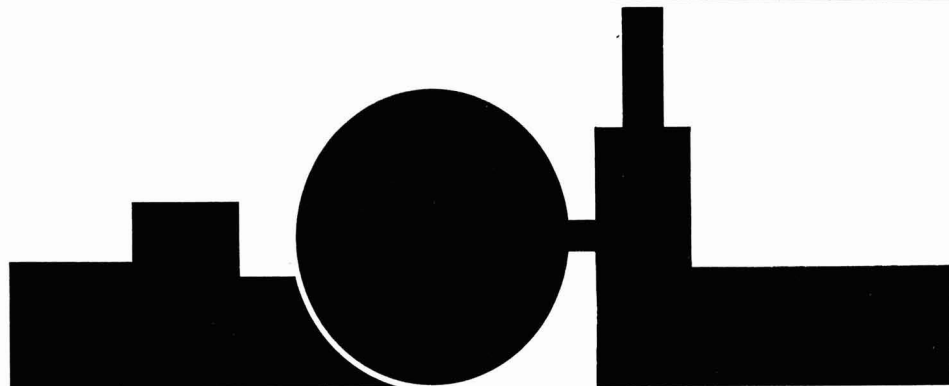
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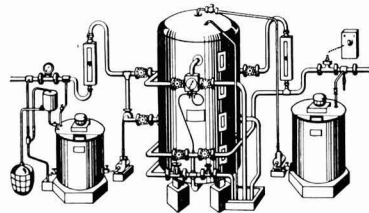
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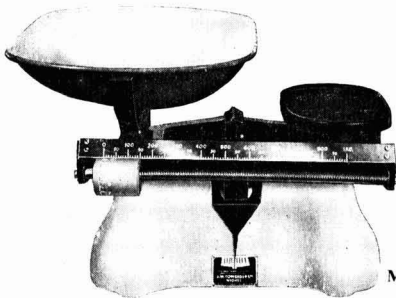
Sliding Weight Balance, Model 5

Capacity 2 kilos, sensitivity 0.1g.

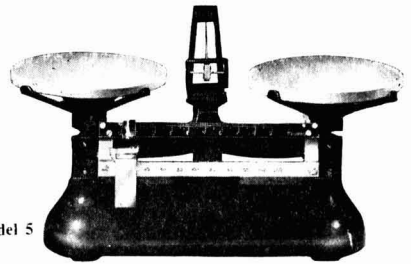
Fitted with 2 scales, 0-10g. in 0.1g. and 0-200g. in 10g.

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With chromium plated scoop pan £11.5.0



Model 7



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