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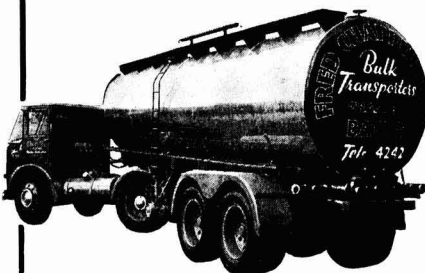
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PRICE POLICY FOR DRUGS

MAJOR price reductions announced this week for 29 pharmaceutical preparations sold on the National Health Service and produced by Glaxo Laboratories Ltd., mainly affect penicillin, corticoid and vitamin B₁₂ preparations. Further price cuts can be expected in the near future both for competitive reasons and because the Ministry of Health, which must try to cut the State's drug bill, and the U.K. pharmaceutical industry have recently agreed on a new price-fixing scheme for N.H.S. drugs. The new agreement began on 1 January and extends to 30 June 1964. It represents an extension of a price regulation scheme brought into operation in 1957.

Basically the scheme is the same as the earlier one—after a three-year period of 'free pricing' (the price fixed by the manufacturer and designed to allow him to recover research and development costs), the price will be determined by the export price if overseas trade is substantial. Alternatively prices can be determined by comparison with the price of an unbranded equivalent if such exists, or by a special formula.

One of the changes in the scheme refers to the definition of 'substantial exports', 25% of total sales compared with the previous 20%, which represents a Ministry concession. Other agreed changes will strengthen the N.H.S. position. Most important is that allowing the Ministry to initiate immediate price negotiations directly on any widely used N.H.S. drugs with the object of cutting the national drug bill. Also likely to lead to lower prices is the announcement that a price calculation formula will be used for drugs not important in export sales and the fact that the new scheme excludes from the three-year free price-fixing period those products "which manifestly owe nothing to fresh research". The latter point is aimed particularly at the large number of new preparations which are merely combinations of existing pharmaceuticals.

For some years, the British drug industry has been subject to charges of excessive profits and large advertising and promotion expenditures. In particular, U.S. subsidiaries in the U.K. which have much of the trade in antibiotics and which account for a large part of the total N.H.S. drug bill, have been widely criticised both in Parliament and the medical Press. Despite all this, total pharmaceutical industry sales to the N.H.S. represent only 7% of the total cost of the National Health Service. It is legitimate to wonder if so much criticism would be heard were it not for the presence of so many American companies.

The new price scheme does not require the industry to disclose to the Ministry its profit margins and other costs, such as advertising and promotion, except when these costs may be concerned in negotiations with the Ministry on the widely-used new drugs. On behalf of its members, however, the Association of British Pharmaceutical Industry has volunteered information on margins and costs with the aim of providing the Ministry with "acceptable evidence of the fairness and reasonableness of the prices charged".

Glaxo in announcing their price cuts indicate that they have cut their prices substantially by an average of 6½% each year since the N.H.S. began.

(Continued in page 138)

I.C.I.'s £34 Million Issue Will Help Finance Mounting Construction Programme

AN even higher rate of capital spending in 1961 can be expected by Imperial Chemical Industries Ltd., compared with last year. This was stated by Mr. S. P. Chambers, C.B., chairman, on Monday evening when he announced details of the company's plans to raise between £34 million and £35 million through a new rights issue. (For details of this issue see p. 153.)

Capital expenditure sanctioned at the end of 1960 totalled £51 million, compared with £40 million at the end of 1959. Most of the spending sanctioned at the end of 1960 has already been announced and includes the £10 million nylon 6 project, the Ulster Terylene plant, the Severnside ammonia and fertiliser projects, plus the expansion of many existing facilities. No further announcements of major projects are likely to be made within the next week or two, said Mr. Chambers, but he added that I.C.I.'s rate of capital spending was currently rising.

£535 Million Spent

In the 16 years to 31 December 1960 the total cost of new plants and buildings, including extensions and alterations to existing assets, of providing additional working capital and of further investments in subsidiary and associated companies (mainly for construction of plants and supplying additional working capital overseas) totalled about £535 million. Of that sum, about £410 million came from the company's own resources—depreciation funds and unattributed profits—and the balance of about £125 million was met from the proceeds of cash issues of ordinary shares and of unsecured loan stocks. It is still the board's policy to finance a substantial part of the company's capital expenditure from its own resources; the extra cash is now needed to continue the large construction programme and to provide further working capital.

If I.C.I. match the £35 million capital now to be raised with resources of their own on a scale comparable to that of the past 16 years, then the company will themselves find a further £113 million.

During 1960, the company repaid its £20 million 4% loan stock out of internal resources without raising its overdraft which at the end of the year still stood at £500,000.

It is too early for the company to give final figures of trading profits and other income for 1960 owing to the worldwide spread of the group's interests, but it is estimated that group income before tax will prove to be about £88 million, a 20% increase on the 1959 figure of £73.1 million, which was more than 60% up on 1958.

I.C.I. directors expect to recommend

a final dividend of 1s 6d on ordinary, which with the interim of 1s 3d already paid will make a total payment of 2s 9d, compared with 2s 3d for 1959. The board believes that the company's prospects are such that it will be possible to maintain this rate in 1961 on the increased ordinary capital.

Mr. Chambers said it was too early to say anything about prospects for 1961, but the divisions were working well and exports were still strong, although profit margins were lower, partly as a result of the company's policy of cutting prices. He saw no reason to suppose that 1961 would in any sense be a bad year for I.C.I. The company was not dependent on the fortunes of any one British industry or on any particular section of broad demand; overseas its business was spread throughout the world, both by country and by industry. Unless there is a deep depression in the U.K. and unless many other countries also have problems at the same time, demand should remain reasonably good.

Price Policy for U.K. Pharmaceuticals

(Continued from page 138)

While drug research is a costly business it must be noted that the products now the subject of price cuts have been in use on a large scale for five years in the case of the corticoids, 11 years in the case of vitamin B₁₂—the discovery of this vitamin was announced by Glaxo in 1948—and over 12 years in the case of penicillin.

It must be remembered, however, that for the few pharmaceuticals introduced each year, following several years' research, there are hundreds which never get beyond the research laboratory; the salaries of research teams, time and overheads must be paid for. In addition the life of some drugs may well be brief as the result of a later discovery completely overshadowing an earlier one. That is why a high initial price is always set on any new pharmaceutical preparation; with the three year free price-fixing period this enables manufacturers to maintain the high research and development activity which is vital to the health of the nation.

Glaxo Cut Prices of 29 Ethicals

THIS week Glaxo Laboratories Ltd. drastically cut the prices of 29 pharmaceuticals, including penicillin, corticoid preparations and various forms of vitamin B₁₂. All the price reductions cover drugs for the National Health Service and the cuts range from 40% downwards.

These have been made possible largely as a result of Glaxo's heavy investment in research and development. Since the National Health Service was introduced, the company has reduced its prices to the N.H.S. by an average of 61% per year (see also p. 137).

Brighton Conference on Insecticides, Fungicides

THE British Insecticide and Fungicide Conference will be held in Brighton on 7-10 November. Papers will be presented on a variety of subjects including the following: systemic insecticides; new developments including new compounds, novel formulations or new application methods; and the translation of research into practice.

Scientific workers in the U.K. and overseas are invited to make contributions at the conference. A short summary indicating the scope of the paper should be sent to Mr. W. A. Williams, secretary, Association of British Manufacturers of Ag-icultural Chemicals, Cecil Chambers, 86 Strand, London W.C.2.

Fisons Withdraw from Battle for Evans Medical

WHEN they withdrew their bid for Evans Medical Ltd. at the end of last week, the board of Fisons Ltd. stated they felt their offer was based on an appropriate valuation both of Evans and of Fisons, taking into consideration the potentialities of both enterprises and the advantages of diversification resulting from a merger. Fisons' directors thought it undesirable that there should be competitive bidding for a business of this character.

This withdrawal leaves Glaxo Laboratories Ltd. in the field as the only contenders; Glaxo had countered Fisons' bid. Fisons valued the Evans Medical ordinary shares at about 25s and the preference at about 19s; the Glaxo offer put a value of 31s 4½d on the ordinary and of 20s 9d on the preference.

This is Fisons' third unsuccessful takeover bid. A year ago, Nestlé Alimentana beat them for control of Crosbe and Blackwells, while 10 months ago their bid for British Drug Houses failed to gain enough acceptances.

Wills

Mr. Harry Caddick, late joint managing director of Wm. Neill and Son (St. Helens) Ltd., chemical plant manufacturers, who died on 4 October, left £12,397 net.

Mr. John Alexander White, director of Witco Chemical Co. Ltd., London, who died on 28 August, left £7,118 net.

Project News

U.A.R. Chemical Feasibility Studies For London Firms

A CONTRACT for the study of industrial applications of electric power which will become available from the Aswan High Dam has been awarded to **Andrew Crookston and Co. Ltd.**, 38 Grosvenor Gardens, London S.W.1, in association with **L. H. Manderstam and Partners** of the same address. The award was made by the Five-year Plan Organisation of the Southern Region of the United Arab Republic.

The feasibility study will cover the following industries:

Phosphorus and phosphoric acid, triple superphosphate, dicalcium phosphate and phosphoric acid salts for the synthetic detergents industry.

Aluminium production.

Nitrogenous fertilisers based on electrolytic hydrogen.

Electrolytic caustic soda with special stress on the utilisation of chlorine produced.

Graphite electrodes.

Silicon carbide.

Iron and steel production using the electric shaft furnace method.

Ferro-silicon alloys production.

Ferro-manganese alloys production.

ment could be installed during the planned maintenance shut down of existing plant, and involved close co-operation between A.P.V.'s and I.C.I.'s engineering departments.

In addition, A.P.V. are to supply a methyl chloride vaporiser, several more West distillation and recovery columns with condensers and reboilers and a reactor scrubbing column. Three of these distillation columns are being designed for continuous operation and the fourth will be a 2,000 gall. batch still.

These are the second and third orders placed by I.C.I.'s Nobel Division for A.P.V. distillation equipment during recent years, the first order having been placed during 1956.

It was reported in *CHEMICAL AGE*, 15 October, p. 623, that construction of the silicone plant extensions at Ardeer was on schedule and that the first major item of new equipment should be ready for operation early this year.

Oil and Chemical Projects Keep A.E.I. Busy

● **IMPORTANT** electrical equipment contracts received by the Motor and Control Gear Division of **Associated Electrical Industries Ltd.** during 1960 include a £750,000 contract for Shell Chemical's polyolefin plant at Carrington, equipment on order or already supplied including over 700 motors, distribution switchgear, transformers, cables, telephones and lighting fittings. For Esso at Fawley A.E.I. have a £200,000 contract, including a 13,000 h.p. motor for a compressor drive, believed to be the largest direct-on-line started squirrel cage motor to be used in a refinery process anywhere. Numerous other refinery equipment contracts, both home and overseas, have been received.

For the British Hydrocarbon Chemicals extension at Grangemouth, A.E.I.

are to supply 30 motors, 1-650 h.p., for pumps and compressor drives for the butadiene plant, and 32 motors, 3-50 h.p. for the formaldehyde plant. Over 150 flameproof motors are on order for the I.C.I. polypropylene plant at Wilton and 60 motors for the first construction phase of the new Severnside plant. Some 150 motors, suitable for pressurising against uncertifiable gases, were supplied for the new carbide and acetylene plant of Carbide Industries Ltd., recently commissioned at Maydown, Londonderry.

Czechs May Buy Chemical Plant in Britain

● THE possibility of buying complete chemical plants and equipment for the Czechoslovak chemical industry from Britain, Austria and France, is being studied in Prague by **Strojimport**. Plant and equipment is needed for the expansion of facilities under a planned total chemical industry output increase of 97 during the period 1961-1965.

Whesoe Gain £900,000 Indian Refinery Contract

● **OIL INDIA LTD.** have awarded **Whesoe Ltd.** of Darlington the contract for the supply and erection in Upper Assam of plant required to condition the crude oil before it is pumped through the 720-mile pipeline from the Nahorkatiya oilfield to the new oil refinery at Nunmati and Barauni. The contract, which was the subject of international tender, is valued in the region of £900,000.

Albright to Expand Carbon Tetrachloride Capacity

● To meet rapidly expanding demand for use in fluorocarbons, **Albright and Wilson (Mfg.) Ltd.** are installing two additional units at Widnes for the production of carbon tetrachloride. Since 1939, capacity at Widnes has risen tenfold.

New Warehouse for Q. and Q.

A new raw-glass warehouse of 5,000 sq. ft. capacity has been completed at the Stone (Staffs) factory of Quickfit and Quartz Ltd., makers of interchangeable laboratory glassware.

Starch Derivatives Plant Sought in Falkirk

● A **SCOTTISH** extension at Camelon, Falkirk, is planned by **Starch Products Ltd.**, of Langley, Slough, who have received approval for change of purpose of foundry trade buildings to their needs. The firm proposes to manufacture adhesives, dextrans, starch and starch derivatives starting in a small scale and expanding.

Geigy Plan New Compounding Plant for Hurdfield

● **CONSTRUCTION** is due to start in the spring on the new buildings at the Hurdfield Industrial Estate for the **Geigy Pharmaceutical Co. Ltd.** The installations, estimated to cost about £1 million, will be used for compounding and packaging pharmaceuticals. A contract has yet to be awarded.

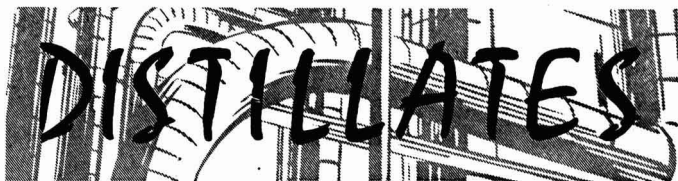
A.P.V. Distillation Equipment for I.C.I. Silicones Plant

● **WITHIN** four months of the order being placed, West plate distillation equipment for the third stage extensions to **I.C.I. Nobel Division's** silicones plant at Ardeer, Scotland, was delivered by the manufacturers, the Chemical Engineering Division of the **A.P.V. Co. Ltd.**, and erected on the site. The tight delivery schedule was necessary so that the equip-

Model of a Texaco partial oxidation gasification plant which P.G. Engineering Ltd. (associate of the Power-Gas Corporation Ltd.) are designing and supplying for Fertilisers and Chemicals, Travancore Ltd., South India. Brief details of the plant were given in C.A., 24 Sept. 1960, p. 501

P.G. Texaco Gasification Unit for India





★ WHEN Fleet Street news offices received urgent invitations late on Monday afternoon to meet Mr. S. P. Chambers for a Press conference the same evening in I.C.I.'s sixth-floor board room on Millbank, it was obvious to most that the long-awaited rights' issue was about to be announced. For one thing, such an issue would not be revealed during Stock Exchange hours.

I was much impressed by Mr. Chambers' urbane handling of awkward questions fired in rapid sequence by City editors and financial correspondents. At a reception after the conference, he showed a detailed knowledge of a wide range of his company's activities with 'off-the-cuff' answers to questions on plant projects, share yields, polymers, fibres, olefins, paints, dyestuffs and even wallpaper. So far as the latter is concerned, I was told that I.C.I.'s recent entry into this field was nothing more than a logical diversification—representing what Mr. Chambers said was an insurance against popular demand swinging from paint to paper as a wall covering.

While trade is booming in some I.C.I. products, notably fibres and pharmaceuticals, paints are having a thin time—having to contend with short-time in the car industry and a year in which rain at times brought outside decoration to a standstill.

★ I SEE from a recent edition of *Chem. and Eng. News* that joint ventures in the U.S. chemical industry are running into trouble with the Antitrust laws. The Justice Department has asked the U.S. District Court of Wilmington, Del., to order the dissolution of the Penn-Olin Chemical, the company formed by Pennsalt and Olin Mathieson in February 1960 to build and operate a sodium chlorate plant, on the grounds that such a company is subject to the application of antitrust principles.

The Justice Department charges that the creation of Penn-Olin eliminates potential competition between Pennsalt and Olin Mathieson in the production and sale of sodium chlorate, substantially lessens actual and potential competition between the two firms in the production and sale of other chemicals, and encourages competitors in the chemical and other industries to take part in joint ventures to avoid or lessen competition.

Joint ventures have been a standard method of developing new products and markets and there must be many such companies in the U.S. anxiously waiting the result of the suit which Pennsalt intend to contest.

The success of such a suit could have

far-reaching effects in the chemical industry, not only in the U.S. but overseas too. The application of the Antitrust Act is complex and usually joint ventures between U.S. and overseas companies are exempt, but in view of the extent of the infiltration of U.S. companies into the European markets by this means, the European chemical industry will also follow with interest this precedent-setting suit.

Apart from the direct effect on existing and potential joint ventures, the success of the Justice Department's action is bound to have repercussions on U.S. exports.

★ EVERYONE knows that the U.S.S.R. has overcome rocket fuel problems and made great advances in metallurgical and even polymer chemistry, but I wonder how many of my readers know of the Soviet Union's need of laboratory reagents. I learn that Russia is finding it difficult to obtain even small quantities of high-purity reagent chemicals, extracting and complexing agents and the new organic reagents.

This affects the development of progressive analytical methods because reagents are either lacking or badly distributed. Now under study in the U.S.S.R. are problems of raising production of borides, silicides, phosphides, sulphides, lanthanum, hexaborides, carbides and nitrates, particularly of boron and silicon.

Attempts are being made to organise and standardise production of titanium boride and chromium boride, silicon nitride, boron nitride, molybdenum silicide and others. The question of obtaining supplies of heat-resistant quartz vessels, plus other glassware for laboratory and process use are also being studied.

★ MANY of my readers will need a little prompting from me to see that a 'People in the News' item (p. 151) concerning the Mobil Oil Co. is of more than usual interest. The Mobil Group has appointed a European technical adviser, based in the Netherlands, to advise the Mobil Chemical Co. on expansion and research projects.

The group were late entrants in the U.S. petrochemical field. The big question now is whether the present move marks the first tentative step into chemicals production in Europe. No further information is available from the London end of Mobil, but rumours have been circulating in the oil world that Mobil

would shortly launch into chemicals either at Coryton or on the Continent.

★ BOLD but belated is the National Coal Board's offer, made to the Minister of Power, to help finance the development of Lurgi gasification plants, if only the Gas Council stops being naughty and drops its plans for the large-scale importation of methane gas from the Sahara or elsewhere for gas-making. Trump card in the N.C.B. move is that the Gas Council has been anxious for a long time to reduce its dependence on coal, especially since the coke by-product is so hard to get rid of and the Lurgi process certainly disposes with the coke problem.

Will the Minister of Power succeed in reconciling his two protégés? Or will the Gas Council merely go on whistling its 'Desert Song'? One factor which must be taken into consideration is the high price of N.C.B. coal for gas making—at present a thorn in the side to the gas industry in developing economical methods of production. This the Gas Council might well use as a lever in any bargaining that results from the N.C.B. offer. In any case, enthusiasm for imported natural gas has been worked up too long for it to be dropped suddenly, and my guess is that some compromise arrangement will be worked out.

★ YOU would think anyone would be welcome to watch the inauguration parade of the U.S. President—anyone that is with the right sentiments towards U.S. presidents—but this appears not to be the case. The various birds which frequent the trees along part of the processional route have been asked to withdraw, and to encourage them to do so the National Bird Control Laboratories will spray the trees with \$5,000 worth of Roost-No-More, an N.B.C.L. product.

Roost-No-More is an oil-based emulsion which irritates the birds' feet and which smells unpleasant to them. The product is not harmful to birds, humans or the trees on which it is sprayed.

Having suffered from the nightly invasion of Trafalgar Square by starlings, I wonder if we might take a tip from the U.S. Inauguration Committee. Its true it would be rather difficult to spray Nelson's hat or St. Martin's spire—but it's a thought.

★ LIFE is getting tougher not only for starlings but also for crocodiles, as readers will deduce from the paper on 'Anti-crocodile agents' to be presented by Dr. D. W. Ollis, of Bristol University's Chemistry Department, at a meeting of the Chemical Society next Thursday (see 'Diary Dates', p. 154). What sort of agents keep crocodiles at bay? Alligatory compounds? Anyway, some real crocodile tears will be shed when they start shooting this stuff into the water.

Alembic

North-west Producers See No Decline in Current Demand for Chemicals

NO decline in the present demand for chemicals is anticipated and hopes are high for the future. This is the tone set in the annual report for 1960 of the Chemical and Allied Trades Section, Manchester Chamber of Commerce, Section chairman is Mr. E. D. Carey, northern regional sales manager for I.C.I.

If the consumption of sulphuric acid can still be used as a guide to industrial activity then there is little cause for anxiety in the immediate future. (Production in 1960 totalled 2.7 million tons, and is expected to reach 3 million tons in 1961—as estimated in C.A., 14 January, p. 83.)

The report says there can be little doubt that 1960 was an encouraging year for the north-western chemical industry. New plants and extensions increased capacity over a wide range of chemicals, notably petroleum products, but also including sulphuric acid, dyestuffs and agricultural chemicals.

Exports. For some years U.K. exports of chemicals have risen steadily with current figures showing a rise of 76% over the volume exported in 1954. But there is no room for complacency, says the Chemical and Allied Trades Section, since the U.K. share of world chemical markets has fallen, while overseas competition is still growing, with prices and margins being forced downwards. According to reports the U.S. industry is working below capacity and has achieved some success in disposing in export markets of the surplus from some large-scale units at heavily competitive prices.

In the first 10 months, the report highlights growing exports to South Africa (up £1.2 million to £10.9 million); Nigeria (up £1 million to £6.6 million); New Zealand (up £700,000 to £6.6 million); Malaya (up £1 million to £4 million); and Pakistan (up £2.6 million to £5.7 million).

E.F.T.A.

Advantages to be gained in the European Free Trade Association resulting from progressive dismantling of tariffs would be of limited consequences to chemical exports because duties of E.F.T.A. countries are already mostly low or non-existent. Keener competition on a world-wide basis would be provided by chemical manufacturers in the 'Six', where integration and amalgamation would lead to larger production units and greater efficiency.

The report adds "It is in the interests of the British chemical industry that the problems facing the reconciliation of the E.F.T.A. and the European Economic Community be solved in order to bring about the desired object of free trade in Europe".

Dyestuffs. The 1959 recovery continued in 1960 and was still in operation. Feel-

ings of uncertainty had started to obtrude on forecasts for 1961, originating from lack of confidence in prospects for processors of textiles and users of dyestuffs for that purpose. As former prices had been held in face of higher costs, particularly for fuel and labour, profit margins had tended to diminish. In spite of that the industry maintained a high degree of technical service, development and research.

Plastics. Domestic consumption was up by some 18% to 470,000 tons in 1960, or 20 lb. per head of population. Sales by British producers rose by about 50,000 tons to 550,000 tons. Imports rose by 72% and exports by only 9%. Polythene consumption increased by 20-30% to about 65,000 tons, while p.v.c. consumption rose by 40% to about 120,000 tons. Consumption of polystyrene was up by 30-35% to well over 40,000 tons, the increase in demand being met more by increased imports at highly competitive prices rather than by increased sales by U.K. producers.

Drug Exports

Pharmaceuticals. Exports of pharmaceuticals in 1960 rose by some 10% over 1959. Proprietary medicines again formed the largest product group and the setback experienced by antibiotics in 1959 was more than offset by an increase in 1960, despite a small fall in the value of exports of penicillin itself due to continued price competition from overseas producers. The sulphonamide group also showed a substantial recovery from the 1959 recession, due largely to the development of newer sulpha drugs. Appreciable increases were obtained in antimalarial drugs, aspirin, insulin, hormones, ointments and liniments. Vitamin products and alkaloids were among the few groups to decline.

Organic Chemicals. Further substantial advances in the production of organic chemicals took place, notably in the

petrochemical field. Synthetic fibres were making increased demands on organic chemicals and it was generally considered that there was scope for further expansion.

Many of the additives used in petroleum and mineral oil were finding wider usage in their more refined forms in the preservation of animal and human foodstuffs.

Present and future developments in organic chemicals are closely tied with those of plastics materials and demand for p.v.c. and its plasticisers continues to rise. Prices of organic chemicals generally fell during 1960.

Lube Oils and Greases. Demand for lubricating oils and greases expanded during the year. While home trade expansion has been considerable, it is in exports that the greatest expansion has been seen. The U.K. industry has ambitious plans for further increasing this all important export trade. Prices showed a firmer tendency in 1960 despite every effort to effect economies in production and distribution.

Farinaceous Products. Both U.K. and continental producers of maize starch are working to capacity at more remunerative prices. The advances in prices of all starches has forced the dextrines and other derivatives producers to raise their prices.

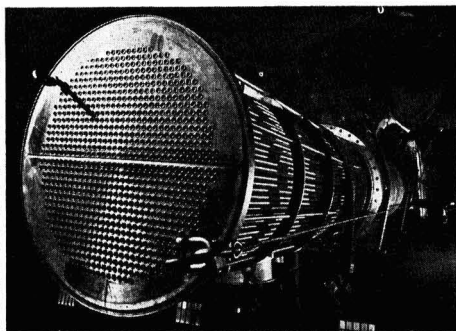
Recommendations for Safe Use of Thiodan

THE Ministry of Agriculture has issued recommendations for the safe use in the U.K. for Thiodan in agricultural and horticultural use.

For the protection of operators, Thiodan should be included in the Agriculture (Poisons Substances) Regulations as a Second Schedule Part II substance. For the protection of consumers, Thiodan is acceptable for use on non-edible crops.

Chemical Engineering Photography Exhibition

Final assembly of a tubular heat exchanger at the Thornaby works of Head Wrightson Teesdale Ltd. This photo was one of a number displayed at a special exhibition of photographs, covering a wide range of operations in the heavy engineering field, which was held at the London offices of Head Wrightson and Co. Ltd. The photographs were taken by Mr. John Jochimsen



Letters to the Editor

Diepoxides Are Not Carcinogenic, Says CIBA Research Director

SIR.—In a recent article entitled "Crease Resistant Fabrics Obtained by the Cross Linking of Cellulose" (C.A., 24 December, p. 1049), you reported a lecture by Dr. J. Honeyman. In this article the use of diepoxides as cross linking agents for cellulose was described together with the totally misleading statement that diepoxides are carcinogenic. Our company has been engaged upon the production and distribution of a range of diepoxides for the past 10 years and during this time we have always maintained a keen interest in the biological properties of these products.

The most important commercial diepoxides are the diglycidyl derivatives of bisphenol A and these are obviously included in Dr. Honeyman's sweeping classification, even though such materials have been the subject of intensive investigation which has clearly demonstrated their lack of carcinogenic activity (Hine *et al*, *Cancer Research*, 1958, 18, 20).

We are greatly concerned with the incomplete statement reported in your journal concerning diepoxides and trust that you will take steps to clarify the position for your readers.

Yours, etc.,

R. F. WEBB,

Director of Research.

CIBA (A.R.L.) Ltd.,
Duxford.

Relevance of Weight in Plastics Argument

SIR.—We have read with interest the letter in your edition of 17 December from a director of Tough Plastics Ltd. This letter was as amusing as it was irrelevant. The subject matter concerned 'plastics' chemical plant. We do not consider that lead has any relevance in this field. Neither did we discuss the specific gravity of our material.

We did, however, mention in the context of size of mouldings that we had produced large tanks and that our biggest mouldings to date weighed 7½ tons. This, in fact, is a very good indication to your readers of our capability to produce large plastics mouldings.

The question of weight is entirely a different question, and in this context the specific gravity of our Keebush material is 1.6, while the specific gravity of our associated Keeglas and other plastics material ranges from 1.2 upwards.

We would certainly not suggest that because a unit of plant is heavy that this, in itself, has relevance but, incidentally, neither would we suggest, as the writer of your letter seems to do, that lightness in itself is a virtue. With all the 30 years' experience in plastics for chemical plant which we have had, we believe that there are applications for

all types of plastics and we are in the fortunate position of manufacturing not only Keebush but most of the other plastics which, no doubt, the writer of the letter had in mind.

We appreciate that the writer of this letter was probably speaking without experience or knowledge of our materials, but we felt that we should put on record the true facts since we would not wish your readers to be misled in any way.

Yours, etc.,

G. H. BLACK,

Joint Managing Director.

Kestner Evaporator and Engineering

Co. Ltd.,

London S.W.1.

Immune to 'Pie- in-the-Sky'

SIR.—In your feature 'Distillates' of 19 November, 'Alembic' asks how Chemical Abstracts Service reacts to the report of two Battelle investigators on data processing machinery and its prospects. The answer is simple—we do not react, having become immune to 'pie-in-the-sky'.

The sight of a floor-full of scientists evaluating some 200,000 chemical documents a year in terms of "how useful it is" to other people whose needs are not precisely known neither reduces us to tears nor incites us to laughter, for this

is an old problem. Recently we experimented by asking a number of top organic chemists to select from Section 10 (Organic Chemistry) of *Chemical Abstracts* the 10 "most important" articles. Their views were so widely divergent that no article was selected by all of them, and only one by six of them; in other words the phrase "how useful" is quite meaningless except in relation to a particular need at a particular time.

So—while Battelle prepares its crystal ball—we will get on with the earthy business of mechanically handling chemical information, providing the best service we can.

Yours, etc.,

G. MALCOLM DYSON,

Director of Research.

Chemical Abstracts Service,
Loughborough.

Artrite Resins for High Temperature Use

HIGH-TEMPERATURE resistant resins and specialised ceramics with good mechanical properties are being intensively developed by Artrite Resins Ltd., but it will be some time before the products will be available in commercial quantities. This was stated by Sir Walter Worboys, chairman of B.T.R. Industries Ltd., the parent company, in his annual report.

During recent years, Artrite have increased their research and development spending on improving their present product range and manufacturing processes, as well as towards the discovery and development of new products. This work is now leading to lower production costs and Artrite have been able to market several new products, including polyether foam, corrosion-resistant spray coatings, etc.

Punched Card System Rationalises Chemical Works Maintenance

A SYSTEM of planned maintenance introduced at the Clitheroe, Lancs, catalyst factory of I.C.I. Billingham Division six years ago is felt to be proving its worth as a means of rationalising maintenance works. The system is also applied to improvements and modifications to plant. Small inspection jobs, instead of being dealt with singly, are collected to form inspection schedules covering several days' work.

When plant extensions were completed three years ago, a plant inventory was made section by section, each item being given a reference number. At the same time, all routine maintenance jobs including overhauls and inspections associated with each item were compiled in a job description book. Provisional frequencies were applied to those maintenance jobs which it was decided to carry out; allowed time estimates were made for each job and a punched card system was installed.

The planning clerk serves out cards weekly to the plant foreman, and cards for jobs to be done straight away are

passed to the chargehand for action. Pinned to each card is a log sheet on which the chargehand reports the result of the job, components replaced, etc. This report is transferred to the history record card for the plant item.

Timing of maintenance work is achieved by working out a detailed maintenance schedule in relation to the production programme which is drawn up at five-week intervals. Once this is confirmed, the plant engineer arranges with the planning clerk for items of plant not required on production to be available for maintenance at the appropriate time.

The maintenance schedule is reviewed from time to time to ensure that it remains "alive". Frequencies may be adjusted in the light of experience; some maintenance jobs may be eliminated, others introduced. The number of spare components, etc., held in stock is also carefully controlled.

The system is described in rather more detail in the January issue of *Target*.

West German Firms Have Big Expansion Plans

HÜLS TO ENTER GLYCERINE AND NON-FOAMING DETERGENTS FIELDS

UNDER construction at the Marl site of Chemische Werke Hüls AG is a new acetic acid plant based on *n*-butane, while provision has been made for increases in the production of crotonaldehyde and phthalic anhydride. Plants for p.v.c., polystyrene and polyester resin are to be extended and further projects are a new electrolysis plant and an extension of the sulphamic acid units. Alkyl phenol capacity is to be raised considerably and acetylene capacity enlarged by the erection of a new gas compressor.

It is also planned to go into glycerine production on a large scale. Considerable funds have been invested for research into biologically decomposing surfactants based on alkylbenzene sulphamates. Hüls expect to have several hundred tons of a new product featuring these biological properties in the spring of this year; following completion of further tests large-scale production facilities could be established and the product marketed in about three years.

Through the foundation of Faser-Werke-Hüls, Chemische Werke Hüls have started a new phase of development. This affiliate will produce polyester fibre based on terephthalic acid and 1,4 dimethylol-cyclohexane, a new product to Europe. Until the plant is in production deliveries in Europe will be made with material imported from the U.S. partner in this venture—Tennessee-Eastman (see CHEMICAL AGE, 14 January, p. 102).

1960 Plant Schedule

During 1960, Hüls invested some DM85 million in new plant. Projects included a wet phase carbon black production unit, automation of plasticiser production, pelleting of SK resin, production of hydrochloride under pressure, expansion of morpholine production and raising p.v.c. paste output to 400 tonnes/month, plus the extension of the pipeline system to Leverkusen.

During 1960, 70% of all raw materials processed (i.e. 373,000 tonnes), were based on oil or its derivatives, against 30% (or 162,000 tonnes based on coal). In the latter category, almost 103,000 tonnes were benzene.

According to Professor Paul Baumann, chairman of the Hüls board, sales in 1960 rose by about 14% to about DM700 million (DM612.5 million). He is optimistic about 1961, despite increasing competition. The growth rate of some 5% in exports lagged far behind the increase in home sales where strong competition resulted in diminishing profits.

Since 1945, Hüls had spent DM9 million on administrative buildings, i.e.

DM9,000 per administrative employee. Labour costs rose by some 14% in 1960 to DM112 million; Dr. Baumann warns that receding returns do not allow higher wages or salaries to be absorbed by prices.

Production of synthetic rubber by the 50% affiliate Buna-Werke Hüls totalled 70,000 tonnes, 67% more than in 1959 (41,722 tonnes). Some 13% (9,000 tonnes) were exported. Dr. Baumann now expects that this company will leave the 'loss phase'. During 1960 the butadiene plant

was modified, the polymerisation plant being divided into three lanes. A fifth styrene stripper was installed and another finishing plant with a three-band dryer put into operation; the capacity of the plant now amounts to 120,000 tonnes/year. By the end of 1960, a new plant for carbon black extended rubber went on stream with capacity of 300 tonnes/month.

The joint Hüls-Houdry catalyst firm—Katalysatoren-Werke Hüls GmbH, has now started production and sale.

Bayer Plan Rubber, Fibre and Agricultural Chemical Plants at Dormagen

NEW production units for the manufacture of synthetic rubber and agricultural chemicals are to be built at the Rhineside Plant, Dormagen, of Farbenfabriken Bayer AG, of Leverkusen. Bayer have purchased land to the west of their existing Dormagen works, which with the present site covers a larger area than the main plant at Leverkusen.

All possible production expansion through the erection of new plant has now been undertaken at the Leverkusen works. The planned Dormagen extension is separated from the present Dormagen plant by the Cologne to Neuss railway line, and a bridge is to be constructed across this line to link the two sites.

The plans are mainly concerned with the production of synthetic rubber and plant protection chemicals. The expansion of the company's synthetic rubber programme is planned on a broad front and includes the doubling of Bayer output of Perbunan N and Perbunan C. The new units planned for the production of phosphoric acid esters for use in plant protection media will work to large-scale capacities. Bayer are already Europe's main producers of plant protection chemicals.

Expansion will also raise Bayer's capacities for Dralon and Perlon. Dormagen production of the former will be increased to 25,000 tonnes annually while the monthly output of the latter is brought up to 600 tonnes. Plastics units at the Dormagen plant are also to be expanded.

The Erdölchemie GmbH plant, also at Dormagen and a joint enterprise of Bayer and B.P. Benzin und Petroleum AG, the German subsidiary of British Petroleum, also announce steady progress. Over 1960 some 65% of the petrochemical plant's planned capacity was reached and over the current year this is expected to rise further to 80%. Last

year the plant brought on stream a Stone and Webster steam cracker with an annual capacity of 30,000 tonnes of ethylene, an ethanol plant with a capacity of 18,000 annual tonnes, a benzene hydrofiner for 120,000 tonnes per year, the ethylene plant No. 2 for 24,000 annual tonnes, and the glycol plant No. 2 with annually 15,000 tonnes. A power station with an output of 220 tonnes of steam per hour and 36,000 kW was also brought into operation.

This month production of butadiene is to be taken up by Erdölchemie. The autumn of this year should see start of production in the di-isobutylene and tri-isobutylene plants at present under construction.

By the start of last month, the sum of DM318 million granted by Bayer shareholders for investment purposes had been used to 82.5 per cent with expenditure of DM262 million.

Index of Wage Rates in Chemical Industries

AN index showing the relative position of wage rates (not earnings) in various trades and industries in the U.K. in September 1960, published in the *Guardian*, shows that the mean wage index for all industries at that time was 179.3 for men and 178.3 for women, calculated on a base of 1948 = 100. On the same base, indexes for workers in the chemical and allied trades in September 1960 are given as follows:

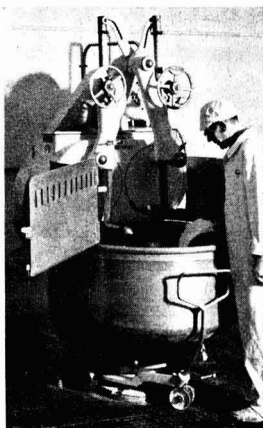
	Men	Women
Coke-Ovens and By-products ...	179.4	189.8
Heavy Chemicals ...	180.5	195.4
Chemical Fertilisers ...	184.1	187.5
Drugs and Fine Chemicals ...	180.5	188.1
Paint, Varnish and Lacquer ...	168.9	176.0
Explosives (Govt. Est.) ...	182.5	192.0
Soap, Candles, Matches, Ink and Glycerine ...	179.8	191.2
Other Oils, Greases, Glue, etc. ...	175.1	182.5

New Glaxo Complete Food Aids Hospital Patients, 'Slimmers', Antarctic Explorers

A CONVENIENT way of taking a meal with a controlled calorie content has been developed by Glaxo Laboratories Ltd. Called Complian, this complete, planned food is the outcome of three years' research. Complian contains 20 nutrients essential to life including protein, fat (derived from vegetable oil), carbohydrate, calcium, phosphorus, sodium, chloride, potassium, iron, iodine, riboflavin, nicotinic acid, pantothenic acid, choline, pyridoxine, and vitamins A, B₁, B₁₂, C, D, E (acetate), and K plus trace elements. One pound of Complian contains 2,000 calories.

Complan originated with the need to produce a food blend for hospital patients who could not take nourishment in the normal way but, as the process developed, it became clear that the product had wider possibilities.

After large scale clinical trials Complian was marketed on a restricted basis in November 1955. Since then it has become known as a supplementary food with a wide variety of usage. Complian will provide sufficient nourishment for those unable to eat; it is a valuable supplement to a limited diet and a nourishing addition for those who need building up; for



A final stage in the production of Complian

those on a low calorie or obesity diet. Complian is a convenient way of controlling the intake of calories.

Complan, a pale-yellow powder, is best given as a drink. It is intended to be mixed with water, although milk can be used instead, and it can be flavoured as desired. It retails at 4s 2d per lb.

It is believed that Complian has immense potential value as an emergency ration. It has been tested under a variety of difficult conditions. For example, a consignment was taken on the Royal Society's Geophysical Year Expedition to the Antarctic where it met with considerable success.

some advantage over the more cumbersome differential expressions often used in kinetic analyses, in that it can be used to interpret deviations in the order. If the order does not follow a simple kinetic expression, the method may aid in recognising this and in interpreting the correct expressions.

Foreign P.V.G. Sheeting Not to be Marked

The special standing committee appointed by the President of the Board of Trade to consider an application by the British Plastics Federation for marking orders in respect of imported p.v.c. sheeting rejected the application on the grounds that "the origin of the goods is already known by the majority of purchasers and users".

The applicants had claimed that it was impossible to tell by ordinary examination whether p.v.c. sheeting is foreign or not, or to determine its quality.

London Office Opened by Sulphur Institute

The newly formed international research and information organisation the Sulphur Institute, which has its head office in Washington D.C., has opened a European office in London. Dr. Rene Leclercq, former director of research for Union Chimique Belge, who will head this office will be responsible for developing a sulphur-uses research programme in Europe.

For the time being the London office is c/o Hughes and Hughes, 197 Knightsbridge, London S.W.7.

Guide to O.C.C.A. Exhibition

Official guide to the 1961 technical exhibition of the Oil and Colour Chemists' Association is now available from Mr. R. H. Hamblin, O.C.C.A., Wax Chandlers' Hall, Gresham Street, London E.C.2. This year's exhibition, to be held in London, 6-9 March inclusive, is the largest yet staged and will occupy both the Old and New Halls of the Royal Horticultural Society. An exhibition luncheon will be held on 6 March, the guest of honour being Sir Cyril Hinshelwood, O.M., D.Sc., F.R.S.

Sewage Purification Conference

Annual conference of the Institute of Sewage Purification, to be held at Brighton from 19 to 23 June, will mark the Institute's 60th anniversary. The conference will cover aeration units for sewage treatment, chemical engineering in water pollution, the Armer Report, and costs of construction of sewage treatment works.

One-day Meeting on Foamed Rubber and Plastics

A one-day symposium on foamed rubber and plastics is being arranged by the London Section, Institution of the Rubber Industry and the Plastics Institute. This will be held at the Institution of Electrical Engineers, London, on 5 May. Full details will be announced later.

N.B.S. Simplified Method for Determining Order of a Chemical Reaction

A METHOD, promising to be of particular interest to chemical engineers, industrial chemists, and other scientists concerned with controlling rates of reaction, for determining the order of a chemical reaction has been devised by J. H. Flynn of the U.S. National Bureau of Standards. When the order of a chemical reaction is known, the factors influencing the speed of the reaction can usually be determined. The procedure may also be used to detect errors in initial conditions and stoichiometry; and in some cases it provides clues to the forms of complicated kinetic expressions.

The procedure is a simple, rapid mathematical one. Although distinct first- second- third- and zero-order reactions can be defined in simple terms, very few reactions actually follow a constant order throughout an entire series of steps. In fact most processes involve two or more simultaneous reactions.

Because of the complex nature of such reactions, the mathematical description of the overall process is the result of several rate expressions and consequently is difficult to obtain accurately. Although the Bureau method does not

solve all the problems involved, it does simplify the fitting of data to mathematical expressions and provides information on the actual equation.

The method of finding order is based upon time-ratio tables which were calculated by the Bureau. For a given reaction, the values were determined of a time t_x required for the reaction to $x\%$ completion. Successive overlapping ratio values (t_{15}/t_5 , t_{20}/t_{10} , ..., t_{95}/t_{85}) were then tabulated as a function of order to give the tables. Time-ratio values can be plotted as a function of order, as is done for several time-ratios. By using such a family of curves, fractional orders can be easily obtained.

To find the order of a chemical reaction by the Bureau's method, the degree of advancement of the reaction is obtained experimentally at specific intervals. By plotting the different percentages of completion as a function of time, values of the times of various degrees of advancement can be obtained. Then, by comparing different ratios times to time-ratio values on the Bureau table, the related order can be rapidly determined.

This method of determining order has

Hydrodealkylation

NEW PETROLEUM ROUTE TO NAPHTHALENE AND BENZENE

A NEW processing technique—hydrodealkylation—is expected to cause a major shift in the supply of benzene and naphthalene. As previously reported in CHEMICAL AGE, hydrodealkylation plants now under construction in the U.S. will add 97 million gall. per year to benzene capacity, 300 million lb. per year to naphthalene production potential, thus breaking a supply bottleneck in both commodities.

Most important will be the impact on naphthalene, which has been in short supply for some time. Until the new petroleum-based U.S. plants come on stream in late 1961, coke-oven plants and tar distillers will be the only source of naphthalene, and this hydrocarbon will thus continue to be dependent on steel output, which has not grown at a rate commensurate with the demand for naphthalene.

Phthalic Anhydride

Biggest factor responsible for the rapid growth in naphthalene consumption has been the production of phthalic anhydride, which in the U.S. accounts for some 430 million lb. out of the total 1960 demand for 550 million lb. naphthalene. Lacking an adequately reliable source of naphthalene, producers of phthalic anhydride have given much consideration to *o*-xylene as alternative raw material. However, this solution is handicapped by low yields and drastic operating conditions needed in the partial oxidation of *o*-xylene. Thus, of the U.S. phthalic output of 345 million lb., only 35 million lb. is derived from *o*-xylene, the remainder from naphthalene. Other producers, notably in Italy and Japan, have relied more heavily on *o*-xylene, and U.S. capacity for this hydrocarbon, on stream or under production, totals 300 million lb. a year.

For the producer of phthalic anhydride, hydrodealkylation processes promise to create a new raw materials position by converting alkyl naphthalenes, which are available from various petroleum fractions (notably catalytically cracked distillate) in plentiful supply, to scarce naphthalene. Now under construction are three methyl naphthalene dealkylation plants intended for this use: Sun Oil Co. (100 million lb./year), Ashland Oil (75 million lb.), and Collier Carbon with Tidewater Oil Co. (50 million lb.).

Although different proprietary processes are employed at these plants all of them use the principle of dehydroalkylation of methyl naphthalenes. The following reaction is involved:



The reaction may be carried out thermally or catalytically. For commercial hydrodealkylation, catalytic methods are of greater interest because lower feasible operating temperature and more rapid hydrogenation of the molecule's initial cracking fragments minimise degradation to polycyclic condensation products and tars.

Numerous catalysts have been proposed for the hydrodealkylation of methyl aromatics. Among the more interesting, mention may be made of alkali-promoted ferric oxide or chromium oxide, nickel or cobalt on various carriers, alumina-supported NiO-Cr₂O₃, ferric chloride, chromia-alumina, and molybdena-alumina.

Temperature, pre-pass conversion, and hydrogen pressure are the critical operating variables. With increasing temperature (up to 575°C.) yield of naphthalene rises steadily. At the same time, however, gas and coke formation and hydrogen consumption increase. Thus, for the best selectivity, low temperature is desirable, but this is achieved at the cost of pre-pass conversion and throughput.

As a function of pressure, conversion to naphthalene passes through a pronounced maximum at 800 p.s.i. hydrogen. At lower pressures, dealkylation is evidently incomplete. At higher pressure, undesired product-consuming hydrogenation

reactions become significant.

While hydroalkylation may be carried out on purified methyl naphthalenes, a commercially interesting approach starts with methyl naphthalene-containing feedstocks. To avoid excessive loss due to cracking of non-aromatic components under hydrodealkylation conditions, the process is carried out in two stages. In the first step, a catalytic light cycle stock is subjected to mild hydrocracking over chromia-alumina. By this operation, considerable aromatisation occurs; non-aromatics are converted to high-octane petrol, leaving a high-aromatic low-sulphur recycle oil which can be hydrocracked under more severe conditions to dealkylate substitute naphthalene.

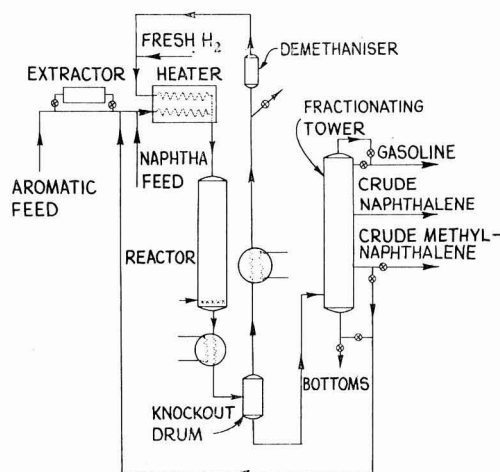
Using a feedstock containing 29.5 weight % 'potential' naphthalene such a two-stage process is reported to be capable of yielding 19.2% product naphthalene (65% of theory). At the same time, overall petrol yield is 54 vol. %; this product has a clear octane value ranging from 90 to 98.

Product Has Melting Point of 78°C

Petroleum-derived naphthalene is characterised by very low content of sulphur, nitrogen, and benzene insolubles. Product with a melting point of at least 78°C can be recovered without difficulty. This is well within the specifications normally set for feedstock to phthalic anhydride plants which call for a melting point between 76 and 79°C.

An analogous process will serve for the conversion of toluene to benzene at eight U.S. plants now under construction, with a combined capacity of 97 million gall. per year (the largest single unit will be Dow Chemical Co.'s 30 million gall. per year benzene plant at Freeport, Texas).

This new capacity will be superimposed on existing petrobenzene plants capable of turning out some 300 million gall. per year benzene, principally by Udex extraction of benzene obtained as



Flow sheet for a naphthalene process by hydrodealkylation

co-product in catalytic reforming and catalytic cracking of naphtha fractions.

Overall, petroleum-derived benzene—regardless of process—still makes up only about 60% of U.S. supply. In 1960, some 170 million gall. will be obtained from coking and tar distilling operations and 5 million gall. are obtained by imports.

With benzene consumption continuing to rise rapidly (485 million gall. in 1960 as against 365 million in 1957), a shortage of supply had threatened to develop, although this has not been as acute as in the naphthalene field. Here, too, the problem is compounded by fluctuations in steel output and by declining availability of foreign benzene, caused by rising demand in the countries of origin.

Thus, the industry turns in increasing measure to petroleum-derived benzene. It is interesting that most of the current expansion projects in this field are based on hydrodealkylation, a process which only made its commercial debut in December 1960 (at Signal Oil Company's 17 million gall. per year plant).

Reason for this emphasis on hydrodealkylation over conventional benzene recovery from petroleum reformate is two-fold: much greater potential availability of toluene in any given location, and ability to operate and expand the plant almost without reference to the need for petrol consumption and quality.

Unlike naphthalene production, benzene manufacture by hydrodealkylation

employs a pure feedstock, namely toluene. Reaction conditions are similar to those employed in single-stage naphthalene production. Some advantage is reported for the use of catalysts containing molybdc acid (such as molybdena or promoted cobalt molybdate). To prevent excessive methanisation and catalyst fouling with catalysts of this type, about 2 moles steam is introduced with each mole toluene feed. Benzene yield is reported at 95-97% of theory.

Despite its current attractiveness, hydrodealkylation as a route to benzene is economically justified only as long as there is sufficient price spread between toluene and benzene. Impelled by a number of newly developing outlets for toluene (e.g., a new commercial route to phenol, hydrodealkylation, rapid growth in derivative tolylene diisocyanate), there were signals in late 1960 of a rising price.

However, there will be no problem in supplying the toluene market on a long-term basis. While present U.S. production capacity is only 380 millions of gall. per year (of which 330 million is based on petroleum feedstock), this capacity will certainly be expanded rapidly in the near future. Petroleum as a source for toluene is virtually inexhaustible—potential availability of toluene from today's refinery stocks has been estimated at 3,500 million gall. New capacity for its recovery will come with the anticipated growth in the total market for toluene.

pitch, paying 89 roubles/tonne compared with a price of 124 roubles to the Netherlands.

For naphthalene, Italy took 20,000 tonnes (230 roubles/tonne) East Germany 13,500 tonnes (380 roubles) and the U.S. 7,100 tonnes (245 roubles).

Exports in 1959 of sulphuric acid totalled 43,200 tonnes, of which Bulgaria took 16,100 tonnes, Czechoslovakia 15,700 tonnes, and Yugoslavia 9,300 tonnes. Average price per tonne was 127.9 roubles, Yugoslavia paying about 105 roubles per tonne.

Fertiliser exports totalled 1,790,200 tonnes in 1959 (1,603,400 in 1958 and 955,400 in 1955), of which potash fertilisers took 438,700 tonnes in 1959 (394,600 tonnes in 1958) with Japan by far the largest customer, taking 168,000 tonnes. Shipments of nitrogen fertilisers totalled 150,600 tonnes (156,700 tonnes in 1958), of which ammonium sulphate accounted for 69,000 tonnes (67,400 tonnes in 1958) and ammonium nitrate 81,300 tonnes (89,300 tonnes in 1958).

Of agricultural chemicals exported in 1959, DDT preparations totalled 2,107 tonnes (1,670 tonnes in 1958), BHC preparations 1,244 tonnes (458 tonnes), and nicotine 107 tonnes (15 tonnes).

Instrument Technology, a Vital Force in Industry— B.I.M.C.A.M. Lunch

THE emergence of instrument technology as a vital force in the achievement of success in every industrial sphere was the theme of a speech made at the annual luncheon of the British Industrial Measuring and Control Apparatus Manufacturers' Association, held in London on 17 January, by Mr. G. C. Eltenton, president of the Society of Instrument Technology. He pointed out that instrument technology was not, as many people imagined, a small, specialist technology, but one which called for an understanding of a wide range of industries and technologies, backed by sound scientific training. The weakness of the instrument industry lay in the shortage of trained men; everything possible must be done to recruit and train aspirants to this extremely useful occupation.

Mr. Eltenton was responding to a toast of 'The Guests' proposed by Mr. W. G. Thomas, president of the B.I.M.C.A.M. Association. Chief guest at the luncheon was Lord Mills, Paymaster General, who paid tribute to the instrument industry's great achievement of raising productivity 75% in the last five years. But the country's great need was for more exports, he said, and the industry must look to its export figures. Lord Mills proposed a toast to "The Association," which was responded to by Mr. W. T. Marchment (Evershed and Vignoles Ltd.), chairman of B.I.M.C.A.M. Guests at the luncheon included Mr. W. K. Hutchison, president of the Institution of Chemical Engineers, and Sir Henry Jones, chairman of the Gas Council.

Soviet Chemical Exports Show Rise of 60% in Five-year Period

EXPORTS of chemicals from the Soviet Union, up 59.6% from 1955 to 1959, are the subject of report No. 4 on the East European chemical industry, published by Joseph Crosfield and Sons Ltd., Bank Quay Works, Warrington.

It is four years since the U.S.S.R. began regularly publishing details of its foreign trade and the checks made by Crosfield's on the official figures reveal a "very high order of internal consistency which seems a pretty good indication that they are reliable". The present report deals with exports; Soviet imports will be the subject of a later report.

The report is divided into three sections, the first dealing with broader aspects, the second with exports to individual countries, and the last with exports of particular chemicals. It is pointed out that prices quoted in the third section (in roubles) should be treated with caution.

Most important, by value, are general chemicals (worth 221.4 million roubles in 1959 and 134.7 million roubles in 1955), followed by fertilisers (212.5 million in 1959, 97.2 million in 1955), rubber, rubber goods and rubber-asbestos goods (171.2 million in 1959 and 139.6 million in 1955); dyestuffs, colours and tanning materials (27.6 million in 1959 and 34.8 million); explosives (estimated at 16.1 million in 1959); and photo-

graphic materials (8.4 million in 1959 and 3.8 million in 1955).

Soviet chemical exports in 1959 (valued at 645.2 million roubles) represented 3% of all U.S.S.R. exports, compared with 2.9% in 1955. Of 1959 total chemical exports, 68.8% went to other Communist countries (74.7% in 1955), but in the general chemicals group, shipments to non-Communist countries accounted for 53.5%.

More than 80% of the general chemicals exports (221.4 million roubles) is accounted for by exports of 'coke chemical products'. Exports of these products were as follows:

COKE CHEMICAL PRODUCTS

	'000 Tonnes		
	1955	1958	1959
Benzole	87.7	185.5	229.5
Toluol	6.3	17.5	28.3
Xylol	0.3	0.3	0.3
Creosote	43.8	60.2	63.5
Naphthalene	28.4	43.5	50.1
Pyridine	0.2	0.9	1.0
Coal Tar Pitch	173.2	207.6	164.9

In 1959, the U.S. took 90,500 tonnes of benzole, East Germany, 40,400 tonnes, Holland 32,900 tonnes, West Germany 22,000 tonnes and the U.K. 3,700 tonnes. Prices range from 317 roubles/ton for East Germany to 274 for Canada. In the same year, Italy took 12,200 tonnes of toluol; Rumania 21,000 tonnes of creosote; France 138,000 tonnes of coal tar

New Analytical and Control Techniques Make Debut at Physical Society Exhibition

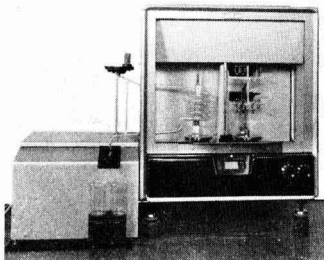
A NUMBER of new analytical and control instruments, inspection techniques and materials of construction were introduced at the 45th Physical Society Exhibition, held in London 16-20 January. The following summary describes a brief selection of the exhibits.

Advanced prototypes of two **balances** which illustrate the application of electronics to high precision weighing were shown by L. Oertling Ltd., Cray Valley Works, St. Mary Cray, Orpington, Kent. One, the model FO5, has been modified to operate on a force-balance system, the beam position being monitored by a photocell unit, while electromagnetic feedback is used to maintain the beam in equilibrium. Differentiating networks eliminate hunting, and the response time is of the order of milliseconds. This, the makers claim, makes the unit ideal for application where an analogue signal or speed of response are the main criteria, e.g. recording, weighing out or sorting. The other balance shown, the HO5, gives a digital output.

The TF 1093 laboratory **pH meter** shown by Marconi Instruments Ltd., St. Alban's, Herts., is a mains operated, high stability unit giving a direct reading of pH from 0 to 14. Any section of the scale can be expanded over a centre-zero incremental range of ± 1.4 pH, enabling small changes in pH to be measured with a discrimination of better than 0.01 pH; the main and incremental ranges are provided with independent buffer controls to enable accurate cross-correlation to be carried out. There is a ± 2 pH increment switch for buffer solution extension or self-check. Full automatic compensation for solution temperature is provided on both ranges. The instrument also measures voltages in the ranges 0 to 1,400 mV and ± 140 mV with the same high input impedance and stability as for pH measurement. This extends its use to such applications as rH or corrosion-potential measurements.

Another stand featured the **differential cathode-ray polarograph**, which possesses very high sensitivity and offers facilities for the subtractive, comparative and derivative methods of differential polarography (using two cells) and also for single cell work. When used with a single cell it provides all the facilities of the single sweep cathode-ray polarograph but, in addition, provision is made for base line slope correction and cancellation of current due to reductions at or below the sweep start potential. This instrument was shown by Nash and Thompson Ltd., Hook Rise, Tolworth, Surrey.

Mervyn Instruments, St. John's, Woking, Surrey, showed another kind of polarograph, the Mervyn-Harwell **square wave polarograph**, mark III. This is contained in a console with an acid resistant



L. Oertling model FO5 balance, modified to operate on a force balance system

desk top. A thermostatically controlled cell holder is built in and contains four Barker-type cells and twin dropping electrodes. Built into the instrument is a source of electrolytic hydrogen for deoxygenation. This is arranged, however, in such a way as not to preclude the use of other deoxygenation gases such as white spot nitrogen.

High Sensitivity Analyser

A model of the **Pye process analyser**, claimed to be the first high sensitivity process analyser to be installed "on stream" anywhere in the world, was shown. The analyser combines the ability to detect trace components present at less than one part per million with a completely flexible construction which enables it to be tailored to suit exactly the requirements of a particular analysis or control problem. It can incorporate any of a range of specialised detectors available for special applications, and can easily be adapted to include column switching, sample selection and the back-purging of unwanted components. Besides the detection system, the equipment incorporates the automatic sampling valve designed and patented by I.C.I. Billingham Division. This enables small samples to be injected with very high accuracy and reproducibility. Makers are W. G. Pye & Co. Ltd., Granta Works, York Street, Cambridge.

The **Ultrascan double-beam recording spectrophotometer** shown by Hilger & Watts Ltd., 98 St. Pancras Way, Camden Road, London N.W.1, is useful for routine analysis in the range from 200-750 $m\mu$. Resolution is 0.1 $m\mu$ at 250 $m\mu$ and 0.2 $m\mu$ at 500 $m\mu$. Two light sources are used, one for the ultra-violet region and one for the visible region. These are a hydrogen lamp and a tungsten filament lamp respectively, and they change over automatically at 350 $m\mu$ where their spectra overlap, enabling a complete scan to be taken right through the range without a break. The flat-bed recorder has three scanning speeds. Spectra are

plotted linearly in frequency on charts calibrated in wavelength. The ordinate scale is linear in density or transmission, and can be expanded to provide for low transmission or high density values. English, French and German charts are available. Specimen cells have path-lengths ranging from 1-100 mm, and many accessories are available for continuous flow measurement, chromatography, flame spectra, etc.

The technique of X-ray microanalysis consists essentially of focusing an electron beam on to a region of the specimen surface approximately 1μ in diameter and slightly less in depth and analysing spectroscopically the resulting X-rays. The **Microscan X-ray analyser** shown by Cambridge Instrument Co. Ltd., 13 Grosvenor Place, London S.W.1, allies this basic technique with scanning facilities so that it can display, side by side, an X-ray image showing the distribution of a particular element over the area scanned and an electron image formed by reflected electrons from the same area. This latter is comparable to an optical micrograph. The magnification can be controlled from about 200 to 3,000 and the resolution for both images is normally about 1μ . The accuracy, for static-probe quantitative analysis, is normally $\pm 1.0\%$ or $\pm 0.1\%$ depending on the form of read-out. The instrument can analyse elements ranging from uranium (92) down to magnesium (12).

A redesign of an earlier instrument, a **flame photometer**, shown by A. Gallenkamp & Co. Ltd., Sun Street, London E.C.2, employs a built-in galvanometer and has been designed primarily for routine testing in clinical laboratories. Filters for sodium and potassium analy-



Gallenkamp flame photometer

sis only are fitted. The speed of response is particularly high and the complete analysis may be performed with small quantities of materials. Excess fluid from the burner system is led via siphon drain to a conveniently placed collection point. The galvanometer suspension employed is robust and the unit is substantially free from errors caused by vibration and dust.

Five new **high temperature ceramics** were shown by the British Ceramic Research Association, Queen's Road, Penkhull, Stoke-on-Trent. Three of them, sili-

con nitride, silicon carbide and boron nitride, are produced on pilot plant scale by the Association and sample products are being supplied to prospective users; the other two, aluminium nitride and boron phosphide, are still in the research stage.

Silicon carbide has an excellent history as a high temperature material but the strength of the bond holding the carbide grains together has limited its use. Now

a technique has been evolved by the B.C.R.A. which produces a self-bonded silicon carbide with about ten times the strength of the older types. The new material is highly resistant to erosion by the hot exhaust gases of rockets. Among its other possible applications are as internal pump parts for handling corrosive liquids and molten metals, high temperature resistance thermometers and heaters for high-temperature furnaces.

Fast Electrochemical Shaping and Drilling Becomes Practicable in U.K.

ELECTROCHEMICAL grinding, shaping and drilling of engineering parts, which has for some years been considered as an interesting possibility, is now being offered in the U.K. as a practical process for replacement of conventional machining techniques. The method has special advantages in the working of metals that are difficult to machine by conventional techniques, and for the achievement of special shapes that are difficult and expensive to obtain with the usual tools. The electrochemical method is claimed to provide the potential for greatly improved dimensional accuracy.

The process was recently demonstrated at the Crawley, Sussex, factory of Metachemical Processes Ltd., whose associated company, Steel Improvement and Forge Co. Inc. (Sifco) of Cleveland, Ohio, developed the process in collaboration with the Battelle Memorial Institute. Metachemical Processes are prepared to produce machinery for engineering firms, who would operate it under an agreement which provides for technical collaboration by Metachemical Processes.

In the shaping process, the shaped master tool is made the anode and the metal workpiece the cathode, both being submerged in a chemical solution with a very small gap between them, normally 5-10 thousandths of an inch. The shaping action depends on the fact that the greatest density of current between anode and cathode occurs where there are protuberances, so that these are reproduced as concavities in the workpiece. A problem in electrochemical shaping hitherto has been to keep the

solution free of metal particles, which reduce conductivity; this problem is now solved by pumping solution continuously through the gap. The solution used has been specially developed by Metachemical Processes.

The shaping process is one of gradually polishing away the surface of the metal, the result being a surface which simplifies subsequent finishing and polishing operations. Since the electro-shaping process takes only a few minutes, it offers a means of speeding up machining operations very considerably. So far, development work has been largely concentrated on the shaping of turbine, compressor and aerofoil blades, but it is believed that the process is potentially capable of duplicating all the common metal-shaping operations in current use. It is particularly useful for the tough new alloys.

Deep hole drilling is also possible using the electroshaping technique and drilling of holes down to .012 in. has been made practical. Holes can be of complex section and multiple hole drilling is also possible. The technique has potentialities for making tube sheets for heat exchangers, Stainless steels, hot-work tool steels, tungsten and molybdenum are among the materials that can be shaped.

Another development with which Metachemical Processes are connected is high-speed plating, including a brush-plating process developed by M. Georges Iexi, director of Laboratoires Dalic of Paris. Metachemical Processes have also developed indium/bismuth electric cells.

Anchor Reorganise Plastics Division for ABS Resin Sales

FOR U.K. and overseas marketing of Cycolac ABS (acrylonitrile-butadiene-styrene copolymer) resin, Anchor Chemical Co. Ltd., Manchester 11, have reorganised their Plastics Division. Cycolac is a product of the Marbon Chemical Division of Borg Warner. The division's marketing policies and activities will be controlled by Mr. T. C. Hewlett and Mr. S. A. Horobin.

Mr. J. M. Warnock, who has been appointed Plastics Division manager, has visited Marbon's plant and laboratories at Parkersburg, West Va. Mr. A. K. Lucas has been appointed sales service manager (technical) and a team of commercial and technical representatives has been appointed, some of whom will operate from the London office and some from J. and G. Hardie, Glasgow.

Ethylene Oxide-treated Alcohols From New Croda Surfactants

A RANGE of non-ionic surface active agents of an entirely new type in which the hydrophobic portion of the molecule is due to mixed sterols, tri-methyl sterols and high mol. wt. aliphatic alcohols, as distinct from products based purely on aliphatic alcohols already available, has been developed by Croda Ltd., Cowick Hall, Snaith, Goole, Yorks.

Trade-named Etolans, these resulted from studies designed to widen the scope of the use of wool wax alcohols. It was found possible to improve the surface-active properties in water, etc., of these alcohols by treating them with ethylene oxide, in processes analogous to the preparation of non-ionic surfactants from oleyl/cetyl alcohols, octyl phenol, etc.

Derivatives of wool wax alcohols can be used as emulsifiers and auxiliary emulsifiers for production oil-in-water emulsion as distinct from the water-in-oil emulsion produced by normal wool wax alcohols. Products ranging from water-dispersible to water-soluble are available in five grades. They also act as solubilisers, wetting agents, dispersing agents and gelling agents.

In the five experimental grades—5, 10, 15, 20 and 40—the numbers signify molecules of ethylene oxide. Production is the subject of British Patent Specification 643,422, 1950. The products can be used as emulsifiers for oleic acids, castor oil, waxes, organic solvents, etc.

Sipon Introduce an Ampholytic Germicide

A NEW ampholytic germicide, named Sipon, has been developed by Sipon Products Ltd., 23 Dryden Chambers, 119 Oxford Street, London W.1. Sipon contains about 50% of the ammonium salt of N-lauryl tetraethoxyamino-sulphonic acid, which is the active ingredient. A clear amber coloured liquid, it remains clear even at the lowest temperatures. It is completely and instantly in water, alcohol and most solvents.

It is claimed that spectrum is wider than quarternaries on both Gram positive and Gram negative bacteria. Sipon is neither toxic nor irritating in recommended dilutions. With a Rideal Walker coefficient of 37, an excellent germicide and antiseptic can be produced by simply diluting 10% of the product with water having an R.W. coefficient of 3-4.

Sipon can be used as an emulsifier for fats and oils. A unique property is stated to be the fact that an anionic emulsion can be converted to a cationic emulsion by varying the pH. Technical bulletin 1260 is available on request.

Q.V.F. Sales Force

Six new sales representatives have been added to the sales force of Q.V.F. Ltd., the chemical engineers in glass, in order to meet increasing demands for glass pipeline and chemical glass-plant for industry. This expansion is an effort to improve efficient service to customers.

Overseas News

POLAND PLANS 6 M.-TONNE REFINERY AS CENTRE OF PETROCHEMICAL INDUSTRY

THE Government of Poland has assigned Zloty 10,000 million for the establishment of a national petrochemical industry. At present the refining capacity of Poland is 800,000 tonnes a year.

The new industry will be hinged essentially on a large refinery which is being built at Plock about 12 miles from the Soviet border. The first part of the complex, a plant with a total capacity of 2 million tonnes a year, is to go on stream in 1964. When all the plants are on stream—in 1967—the capacity of the refinery will total 6 million tonnes.

A cracking plant will be on stream at Plock in 1964. In 1965, it will be supplemented by the initial petrochemical plant which will produce polythene, polystyrene, phenol, acetone, polypropylene, butadiene, ethyl alcohol, detergents etc.

Crude oil will be brought to Plock from the U.S.S.R. by a pipeline which is already under construction. This pipeline will be continued to the East German border to feed a refinery being built at Schwedt.

Polish plans for the extension of the petrochemical industry also include an increased capacity in 1961 of the refinery already operating at Czechowice to 500,000 tonnes a year, while the possibility of adding a petrochemical plant to the chemical factory at Blachownia is being considered.

U.S. Makers Report 3% Rise in Pesticide Sales

The U.S. National Agricultural Chemicals Association states that sales of all pesticides in 1960 totalled \$285 million, a 3% increase on 1959. Herbicide sales rose by 7%.

Italian-built Synthetic Fibre Plant for Yugoslavia

A new plant for the production of nylon and Perlon fibres with a planned annual capacity of some 3,300 tonnes is to be built in Yugoslavia. Plant will be supplied by Snia Viscosa Sp.A., of Italy, who will also train the necessary skilled staff. The plant, the first of its kind on the Baltic Peninsula, will employ some 1,500 and will have a production value of 9.5 million dinars/year.

Two-stage Catalytic Process for Naphthalene

A two-stage catalytic process for the manufacture of naphthalene and high octane petrol (see also p. 145) is the subject of U.S. Patent No. 2,958,643, granted to Bernard S. Friedman of Chicago who has assigned it to Sinclair Refining Co., New York.

The process uses a petroleum light cycle oil consisting essentially of aro-

matics and about 40 to 65% non-aromatic components. In the first stage, the petroleum oil is brought into contact with a hydro-forming catalyst with a non-combustible base, in the presence of hydrogen, at a temperature of 900 to 1,200°F and a pressure of at least one atmosphere. This effects a conversion to an aromatic oil with a boiling point of above 400°F and containing at least 40% by weight of naphthalenic aromatics and not more than 30% by weight of non-aromatics.

In the second stage, under more severe reaction conditions, the aromatic oil, containing not more than 10% by weight of naphthalene, is cracked to form naphthalene and petrol.

Japanese Acetylene Unit

The 27 tonnes/day acetylene plant which, based on natural gas, Chemico are to construct in Japan (C.A., 7 January, p. 16) will come on stream at Niigata in mid-1962 and not Nigeria as stated.

East Germany to Supply Italy with Chemicals worth £1.3 M.

Under an agreement signed between the Italian Government and the authorities of East Germany, Italy is to purchase inorganic chemicals worth \$800,000 and organic chemicals worth \$500,000, as well as laboratory and medical equipment worth a total of \$100,000 from East Germany over the current year.

U.S.-Japanese Plant Firms in Joint Venture

A new company, Shinko-Smith Co. has been formed in Japan to manufacture equipment for the petrochemical and fertiliser industries. This company is a joint U.S.-Japanese venture with Kobe Steel Works, Kobe, holding 60%, and A. O. Smith International, a subsidiary of A. O. Smith Corporation, Milwaukee, holding 40%.

Rumania to Set Up Plant in Sardinia

The Italian company, Rumania S.p.A., are planning to set up a chemical process plant in Sardinia; the nature of the plant is not disclosed. A power station, which will use local beds of brown coal, is to be built to supply power.

Ontario Firm Begins Zinc Roasting Operations

Sherbrooke Metallurgical Co. are starting operations at their new \$5 million zinc roasting and acid producing plant at Port Maitland, Ont. The first of two roasting units has been tested.

The plant is a double phase operation. In the main zinc treatment plant, a roasted zinc concentrate is produced, from which a portion of the sulphur has been removed. The gases from roasting, primarily sulphur dioxide, are then used in the manufacture of sulphuric acid. The plant is the first in North America to use a pelletised fluid hearth process. It is designed to handle concentrates produced by zinc mines in Eastern Canada, en route to the smelter of the parent company, Matthiessen and Hegeler Zinc Co., La Salle, Ill.

Capacity is governed by the acid producing plant, which is rated at 450 tons daily. The acid plant, in operation since the latter part of October, includes a sulphur burner, producing sulphur dioxide directly from imported elemental sulphur.

Of particular importance to the location of the roasting plant is the fact that its acid production is sold under a long-term agreement to nearby plants of Electric Reduction Co. of Canada Ltd. Current production is being trucked for fertiliser usage, but future output is scheduled to be piped to an adjacent plant now under construction and designed to produce detergent raw materials.

French, German and Italian Firms Form Zirconium Company

A joint company for the production of zirconium sponge and ingots has been formed by Pechiney, Degussa, of Frankfurt-on-Main, and Montecatini. The new company, known as Soc. Industrielle du Zirconium, with headquarters in Paris, will also develop zirconium applications, particularly in the field of nuclear reactors and chemicals.

Big Spending on Chemical Plant in U.S.

Figures issued by the United States Department of Commerce in Washington show that over the first quarter of the current year some \$390 million is expected to be spent in the U.S. on new plant and equipment for the production of chemical and allied products. This estimate compares with \$330 million for the first quarter of last year and \$260 million in the first 1959 quarter. It represents an annual rate of \$1,700 million; in 1960 some \$1,600 million was invested and in 1959 \$1,230 million.

Expansion Schemes for Israeli Chemical Plants

Israel Mining Industries and Fertilisers and Chemicals of Tel Aviv are considering jointly the possibility of building a plant in Israel for the production of highly concentrated phosphoric acid, using a process developed by Israeli chemists.

Several developments are scheduled in the region of Negev: expansion of the present capacity of potassium plants in the Dead Sea area (110,000 tonnes) to 600,000 tonnes a year—a development which is expected to take four years; during 1961 the capacity of the Negev area bromine plant will be increased from 5,000 to 10,000 tonnes a year; a new plant with a capacity of about 75,000 tonnes a year will be built for

the production of magnesite for the manufacture of refractory tiles; and a compound fertiliser plant is to be built at Dimona—potassium extracted from the Dead Sea and phosphates from Cron will be used. These projects, together with some minor schemes, will require an investment of about \$56 million.

T.G.T. to Build Vinyl Chloride Plant

Tennessee Gas Transmission are to build an acetylene and vinyl chloride plant with an initial capacity of 100 million lb. per year on the Houston Ship Channel. Cary Chemicals, p.v.c. producers, are to be associated with T.G.T. in the venture. Construction is expected to begin later this year.

U.S.S.R. Claims New Series of Plastics

A new class of synthetic compounds, polyesteracrylates, have been developed by the Institute of Chemical Physics of the U.S.S.R. Academy of Sciences. It is said that these substances, which are viscous liquids capable of forming glass-like or elastic polymer materials under normal conditions of temperature and pressure, fall between monomers and polymers.

In general, these polymers are tough, resistant to temperature fluctuations, oils and solvents and are excellent electric insulators. It is possible to 'tailor-make' polymers by using polyesteracrylates of different types.

New Fertiliser Factory Planned for Uganda

A fertiliser factory, to be known as Tororo Industrial Chemicals and Fertiliser Co. Ltd., is to be built at Tororo, Uganda, by the Uganda Development Corp. Ltd. Construction, expected to take about 12 months, will begin early this year.

SunOlin Pipeline to Serve N.J. Ethylene Markets

The U.S. company SunOlin is to build a \$2 million pipeline under the Delaware River in order to serve the great potential market for ethylene and ethylene oxide which they believe to exist in New Jersey. The company is negotiating with several potential customers. The pipeline will take products from the company's plant, now under construction at Claymont, Del., to a point north of Penns Grove, N.J. Both pipeline and plant are expected to be in operation by the end of next year.

Imhausen Book Orders for Pakistani Chemical Plants

The West German concern, Imhausen International AG, who for a considerable time have been advising the Pakistani Government on chemical projects, have booked a number of orders in Pakistan. The firm is to advise on the installation of a high-pressure polythene plant by Manzoor Chemical and General Industries Ltd., Karachi—which plant is to be supplied by the Salzgitter Industriebau GmbH, also of West Germany—and to

act as consultants for the erection of an acetate plant by Saigo Brothers Ltd., Lahore, of a soda plant by Dadaboy Group Indus Chemicals and Alkalis, Karachi, of a p.v.c. unit by Arocey Chemical Ltd., Karachi, and of an acrylonitrile plant by Hyesons-Munee, Karachi.

Under negotiation is a consulting order for the building by the Dacca firm of Dawood of a viscose-rayon unit.

Lurgi to Build Udex Benzene Plant in Germany

The synthetic production of benzole is to be taken up in West Germany by Gelsenberg Benzin AG. This concern has placed an order with Lurgi, Frankfurt-on-Main for a mineral-oil base unit to be erected at its plant in Gelsenkirchen. Production will be by the Udex process of Universal Oil Products Co., U.S., in the first plant of its kind in West Germany.

Depending on the type of mineral-oil used, annual output will be between 21,000 and 43,000 tonnes of pure benzole. Udex units can also be used for the pro-

duction of toluol and xylol. The Gelsenberg benzole plant is expected to run on stream in the autumn of this year.

B.A.S.F. to Enlarge Overseas Organisation

Badische Anilin- und Soda-Fabrik have announced that for the past year exports have amounted to 35% of total sales. European markets accounted for 58% of this, the rest going to overseas countries. Of the European exports 41% went to European Economic Community countries and 37% to the European Free Trade Association.

The organisation of B.A.S.F. abroad is to be enlarged. During 1960, nearly DM400 million were invested for the benefit of production.

New Caustic and Sulphate Plants for Netherlands

A subsidiary of the Royal Dutch Salt Industry, N.V. Kon. Ned. Soda Industrie, is to open two new factories in the Netherlands this year, one to produce caustic soda and the other sulphate.

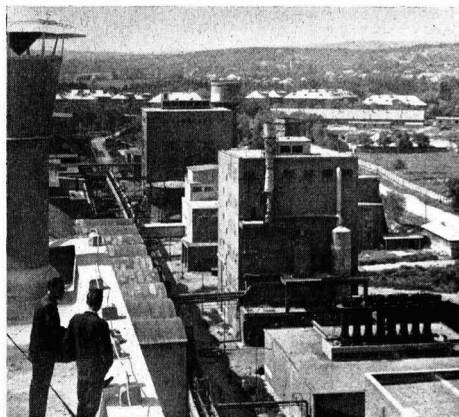
Mammoth Nitrogen Fertiliser Plant Will Boost Hungarian Output

A PLANT which will have an output of 350,000 tons/year of nitrogenous fertilisers—double the present combined output of the Pét works and Borsod combine—is now under construction at Tiszapalkonya in north-east Hungary. The Tiszapalkonya combine, of which the fertiliser plant will be the largest unit, will use as raw material natural gas piped 227 miles from Buciumen in Rumania. The gas is almost pure methane, with a calorific value of 8,400, twice that of the best Hungarian coal.

Another big fertiliser project is at Szolnok, 65 miles south of Tiszapalkonya, where a factory is to be built with a planned output of 200,000 tons/year of superphosphate by 1965. Ground raw phosphate for the factory will come from the U.S.S.R., Tunis, Israel and Morocco.

The two projects are part of Hungary's second five-year plan, which began this month. The Tiszapalkonya project is the third and most ambitious item of a post-war programme for the development and expansion of the chemical industry, and follows the £3 million reconstruction of the Pét nitrogen works, following its destruction during the war, and the building of the big Borsod combine at Kazincbarcika, which completed its first twelve months of working to full production in 1959.

When all three plants are going full out, and with the addition of the Szolnok factory's output, Hungary's output of superphosphate should reach 650,000 tons/year by 1965, and nitrogenous fertilisers 800,000 tons/year—treble the 1959 output.



View over the Pét nitrogen factory in Hungary, with the acid concentration works in the background. New projects being carried out in Hungary are aimed at trebling the 1959 fertiliser output by 1965

PEOPLE in the news

● **Mr. F. R. Crabbe**, formerly manager of the ethical drugs division of Aspro-Nicholas Ltd., has joined Dow Agro-chemicals Ltd., North Lynn, King's Lynn, as director of marketing. Mr. Crabbe, who is 40, has considerable experience in the veterinary and ethical drug fields, and before going to Aspro-Nicholas was sales manager of Vitamins.

● **Mr. C. W. Hayward** is chairman of Quirk Barton and Burns (St. Helens) Ltd., recently acquired by the Firth Cleveland Group (see p. 153). **Mr. R. S. H. Shepard** and **Mr. J. Search** have been appointed to the board as joint managing directors. Day-to-day management will be undertaken by Mr. Search who with Mr. Shepard is also joint managing director of R. E. Roberts and Son Ltd., Bolton, another company in the Firth Cleveland Lead Division.

● **Mr. Edward Tarnell** has been named president of Roger Williams Technical and Economic Services Inc., Princeton, to succeed **Mr. Roger Williams Jr.** Mr. Williams retains chairmanship of the board and will be responsible for policy and financial matters, while Mr. Tarnell, formerly an executive vice-president, will be in charge of everyday operations. The move is designed to strengthen the organisation of the company, said to be the largest in the world dealing solely with consulting chemical market research; branch offices are in London, Geneva, New York and Toronto. **Mr. Nelson Cannon**, former Canadian general manager, becomes a director and vice-president and **Mr. Andre de Pfyffer**, a lawyer of Geneva, becomes a director as does **Mr. Lester Barlow**, vice-president, First National Bank of Princeton.



C. E. Evans, O.B.E., recently appointed managing director of British Hydrocarbon Chemicals Ltd.

● **Mr. D. D. Mathieson**, deputy chairman of Gas Purification and Chemical Co. Ltd., has been appointed chairman to succeed **Vice Admiral Sir Charles Hugh Hallett**, who recently resigned following a disagreement on the appointment of extra directors. Mr. Mathieson was chairman of the company from January to May 1958, when Sir Charles became chairman.

● **Mr. P. A. Gill** has been appointed general manager of the Pfizer Chemical Sales Division in the U.K. Before this appointment he was concerned with the commercial aspects of Pfizer's business in international markets. **Mr. John Villeneuve**, former technical service manager of Kemball Bishop and Co. Ltd., has been appointed sales manager responsible to Mr. Gill for both chemical sales and technical service.

● **Mr. A. J. R. Walter** has resigned from the board of the Permutit Co. Ltd.,

having reached retiring age, but his advice will be available in a consultative capacity.

● **Mr. M. A. L. Banks**, a managing director of the British Petroleum Co. Ltd. and recently appointed a director of British Hydrocarbon Chemicals Ltd., has been appointed a member of the Minister of Power's Advisory Council on Research and Development.

● **Mr. N. L. Goodchild** has resigned from the board of British Benzole and Coal Distillation Ltd. **Mr. W. R. Mason**, secretary of the company, has joined the board.

● **Mr. D. T. Barritt** will relinquish his executive responsibilities and his position as joint managing director of Simon-Carves from 1 March when he takes up an appointment as deputy chairman of Simon Engineering, and as chairman of a subsidiary, Henry Simon (Holdings). Mr. Barritt will remain a director of Simon-Carves.

Mr. J. P. V. Woollam becomes deputy chairman of Simon-Carves, and **Mr. L. Brook** has been appointed a director of the same company and a member of the management board.

● As part of a further expansion programme, **Mr. P. Abel** has been appointed representative by British Geon Ltd., one of the Distillers Plastics Group, for Geon p.v.c. compounds, and **Mr. G. A. Wilson** has been appointed representative for Geon p.v.c. resins. Both represent Geon in the southern area. **Mr. D. Hughes** and **Mr. J. Leach** have been appointed representatives for Geon p.v.c. resins in the northern area.

● **Mr. D. K. Fraser**, joint managing director of G. A. Harvey and Co. (London) Ltd., Greenwich Metal Works, London S.E.7, has been appointed managing director. **Mr. H. E. Cooper** has relinquished his office of joint managing director but remains a director.

● **Dr. Gilbert B. Carpenter** has been retained as technical advisor by Mobil Chemical Co., a division of the Mobil Oil Group. He will have his headquarters at the offices of Mobil Oil Nederland N.V., Stadhuisplein 30, Rotterdam. Dr. Carpenter will gather information on new products and processes and will advise Mobil Chemical on the expansion of its chemicals production and research.

● **Sir Roger Makins, G.C.B., G.C.M.G.**, chairman of the U.K. Atomic Energy Authority, represented the Government at the formal opening of the Canada India research reactor at Trombay, India, on 16 January. Sir Roger also took part in a symposium that was held at Trombay on 17 and 18 January, at which he and **Sir John Crockcroft**, a part-time member of the A.E.A., presented papers on aspects of the U.K. nuclear power programme.

● **Mr. John C. Pipkin** has joined the board of the Thermal Syndicate Ltd., Wallsend, Northumberland. In addition to his new duties as a director he will continue as company secretary. Mr. Pipkin joined the company in 1922 and in 1939 was appointed chief accountant, continuing in this capacity until 1958 when he was promoted company secretary.

● **Mr. C. E. M. Coubrough**, who was managing director of the British Xylonite Co. Ltd. until his retirement on 31 December, joined the company in 1920, and became a director in 1925. After serving in most sections of the business he became managing director in 1939. Although he has retired from executive duties he remains on the board as deputy chairman. His work in the Xylonite Group included negotiating the purchase of Cascelloid Ltd. and implementing the formation of Halex and B.X. Plastics Ltd., while with Ilford Ltd., he was responsible for the formation of Bexford Ltd.



C. E. M. Coubrough **I. Berkovitch**

● **Dr. I. Berkovitch, F.R.I.C., A.M.I.Chem.E., Ph.D.**, has been appointed chief chemist of Polycell Products Ltd., manufacturers of decorating products, who have recently set up an industrial division concerned with the problems of marine and industrial oil pollution. Research into existing and potential products for the company are now being consolidated under Dr. Berkovitch's direction. Dr. Berkovitch, who is 43, conducted research into chemical problems in both the radio and light engineering industry, before becoming Scientist Grade 1 for the National Coal Board, engaged on coal-chemical investigations. From 1957 he was associate editor of *British Chemical Engineering*.

● **Mr. Martin Lovett, O.B.E., F.R.I.C.**, will be installed as president of the Institute of Sewage Purification in succession to **Mr. M. A. Kershaw**, at the annual conference to be held in Brighton in June. Mr. Lovett is chief inspector of rivers of the Yorkshire Ouse River Board, a position he has held since 1950.

TRADE NOTES

Scott Bader Price Cuts

As a result of manufacturing economy and the reduction in price of certain monomers, Scott Bader and Co. Ltd., Wollaston, Wellingborough, Northants, have reduced the prices of several of their Texicryl acrylic emulsions, which are used for paper coating, surface coating, adhesive and textile applications, by between 2d and 5d per lb. depending upon solids content. Latest edition of the Scott Bader technical characteristics leaflet give brief details of their complete current range of polymer products and is available on request.

Industrial Plant

A recent publication of Thos. W. Ward Ltd., Albion Works, Sheffield, is devoted to the services of their Industrial Plant Department, which produces made-to-measure systems of plant to fit the needs of any industrial organisation. Additionally, as manufacturers and distributors, they supply a wide variety of plant and equipment, including specialised castings and intricate fabricated components. Also mentioned are the services of two of the company's subsidiaries, Dick's Asbestos and Insulating Co. Ltd. and Anchor Insulating Co. Ltd., who specialise in industrial and domestic thermal insulation.

Reinforced Plastics Components

A new Reinforced Plastics Division has been formed by English Electric and is situated at Freckleton Works, Mill Lane, Wharton, Lancs. The range of manufacture covers aircraft, traction and rolling stock components previously made at the company's Preston works as well as many other items from various small manufacturing units which have been operating in the group. Up to now much of this had

to be done by hand, but it is now intended to mechanise as far as possible most of the processes at Freckleton for short and medium quantity production. Although at this stage the bulk of production will be used by the group, reinforced plastics components will be produced on a commercial basis for outside production.

Curing Agents for Epikote Resins

Two new curing agents Epikure H-1 and Epikure H-2 have been added to the Shell Chemical Co. range of chemicals for the surface coatings industry. They have been specially developed for use with the liquid grade 'Epikote' resins for the manufacture of solventless coatings which can be applied with conventional spraying equipment. A feature of the new curing agents is their low viscosity, and the long pot life of the solventless systems based on them.

Terylene Clothing

A range of Terylene industrial clothing manufactured by Willson Bros., Epsom, Surrey, includes a raglan sleeved two-piece suit which breaks away from the traditional overall appearance. Results of a complete acid exposure test on 100% Terylene overall cloth and 100% cotton drill material are given to show that Terylene work is virtually acid proof.

Compact Heat Exchanger

A completely revised brochure on the Holo-Flite Processor has been produced by Holden Engineers (London) Ltd., 119 Victoria Street, London S.W.1, who are associated with W. C. Holmes and Co. Ltd. The Holo-Flite can be used for heating, cooling and drying, being a continuous indirect heat exchanger constructed as a screw conveyor with helical, hollow flights through which the heat transfer agent is circulated.

Market Reports

COAL TAR PRODUCTS STILL IN DEMAND

LONDON New business on the industrial chemicals market has been reasonably good for the period, and there has been a steady movement of supplies to the home consuming industries against contracts. Export inquiry is about maintained with buyers seeking competitive quotations.

Prices for the most part are well held and the undertone is firm. Copper sulphate is again cheaper at £75 15s per ton, less 2% f.o.b. Liverpool.

Rather more activity has been reported in fertilisers, while demand for the coal tar products continues at a satisfactory level.

MANCHESTER On the Manchester market fresh bookings in a wide range of chemicals have been on quietly steady lines, largely for near delivery positions. The textile and allied industries and most other home industrial users are specifying for satisfactory deliveries under con-

tracts of the bread-and-butter lines, including soda and potash compounds, and there is a reasonably steady movement for export. Quotations generally have been well maintained, but a further reduction of 15s in copper sulphate has brought current value to £75 15s, f.o.b. Liverpool. Rather more business has been reported in fertilisers.

SCOTLAND As was expected, the Scottish heavy chemical market has settled down to normal conditions, and business during the past week has been very brisk. Demands against home requirements have been varied, and quantities both in regard to spot and contract requirements have been well maintained. On the whole, prices have remained firm with some slight variations. Interest has been shown in the export market both in inquiries and resultant business.

Fumigation Services Become Division of Disinfestation Ltd.

ONE of the oldest-established U.K. pest control companies, Fumigation Services Ltd., Barking, Essex, and Ossett, Yorks (founded in 1924), have now become the Fumigation Division of the associated company, Disinfestation Ltd. Fumigation Services joined the British Ratin Group, now the Rentokil Group, in January 1958.

The Fumigation Division of Disinfestation Ltd. will continue to be engaged in fumigation and other measures for pest control. The division also acts as consultant on pest problems, and in addition make and export fumigation plant and equipment to many overseas countries.

Mr. T. L. Knight, director since 1931, now becomes a director of Disinfestation, in charge of the division. The division will continue to operate from Pylon Works, Hertford Road, Barking and 1 Headlands Road, Ossett, Yorks.

The change of name is part of the re-grouping of companies which has taken place since the British Ratin Co. became Rentokil Group Ltd. last November. What is said to be Europe's largest pest control organisation now has three main companies: Disinfestation Ltd. (pest control services); Woodworm and Dry Rot Control Ltd. (timber preservation services); and Rentokil Products Ltd. (pest control products).

Quickfit Plan Further Export Expansion

COMBINED sales of Q.V.F. Ltd. and its associated company, Quickfit and Quartz, are expected to pass the £2 million target during 1961, Mr. J. G. Window, Q.V.F. sales director, told a meeting of sales representatives at Stoke-on-Trent. Q.V.F. reached their 1961 sales target in 1960, and the company were now making special efforts to widen their interests in the export field.

Mr. Window reported "tremendous Russian interest" in the company's industrial glassware, while for the international Achema exhibition to be held at Frankfurt, Germany, in the spring, the Quickfit group have taken the largest space of any exhibitor; their stand will cover 4,000 sq. ft.

The company, who are "bursting at the seams" in their present factory in Stone, Staffs, have sought permission to build a new 150,000 sq. ft. factory to accommodate both companies of the group in the Walton area of Stone—just outside the town (C.A., 24 Dec., p. 1052).

Stone and Webster

The reference to E. B. Badger in the article 'Wind of Change' by Contractus in our issue of 31 December should have been to Badger Manufacturing Company. Name of E. B. Badger and Sons Ltd. was changed to 'Stone and Webster Engineering Ltd.' in May 1958; this company has no connection with Badger Manufacturing.

Commercial News

C.J.B. Subsidiaries

Services provided by Welding Super-visor Ltd. and Cathodic Corrosion Control Ltd. (wholly owned subsidiaries of Constructors John Brown Ltd.) have been amalgamated and will now be provided by a single company, Corrosion and Welding Engineering Ltd. Directors will be R. M. Wynne-Edwards, C. C. Bates, R. A. Lowe, H. M. Powell, J. A. R. Staniforth and H. D. Walker.

I.C.I. £34 Million Issue

The I.C.I. rights issue, which has been rumoured in the City for some weeks, has now been disclosed and is designed to raise between £34 million and £35 million. The issue will be made to ordinary shareholders registered on 20 January who will be offered one new £1 ordinary share at 55s for each £20 ordinary stock, or part thereof, held at that date. Between 12,584,450 and 12,910,000 shares will be issued. Applications for additional shares will not be accepted.

The offer, with provisional allotment

letters, will be posted on 24 February. Payment for the new shares will be due as to 20s by 17 March and the balance of 35s by 12 May. Of each instalment, 10s will be share capital and the balance premium. The new shares will not participate in the final dividend for 1960 but will otherwise rank equally with existing ordinary stock. For the new issue, employee stockholders will be treated as any other shareholders (see also p. 138).

Firth Cleveland

The Firth Cleveland Group, through the subsidiary Firland Metals Ltd., has acquired Quirk, Barton and Burns (St. Helens) Ltd., St. Helens, Lancs, manufacturers of sheet lead, lead pipe, solder, laminated lead and other products. The group will have three lead and lead alloy production centres in the U.K. and thus will provide service adequate to meet increasing demands from the chemical and atomic industries, etc. (see also p. 151).

Petro Engineering

A new company, Petro Engineering Services Ltd., has been formed to give a service to industry in the design, purchase, manufacture and erection of petrochemical and medium to heavy engineering plant. This is purely a British com-

pany, the chairman and managing director is Mr. A. C. Wilson and the registered office will be Longfield House, 18-20 Uxbridge Road, Ealing, London W.5. Branch office is Oak House, Cross Street, Sale, Cheshire. Mr. Wilson was until recently chairman and managing director of A. C. Wilson and Partners Ltd.

Morgan Crucible

The recent re-organisation of the Morgan Crucible group has been completed with the registration of four new wholly owned subsidiaries—Morganite Carbon, Morganite Crucible, Morganite Electroheat and Morganite Research and Development.

The new companies, together with Morganite Exports, will take over the parent company's trading activities from 3 April next, as outlined at the annual meeting last July.

INCREASES OF CAPITAL

DOW AGROCHEMICALS LTD., King's Lynn, Norfolk. Increased by £250,000 beyond the registered capital of £500,000.

NUCLEAR CHEMICAL PLANT LTD., 22 Carlisle Place, London S.W.1.

Increased by £29,901 beyond the registered capital of £99.

CLASSIFIED ADVERTISEMENTS

Continued from page 158

SITUATIONS VACANT: continued

CHEMICAL ENGINEERS

A large and progressive chemical company engaged in the manufacture of organic and inorganic chemicals, requires Engineers who possess an Honours Degree in Chemical Engineering or associate membership of the Institute of Chemical Engineers.

Applicants should preferably be 25-30, and should have had at least three years' experience in either production research or factory development department. Experience in estimation and process design is desirable but not essential.

The positions are progressive and there is a contributory pension scheme.

Apply to **Box No. 3737, Chemical Age.**

SITUATIONS VACANT: continued

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ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL

to work in a section responsible for the chemical control of reactors, and the associated plant and equipment.

There are opportunities for investigational and development work.

Experience of one or more of the following is desirable:—
Boiler Water Treatment General Water Chemistry
Ion Exchange Gas Analysis
Corrosion

SALARY: £860 (at age 25)—£1,340 p.a.
Applicants should have an honours degree in chemistry or A.R.I.C. or equivalent qualifications.
Housing and superannuation schemes.
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PAINT TECHNOLOGIST

If you have a good University Degree in chemistry with at least seven years' industrial experience in paint and varnish technology, and your age is still under 35, **IMPERIAL CHEMICAL INDUSTRIES LIMITED, NOBEL DIVISION**, has a vacancy that will interest you. In the Division's Research and Development Department on the Ayrshire Coast of the Firth of Clyde, stimulating work on surface coating agents engages vigorous effort.

The successful candidate will be engaged on the servicing and development of paint and lacquer intermediates for surface coatings.

Starting salary will depend on qualifications and experience. The Company operates a five-day week, a Staff Pension Fund and a Profit-Sharing Scheme. A married man will receive a refund of reasonable removal expenses, and assistance towards house purchase is available.

Application should be made in writing direct to the

Staff Manager,

IMPERIAL CHEMICAL INDUSTRIES LTD.,

Nobel Division,

460 Sauchiehall Street, Glasgow, C.2



NEW PATENTS

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

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

ACCEPTANCES

Open to public inspection 1 March

Methods for the production of titan tetrachloride. British Titan Products Co. Ltd. [Addition to 724 193.] **861 991**
 Propellant powders. Imperial Chemical Industries Ltd. **861 810**
 Compounding of rubbers and synthetic resins. Semtex Ltd. [Addition to 727 393.] **861 968**
 Production of elastomer foams. Dunlop Rubber Co. Ltd. **861 858**
 Ion-exchange in non-aqueous media. Armour & Co. **862 180**
 Elution of ionisable substances in non-aqueous solvents. Armour & Co. **862 181**
 Production of polymers. British Celanese Ltd. [Divided out of 20 702/56.] **861 986**
 Organic dithiophosphoric compounds, their preparation and pesticidal compositions comprising same. Pfizer & Co. Inc., C. **861 860**
 Dihydroxy phthaline derivatives and a process for their preparation. Alkaloida Vegyeszeti Gyar. **861 865**
 Xanthene derivatives and salts thereof and a process for the manufacture of same. Hoffmann-La Roche & Co. AG, F. **862 200**
 Graft composition. Polyplastic. **861 848**
 Process for recovering metal values utilising organic orthophosphate extractants. United States Atomic Energy Commission. **862 204**
 Method for recovery of solvent from olefin polymerisation catalyst. Phillips Petroleum Co. **861 925**
 Compositions capable of hardening throughout at room temperature and containing condensation products of LB-unsaturated compounds with methylolaminotriazine allyl ethers. Ciba Ltd. **861 852**
 Process for the manufacture of plasticised polymers or copolymers of vinyl chloride. Farbwerke Hoechst-AG. **861 854**
 Production of sulphur dioxide. Zaklady Cynkowe Trzebinia. **861 855**
 Hydroxyalkalated polyamines and a process for their preparation. Union Carbide Corp. **861 959**
 Diols and their method of preparation. British Petroleum Co. Ltd., Birch, S. F., and Gould, P. **861 961**
 Polyesters and their method of preparation. British Petroleum Co. Ltd., Birch, S. F., Gould, P., and Critchley, S. W. **861 962, 861 963**
 Synthetic polymers. British Nylon Spinners Ltd. **861 866**
 Preparation of monocarbamates. Robins Co. Ltd. **861 960**
 Polyepoxide-thermoplastic polymer compositions. Swift & Co. **861 971**
 Benzimidazoles. Ciba Ltd. **862 175**
 Synthetic resin coating composition and process of producing same. Shawinigan Resins Corp. **862 165**
 Water dispersible carbon black and production thereof. Soc. d'Etude des Industries du Petrole au Port de Strasbourg. **862 018**

Chemical compounds. Du Pont de Nemours & Co., E. I. [Addition to 789 786.] **861 951**
 Process for preparing organic dithiophosphates. Pfizer & Co. Inc., C. **862 123**
 Manganese base alloys. Imperial Chemical Industries Ltd., and Appis, R. L. **861 813**
 Hydroxyalkyl-piperidines. Ciba Ltd. **861 815**
 Addition product of tetracycline and process for its manufacture. Farbwerke Hoechst AG. **862 124**
 Polymerisation of diallyl phthalate. Food Machinery & Chemical Corp. **861 817**
 Process for preparing azomethines of amino-2-oxazolones. Hellinghuizer-Gerriessen, B. **862 206**
 2,5-Dimethanesulphoxyhexane. National Research Development Corp. **861 818**
 2-Bromo-1:1:2-tetrafluoroethane and process of making same. Imperial Chemical Industries Ltd. **861 822**
 Derivatives of 2-hydroxy-3-naphthanilide. Imperial Chemical Industries Ltd. **862 127**
 Process for the electrolytic production of fluorine and apparatus therefor. Imperial Chemical Industries Ltd. **861 978**
 Process for the production of nitrogenous polycondensation products. Farbenfabriken Bayer AG. **862 192**
 Potassium phenoxymethyl penicillin. Distillers Co. Ltd. **862 159**
 Process for preparing trisubstituted s-triazines. American Cyanamid Co. **862 193**
 Tetrahydrofuran carbamates. Frosst & Co., C. E. **861 938**
 Process for the production of cyclodecane derivatives. Studiengesellschaft Kohle. **861 979**
 S-substituted hydantoin and their preparation. Spencer Chemical Co. **862 194**
 Amino aralkyl nitriles. Ravensberg GmbH. **861 980**
 N-alkanoil dinitrobenzamidates. Dow Chemical Co. **861 890**
 Enzyme precipitation process. Miles Laboratories Inc. **862 195**
 Production of alkyl halides. Imperial Chemical Industries Ltd. **861 945**
 Ion-exchange processes and apparatus. Permutit Co. Ltd. (Permutit AG). **861 946**
 Process for the manufacture of ferrocene derivatives. Imperial Chemical Industries Ltd. **861 833**
 Hydrogenation of unsaturated hydrocarbons. British Petroleum Co. Ltd., Bourne, K. H., and Holmes, P. D. **861 995**
 Ferrocene derivatives. Imperial Chemical Industries Ltd. **861 834**
 Xanthene derivatives and salts thereof and a process for the manufacture of same. Hoffmann-La Roche & Co. AG, F. [Divided out of 862 200.] **862 201**
 Manufacture of petroleum gas. Shell Internationale Research Maatschappij NV. **862 196**
 Derivatives of estrane. Ayerst, McKenna & Harrison Ltd. **861 893**
 Copolyester-based adhesive compositions. Du Pont de Nemours & Co., E. I. **861 835**
 Pentachlorophenol suspensions and method of preparation. Monsanto Chemicals (Australia). **861 981**
 Production of substituted tetrahydro-1, 4-oxazines. Boehringer, A., Boehringer, E., Liebrecht, I., Liebrecht, J., and Mayer-List, W. **862 198**
 Thia-alkyl orthosilicate esters. Shell Research Ltd. **862 199**
 Glutarimide compounds and methods for their production. Parke, Davis & Co. **861 838**
 Preparation of polycarbonate in particulate form. Onderzoekingsinstituut Research NV. **861 918**
 Revaporisation of liquefied gases. Conch International Methane Ltd. **861 919**
 Fibrous titanium dioxide and its production. Du Pont de Nemours & Co., E. I. **861 802**
 Production of materials useful for producing vitamin A. Nopco Chemical Co. **862 040**

DIARY DATES

MONDAY 23 JANUARY

C.S.—Cambridge: Univ. Chemical Lab., 5 p.m. 'Quantitative studies of aromatic character', by Dr. L. M. Jackson.
 C.S.—Cardiff: Univ. Coll., Chem. Dept., 5.30 p.m. 'Spectroscopic studies on the hydrogen bond', by Dr. L. J. Bellamy.
 C.S.—Dublin: Trinity Coll., Chem. Dept., 5.30 p.m. 'Recent developments in theory of organometallic compounds', by Dr. D. A. Brown.
 C.S.—Leeds: Univ. Chem. Dept., 6.30 p.m. R.I.C. Lecture: 'New polymers', by Dr. R. Smith.
 C.S.—Leicester: Univ., 4.30 p.m. 'Clatteration & occlusion', by Prof. R. M. Barrer.
 R.I.C.—Enfield: Tech. Coll., 6.30 p.m. 'Chemical control of plant diseases', by Prof. R. L. Wain.
 R.S.A.—London: John Adam St., Adelphi, W.C.2., 6 p.m. Cantor Lecture: 'Modern chemical industry in Britain'—Part 1, by Dr. J. Taylor.

TUESDAY 24 JANUARY

I.Chem.E.—Birkenhead: Tech. Coll., 7.30 p.m. 'Examination & reactor design in process research & development', by W. Waddington & W. D. Betts.
 I.Chem.E.—London: Burlington Hse., W.1., 3.30 p.m. Inaugural mtg. of S. Eastern Branch.
 I.Chem.E.—London: Burlington Hse., W.1., 5.30 p.m. 'A survey of chemical engineering & practice', by Prof. R. Edgeworth Johnstone.
 R.I.C.—Cambridge: Technological Research Station, Spillers Ltd., 7.30 p.m. 'Toxicology of fluorine compounds', by Dr. B. C. Saunders.
 S.C.I.—Birmingham: Birmingham & Midland Inst., 6.30 p.m. 'Beryllium', by Dr. T. W. Farthing.
 S.C.I.—London: 14 Belgrave Sq., S.W.1., 6.30 p.m. 'Papers from non-cellulose fibres', by R. S. Lenk.

WEDNESDAY 25 JANUARY

R.I.C.—Slough: Coll. of Further Education 7 p.m. 'Magnesium in inorganic chemistry', by Prof. R. S. Nyholm.
 S.C.I.—London: 14 Belgrave Sq., S.W.1., 6.15 p.m. 'Some biological effects of heated fats', by Prof. A. C. Frazer.
 S.C.I.—London: Pest Advisory Centre, 16 Dover St., W.1., 7 p.m. Conversation.
 S.C.I.—Newcastle upon Tyne: Rutherford Coll. of Technology, 6.30 p.m. 'Co-ordination chemistry of some organometallic compounds', by Prof. G. E. Coates.
 S.C.I. with R.I.C.—Stirling: Golden Lion, 7.30 p.m. Meeting for reading of original papers.

THURSDAY 26 JANUARY

C.S.—Aberystwyth: Edward Davies Chemical Labs., 5 p.m. 'Dissociation in electrolytes', by Prof. C. W. Davies.
 C.S.—Bristol: Univ. Chem. Dept., 5.15 p.m. 'Anti-crocodile agents', by Dr. D. W. Ollis.
 C.S.—Glasgow: Univ. Chem. Dept., 4 p.m. 'Ion-selective membranes', by Dr. F. L. Tye.
 C.S.—Liverpool: Univ. Inorganic & Physical Chem. Dept., 5 p.m. 'Stereochemistry of some metal ions', by Prof. L. E. Orgel.
 C.S.—Manchester: Robinson Lecture Theatre, Univ., 6.30 p.m. 'Structure of insulin', by Dr. F. S. Sanger.
 R.S.—London: Burlington Hse., Piccadilly, W.1., 4.30 p.m. 'Spectroscopy at extreme infrared wavelengths', by D. Bloor, T. G. Dean, G. O. Jones, D. A. Martin, P. A. Mawer and C. A. Perry.
 S.A.C.—Glasgow: Scottish Section a.g.m.
 S.C.I.—London: 14 Belgrave Sq., S.W.1., 6.30 p.m. 'Corrosion conversazione & exhibition.'

FRIDAY 27 JANUARY

C.S.—Newcastle upon Tyne: King's Coll. Chem. Dept., 5.30 p.m. 'Molecular energy transfer in gases', by Prof. T. L. Cottrell.
 C.S.—Southampton: Univ. Chem. Dept., 5 p.m. 'Hydrides & complex hydrides of transition metals', by Dr. B. L. Shaw.
 S.C.I. with C.S.—Belfast: Ge. Hall, Queen's Univ., 7.30 p.m. Joint annual dinner.
 S.C.I.—Plymouth: Tech. Coll., 5.30 p.m. 'Organophosphorus compounds & their applications', by Dr. A. F. Childs.

SATURDAY 28 JANUARY

S.A.C.—Manchester: Nag's Head Hotel, Lloyd St., 2.15 p.m. Northern Section a.g.m.

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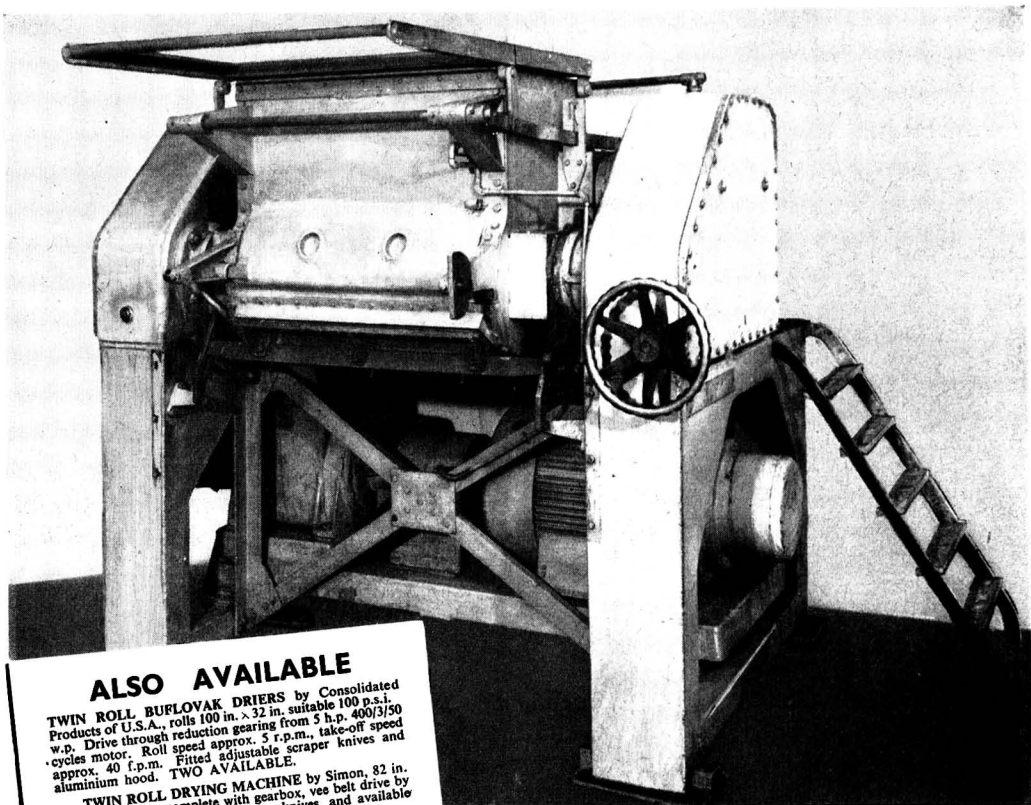


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STAG KB2 PULVERISER by Edgar Allen, manganese hammers and liners, 26 in. flywheels, six-groove belt pulley. Feed box fitted counterbalance dust flaps. Capacity 15/16 tons per hour. 25/30 h.p. required to drive.

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HORIZONTAL POWDER MIXER by Gardner, mild steel construction, trough 5 ft. 6 in. by 24 in. by 28 in. deep with broken scroll agitator, plain bearings, unglanded shaft, bottom end slide outlet with bagging off spout. Drive by 5 h.p. 380/3/50 cycles motor with starter. Mixer mounted on extended feet. Mild steel hinged covers fitted to trough.

TWIN ROLL DRYING MACHINE by Simon, 82 in. long by 28 in. dia. suitable 80 p.s.i. w.p. Drive by 15 h.p. 400/3/50 cycles motor. With mild steel fume hood, scraper knives, collecting troughs.

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PUBLIC APPOINTMENTS

CITY AND COUNTY OF KINGSTON UPON HULL WATER DEPARTMENT

APPOINTMENT OF CHEMIST AND MICROBIOLOGIST

Applications are invited for the appointment of a Chemist and Microbiologist to supervise and control a new river water treatment plant, capacity 12 m.g.d.

Candidates must hold a degree in Natural Science from a recognised University or equivalent qualification and must produce evidence of a thorough knowledge of Chemistry, Bacteriology and Biology as applied to water; have experience of water treatment by coagulation and chlorination methods and be conversant with the biology and management of storage reservoirs.

The duties of the officer appointed will include analysis of water samples at all stages of purification from the river to the distribution system and the daily control of the water treatment plant.

The officer will be under the general direction of the Water Engineer and Manager who may allot such other analyses, investigations and duties from time to time.

The person appointed will be required to reside on the site, where housing accommodation will be provided at a rental of 15s. 0d. per week, plus rates.

The salary will be within Grade V, A.P.T. Division of the National Joint Council's Scales (£1,310 to £1,480 per annum) according to qualifications and experience.

The whole of the candidate's time will be required to be devoted to the service of the Water Department.

The appointment will be subject to one month's notice on either side, to the National Scheme of Conditions of Service, and, being superannuable, will be subject to the passing of a medical examination.

Applicants should state age and give details of education, training, experience and present and previous appointments.

Applications, with copies of two recent testimonials, are to be received by the undersigned not later than 10 a.m. on Saturday, 4th February, 1961.

Canvassing a member of the City Council or any Chief Officer will be a disqualification.

T. H. JONES, M.I.C.E.,
Engineer and Manager.

Water Department,
Alfred Gelder Street,
Kingston upon Hull.

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SITUATIONS VACANT

ANALYTICAL CHEMIST

PETFOODS LIMITED, the leading manufacturers in a rapidly expanding section of the Food Industry, have a vacancy for an Analytical Chemist in their new Research Laboratory at Melton Mowbray.

The successful candidate will be responsible, under a Chief Analyst, for the testing of newly developed methods and techniques and the carrying out of analytical surveys.

Applicants (male aged 25-35) should have reached H.N.C. or equivalent standard in Chemistry and have had at least two years' experience in food analysis.

Starting salary will be in the range £850-£1,000 per annum and in addition the Company operates generous non-contributory pension, sickness and Life Assurance schemes.

Applications giving brief details and requesting an Application Form should be addressed to:

The Personnel and Safety Officer,
PETFOODS LIMITED,
Melton Mowbray, Leics.

CHEMIST. Minimum qualifications, H.N.C. required for work on Aerosol formulation and raw material control on new Aerosol filling line. Previous aerosol experience desirable, but not necessary. Salary commensurate with qualifications and experience. Age 25-35. Replies to Works Manager, Odex Manufacturing Ltd., Cromwell Road, Ellesmere Port, stating age and salary required.

GLOVERS (Chemicals) LTD., of Leeds, require an additional Graduate Chemist, for Technical Service and Sales duties in their Southern Area. This comprises West London, South West London, Southern England, South Western England and South Wales.

The company supply surface active agents and chemical specialities to many widely differing industries and an ability by candidates to gain knowledge rapidly is essential. A period of training in Leeds will be necessary.

The successful applicant will be expected to reside in the Western, or, South Western London suburbs. A company car will be provided, there is a good salary and a contributory pension scheme.

Applications in writing, from Graduates, of about 30 years of age, detailing their qualifications and experience, should be addressed to V. C. H. Brockwell, 6 Speart Lane, Heston, Hounslow, Middx.

ANALYTICAL CHEMIST, preferably with knowledge of Brewing or Biochemistry, required for Brewery Laboratory. Applicants must be under 30 years of age and should write, in the first instance, giving full details to the Staff & Personnel Manager, Joshua Tetley & Son, Limited, The Brewery, Leeds, 10, Yorks.

SITUATIONS VACANT: continued

CHEMICAL ENGINEER—RESEARCH
ANGLO-LAUTARO NITRATE CORPORATION, a large mining and chemical company with operations in the North of Chile, requires a
B.Sc. IN CHEMICAL ENGINEERING, age 25 to 35, preferably married, for a position in its research organisation. Salary, U.S. \$6,600 per annum or higher depending on qualifications.

The successful candidate will be expected to take charge of pilot plant operations, perform mathematical studies of processes and related problems associated with the production of sodium nitrate, potassium nitrate, iodine and boric acid.

Opportunities for advancement may be in either administrative or scientific directions.

Applicants should have experience in industrial research or development and should have demonstrated ability in initiating research in chemical engineering and allied fields. Applications from Junior Chemical Engineers will also be considered.

The Company's operations and research laboratory are located near Antofagasta, Chile. It maintains full supporting services including a mechanical design section and large machine shop facilities.

Applications, with full details of qualifications and experience, age and family status, should be addressed to:

MR. C. S. HILL,
NITRATE CORPORATION OF CHILE LTD.,
Chile House,
20-24 Ropemaker Street,
LONDON, E.C.2.

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Applicants should be in the age group 35-45 with 1st or 2nd class degrees (or the equivalent) in chemistry or chemical engineering. They should have had wide experience of operation on large continuous organic chemical plants with several years responsibility for one, or a group of such plants, preferably as a Works Manager responsible for every function of factory operations. They should also be familiar with the latest methods of automatic control.

This is an appointment of considerable responsibility and an appropriate salary will be paid. Prospects are excellent in this rapidly expanding company and there is a non-contributory pension fund.

Applications, with full particulars, which will be treated in strict confidence, to

Box No. 3738 Chemical Age.

A large engineering group expanding its interests in the Food and Chemical Industry seeks the services of a first-class technical representative for the marketing of its specialist process plant. Preferably applicants should have established connections in the Food Processing Industry and/or a sound training in the application of spray drying or fine grinding techniques. Write in confidence giving full details to Sales Director, Steels Engineering Installations Ltd., 143 Sloane Street, London, S.W.1.

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Continued on page 153

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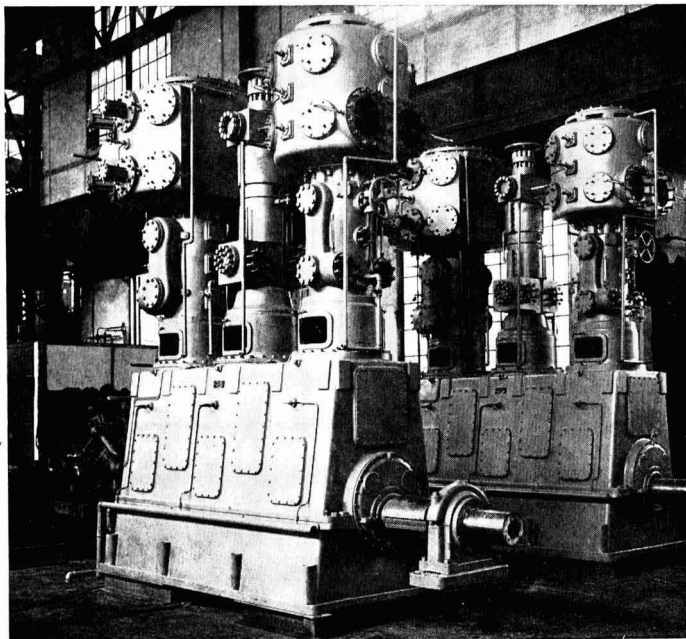
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