Chemical Age

incorporating

PETROCHEMICALS and POLYMERS

VOL. 86 No. 2208 4 NOVEMBER 1961

INDEX TO ADVERTISERS

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

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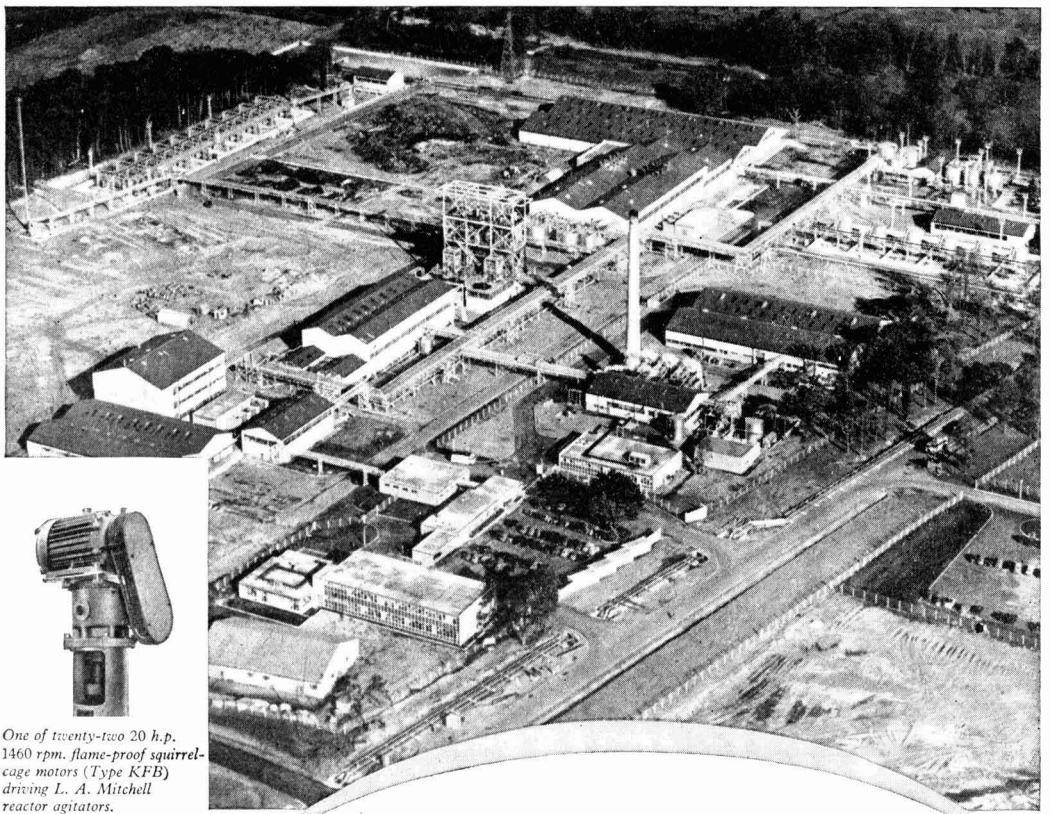
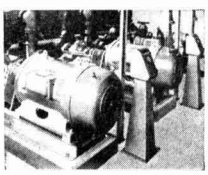
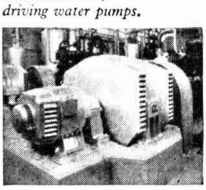


One of twenty-two 20 h.p. 1460 rpm. flame-proof squirrel-cage motors (Type KFB) driving L. A. Mitchell reactor agitators.



Two of four 100 h.p. 2920 r.p.m. squirrel-cage motors (Type HRSP), with pedestal control stations, driving water pumps.



Two of four 425 h.p. 300 rpm. salient pole synchronous motors (Type SM) with overhung exciter driving Laurence Sterne refrigeration compressors.

Over 850 AEI Motors

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The plant of the International Synthetic Rubber Company Ltd at Hythe is capable of producing 90,000 tons of synthetic rubber a year using butadiene and styrene as the main raw materials. Three grades of rubber are produced suitable for making motor vehicle tyres, coloured rubber products and general products. The motors, ranging from 0.25 to 620 h.p. and used for driving pumps and compressors, were all supplied by AEI. In addition, AEI made and erected the switchgear, transformers and other substation equipment for this plant.

AEI Associated Electrical Industries Limited

Motor and Control Gear Division

RUGBY AND MANCHESTER ENGLAND

A5580

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VOL. 86 No. 2208
NOVEMBER 4 1961

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IN THIS ISSUE

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Chemical Age
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EFFLUENTS AND THE LAW

EFFLUENT treatment and disposal has become a separate and distinct branch of chemical and engineering technology, with its own operational and design techniques. This much is manifest at the Effluent and Water Treatment Exhibition that is being held in London as we go to press. The chemical engineering and instrumentation techniques on view there are a striking commentary on the progress made in this field since the days when effluent treatment facilities were added to industrial works as an afterthought, or not at all.

Further evidence of the effort being devoted to this subject lies in the setting up by some engineering firms of special departments to offer effluent treatment services, and in combinations of know-how such as that arranged between I.C.I. and Head Wrightson (C.A., 22 April, p 654) and between Simon-Carves and Monsanto (C.A., 13 August, 1960, p 235).

Giving further impetus to effluent technology is the increased responsibility placed on manufacturers by various legislative enactments. A valuable service to the chemical industry has now been rendered by J. B. C. Carr, J. C. Pinder and D. H. Sharp, in their paper presented to a meeting of the Fertiliser Society in London on 26 October, by their timely survey of current legislation. After tracing the various legislation, stress was laid on the two new Acts of this year—the Rivers (Prevention of Pollution) Act, 1961 and the Public Health Act, 1961.

For both broad types of discharge (either in rivers, streams and tidal waters, or into a local authority's sewers), the new 1961 Acts fundamentally change this present situation of exemptions from previous legislation.

With waterways discharge, it becomes unlawful under the 1961 Act to discharge any trade or sewage effluent into a stream without river board consent. The Act's operative date is as yet undetermined but it will be not less than 14 months after 27 July 1961. An important point is that applications for consent in respect of formerly exempt discharges may be made before the new Act's operative date. Once such an application has been made, there is protection from liabilities under the new Act (or under older enactments which can still have some relevance, e.g. Salmon and Freshwater Fisheries Act, 1923; Sea Fisheries Regulation Act, 1888) until the application for consent has been settled.

Another major change in the 1961 Act is that when conditions for consent have been laid down, they will remain valid for a reasonable period, which must be not less than two years; under the 1951 Act consent conditions could be reviewed and altered at any time, creating the possibility of unknown costs for the manufacturer. The 1961 Act also tightens up the conditions for discharge into tidal waters, the main change being that river board consent will be required for a new discharge or the opening of a new outlet.

With effluent disposal into sewers, the privileges of pre-1937 discharges have been considerably modified by the new Public Health Act, 1961. The trader's right to discharge them into sewers continues but the local authority may impose conditions, e.g., charges can be made, conditions may be required for effluent temperature, acidity, alkalinity, point of discharge, installation of flow meters and provision of inspection chambers

(Continued on page 720)

Process for new type of organo-arsenical polymers

AVAILABLE under licence from the National Research Development Corporation, 1 Tilney Street, London W.1, is a process for organo-arsenical polymers under patent applications 34,031/60 and cog. 7636/61.

These are new types of polymers (phenylene-arsine), which contain arsenic atoms and phenylene groups in the polymer chain. Typical polymers which contain only arsenic atoms and p-phenylene links in their main chain, are insoluble and infusible and lose less than 10% of their weight at 400°C. Those containing m-phenylene links are stable up to their softening temperature (250-300°C) and lose about 25% of their weight at 400°C.

Other process inventions available under N.R.D.C. licence are:

Anti-shrink treatment of wool (patent applications 16724/60 and cog. 5355/61). A shrink resistance is imparted to wool by an initial treatment with a solution of the first of two polymer precursors followed by treatment with the second, so that a condensation polymer is formed rapidly on the fibre surface. Liquid paraffin can be used as a solvent. A typical example is the *in situ* preparation of nylon types of surface coatings. Practice tests on wool have shown greatly improved resistance to shrinkage.

Synthesis of phosphorothiolates (Patent 851,590). Organic phosphorothiolates are obtained by the catalytic transesterification of a trialkylphosphite $(RO)_3P$ to give $(RO)_2POR'$, which on treatment with sulphur yields the phosphorothionate $(RO)_2P(S)(OR')$. Isomerisation by heating with a catalyst gives the phosphorothiolate $(RO)_2P(O)(SR')$ in excellent yield.

4-Hydroxycoumarin derivatives (patent 858,110). This is a convenient Indian process for the synthesis of 4-hydroxycoumarin and its substituted derivatives. It comprises heating a phenol and an appropriately substituted malonic acid in the presence of anhydrous zinc chloride and phosphorus oxychloride. Goods yields have been obtained from operating the process on a 5-gall. scale.

Cyclic phosphorus-nitrogen esters (patent application 7248/60). These novel compounds consist of cyclic phosphorus-nitrogen compounds containing substituted ester groupings; doubly linked oxygen atoms are attached to the three phosphorus atoms in the six-membered ring. The compounds are useful as intermediates and for the production of polymers.

Other N.R.D.C. processes cover: Phenyl phosphonitrilic chloride (patent application 23973/60); aminovinylquinones (patent 819-654); free radical alkylation agent (patent application 5117/61); vacuum-tight seals (patent application 481/59); cadmium oxide films (patent application 19,127/60); ultraviolet filter (patent application 1136/61).

New tanker for Price's stearine beads

RAPID popularity of stearine beads with all users of commercial stearic acid has prompted Price's (Bromborough) Ltd. to add to their tanker fleet a new vehicle specially built to carry and discharge beads in bulk. This will enable large users to take delivery of 8-ton lots, blown straight from the tanker into their storage hoppers, from which they can be conveyed to any part of the plant without the use of bags, pallets or trucks.

The tanker, which can also be used for conveying bulk liquids is 30 ft. long, 7 ft. 10 in. wide and 12 ft. high. When discharging beads, the tank is tilted, increasing the overall height to 22 ft. Air is supplied to the tank car and a discharge booster from a compressor. Early trials have shown that beads can be vertically elevated to heights in excess of 60 ft. on a 3 in. main.

Price's, the Merseyside oleochemical producers, pioneered the production of stearine in bead form some three years ago. This enabled modern techniques of pneumatic handling to be applied for the first time to a wax-like solid. Further information on Price's stearine beads is available from the company at Bromborough Pool, Bebington, Wirral, Ches.

The new road tanker in the tilted position

Laporte now make epoxy soya bean oil

EPOXY soya bean oil has been added to the range of products currently sold to the plastics industry by Laporte Chemicals Ltd. The company has well-established connections with all sections of this industry and production of epoxy soya bean oil is a logical extension into the important and rapidly extending field of p.v.c. applications.

Epoxy soya bean oil exerts a strong synergistic effect when used in combination with many metallic stearate type stabilisers and permits the safe use of aluminium and zinc compounds in non-toxic stabiliser systems.

It is an efficient stabiliser in its own right on account of its high oxirane oxygen content and its widespread acceptance as a plasticiser seems likely in view of its extremely low volatility, diminished tendency to migration and high resistance to extraction by solvents, oils, fats and aqueous solutions of soaps and detergents. It will react with organic acids and each epoxide group may yield a diester. The use of such oils in alkyd manufacture can yield products with pronounced gelling properties at relatively low temperatures.

Technical information concerning epoxy soya bean oil will be available in the very near future; Laporte Chemicals offer a full technical service to cover applications.

Grange cut price of Oronite isophthalic

IMMEDIATE reductions in the price of Oronite isophthalic of from 2d/lb., or rather more than 10%, have been made by Grange Chemicals Ltd. As a result of continuous process development, the product is now being manufactured to a higher standard of purity.

Grange are the only U.K. distributors for isophthalic which is produced by the California Chemical Co., who have a one-third interest in the U.K. company. The remaining two-thirds interest is held by British Hydrocarbon Chemical Ltd.

Oronite isophthalic is being increasingly used in the production of several types of alkyds for paints and printing inks and in high-quality polyester resin for glass fibre moulding.

Shirley Institute develops metallised fabric

A COMMERCIAL metallised fabric, with the properties of radiating heat, offering protection against cold, but at the same time being permeable, has been developed by the Shirley Institute, headquarters of the Cotton, Silk and Man-made Fibre Research Association. The Institute prefers to use the term 'metallised' rather than 'aluminised' since metals other than aluminium are used.

Work has been proceeding in this direction in spite of claims that the fabric was produced in the U.S. some years ago. It is understood that the fabric is being sought by U.S. firms for commercial production. It is expected to be used in space travel and research.

Project News

Grace to build first U.K. polyisobutylene facility

FIRST U.K. polyisobutylene plant, with capacity of 8 million lb./year, is to be built by the Overseas Chemical Division of W. R. Grace and Co., at Baglan Bay, South Wales. It is expected that this, Grace's first chemical production unit in Britain, will be followed by facilities for other chemicals.

Site preparation is already in progress and construction is due to start by the end of November by the main contractors, **Parsons Power-Gas Ltd.,** London, who have designed the unit. Completion is scheduled for the end of 1962. Under a long-term contract with British Hydrocarbon Chemicals Ltd., C_4 feedstock—a mixed butane-butylene stream rich in isobutylene—will come from a plant under construction at Baglan Bay.

Grace will produce polyisobutylenes in molecular weights ranging from 600 to 2,000. The material is an important intermediate in the production of lube-oil additives, caulking and sealing compounds, etc., and is also used in the electrical, adhesive and metal industries.

The new plant will use the process developed and licensed by Cosden Petroleum, a 53% subsidiary of Grace. With refineries and a petrochemical plant in Texas, Cosden are one of the leading U.S. producers of polyisobutylene.

There are only two producers at present in Europe—Badische Anilin und-Soda Fabrik, the longest established, and Naphtachimie, whose plant at Lavera also produces under Cosden license. This licence is reported to give Naphtachimie exclusive manufacturing rights in the Common Market. B.A.S.F. have been making low-molecular weight material for some 26 years and it has been sold in the U.K. through their distributors, F. A. Hughes and Co. Ltd. Other importers are Allied Colloids Ltd., Esso Petroleum Co. Ltd., and Kingsley and Keith Ltd.

Demand for polyisobutylenes in the U.K. is difficult to estimate accurately because it covers a wide range of molecular weights, but it is felt that the Grace plant will be sufficient to meet all demands in the intermediate range in the foreseeable future and to give a surplus for export.

Grace's U.K. manufacturing operations are at present confined to the wholly-owned subsidiary, Dewey and Almy Ltd., who produce container sealing compounds and heat-shrinkable packaging films.

Power-Gas to build Benfield process plant for I.C.I.

● CONTRACT for a large carbon dioxide removal in connection with the £10 million ammonia and associated fertiliser plant under construction by **I.C.I. Billingham Division** at Severnside, has been awarded to **Power-Gas Corporation Ltd.,** a member of the Davy-Ashmore Group. The new plant will remove CO_2 from a synthesis gas stream and will be the second constructed by Power Gas for I.C.I. Billingham to use the Benfield hot potassium carbonate process.

Power-Gas are responsible for the complete process and engineering design, manufacture and plant procurement. The new plant will be erected on foundations designed by the P.G.C. civil engineering department and is scheduled for completion early in 1963.

Compressors for Polish tonnage oxygen plant

● THREE axial flow compressors to supply compressed aid for a large tonnage oxygen plant in Poland are to be supplied to **Constructors John Brown Ltd.,** the main contractors, by **Hawker Siddeley Brush Turbines Ltd.** (CHEMICAL AGE, 12 August, p. 222). The compressors will be electrically driven (about 6,000 h.p.) and delivery of the first compressor set will be made in December 1962.

Robinson's new plant produces polyolefins antioxidants

● BRINGING on stream of a new plant for making dilauryl 3,3'-thiodipropionate is announced by Robinson Brothers Ltd., Ryders Green, West Bromwich. Chief use for this material is expected to be as an antioxidant for polypropylene and polythene. Other uses are as a lubricant additive and as an antioxidant for foodstuffs, etc. A data sheet on this material is available from Robinson's.

John Thompson win order for Indonesian compost plant

● CONTRACT for a refuse-composting plant in the Tjempaka-Putih development area of Indonesia, valued at £760,000, has been won by **John Thompson Compost Plant.**

Orders received from the Far East by the John Thompson group since February of this year have aggregated nearly £2 million.

German hydrogen peroxide plant to use Laporte process

● A LARGE-SCALE plant for the production of hydrogen peroxide by the **Laporte** autoxidation process, operated in the U.K. by Laporte Chemicals Ltd., at Warrington, is to be constructed by **Elektrochemische Werke München, A.G.,** who earlier this year became a member of the Laporte Group

The new German plant will be at the E.W.M. works at Höllriegelskreuth, near Munich, and will augment the existing electrolytic process for the production of hydrogen peroxide and persulphates. Extensive planning activities are well advanced and construction of the plant will be started in the near future.

Expansion of Laporte's own hydrogen peroxide plant has recently been completed at Warrington.

Electric motors and control gear for polythene projects

● A CONTRACT worth more than £500,000 has been secured by **Laurence, Scott and Electromotors Ltd.,** Norwich and Manchester, for the supply of electric motors and control gear for use in the production of polythene by a group of four East European countries—Czechoslovakia, East Germany, Poland and Rumania.

These contract have **Simon-Carves Ltd.** as main contractors and will use I.C.I. know-how for the production of high-pressure polythene. (CHEMICAL AGE, 15 April, p. 616).

F.W. to engineer Burma refinery unit

● CONTRACT for the design, engineering and procurement of a new 14,300 b.p.s.d. crude oil distillation unit for the Syriam refinery (Rangoon) of the Burma Oil Co. (1954) Ltd., has been awarded to **Foster Wheeler Ltd.,** of London. The addition of the new plant will raise the throughput capacity of the refinery to 650,000 Imp. gall./day.

Construction of the new unit is expected to be completed by July 1963.

I.C.I. plant produces new solvent for U.K.

● PLANT to make 1,1,1-trichloroethane, a solvent not previously made in the U.K., has been completed at Widnes, Lancs., by **I.C.I. General Chemicals Division.** The product will be sold under the trade mark Genklene and extends the range of chlorinated solvents already produced by the division.

Genklene is non-inflammable, of medium volatility and low toxicity, and is therefore especially suitable for cold cleaning. It is likely to become widely used for cleaning machinery *in situ* without dismantling, and for many routine production and maintenance jobs.

As well as its use for cleaning, Genklene is expected to find application as a solvent in adhesive compositions, in the formulation of cutting oils and for the spotting of textiles. It will be sold in 5- and 45-gall. drums.

Texaco consider building U.K. refinery

● IT WAS stated in Boston on Monday that Texaco are studying plans to build a refinery in the U.K. with a capacity of from 80,000 to 100,000 barrels a day to supply Regent Oil Co. No details are available at present, but a further announcement will be made later.

Regent are owned by Texaco and Caltex on a 50-50% basis.

DISTILLATES

★ OUR survey on statistics in the chemical industry (p. 717) brings into the open a sorry state of affairs. That the Government is contemplating setting up a National Economic Development Council at the same time that it is negotiating Britain's entry into the Common Market makes sense. But to do both these things at a time when Government Departments are cutting their statistical services is quite ridiculous.

It would be impossible for industry to co-operate in the Government's planning proposals without adequate data on which to base assessments of forward requirements. It would also be extremely dangerous for British chemical manufacturers to contemplate trading in a vast European market without accurate information on British consumption, production, imports and exports.

Recent cuts in official statistics have already led to vigorous protests from British chemical producers. Some companies I believe would be only too pleased to finance the collection of official statistics; other companies would like an arrangement whereby chemical industry statistics, collected by Government Departments, were made available only within the industry and, presumably, without publication. That would be a very retrograde step unless applied only to those chemicals made by only one or two producers. Other countries which already publish fuller statistics on chemicals than the U.K.—and there are many of them—would have strong and legitimate grounds for complaint.

★ IN THE past few months I and my colleagues have frequently been visited by representatives of European chemical firms thirsting for knowledge of British markets for specific chemicals—capacities, outputs, consumption, and trends in growth of end products, etc. It is significant that in all cases this information is sought not by companies wishing to build plants in this country, but by firms planning plants in their own countries.

It is part of the new thinking fostered by the Common Market that chemical companies now look on the whole of Europe as their home market. A plant built by a German company in its own country is not only a German production facility, it is a European plant. It is just as important for the company to assess production and consumption trends in other countries as it is in its own country. It is not enough that there is room in Germany itself for such a plant; plans for future plants in France, Italy or elsewhere could easily make nonsense of the economics of the whole project.

The quicker British chemical companies get used to thinking about Europe as their home market the better; some have of course already done so. It is much easier for the larger companies to adopt the new philosophy, for their production or sales subsidiaries on the Continent as a matter of course keep a close watch on production and consumption trends.

★ THE Japanese polypropylene set-up becomes more confusing each week. Piero Guistiniani, managing director of Montecatini, said in Tokyo recently that his company may license extra firms if the Government approves. The six firms he referred to as holding Montecatini licences are: Mitsui Chemical, Mitsubishi Yuka, Sumitomo Chemical, Toyo Rayon, Mitsubishi Rayon and Toyo Spinning.

Showa Denko now have a contract to produce polypropylene under licence from Tennessee Eastman as stated in 'Overseas News' last week, but according to Ing Guistiniani, Eastman would be required to pay royalties received to Montecatini when their process is introduced by Showa Denko. A patent suit has already been filed against Shin-Nippon Chisso Hiryo who propose to use AviSun know-how for polypropylene.

To complicate matters still further, Tokuyama Soda and Asahi Chemical both plan production with 'domestic processes'. Montecatini have already sought a provisional injunction against the production of polypropylene by Tokuyama Soda.

Back to Italy, 'home' of polypropylene. Montecatini's own output is around 20,000 tonnes of resin a year, which will rise to 40,000 tonnes by the end of next year and 60,000 tonnes in 1963. By the end of this year, the company will have capacity for 7,000 tonnes of fibre, which is to be increased to 10,000 tonnes/year.

★ IT is strange to find special supplies of water being sent to the Antarctic, but then the 20 gallons being sent there by F. W. Berk and Co. is not just water but demineralised water, which, since Berk introduced it in 1956 has virtually displaced distilled water for topping up batteries in this particular corner of the world. The demineralised water travels along with a consignment of Berk Accumulator Acid (B.A.A.), a product which Berk have manufactured for 60 years, and which in this case goes to their most exacting customers—the groups of scientists and explorers scattered along the Antarctic peninsular of Graham Land.

The stations, at Stonington Island, Adelaide Island, Argentine Island and Fossil Bluff, are supplied by the Falkland Island Dependencies Royal Research Ship *John Biscoe* on instructions placed by the Crowns Agents for Oversea Governments and Administrations. Landing and distributing the supplies can pose difficult problems on this coast, where mechanical aids are primitive and high winds prevalent. So the acid is specially packed in small containers for ease of manhandling.

Another strange thing at first sight—it is dilute B.A.A. that is ordered, although this is a waste of shipping space compared with a concentrated acid which could be diluted as required. but the over-riding factor, of course. is the very low freezing point of the weaker acid.

★ FIVE-GALL. stackable tinplate drum, manufactured by the Metal Box Co. Ltd., was awarded a trophy in the recent international Eurostar Contest, 1961, sponsored by the European Packaging Federation. This drum was designed for safe stacking when either empty or filled. The top with its sloping shoulders ensures a safe, rigid stack that is particularly suitable for palletisation and mechanical handling.

Among other trophy winners were Montecatini with their Timor miniature aerosol bottles, a new patented package for one-shot discharge of insecticide or other spray.

★ TRENDS across the Atlantic are always of interest to U.K. chemical producers, for in so many lines, the pace is set in America. Latest news will be given a mixed reception for on one hand third quarter company reports show a distinct sales recovery. To be set against that is a story of mounting capacities and spiralling price cuts.

Latest price survey of *Chemical and Engineering News* (30 October issue) reveals widespread cuts in the prices of acrylonitrile, adipic acid, aniline, benzene, phenol, phthalic anhydride and sodium phosphates. Not only are these likely to mean lower profits, but they will have a direct impact on the U.K. chemicals trade.

As this journal showed recently in an exclusive report, a 40% cut from 23 cents to 14½ cents/lb. by tank car for acrylonitrile dealt I.C.I. an economic body blow and forced them to close the only U.K. plant. This low price meant that even with a 33⅓% import duty, U.S. acrylo could under cut I.C.I. This material now joins the long list of chemicals for which there is temporary exemption from import duty.

Faced with comparatively low European tariffs, American producers are still calling for a greater liberalisation; failing this the U.S. Government will be asked to raise its tariffs on chemicals—and they are already way above Europe's levels for most products!

Alembic

Fisons' annual report

PART OF MILFORD HAVEN PROJECT TO BE ABANDONED

CONFIDENCE in the future of Fisons in the event of Britain's entry into the Common Market was expressed by Sir Clavering Fison, chairman, in his annual review published on Thursday. He said that with the renewed efforts being made, both technically and in cost reduction, fertilisers are expected to remain a sound and satisfactory business, although one with more fluctuations than in the past. The profits from interests other than agricultural fertilisers in the home market are currently about one-third of the total, and these other interests are expected to show substantial gains in the next few years. These interests, depending largely on research, could encounter new opportunities rather than increased difficulties in the event of entry into the Common Market.

It is apparently, said Sir Clavering, the Government's policy to bring about a large measure of deflation in the economy. The chemical industry is highly protected and has been so for a number of years. In general it is efficient, but some adjustment of prices, such as is taking place in heavy chemicals and fertilisers, is inevitable. Although the chairman's view about the outlook for the continued progress of the group has not been changed, the effect of Government policy and of the general situation must be to make profits harder to earn than in the more sheltered conditions of the past.

Like other companies, Fisons have been reconsidering their projections for the future to take account of the changing conditions. Because of the keener competition to be expected from Common Market conditions, a process which will merely accelerate an existing tendency, costs and capital expenditure employed must be reduced. Fisons have set up working committees in the various companies to look into the best method by which working capital can be reduced.

Capital projects

Capital projects approved by the Board up to the end of the year under review were estimated at £13,508,000, the major part of which is for the proposed Milford Haven nitrogen complex. The figure of £13.5 million is probably an overestimate and one which was made before entry into the Common Market was considered. Re-examination of the situation has resulted in the decision to abandon some part of the Milford Haven project. In view of this it is unlikely that any large amount of new capital will have to be raised. Other projects may gain the approval of the Board in the future which may alter the situation, but no new capital will be sought in the current financial year.

Sir Clavering is confident that Fisons will fare as well as other companies in the chemical industry. In the first three months of the current year, however, the deflation of prices continues, costs are increasing and the economic situation remains confused. Sir Clavering, therefore, does not feel justified in holding out hope of higher profits.

Fertilisers. In the year under review bad weather and a serious outbreak of foot and mouth disease has hit the fertiliser industry hard. It is estimated that the actual usage of plant nutrients in compounds increased by only 1% over the previous year, whereas a 4% increase was budgeted for. The fertiliser budget for the current years is not yet worked out.

Milford Haven

Work is expected to start in the spring of 1962 on the Milford Haven project carried out in conjunction with Esso. The project is expected to involve Fisons in a capital expenditure of £10 million (previous estimate £12 million) which will be spent over a period of about 3½ years. It is hoped that the complex will be in production by 1964. The newly formed company, Milford Haven Ammonia Co. Ltd., will produce £150,000 t.p.a. ammonia in a plant costing £4 million. The ammonia will be piped to the wholly-owned Fisons plant which will produce ammonium nitrate and other nitrogen projects (see CHEMICAL AGE, 30 September, p. 500).

Although important questions still need to be resolved on this project, they are no more than are usually encountered in a project of this size.

Modernisation of the company's granulation plants to enable them to produce compounds of higher concentration and improved quality has continued and a further stage in the extension of the company's largest fertiliser works at Immingham is almost complete. Plans are well advanced for considerable extensions at Cliff Quay, Ipswich, Extensions to the ammonia plant at Nitrogen Fertilisers Ltd. are also in the course of construction.

Fisons Horticulture Ltd. had a successful year and has continued the high rate of growth of the past few years. It is the company's intention to expand their horticultural interests. A number of small interests already existing on the Continent are expected to expand.

Fisons do not expect to export large quantities of fertilisers. The effect of transport costs on such low value products is considerable. The possibilities, however, have been examined and it seems likely that there may be a market in Northern France and perhaps Northern Europe. The extent and type of export will depend on the cost situation of a particular product in a particular area.

Chemicals and other interests. All Fisons' chemical companies showed profits. The progress of the last four years is expected to be maintained in the future. Exports of chemicals was 30% above last year's level.

Benger Laboratories is making good progress both in the home and overseas markets. The new plant in India owned by Bengers Laboratories (India) Ltd. in which Fisons is associated with Tata Industries Ltd. is now nearly complete and is expected to contribute to profits next year.

Fisons Pest Control has shown very good progress. New products were again introduced, principally Carbyne, for which a licence is held from the Spencer Chemical Co. Fisons have recently bought shares in this company to the extent of approximately 3% of the equity capital.

Fisons Pest Control progress overseas is particularly satisfactory, good results being achieved especially by the Canadian, Sudan and Central African companies. The associate company, Tata-Fison Ltd. in India, now the largest company in the industry, made good progress and is expected to pay satisfactory dividends in the near future.

The overseas business of Fisons Pest Control is expected to be several times the size of the U.K. business in a few years time and plans are being made accordingly. The potential in India is very large indeed. The Indian Government foresees a five-fold increase in this field in the next few years. Even if Fisons only retain the relative position they hold at the moment, a large increase in sales can be expected. The company is also expecting to launch out into the U.S. market in the near future. In order to compete successfully in the U.S. market a company must have good and original products protected by patents. Fisons expect to have these products. The South American market also holds good prospects. It has one of the highest rates of population increase in the world and will require large quantities of pest control products and fertilisers in order to increase food production.

New isotopes for medicine

THREE new isotopes for medical research are available from the Radiochemical Centre at Amersham. They are Arsenic-74, which is very easily detectable and is used in the location of brain tumours, cobalt-57, for labelling vitamin B_{12} in the studies of pernicious anaemia, and strontium-85 for the measurement of strontium uptake.

These new isotopes are of particular interest in that they are not prepared in a nuclear reactor as others from Amersham have been but by bombardment with high energy particles from cyclotrons. The cyclotrons used are the 86-in. one at Oakbridge, U.S., the Nuffield cyclotron at Birmingham University and the Medical Research Council's cyclotron at Hammersmith.

CHEMICAL PLANT MAKERS FAVOUR PLANNING PROPOSALS

Norman Fraser at B.C.P.M.A. annual dinner

TO avoid the need for applying the brake of a high bank rate, which was very harmful to British contracting firms quoting for overseas chemical plant projects demanding long-term credits, action must be taken to take the peaks and troughs out of our economy.

This was stated by Mr. Norman C. Fraser (W. J. Fraser and Co. Ltd.), chairman of the British Chemical Plant Manufacturers' Association, at the annual dinner held at Grosvenor House, London, on 25 October. when he proposed the toast of 'The Guests'. Sir Keith Joseph, Minister of State, Board of Trade, replied. Mr. Fraser, who also dealt with delivery delays and the Common Market, said he had never been frightened of the word 'planning', which he regarded as a perfectly normal business function, provided it was carried out by experts with their feet on the ground. Chemical plant manufacturers would be far more efficient and highly geared if they had reasonable forecasts of the future capital commitments of their main consumer industries.

Referring to experts, Mr. Fraser was glad to see that the results for 1961 were so far most encouraging. The official statistics, however, only told part of the story, for they did not include overseas contracting and, during 1961, B.C.P.M.A. members had announced overseas contracts totalling over £12 million for plants using know-how supplied by British chemical manufacturers. That was a satisfactory trend which Mr. Fraser hoped would continue. For a long time, the association had been pleading with chemical manufacturers to make their know-how available for use in overseas contracts. It was most encouraging that this was bearing fruit.

As an association, they had come out in favour of Britain entering the Common Market. Undoubtedly there would be intensive competition, but also great opportunities. There would be a very real scrap, but the plant makers would face it with confidence for it would mean increased capital requirements for their customers.

B.C.P.M.A. had recently appointed a European Trade Committee under the chairmanship of Mr. Peter Seligman (The A.P.V. Co. Ltd.).

Referring to the delivery position, Mr. Fraser recalled the "dam of pent-up orders" released rather suddenly about a year or so ago which inevitably created bottlenecks and some temporary shortages of raw materials and components. This led to prolonged delivery periods and unfortunately a number of broken promises.

The problem had been tackled energetically and customer industries had been told how they could help themselves avoid some of the delays. Mr. Fraser did not believe that the customer was always right, saying "After all, all of us are somebody's customer and we all have to sell."

A proper relationship between buyer and seller could surely only be to mutual advantage. It was impossible to get the best out of a bargain unless it was reasonably acceptable to both sides. Once a contract was signed, it must be to the benefit of both parties that it be quickly and satisfactorily completed. That was best done by making it the business of both parties to work together on it; to acquire confidence in the other's integrity and to co-operate in overcoming any difficulties.

As a result of discussions with stainless steel manufacturers and with several supplier associations, Mr. Fraser was convinced that there should be a close inter-relationship between customer and supplier. An intelligent appreciation of the other's viewpoint, a little give and take and a practical approach were needed on the common objective—that of putting into operation plant or equipment that was technically and economically available when required.

The greater the exchange of relevant information and the greater the realisation that buyer and seller had a mutual interest, the more likely that objective was to be achieved.

No tax relief for export companies

PLEAS from industrialists that export firms should be given some relief from profits tax as an incentive to increase their overseas trade, were rejected by Sir Keith Joseph, Minister of State, Board of Trade, replying to the toast of 'The Guests' at the B.C.P.M.A. annual dinner.

The Government had carefully considered the proposal, but it would undoubtedly break international agreements. Other countries, particularly Germany, which did at one time give an incentive of that kind, had by agreement with Britain, abandoned it.

Sir Keith added "More generally, we do not want to start on a course which other countries would undoubtedly follow, and from which we might lose more than we could ever hope to gain."

Speaking of the export contribution of the chemical plant industry, Sir Keith declared that last year exports were worth £20 million and were rising. In addition, the plant makers made a great contribution to chemical exports, which last year totalled more than £300 million.

He described the high bank rate as "thoroughly inconvenient, to put it mildly", but it was essential to safeguard industry's capacity to do business. All the Chancellor had done was to restrain growth, not the market. A boom was coming in the U.S. and the prospects both at home and abroad were singularly good.

Changes in British Oxygen executive board

CHANGES in the executive board of the British Oxygen Co. Ltd. include the appointment of **Mr. J. Strong,** formerly in charge of sales, as chief executive of a newly set up Special Projects Division, with responsibility for all plant sales and supply projects at home and overseas and associated plant products. This appointment follows expansion of tonnage activity and special supply projects. **Mr. R. C. Hesketh-Jones,** formerly chief executive, overseas, has become chief executive, sales, responsible for all group selling activities at home and overseas, except for special projects and chemicals.

Mr. L. E. G. Smith, previously group chief accountant, has succeeded **Mr. L. S. Kinnear,** who has retired, as chief executive, Finance Division. The Administrative Division has been divided into 'personnel' and 'commercial'. **Mr. F. C. S. Lewin-Harris,** chief executive, personnel, retains responsibility for personnel, public relations and publicity; **Mr. C. A. B. Leslie,** group solicitor, becomes chief executive, commercial, responsible for legal, secretarial, property, patents and purchasing.

The executive management board in its adjusted form now consists of the following chief executives: Mr. L. E. G. Smith (finance); Mr. F. C. S. Lewin-Harris (personnel); Mr. C. A. B. Leslie (commercial); Mr. J. Strong (special projects); Mr. R. C. Hesketh-Jones (sales); **Mr. R. J. Barritt** (engineering); **Mr. R. H. Reynolds** (operating); **Dr. N. Gross** (technical); **Dr. N. Booth** (scientific); **Dr. R. F. Goldstein** (chemical).

British Xylonite form printed plastics company

A new company which will specialise initially in the production of printed flexible vinyl is to be formed jointly and on an equal basis by British Xylonite and the Calico Printers Association. Production is expected to begin early in 1962 and will be carried out in one of C.P.A.'s printing works.

C.A. Surveys Statistical Sources

Whitehall economies in official statistics alarm U.K. chemical industry

THE British chemical industry has for long been one of the world's most poorly served with official statistics. This special CHEMICAL AGE report shows that it will be in an even worse position in future for obtaining information on production, consumption, imports and exports.

Government Departments have recently dropped from official publications many statistics that have been of vital interest to the chemical industry. Reason given in most cases has been a need to economise.

At present economists and chemical market researchers associated with the chemical industry have to rely on a very limited number of official sources for information on trade in chemicals. The data contained in these are very meagre and cover only a small number of the industry's many products. Indeed, official statistics in the U.K. compare most unfavourably with those released in other countries, notably the United States and Japan. Official statistics published in the U.S. are the most comprehensive in the world and are readily available at only nominal cost to economists in Britain and elsewhere.

The Ministry of Trade and Industry in Japan publishes precise details concerning the production and consumption of all chemicals. Because producers have to obtain planning permission for new plants, expansions and developments, full details are also published covering anticipated future production.

In many other countries the availability of official statistics is very much better than in the U.K. In addition, trade associations overseas are often much more active in collecting and publishing statistics.

Planning of new chemical plant

The most important sector where accurate statistics are required is in the planning of new chemical plant to meet home and export demand, particularly as the optimum economic size of modern production units increases yearly. Individual plants to produce, for instance, olefins, are now being built in the U.K. with capacities of around 80,000 tons a year. In the U.S., however, the optimum size of an olefins plant is currently 200,000 tons a year, and it may well be that with the Common Market to serve, British olefins plants of the future will be much nearer that capacity.

Very careful planning, based on accurate statistical data relating to available raw materials, total production in the U.K. and elsewhere, consumption in the U.K. and overseas, plus production of end-products is required for the assessment of the ideal plant capacity to meet the needs of the potential market.

Statistical information is therefore the key to success and many of Britain's leading chemical producers consider that it would be disastrous to enter the Common Market—with the increased competition it entails—without adequate and accurate statistics to back up investment decisions that in many cases will be in the £multi-million bracket. For the great majority of chemicals produced in Britain, and the raw materials concerned, no official statistics are available.

C.A. SURVEY REVEALS CUTS IN STATISTICS

Rubber end-use analysis figures no longer published

Ministry of Power deletes aromatics production statistics

Eight-year gap between publication of raw materials usage in U.K. production census reports

Official sources of statistical information available in the U.K. include the following:

'**Monthly Digest of Statistics**', published by the Central Statistical Office, together with the 'Annual Abstract of Statistics' which is slightly more comprehensive in coverage. Among other general information the 'Monthly Digest of Statistics' includes figures relating to the usage of coal and oil in the chemicals and allied industries; information on gas production, electricity used in the chemical industry oil refinery throughput and deliveries of petroleum products, including petrochemical feedstock. Production, delivery and/or sales figures are given for fertilisers (single superphosphate, basic slag, N, P_2O_5, compounds and liming materials), synthetic dyestuffs, inorganic pigments, paints, and varnishes, industrial ethyl alcohol, plastics materials, penicillin, soap, synthetic detergents (sales only) rubber and carbon black.

In many cases, however, the basis used is too broad for the figures to be of maximum value.

'**Trade and Navigation Accounts**' is published monthly by the Board of Trade plus an 'Annual Statement of Trade of the U.K.' which is somewhat wider in its scope than the Accounts. These give details of the U.K. import and export trade, but the chemicals section leaves much to be desired.

'**The Board of Trade Journal**' publishes weekly information of interest to the chemical industry, including the index of industrial production, index of wholesale prices and figures relating to sales of plastics materials.

Of the many trade organisations, only a few publish statistics. Thus the Man-made Fibres Federation regularly issues data on the production of synthetic fibres, while the '**Rubber Statistical Bulletin**' of the Secretariat of the International Rubber Study Group, publishes statistics on natural and synthetic rubber that have been collected by the Board of Trade and by official bodies in other countries.

The National Sulphuric Acid Association publishes quarterly returns relating to production and consumption of acid and raw materials used in its manufacture. Similarly the Sulphate of Ammonia Federation publishes on behalf of its members production and export figures on ammonium sulphate.

Raw materials data dropped from Census

Recently a number of important deletions from official British statistics have been noted. There has, for instance, been a change in the tables published in the four-yearly 'Census of Production' reports. The section on raw materials consumption which is by far the most valuable in the report, is now to be included only once every eight years.

Although, following representations in the House of Commons, Census Reports have been greatly speeded, they are still published three years in arrears which greatly reduces their value. Omission of raw materials statistics from the 1958 report means that it will not be possible to compare the 1954 figures with those for 1962 until 1965—too long a gap to make the statistics of any value in so far as an assessment of trends is concerned.

As a result of this the census of production report dealing with plastics will give no guide as to overall consumption of such vital raw materials as styrene monomer, olefins, etc., until 1965. CHEMICAL AGE has been told that this new policy in relation to publication of raw material statistics is due to Treasury restrictions on the budget of the Census Office.

The second case in which official statistics have been curtailed relates to world-wide rubber data published by the Secretariat of the International Rubber Study Group on a world-wide basis, in '*Rubber Statistical Bulletin*.' This publication formerly included detailed

NEED IS FOR MORE STATISTICS, NOT LESS, SAY CHEMICAL PRODUCERS

information on British consumption of different types of rubber and on the various end-uses. For 1960, however, there has been a drastic curtailment of the data published for the U.K.—although the bulletin continues to publish full data on rubber usage in other countries.

Statistics for 1960 give no indication of the U.K. consumption of butyl rubber, nitrile rubber, SBR, etc. Also eliminated are figures relating to the usage of rubber in wire, cable, hose, sports wear, belting etc. Consumption of rubber in the U.K. is now merely classified as 'natural' or 'synthetic' and all end uses are lumped together under two headings 'tyres and tyre products' and 'all other.' There is not even a breakdown to show the quantity used in tyres—by far the biggest single use.

This information was previously provided by the Board of Trade and the reason given for discontinuing these comprehensive statistics is that economies have had to be made and that there is not sufficient staff to collate the material.

Similar information which also appeared in the 'Annual Abstract of Statistics' is no longer published.

A third instance of restriction in published statistics that affects the chemical industry relates to the Ministry of Power's 'Statistical Digest.' Much valuable information previously included in the 'Benzole and coal tar' section—and available from no other source—is omitted from the recently published 1960 edition.

Among data dropped is information on the production of coal tar products, pyridine bases, cresylic acid and anthracene. Much more serious is the omission of statistics on the production of refined light oil, such as benzene, toluene, and xylene.

No demand for statistics, says Ministry

According to the Ministry of Power the reason for these omissions is that there is 'very little demand for these figures.' Enquiries made by CHEMICAL AGE indicate, however, that far from there being little call for these statistics, they are of vital interest to many in the industry, particularly at the present time when there is considerable concern regarding the adequacy of U.K. benzene supplies.

Another example of apparent official apathy towards statistics and a total inability to appreciate their vital role in industry, is noted in the 'Trade and Navigation Accounts,' which lists by value, and in many cases by quantity, U.K. imports and exports. To obtain further information on countries of origin and destination for particular chemicals or group of chemicals, requires advance payment of a search fee and a wait of anything up to six weeks.

Frequently the information supplied omits data for certain months of a given period, rendering the information supplied worthless, since it is impossible to calculate a total over the whole period. It is part of the system—although not laid down in any regulations—that before releasing figures, the exporting and/or importing interests concerned are first asked if they have any objections to these being used. Objections often relate only to certain months; hence figures for those months are excluded from the material supplied. The publication of information on a yearly basis only would surely overcome these objections, but yet would be of considerable value.

Occasionally no information whatever is supplied, but the search fee is still retained.

For the imports and exports of many products which H.M. Customs and Excise treat as highly confidential the information required can often be obtained by searching the official records of the countries of origin in the case of imports, or the countries of destination for exports.

It is not difficult to appreciate the anxieties of those concerned with the development of the chemical industry, in view of the present sorry state of affairs.

Data not collected for Government benefit only

Many Government departments are engaged full-time on the collection of industrial statistics (many of which are never published) and the Government also have the power to insist that companies supply the required information when a real need exists. With this work actually being carried out, it is indefensible to suggest, as has been done in the past, that the service is for the use of the Government only. Since, in the final analysis, industry pays for these Government activities, and since it can be shown that industry badly needs statistics, the Government have a responsibility not only to publish all the information that can be disclosed without harming the operation of individual companies, but also to expand their activities to keep pace with the modern needs of industry.

As a first step, the statistics recently omitted from official publications should be reinstated without delay but, in the long run, it is obvious that what is required is a change of heart on the part of the Chancellor. The niggardly role of the Treasury is more akin to Micawber than the needs of a bustling, investment-conscious industry that is currently spending or planning to spend more than £300 million to ensure that British chemical producers stay in the forefront.

The need is for more statistics not less. Companies must have detailed statistical information in order to plan their future development in the U.K. and on a wider basis, in the Common Market. If it is assumed that the Government have obligations to industry to provide this essential information, it is difficult to understand why, in recent months, there has been a disturbing trend towards a reduction rather than an expansion in the chemical statistics published by various Ministries and Departments.

The reason advanced for the omissions in most cases has been a need to economise. At this critical period in the industry's development and expansion, this could well be a case of misguided economy. In view of the chemical sector's contribution to the national economy and the balance of payments, the demand on Government service is little indeed.

It is unfortunate that in order to achieve minor economies steps have been taken to reduce the collation and presentation of statistics without first approaching the chemical industry to ascertain whether it would be willing to contribute towards the costs of providing the information it so badly requires.

Industry's attitude to publication of statistics

For some sectors of the U.K. industry, however, it may be that tight budget restrictions are not the full reason for the dearth of statistics, and it has been suggested that pressure is sometimes brought to bear on the Board of Trade and official organisations by some of the large U.K. chemical concerns which fear that release of statistics may provide competitors, particularly overseas, with information.

This conservative, faint-hearted attitude is difficult to understand when one considers the booming state of the industry in the U.S. and Japan where detailed statistical information is published. But apart from this there are for many of the chemicals in question, at least three large U.K. manufacturers so that the publication of total production figures cannot be held to affect the competitive position of any one company.

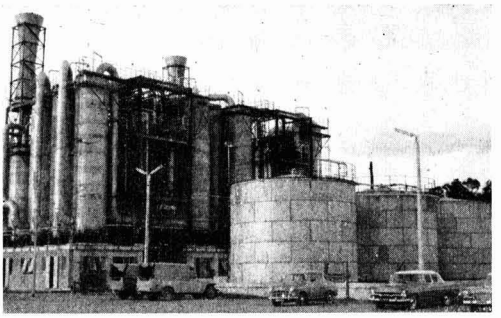
While there is much that Government departments can do to improve the availability of chemical statistics constructive co-operation on the part of the industry itself will do much to help in this very worthwhile endeavour.

I.C.I. add tridecanol to sales range

COMPRISING a mixture of branched-chain C_{13} primary alcohols, tridecanol has been added to the product range of I.C.I.'s Heavy Organic Chemicals Division. This product can be esterified to ditridecyl phthalate, said to be a low-cost replacement for special-purpose plasterisers where properties of low volatility and low irrigration are important.

Tridecanol can be used for both nonionic and anionic surfactants and it is said to be particularly suitable for formulating liquid detergents. Another use for this high molecular weight product is in oil viscosity-index improvers.

More private sector licences will boost Indian fertiliser capacity above 1 m. tons



Absorption towers of the nitric acid plant at Nangal

THE Indian Government has decided to license fertiliser capacity in excess of the Third Five-Year Plan (1961-65) target of 1 million tons of nitrogen (CHEMICAL AGE, 20 May, 1961) in order to provide a cushion for any shortfall resulting from the industry's teething troubles. The private sector share is also being raised from 200,000 tons to 300,000 tons and possibly even higher.

While the target for phosphate fertilisers, already fixed at 400,000 tons of P_2O_5 basis, remains unchanged, the Development Council for Inorganic Chemical Industries (Ministry of Commerce and Industry) has suggested production of two additional grades of superphosphates, namely, 17% and 18% water soluble P_2O_5; the present standard guarantees a minimum of 16% water soluble P_2O_5.

Foreign enterprises have recently shown great interest in the setting up of fertiliser plants in India. The Indian Government has also announced that it would welcome all foreign investors who would collaborate with Indian companies and provide them with a part of the needed foreign exchange.

Gypsum-based project

Meanwhile, the Andhra State Government have allotted the gypsum-based Kothagudam fertiliser project (80,000 tons nitrogen as urea) to the private sector (Seshasayee Brothers and Anthra Sugars Ltd.). The project will cost about £18.7 million and the plant is likely to go into production by the end of 1963.

The Fertilizer Corporation of India (a Government undertaking) is negotiating with Japan Consulting Institute (a consortium of Japanese firms) for the supply of plant and machinery for the Gorakhpur Fertiliser Project in Uttar Pradesh. The plant will produce 80,000 tons of nitrogen (180,000 tons urea) annually and is estimated to cost £18.7 million. It will be based on petroleum naphtha from the Barauni Refinery in Bihar State.

The Gujarat State Government has now decided that it will hold a minority share (45%) in the equity capital of the £21 million fertiliser project to be set up at Koyali, the site of the 2 million-ton oil refinery in Gujarat State. The project is to produce about 90,000 tons/year of nitrogen. The State Government has approached 22 firms of consultants for technical and financial collaboration.

At Trombay, near Bombay where work on the £18.7 million fertiliser project is in progress, argon gas is proposed to be produced as a by-product. The project authorities are examining a scheme for the production of 38,000 cu. ft. of argon per day for use in the welding of stainless steel and similar materials.

Meanwhile the heavy water plant, an associate unit of the State-owned Nangal Fertilizers (Punjab) is nearing completion for commissioning by the end of the year. The plant has been designed to produce 14.5 tons of heavy water a year by the hydrogen distillation process and will cost £975,000. The heavy water, produced for the first time in India, will be used as a moderator in atomic reactors. Cost of producing heavy water will, it is expected, compare favourably with the current U.S. selling price.

The fertiliser unit of the Nangal project has stepped up its production to two-thirds of its rated capacity of 1,176 tons/day of calcium-ammonium nitrate. Total production since March 1961 has exceeded 100,000 tons. With the availability of a full power load from Bhakra Dam, the full production capacity will be reached early next year.

Fertiliser Plant in Malaya. In connection with Malayan proposal to set up a co-operative plant at Port Dickon with a production capacity of 100 tons/day of urea, the Fertilizer Corporation of India has offered technical assistance and training facilities for Malayan personnel at Sindri and Nangal. The proposal for technical assistance in setting up the project was discussed with a three-member Malayan team which visited India in September.

N.B.S. research work leads to process for chemical crimping of nylon-6

CRIMPING of nylon-6 is the unexpected result a U.S. National Bureau of Standards basic research programme in textiles. Workers at the N.B.S. have found that nylon-6 can be crimped and coiled chemically by the introduction of disulphide and alkylene sulphide cross linkages in the swollen fibre, followed by drying (*Chem. and Engg. News,* **39,** 43). Generally, crimping of homogeneous fibres is done mechanically, and coiling is achieved by treating the crimped fibre with *m*-cresol.

Intermolecular cross linkage has been used by many workers to change the properties of rubber and many studies have been made on cotton, but more needs to be known about cross-linking in solid, orientated, semi-crystalline structures such as those that occur in synthetic fibres.

Crimping gives a soft texture to synthetic fibres, rather like wool which has a natural crimp. Natural fibres such as wool and other proteins contain disulphide cross linkages. Devising ways of forming similar disulphide cross linkages in synthetic fibres by first forming sulphhydryl groups looked like a promising approach to the modification of polymers. Polyamides were selected by the N.B.S. because of the active hydrogen on the amide groups.

The crimping is carried out by first treating the nylon-6 with a swelling agent. Sulphhydryl groups are then inserted to form disulphide cross linkages and some crimping. Alkylene cross linkages are then made from the sulphhydryl derivatives.

Two types of alkylene sulphide cross linkages can be obtained, one consisting of alternate methylene groups and sulphur atoms (N—CH_2—S—CH_2—S—CH_2—N) and the other a sequence containing an ethylene group (N—S—CH_2—S—CH_2; CH_2—S—CH_2—N). The first type is obtained with methylene dihalides and the second with ethylene dihalides.

Apparently, according to the N.B.S., the right choice of swelling agents—singly or in combination—could give a specific degree of coiling.

Gradual oxidation of the crimped fibre by exposure to the air could destroy the crimping and coiling effects, but the free sulphhydryl groups remaining after the crimping process is completed can be stabilised by treating the cross-linked fibres with silver nitrate solution. The disadvantage of silver nitrate is that it causes blackening of the fibre. However, it is felt that other compounds, such as alkylating agents, might work in the same way without affecting the fibre's colour.

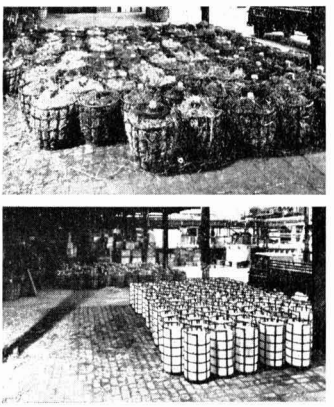
Wire-crated polythene bottles cut firm's handling, storage costs

STORAGE capacity for 10-gall. containers has been doubled by changing over from conventional glass carboys to polythene containers in wire crates at the works of Spencer Chapman and Messel Ltd., whose products include distilled water and certain acids. More important still, depending on the specific gravity of the contents, up to 75% more filled containers can be carried by the company's transport.

A further saving is in straw packing along with its associated fire precautions and other problems, while the absence of straw makes the wire-crated polythene container more acceptable to the company's customers in the food industry, to whom straw represents a hygiene hazard. The polythene container can also be hosed down, while its tare weight of 9 lb against the 35 lb. of the glass carboy eases handling problems.

As their existing stocks of glass carboys are run down the company is replacing them with Polycrates, produced by the Fibre Drum Division of Bowater Packaging Ltd., Harlequin Avenue, Brentford, Middlesex. The Polycrate comprises a 0.060 even gauge polythene bottle available either in a p.v.c. coated or aluminium painted wire crate, or, as in the accompanying illustration, in a stoved steel strip crate. Both types have raised bases to protect the bottle from rough ground, as well as protective end discs. Weather-proofed sleeves give added protection for rail and sea journeys.

Mr. R. A. Wiltshire, Spencer Chapman's work study officer, says that although the Polycrate is, initially, slightly more expensive than the glass carboy, it quickly pays for itself and becomes a more economic proposition. Apart from the savings in storage, freightage and overheads mentioned above, there is a saving on breakages—in six months of using Polycrates less than 0.5% have been damaged and these have been easily repaired. The company is extending its present use of Polycrates for distilled water and weak acids to some of the stronger acids, "although in our experience," says Mr. Wiltshire, "the Polycrate is as yet not suitable for every type of acid".



Pictures show how switching from carboys (above) to Polycrates (below) has doubled storage capacity for 10-gall. containers at Spencer Chapman and Messel's works

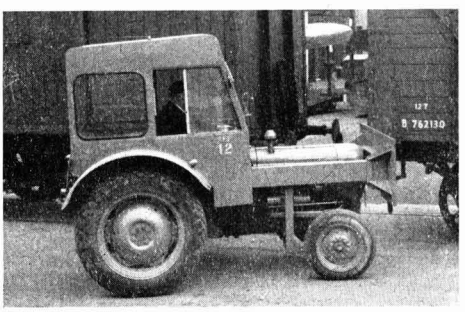
Radio-controlled tractors speed handling at I.C.I. works

MOVEMENT of raw materials at the I.C.I. Dyestuffs Division works at Grangemouth on the Firth of Forth, involves handling thousands of barrels, drums and carboys. A recent review of methods and equipment used led to adoption of a new system based on the radio taxi techniques and the works have standardised on Fordson Dexta tractors for their fleet after four trials with competitive equipment.

A vital factor governing choice of tractor was the ability to manoeuvre rapidly in confined spaces. Other considerations were safety and comfort, while the need for a minimum of mounting and dismounting required all hitching operations to be conducted automatically from the driving seat.

Four Dexta tractors were supplied with extended draw-bars and low-level extended exhausts for factory safety and improved forward vision. Fire extinguishers were fitted in every cab and fan belts are screened by wire mesh squares. Special cabs, prefabricated to I.C.I. specification to give weather protection without impairing visibility.

These tractors are used mainly in conjunction with their Eezion low load trailers each with a load capacity of 3 tons. Two, however, are fitted with Young Sturdiluxe shunters for dealing with railway wagons. Each vehicle is fitted with Pye short-wave radio for reporting to a central control room, where requests for tractor transport are received by telephone and priorities assessed, the most appropriate tractor then being directed by radio to the point required.



A Dexta tractor shunts off a rail wagon at I.C.I. Dyestuffs' works

Effluents and the law

(Continued from page 711)

and sampling points. The new Act also extends the classes of trade premises within the scope of control. The new extension includes premises used for scientific research or experiment.

Water supply for industry was also surveyed in the paper, and the authors predicted new legislation at an early date. An expansion of the practice of some water undertakings of supplying industrial or 'raw' water at a lower price than that for potable water is also likely. It is becoming increasingly recognised that it is wasteful to provide water to a higher standard of treatment than is strictly necessary.

The paper concluded with a discussion of the fertiliser industry's effluent disposal problems. These are relatively few, the main one being the disposal of liquor from gas scrubbing to prevent atmospheric pollution. One treatment to remove fluosilicic acid—formed from SiF_4 by aqueous hydrolysis—leads to valuable by-product recovery; treatment with potassium chloride will produce potassium fluosilicate. Fertiliser industry effluents seem unlikely to be particularly toxic to fish or to carry a high B.O.D. (biological oxygen demand), but ammonia in river-discharged effluents can be toxic to fish. A low ammonia content may be required; the toxicity of ammonia to fish is affected by the pH of the receiving river water.

However, specific fertiliser problems are of minor importance in a paper which, when finally available in print as Proceedings of the Fertiliser Society, will be a most valuable document for a wide range of industry, particularly chemical industry.

Overseas News

Increase in U.S. phthalic output planned but prices going down

A CUT in U.S. prices of phthalic anhydride to 15½ cents/lb. for bulk supplies of bagged flake and 15 cents for molten material has led to lower prices for phthalic plasticisers. Union Carbide have cut 1 cent/lb. from most of their esters, making dioctyl phthalate 22½ cents/lb. in tankers.

Allied Chemical, who initiated the price reductions in phthalic anhydride, expect U.S. producers to lower their naphthalene prices now that supplies are improving.

Output of phthalic anhydride is expected to increase from 375 million lb. in 1960 to some 460 million lb. by 1965, well under half of total capacity by that time. Meanwhile, Sherwin-Williams are to raise their capacity 150% to 20 million lb./year at Chicago, with a Badger-built fluidised bed unit that will use naphthalene as raw material.

Special committee to probe Italian sulphur problems

It is reported from Italy that the E.E.C. Commission is instituting a special committee, the task of which will be to facilitate a solution of the Italian sulphur industry's problems. The committee will consist of 15 members, of which four will be Italian (one representing the Italian Government, one representing the Sicilian Government, one from Ente Zolfi and one expert in Sicilian problems), five will be representatives of other countries of the E.E.C., three will be experts of the E.E.C. Commission, and one representative of the European Investments Bank.

Magnesium oxide plant in Sardinia

The plant that will be built at S. Antioco, Sardinia, for the production of magnesium oxide out of sea water, will cost 7,000 million lire, of which 4,000 million lire will be provided by Credito Industriale Sardo. It will be the first plant of its kind in Italy and the lagoon of S. Antioco is particularly suitable for the process chosen.

No actual names have been disclosed as yet, but it is understood that several British specialists, some Italian investors and a German bank are taking part in this scheme.

Italian-built plant in Yugoslavia

Mr. De Rosa, general manager of the Italian concern, Ansaldo, and Mr. Tredici, director of projects service of Montecatini, recently visited Lukavac (Central Bosnia) in Yugoslavia to see the new nitrogen fertiliser plant there, which was designed by Montecatini and constructed by Ansaldo for the local Korsara Boris Kidric company. The plant will start producing in February 1962 at the rate of 120,000 tonnes/year which will cover about one-third of Yugoslav requirement.

Canadian call for higher duty on citric acid

Two Canadian producers of citric acid —Kemball Bishop, Cornwall, and Sturge, Valleyfield—have applied to the Canadian Tariff Board for an increase in import duty to 20% (British preference) and 25% (most favoured nation). This move follows a cut made in the price of material imported from Europe.

Montecatini to build film plant in U.S.

A polypropylene film plant is to be built by Montecatini at the Neal, W.Va., plant of their U.S. subsidiary, Novamount Corporation, with capacity estimated at 12 million lb./year. Production at the 30 million lb./year polypropylene resin plant started at Neal in mid-October. Resin output will be marketed in the U.S. by W. R. Grace and Co.

Enjay to build new solvents unit

Enjay Chemical, a division of Humble Oil, are to build a new solvents and chemical intermediates unit at the Bayway, N.J., refinery of Humble Oil. The principal product will be methyl isobutyl ketone. Production is expected to begin mid-1962.

Synthetic resins plant for Venezuela

Empresa Adhesivos y Gomas de Venezuela are to build a plant for the production of synthetic resins at El Pinonal in the Maracay region of Venezuela. Adhesivos y Gomas already produce resins under U.S. and Mexican licence.

Big benzoic acid plant for U.S.

Heyden Newport Chemical Corporation have opened what is stated to be the biggest benzoic acid plant—its capacity is 12 million lb.—at Garfield, New Jersey. The plant will be operated by the Corporation's Heyden Chemical Division.

Dutch manufacture of ammonium nitrate

Société Belge de l'Azote et des Produits Chimiques du Marly de Liége have a new plant under construction, commissioned by the Dutch concern the N.V. Mij. tot. Exploitatie van Kooksoven-Gassen. The layout being installed is intended for the production and concentration of solutions of ammonium nitrate, under atmospheric pressure. This new plant will have a daily output of 285 tonnes of ammonium nitrate.

Long range forecasts for Japanese chemicals

The Ministry of National Trade and Industry of Japan has issued the following long range forecasts for Japanese chemical demands. The Government policy will aim at avoiding the establishment of too many chemical centres.

	1965	1970
	'000 tonnes	*'000 tonnes*
Petrochemicals		
Ethylene	609	1,515
Propylene	396	906
Butadiene	117	166
Styrene	118	218
Ethylene oxide	67	94
Higher alcohols	50	100
Alkyl benzene	68	96
Synthetic resins		
Vinyl chloride	520	700
Polythene	238	544
Polystyrene	70	155
Polypropylene	75	233
Phenol resin	119	250
Urea resin	237	343
Melamine resin	38	70
Others	143	270
Synthetic organics		
Benzene	369	635
Toluene	196	280
Xylene	109	172
Synthetic phenol	95	160
Phthalic anhydride	103	143

Montecatini in India

It is reported that Montecatini have offered technical and financial co-operation for four industrial schemes in India involving the production of polypropylene resin, explosives, formaldehyde, and polystyrene.

Monsanto acrylic fibre plant for Israel ?

Agreement has been reached in principle on the setting up of an acrylic fibre plant in Israel by Monsanto Chemical Co., U.S. A 1,000 tons/year factory costing between £700,000 and £1 million is envisaged, and some 80% of output would be exported in the form of yarn or cloth.

Rise in U.S. chemical investment expected

Some $470 million will be spent by the U.S. chemicals and allied products industry over the last quarter of 1961, according to figures issued by the U.S. Office of Business Economics. This compares with an estimated $420 million spent over the third quarter of the year and $460 million for the final quarter of last year. It is now estimated by this Government department that a total of $1,650 million will be spent by the chemical industry for new plant and equipment over the whole of the year, compared with $1,600 million in 1960 and $1,230 million in the previous year.

C.S.I.R.O. STUDIES PROCESS TO SEPARATE BERYL FROM FELSPAR

Bubble pick-up technique employed

AMONG some of the more important developments arising from research being carried out in the laboratories of the Commonwealth Scientific and Industrial Research Organisation (annual report, 1960-1961) is the investigation of a technique for the separation of beryl from felspar.

The basic source of supply for beryllium, which is assuming increasing importance in the nuclear energy field, is beryl, a comparatively rare mineral. Following earlier work carried out for North West Tantalum N.L. on the flotation of beryl from a Western Australian pegmatite, a more fundamental investigation has been sponsored by that company and Consolidated Zinc Pty. Ltd.

By using a 'bubble-pickup' technique, it has been found that beryl responds to alkyl sulphonates, sulphates and carboxylates, but most readily to the sulphonates. Response is greatest in acid solutions. Mixed albite-microline felspar, which must be left unfloated, did not respond to the sulphonate collectors, except in the presence of certain activating ions.

Sodium flouride is a beryl depressant when alkyl sulphonate collectors are used. This system is being studied at the present time. The conditions under which iron-activated felspar is depressed by sodium fluoride will also be investigated.

It is hoped that contamination of these studies will lead to a better understanding of the conditions necessary for satisfactory concentration of beryl ores.

Australian Cement Ltd. have large reserves of cement rock containing over 80% of calcium carbonate which can be used directly in their plant. In addition, however, there are large quantities of lower grade material beneath the high grade rock. The company has financed an investigation into the concentration of this lower grade material by flotation.

Separation can be achieved either by floating the limestone from the silica or *vice versa*. Since there is less silica the latter method is preferred, although the cationic flotation reagents necessary have a higher unit cost. Methods by which reagent costs may be reduced to a satisfactory level have been evolved, and it has been shown that there is a possibility of controlling the flotation separation process automatically. Examples are given of the results obtained.

$CaCO_3$ in raw material	$CaCO_3$ in conc. product	Recovery of $CaCO_3$
40%	83%	86%
60%	87%	88%
70%	90%	91%

Should it become necessary, it would be possible to install a full-scale flotation plant to use the large reserves of low-grade cement rock.

The composition of light tar from the Morwell plant of the Gas and Fuel Corp. of Victoria is being investigated to determine the amounts and identities of the companies present, in order to show how they differ from those present in black coal tar and to estimate the potential economic value of the tar. The tar has been separated into a number of fractions and the individual components present in the fractions have been further separated and identified by gas chromatography. In the lower boiling part of the tar, over 180 compounds of six main types have been found and about 20 of these may be of economic importance in the organic chemicals industry. Work on the higher boiling part of the tar is in progress.

Laporte chairman visits Munich subsidiary

Mr. Patrick O'Brien, chairman of Laporte Industries Ltd., and Mrs. O'Brien, being greeted at Munich Airport on a visit to the Elektrochemische Werke München, A.G., by Dr. Jakob Strobl, of E.W.M. (See 'Project News')

Soviet chemical output to increase 17-fold by 1980

A SEVENTEEN-FOLD increase in chemical industry output by 1980, with synthetic rubber and plastics to be increased 60 times, synthetic fibres 15 times and chemical fertilisers 10 times, is among the ambitious aims of the U.S.S.R. set out in the 20-year economic plan presented by Mr. Kruschev to the Soviet Communist Party's 22nd Congress. Overall industrial capital investment during this time is placed at about £800,000 m. to boost the gross national product to five times its present level with industry increasing at least sixfold.

Against a 1955 chemical output valued at 3,700 million roubles in 1955, anticipated output for 1961 is 7,600 million roubles—a 105% increase over the six years. Output of (natural) gas, 10,400 million cu. m. in 1955 is anticipated to show an increase of 475% at 59,500 million cu. m. for 1961. The output of plastics and man-made fibres has been more than doubled in the six years.

For the first nine months of 1961, the chemical industry's gross output is placed at 114% of the same period of 1960. Other output figures for the nine months include: sulphuric acid, 4.2 million tons (105% increase); artificial and synthetic fibres, 183,000 tons (120%); chemical equipment, 177 million roubles (109%); oil, 122 million tons (113%); gas 42,800 million cu. m. (128%); vegetable oil, from State resources, 860,000 tons (110%); soap, 1.1 million tons (101%).

New joint company for fuel cell research

A NEW company has been formed—Energy Conversion Ltd.—to promote research into the development of fuel cells. Three leading U.K. companies, British Petroleum, British Ropes and Guest, Keen and Nettlefolds, with combined assets of over £700 million, have joined with the National Research Development Corp. in the project.

The new company, incorporated on 25 October, and in which all four parties have an equal share, has an authorised capital of £200,000. Registered office will be at Britannic House, Finsbury Circus, London E.C.2, and the board will comprise: Dr. F. E. King, F.R.S., and Mr. T. G. McLintock of B.P.; Mr. H. Smith and Mr. J. R. K. Buckley, of British Ropes; Mr. R. G. Lewis and Dr. T. Emmerson, of G.K.N. Group; and Mr. J. C. Duckworth and Mr. H. J. Crawley, of the N.R.D.C.

Research into fuel cells has been carried out in this country with the support of the N.R.D.C. over a number of years. Although working versions have been demonstrated, none have yet been produced commercially.

Probably the most advanced work is that now being carried out jointly by the United Aircraft Corporation of East Hartford, Connecticut, and the Leesona Corporation, of Providence, Rhode Island. The N.R.D.C. has reciprocal arrangements with these companies for the licensing of patents and interchange of technical information and it is intended that the benefit of these arrangements will now be transferred to Energy Conversion.

PEOPLE in the news

● **Mr. G. E. J. Reynolds** has been appointed research manager of Vinyl Products Ltd., Carshalton, Surrey. He joined the company in 1950 and was appointed assistant research manager in 1957; although he has devoted most of his time to polymer research his experience also covers development and technical service aspects of the company's interests.

● **Dr. E. M. Glaser, M.C.,** has been appointed director of research at Evans Medical Ltd., Speke, Liverpool. Since the war, Dr. Glaser has worked at the Department of Experimental Medicine in Cambridge, was Professor of Physiology at University of Malaya in Singapore, and a reader at London University.

● **Dr. Arthur D. Ketley,** London born and educated research chemist, and **Dr. Nelson Marans** have become the first recipients of the new title of research associate within the Research Division of W. R. Grace and Co., U.S. Dr. Ketley has conducted research in the field of polymer synthesis since joining Grace three years ago; Dr. Marans specialises in radiation chemistry.

● **Mr. S. T. Ferris,** general sales manager of Ilford Ltd., has been appointed a director with effect from 26 October.

● **Mr. R. L. H. Damerham,** technical director of Durapipe and Fittings Ltd., has been elected chairman of the new Thermoplastic Pipe and Fittings Group of the British Plastics Federation.

● **Mr. D. C. B. Chandler** has been appointed U.K. sales manager of Durapipe and Fittings Ltd., thermoplastic pipe and fittings manufacturers. He joined the company's sales force in 1956.

● **Mr. P. C. Chaumeton,** deputy chairman of Erinoid Ltd., retired on 1 November after 45 years in the plastics and textile industries. After 10 years with the British Cellulose Acetate and Chemical Manufacturing Co. (now, British Celanese Ltd.) he joined Lansil Ltd. in 1928, first as works manager and then as commercial manager. He joined Erinoid in 1944, as director concerned mainly with technical operations. He was also, 1950-59, managing director of Styrene Products Ltd., the polystyrene manufacturing company formed by Erinoid and Petrochemicals Ltd. During the period 1948 to 1959 he was also a director of Nelsons Acetate, Utilex and Petrochemicals. He was appointed deputy chairman of Erinoid in 1959.

● **Dr. A. W. Baldwin,** who was lately an associate research manager of I.C.I. Dyestuffs Division, has been co-opted as a governor of the J. A. Radley Research Institute, Reading.

● **Mr. T. E. Peacock** and **Mr. A. C. Nicholson,** joint managing directors of Laporte Acids Ltd., have been appointed directors of James Wilkinson and Son Ltd., the Laporte Group company specialising in aqueous hydrofluoric acid and inorganic fluorine compounds. Mr. Nicholson has also been appointed a director of the Sheffield Chemical Co. Ltd., the other Laporte manufacturing company in Yorkshire. **Mr. J. Hill,** who has been appointed secretary of Laporte Acids, James Wilkinson and Sheffield, is also accountancy manager of those companies.

● Board changes have been made by Associated Chemical Companies Ltd. as follows: **Mr. C. L. Evans** relinquishes his position as a managing director of A.C.C. (Brotherton) Ltd. to become managing director, production and technical, of A.C.C. (Fertilisers) Ltd.; **Mr. T. Williams** has been appointed managing director, commercial, of A.C.C. (Fertilisers) and **Mr. F. Nicoll** has been appointed production director of A.C.C. (Brotherton).

● **Mr. G. B. R. Feilden, F.R.S.,** has resigned his present directorships in order to join the board of Davy-Ashmore Ltd. as technical director on 4 December. He will be based at the group's London headquarters at 15 Portland Place, W.1, and will also be joining the boards of the principal operating companies of the Davy-Ashmore group.

● **Dr. David T. Lewis,** Government Chemist, **Mrs. Lewis,** and **Dr. J. Longwell,** Deputy Government Chemist, received guests at the recent annual dinner and dance of the Laboratory of the Government Chemist that was held at the Empress Banqueting Hall, London. Our picture shows them receiving Sir Harry and Lady Jephcott. Sir Harry, chairman of Glaxo Laboratories Ltd., recently retired as chairman of the Council for Scientific and Industrial Research. He started his chemical career at the Laboratory of the Government Chemist.

● **Dr. John Vernon Dunworth, C.B.E.,** has been appointed deputy director, National Physical Laboratory, D.S.I.R., in succession to **Dr. G. Macfarlane,** who is shortly to take up the appointment of director of the Royal Radar Establishment, Malvern. Dr. Dunworth is at present deputy director of the Atomic Energy Establishment, Winfrith. The date on which he will take up his appointment will be announced later.

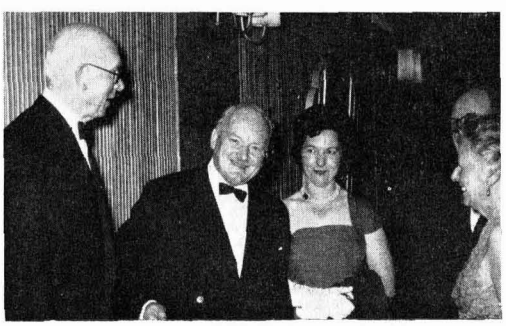
● **Mr. F. Brian Holmes,** chairman and managing director of W. C. Holmes and Co. Ltd., retired as managing director on 31 October. He joined the company in 1922 and was appointed to the board in 1923, becoming joint managing director with Mr. D. M. Henshaw in 1941, and chairman of the company on Mr. Henshaw's death in 1953. Mr. Holmes will retain his position as chairman of the company, of the holding company, B.H.D. Engineers Ltd., and of those member companies of which he is at present chairman. He is succeeded as managing director by **Mr. A. J. M. Henshaw,** who joined the company in 1946, was appointed to the board of directors in 1953 and became assistant managing director in 1960. **Dr. W. T. Cosby** was appointed to the board on 1 November. Dr. Cosby joined the company in 1950 and became manager of the Gas Cleaning Division in 1957.

● **Professor K. G. Denbigh,** Professor of Chemical Engineering Science at Imperial College, has been appointed to the Courtaulds Chair of Chemical Engineering at the same college.

● The title of Professor of Organic Chemistry, London University, has been conferred on **Dr. L. N. Owen** in respect of his post at Imperial College.

● **Dr. C. A. Vernon, D.Sc.,** has been appointed reader in organic chemistry in London University in respect of his post at University College.

● **Mr. Albert L. Nickerson** has been appointed chairman of Socony Mobil Oil Co. Inc. in succession to **Mr. Fred W. Bartlett,** who has retired as a director and chairman. **Mr. Herbert Willets** has been elected president, and **Mr. Fred H. Moore** a director and executive vice-president.



Dr. David T. Lewis, Government Chemist, and Mrs. Lewis (centre) and Dr. J. Longwell (background) receive Sir Harry and Lady Jephcott at the recent annual dinner-dance of the Laboratory of the Government Chemist

AUTOMATIC DRUM HANDLING FOR I.C.I. BILLINGHAM DIVISION

DRUM handling and spraying equipment designed to effect an automatic marshalling of drums from the last drum-making machine to the stage where the finished drum, ready for filling, leaves the installation has been fitted by I.C.I. Billingham Division at their drum works.

Drum marshalling gear and automatic handling equipment up to the stage where the drums enter a Ballard oil fired drying oven after spraying has been supplied by the Hymatic Engineering Co. Ltd., Redditch, Worcs. A double spraying booth and manually operated spraying equipment were supplied by Alfred Bullows Ltd., Walsall, Staffs.

After fabrication, the drums run along a floor level conveyor before being automatically sensed and fed alternately to one of two drum spraying positions. Both drum lines are identical in operation and as the drums are pushed off the conveyor they roll on to the lifting platform of an automatic lift unit. When the drum is in position, the pusher gear retracts ready to operate again as the next drum is selected for spraying on that line.

When the drums are awaiting spraying they are metered automatically on to a rolling frame. The metering device holds the drums on the end of a set of inclined rails until the previously sprayed drum has been ejected. This ejection is achieved by the rolling frame rotating itself upwards, about its one end, through 90° and then depositing the sprayed drum on to a drying oven conveyor.

Output of drums through this equipment is over 1,000/day when both booths are in operation at the same time. These drums would be a maximum of 22 in. diameter by 36 ft. long. When smaller drums are handled, with a diameter of 14 in. by 18 in. long the output increases to 1,600/day.

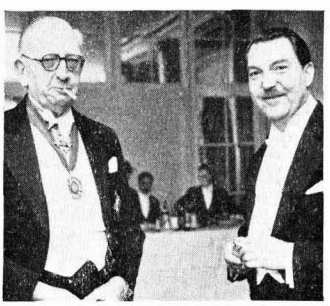
Since the equipment has been installed, the finish on the drums has been consistently better and the system also lends itself to applying different colours inside the drum to the outside, or different end spraying. The constant rolling speed also helps to ensure a good finish.

3-Continent guide to chemicals firms

A GUIDE describing briefly the 500 leading chemical and petroleum firms of Asia, Africa and Australasia has been published by Noyes Development Corp., 38 East 57th Street, New York 22, New York, at $12. Information on affiliations, subsidiaries and participation in specific projects with other firms are given.

The guide is the third of a series on the chemical industry outside the U.S.

London R.I.C.'s annual dinner



At the annual dinner-dance, London Section, R.I.C., when Mr. A. J. Turnbull, vice-chairman, proposed 'The Institute', and Sir William Slater, F.R.S., responded. Mr. P. A. Raine, chairman, proposed 'The Guests' and Dr. A. Clow, head, B.B.C. Science Unit responded

Left: Sir William Slater with Mr. P. F. Corbett, section hon. treasurer

Below: Mr. T. M. D. Ball (Distillers Chemical Division) dances with Miss Audrey Chiles. Mr. and Mrs. Raine (centre) receive Dr. and Mrs. Clow

Commercial News

Manbré and Garton

Manbré and Garton, starch and glucose refiners, are to make an offer for the ordinary shares of James Laing, Son and Co., manufacturers of dextrines. Total value of the offer is about £455,000. The directors of James Laing unanimously support the terms.

Monsanto Chemical

Monsanto Chemical Co., St. Louis, report for a third quarter net profit equal to 56 cents/share (57 cents). Over the first nine months of 1961 net profit per share totalled 1.83 dollars/share ($1.98).

Parke, Davis & Co.

Parke Davis and Co., U.S., announce a third quarter net profit per share of 31 cents (50 cents). Over the first nine months of this year, net profit per share totalled 94 cents ($1.52).

U.S. Borax and Chemical

U.S. operating company of Borax Holdings Ltd., United States Borax and Chemical Corporation, report sales in the fourth quarter of the year ended 30 September, totalled $17.8 million ($15.4 million) with net income of $1,814,000, a rise of 19% on the final three months of 1960. As a result earnings for the full year totalled $6,387,000 (a fall of $500,000), or $1.37 a share, against $1.50.

The year's gross profit improved by more than $1,700,000. The reason for the decline in the net showing is chiefly the substantial rise in consumer goods advertising outlay. It is reported that the American recovery has led to a better demand for industrial products. Exports have improved after a setback in the third quarter and potash prices are up again.

INCREASE OF CAPITAL

R. CRUICKSHANKS LTD., chemical manufacturers, etc., Camden Works, Camden Street, Birmingham 1. Increased by £71,500 beyond the registered capital of £250,000.

Lightnin Mixers form French subsidiary

LIGHTNIN MIXERS LTD. of Poynton, Cheshire, specialists in fluid mixing and agitation machinery, have celebrated their first birthday as a company by setting up a French subsidiary. Known as Lightnin Mixers (France) S.A., it has headquarters in Paris and will be responsible for sales of the complete range of Lightnin Mixers equipment throughout France.

Mr. W. Stockdale, Chairman of Lightnin Mixers Ltd., who returned from France recently after completing arrangements for the setting up of the Paris company, reports that about 70% of the firm's current output is for export.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. 10-ton quantities, 80% tech. in bulk, £77 per ton; in casks, £90 per ton; 80% pure in bulk, £83; in casks, £94; glacial, 98/100% in bulk, £93; in drums, £100.

Acetic Anhydride. Ton lots d/d, £128.

Alum. Ground, f.o.r., about £25.
MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £37 10s.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. MAP., £106 per ton; DAP, £100 10s, per ton, d/d.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s 8d d/d to 6s 2d; golden, 3s 11d d/d per lb. to 5s 4d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 4-ton lots or more, bag packing, £37 10s. per ton.

Barium Chloride. 2-ton lots, £45.

Barium Sulphate [Dry Blanc Fixe]. Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian bags, c.p. Tech. anhydrous, £60 gran., £47 10s; crystal £51; powder, £52; extra fine powder, £53; BP, gran, £56 10s; crystal, £60; powder, £61; extra fine powder, £62. £1 cheaper in 5-ply paper bags.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78 10s; crystal, £87 10s; powder, £85 extra fine powder, £87; BP gran., £91 10s; crystal, £99 10s; powder, £97; extra fine powder, £99. £1 cheaper in paper bags.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. In 1-ton lots, per lb., 2s 2¾d.

Chromium Sulphate, Basic. Powder, d/d, 1 ton lots £77.

Citric Acid—Granular. In kegs, 1-4 cwt. lots, per cwt., £9 6s; 5-19 cwt. lots, per cwt., £9 2s; 1-ton lots, per cwt., £9 1s; packed in paper bags, 1-4 cwt. lots, per cwt., £8 19s; 5-19 cwt. lots, per cwt., £8 15s; 1-ton lots, per cwt., £8 14s.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 3s 6d.

Copper Sulphate. £78 per ton less 2% f.o.b. Liverpool.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £10 2s. Refined technical grade industrial, 5s per cwt. less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £115; 35% wt., d/d, £138.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodine. Resublimed BP, under 1 cwt., per lb., 11s 6d; for 1-cwt. lots, per lb., 11s 3d.

Iodoform. Under 1 cwt., per lb., 24s 1d; for 1-cwt. lots, per lb., 23s 5d; crystals, 3s more.

Lactic Acid. Edible, d/d, 50% by wt., per lb., 16¾d; 80% by wt., 26½d; C.P., 50% by wt., per lb., 14½d; 80% by wt., 23d; dark tech., ex-works, 44% by wt., per lb. 9d. 1-ton lots, loaned containers.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Bases prices: 15-cwt. drum lots, Genuine dry red, £97 per ton; orange lead, £109 per ton; Ground in oil: red, £119 orange, £131.

Lead, White, Bases prices: in 5-cwt. drums, per ton for 2-ton lots, Dry English £110 5s; Ground in oil, £130 10s.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-cwt. drum lots, £99.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s; under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £19 7s 6d per ton.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £14 15s, ex-works.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, in 28-lb. parcels, 19s 6d; 5-cwt. lots, in 28-lb. parcels, 20s; 1-cwt. lots, in 28-lb. parcels, 20s 3d.

Mercury Sulphide, Red. Per lb. for 5-cwt. lots in 28-lb. parcels, £1 10s 6d; 1-cwt. lots, in 28-lb. parcels, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 56 lb. paper bags, c.p., about £125-£130.

Phosphoric Acid. TPA 1,700 ton lots, c.p., £103; BP (s.g. 1,750), ½-ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Gran., 1-ton lots, £131 16s. 8d.

Potassium Iodide. BP, under 1 cwt, per lb., 9s 0d., per lb. for 1-cwt. lots, 8s 9d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 2s 0½d; 3-cwt. lots, per lb., 1s 11¾d; 5-cwt. lots, per lb., 1s 11¼d; 1-ton lots, per lb., 1s 11d; 5-ton lots, per lb., 1s 10½d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £10 3s; 5-cwt. in 1-cwt. drums, per cwt., £10 5s; 1-cwt. lots, £10 14s.

Propylene Oxide. Bulk lots, d/d, £162.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. crums, c.p. station, in 5-ton lots, about £87 per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals 1-ton lots, £109 13s. 4d., anhydrous, 1-ton lots, £126. All lots delivered d/d.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 11s 3d; 56 lb. and over, 11s 0d.

Sodium Lactate. Edible, 70%, per ton, £150, d/d free drums, 1-ton lots.

Sodium Metaphosphate. Flaked, paper sacks, £136.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches, 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. 60/62%, spot, d/d, in drums in 1-ton lots, solid, £38 2s 6d; broken, £39 2s 6d. Flakes, £40 12s 6d, crystals, £29 10s.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £11 10s—£12 10s per ton; 140° Tw., arsenic free, £9; 140° Tw., arsenious, £8.

Tartaric Acid—Powder and Granular. Per cwt.: 10 cwt. or more, in kegs, 294s; in bags, 286s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £90 10s; green seal, £88 10s; red seal, £85 10s.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84;

5-10 tons, £82; 10 tons and up, £80; in 500-gal. tank wagons, £79. In bulk minimum 2,500 gal. £75 per ton.

Butyl Acetate BSS. 10-ton lots, £165.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £137 10s.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158 in 40-45 gal. drums, under 1 ton, £133; 1-5 tons, £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

***tert*-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £216; 45-gal. 1-4 drums, £222.

Diethyl Phthalate. In drums, 10 tons, per ton, £201; 45-gal. 1-4 drums, £207.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £194; 45-gal. 1-4 drums, £200.

Dioctyl Phthalate. In drums, 10 tons, d/d, per ton, £287; 45-gal. 1-4 drums, £293.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £137.

Ethyl Alcohol Fermentation grade (PBF 66 o.p.). Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500-10,000 p. gal. per p. gal., 4s 0¾d. D/d in 40/45-gal. drums, p.p.g. extra, 2d.
Absolute alcohol (74.5 o.p.), p.p.g. extra, 2d.

Methanol. Pure synthetic, d/d, £46.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

Methyl Ethyl Ketone. All d/d. in 40/45-gal. drums, under 1 ton, £143 10s; 1-5 tons, £138 10s; 5-10 tons, £136 10s; 10 tons and up, £143; in 400-gal. tank wagons, £134 10s.

Methyl *iso*Butyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl *iso*Butyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

***so*Propyl Acetate.** 10 tons, d/d, 45-gal. drums £132.

***iso*Propyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 6¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7d per lb.; ex-store, Manchester, London and Glasgow, 7¼d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 7¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8d per lb. Ex-store Manchester, London and Glasgow, 8¾d per lb ISAF: Ex-store Swansea, min. 3-ton lots in one delivery, 9¾d per lb., min. 1-ton lots and up to 3-tons in one delivery, 10d per lb. Ex-store Manchester, London and Glasgow, 10¾d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb. 1s 4½d to 1s 7d; dark, d/d, per lb., 1s 0½d to 1s 4d.

Lithopone. 30%, about £57 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

Vermilion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, d/d bulk, per lb. 1s 2½d; 40/50-gal. ret. drums extra, per lb., ½d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.
MANCHESTER: Per gal., 1s 3d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 7s 9d D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 5s heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 4s. Drums extra ; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 20s about.

Toluol. Pure, per gal., 5s ; 90's 2,000 gal. in bulk, per gal., 4s 9d.
MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 4d-5s 6d.

INTERMEDIATES AND DYES

(Prices Normal)

***m*-Cresol** 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.

***o*-Cresol** 30/31°C. D/d, per lb., 1s.

***p*-Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

Dinitrobenzene. 88/99°C., per lb., 2s 1d.

Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

***p*-Nitraniline.** Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 11d.

Nitronaphthalene. Per lb., 2s 5½d.

***o*-Toluidine.** 8-10 cwt. drums (drums extra), per lb., 1s 11d.

***p*-Toluidine.** In casks, per lb., 6s 1d.

Dimethylariline. Drums extra, c.p., per lb. 3s 2d.

Market Reports

PRICE MOVEMENT IN METAL COMPOUNDS

LONDON Steady trading conditions have again been reported with home industrial outlets calling for good quantities against contracts. Overseas demand has been maintained on a satisfactory scale.

Price movements in general chemicals during the past week have been few, the only changes of note being in the non-ferrous metal compounds. The price of dry white lead has been reduced by 40s/ton, while red lead and litharge are 45s/ton lower. Zinc oxide quotations are also reduced as from 27 October, the white seal now being £90 10s, green seal £88 10s and red seal £85 10s/ton. Copper sulphate is currently quoted at £78/ton.

There has been little of fresh interest to report in fertiliser materials. Among the coal tar products there has been a steady call for refined tar and pitch on home and export account, and a fair business is passing for most other products.

SCOTLAND Although perhaps not quite as busy as last week there has still been a reasonable volume of movement in industrial chemicals to most sections of industry. Demands have been varied; in particular, acids, hypos and caustics have featured well. Once again the off-take against contracts has been fully maintained.

In agricultural chemicals there is no change to report with the position still seasonably quiet.

MANCHESTER New business in chemical and allied products on the Manchester market during the past week has been on a fair scale, but mainly for prompt or early delivery. Most contract consumers are taking good supplies, though there is still room for improvement in the demand from the cotton textile industries.

Most of the potash and soda compounds are going steadily into consumption, as are also borax and boric acid, hydrogen peroxide and pure glycerine, and a fair demand for bleaching powder, white arsenic, formaldehyde and the barium compounds is reported. Prices generally have been held at about recent levels.

N.Z. subsidiary for Roussel Laboratories

FORMATION of a separate company in New Zealand to deal with their growing business there is announced by Roussel Laboratories Ltd. Roussel (New Zealand) Ltd. has been incorporated in Auckland as a wholly owned subsidiary to sell mainly pharmaceutical products.

Mr. J. C. Roussel is chairman of the new company. Other directors include Mr. J. G. Machizaud, managing director of Roussel Laboratories, and Mr. J. T. Hook whose work locally has contributed to the successful development and establishment of Roussel in New Zealand.

1962 Buyers guide available

The 1962 Buyers Guide is available to regular subscribers of *Chemical Week*. It lists 6,000 chemicals with their prime sources in the U.S., together with manufacturers and suppliers of equipment. A company directory and a list of trade names are also included.

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 6 December

Silicone compounds. Bradford Dyers' Association Ltd. **884 141**

Surface-active compounds. Council for Scientific & Industrial Research, and Glovers (Chemicals) Ltd. **884 181**

Pyrazoline derivatives and their use as whitening agents. Unilever Ltd. **883 826**

Polymers and their preparation. Union Carbide Corporation. **883 939**

Preparation of copolymers. Polyplastic. [Addition to 791 453.] **883 791**

Polyesters containing phosphorus and process for their manufacture. Farbwerke Hoechst AG. **883 754**

Hydrocarbon conversion process. Hercules Powder Co. **883 794**

Polyhydrophenanthrene compounds and process for their manufacture. Ciba Ltd. **883 796**

Bis-ketenes and method of preparation. Goodrich Co., B. F. **883 943**

Acrylic cation-exchange resins. Rohm & Haas Co. **884 205**

Process for the purification of waste gases containing free oxygen and the oxides of nitrogen. Engelhard Industries, Inc. **883 944**

4-alkoxymetanilamides and compositions containing them. Du Pont de Nemours & Co., E. I. **884 206**

Oxidation of hydrogen cyanide. Rohm & Haas GmbH. **883 799**

Carbon-containing organo-silicon resin coating compositions. Ekco Products Co. **884 208**

Cyclosteroids. Ciba Ltd. **883 761**

Stabilisation of silica. Pittsburgh Plate Glass Co. [Addition to 745 890.] **883 863**

Acylated alkylene polyamines and process for their manufacture. Ciba Ltd. **883 724**

Resinous polycarbonates. General Electric Co. **883 619**

Substituted phenolated stabiliser composition. Argus Chemical Corporation. [Addition to 752 053.] **884 145**

Vinyl-phenyl boronic compounds and intermediates therefor. American Cyanamid Co. **883 622**

Method of vulcanising substantially amorphous sulphochlorinated copolymers of alpha-olefins. Montecatini. **883 763**

Graft copolymers. Centre National de la Recherche Scientifique. **883 728**

Mono-N-hydroxymethylpiperazine acid addition salts. Hommel, AG. **883 729**

Alginic compounds. Alginate Industries Ltd., Merton, R. R., and Blood, C. T. **883 765**

Preparation of carbon tetrafluoride. Du Pont de Nemours & Co., E. I. **884 148**

Propylene polymerisation. Imperial Chemical Industries Ltd. [Addition to 877 050.] **883 957**

Derivatives of β-hydroxy-butyric acid amide. Farbwerke Hoechst AG. **884 150**

Pyrazolo-pyrimidines substituted in the pyrazole nucleus, and process for their manufacture. Ciba Ltd. **884 151**

Water-insoluble benzene-mono-azo-benzene-dyestuffs and process for their manufacture. Ciba Ltd. **883 627**

Production of oxazolidone products. Jefferson Chemical Co. Inc. **883 994**

Process for the preparation of 1:4-benzdioxane derivatives. Thomae GmbH, Karl. **884 098**

Rubbery copolymers. Esso Research & Engineering Co. **883 731**

Glycidyl ethers of polyhydric phenols. Koppers Co., Inc. **884 152**

Polyurethane compositions. Imperial Chemical Industries Ltd. **884 153**

Acylaminotriazole compounds and herbicidal compositions incorporating same. Amchen Products, Inc. **883 732**

Manufacture of quaternary organic phosphorous compounds. Farbwerke Hoechst AG. **883 834**

Steroids and the manufacture thereof. Upjohn Co. **883 734**

Method of preparing highly dispersed water-insoluble vat dyestuffs and phthalocyanines. Valik, J., and Slechta, J. **884 154**

Process for the preparation of fatty acid-bis (hydroxyalkyl) amides. Colgate-Palmolive Co. **883 733**

Preparation of sulphur halogen compounds. Imperial Chemical Industries Ltd. **883 673**

18-dimethylamino steroids and intermediates therefor. Searle & Co., G. D. **884 176**

3-(3-amino-1-alkenyl)-indoles. Upjohn Co. **883 599**

Phthalocyanine colouring matters. Imperial Chemical Industries Ltd. **883 807**

Glycidyl polyethers. Westinghouse Electric Corporation. **883 748**

Production of polymers. British Petroleum Co. Ltd., Hambling, J. K., and Yeo, A. A. **883 767**

Stabilisation of monomeric esters of acrylic acids. Newby, H., (Chemische Werke Hüls AG.) **883 749**

Melamine preparation. Pittsburgh Coke & Chemical Co. **884 038**

Methods of amide synthesis. American Cyanamid Co. **884 016**

3β:16α:17α-trihydroxy steroids. British Drug Houses Ltd. **883 769**

Preparing liquid polyolefins. Petro-Tex Chemical Corporation. **884 159**

Method of manufacturing stable polymerised emulsion. Kurashiki Rayon Kabushiki Kaisha. **883 750**

Surface treatment of silicon carbide. Westinghouse Electric Corporation. **883 603**

Pregnene derivatives. Searle & Co., G. D. **884 177**

Perfluorocarbon interpolymers and their preparation. Du Pont de Nemours & Co., E. I. **884 161**

Continuous process for the thermal decomposition of a gaseous or vaporous hydrocarbon to coke and hydrogen. Esso Research & Engineering Co. **883 751**

Process for inhibiting the polymerisation of vinyl-substituted nitrogen-containing heterocyclic compounds. Sicedison S.p.A. **883 809**

Process for inhibiting the polymerisation of vinyl-substituted nitrogen-containing heterocyclic compounds. Sicedison S.p.A. **883 808**

Undecatrienones and a process for the manufacture and conversion thereof. Hoffman-La Roche & Co., AG, F. **884 026**

Sulphurised vat dyestuffs in solubilised form. Holliday & Co. Ltd., L. B. **884 027**

Linear addition polymers of N-(β-trichloro-α-hydroxy-ethyl)-amides. Ciba Ltd. **884 028**

Method of producing L-malic acid by fermentation. Kyowa Hakko Kogyo Co. Ltd. **884 029**

Process for the production of a water-emulsifiable epoxy-resin binder. Shell Internationale Research Maatschappij N.V. **884 031**

Carbon black manufacture. Columbian Carbon Co. **884 032**

Curing of chloroprene rubber. Robinson Bros. Ltd. **883 981**

Hydrazinium salts, their production and pharmaceutical compositions containing them. Grace & Co., W. R. **883 741**

Process for the preparation of epoxide resins. Henkel & Cie GmbH. **884 033**

Thionophosphonic acid fluoramides. Farbenfabriken Bayer AG. **883 982**

Preparation of quinacridone pigments. Allied Chemical Corporation. **884 044**

Detergent compositions. Bataafse Petroleum Maatschappij N.V. [Addition to 818 369.] **884 034**

Polymerisation of ethylene. Hercules Powder Co. [Divided out of 849 855.] **883 810**

Photopolymerisation. General Aniline & Film Corporation. **883 811**

Aminoalkylmorpholine derivatives. Searle & Co., G. D. **883 745**

Preparation of polyhydric alcohols. Atlas Powder Co. **883 812**

Steroid derivatives. Searle & Co., G. D. **883 611**

Manufacture of halogen substituted aromatic nitriles. Shell Research Ltd. [Addition to 861 899.] **884 166**

Process for purifying acetaldehyde. Gulf Research & Development Co. **884 088**

Polymeric composition and containers formed therefrom. Phillips Petroleum Co. **884 050**

1-phenyl-3,3-dimethyl-spiro [2¹H-1¹-benzopyran)-2,2¹-indoline] and its derivatives. National Cash Register Co. **883 803**

Diamino-quinones. Farbenfabriken Bayer AG. **884 167**

Steroid. Searle & Co., G. D. **883 615**

Purification of phenol. Distillers Co. Ltd. **883 746**

Process for the production of 1,3,5-triisopropylbenzene-2,4-diisocyanates. Farbenfabriken Bayer AG. **883 650**

Process for the removal of free oxygen and the catalytic reduction of oxides of nitrogen in waste gases. Engelhard Industries, Inc. [Divided out of 883 944.] **883 945**

Process for effecting selective reduction reactions of gases containing oxides and free oxygen. Engelhard Industries, Inc. [Divided out of 883 944.] **883 946**

Process for the thermal oxidative degradation and simultaneous purification of linear polyolefins. Badische Anilin- & Soda-Fabrik AG. **883 804**

Process for the production of eupolyoxymethylenes. Deutsche Gold-und Silber-Scheideanstalt. **883 805**

Production of acylated polyhydroxyamino ethers. Atlas Powder Co. [Divided out of 871 525.] **883 861**

Flame-resistant cross-linked polyethylene compositions. Anaconda Wire & Cable Co. **883 806**

Process for the preparation of p-monochloromethyl-benzoic acid. Chemische Werke Witten GmbH. **884 114**

Process for controlling the molecular weight of vinylidene chloride polymers. Dow Chemical Co. **883 850**

Process for the polymerisation of butadiene. Shell Internationale Research Maatschappij N.V. **884 071**

Substituted amide. Lepetit S.p.A. **884 072**

Manufacture of polyolefins. Shell Research Ltd. **884 116**

Tetrahydro-dioxopyridazine and process for its manufacture. Ciba Ltd. [Divided out of 880 015.] **884 120**

DIARY DATES

MONDAY 6 NOVEMBER

R.I.C.—London: Woolwich Polytechnic, Thomas Street, S.E.18, 7.30 p.m. 'Ion-exchange resins' by Prof. C. W. Davies.

S.C.I.—London: 14, Belgrave Sq., S.W.1, 6.30 p.m. 'U.K.A.E.A. & its relations with industry' by Dr. N. Goodway.

Soc. Instrument Tech.—London: 20, Queen Anne St., W.1. 'Semiconductor diodes & rectifiers in control engineering' by P. R. Wyman, & 'The transistor in control engineering' by Dr. G. D. Bergman.

TUESDAY 7 NOVEMBER

S.C.I.—Falkirk: Lea Park Rooms, 7.30 p.m. 'Super refractories in the chemical industry' by M. O. Parker.

S.C.I.—London: 14, Belgrave Sq., S.W.1, 10.30 a.m. 'Cultivations and their effects on the chemistry of soil' by Dr. P. C. J. Payne, B. M. Dougall, J. C. Hawkins, Dr. J. M. Currie & Dr. N. H. Pizer.

S.C.I.—London: 14, Belgrave Sq., S.W.1, 6 p.m. 'Pyrotechnics' by R. G. Hall.

WEDNESDAY 8 NOVEMBER

S.C.I.—Edinburgh: Heriot-Watt College, Chambers St., 7.30 p.m. 'Some principles & practices in corrosion protection' by Dr. T. P. Hoar.

S.C.I.—London: 14, Belgrave Sq., S.W.1, 6.15 p.m. 'Crystallisation of sucrose' by Dr. H. E. C. Powers.

THURSDAY 9 NOVEMBER

R.I.C.—Croydon: Croydon Technical College, Fairfield, 7.30 p.m. 'Modern colour photographic process' by R. B. Collins.

R.S.—London: Burlington House, Piccadilly, W.1, 4.30 p.m. The Bakerian lecture, 'Sound generated aerodynamically' by M. J. Lighthill.

R.S.A.—London: John Adam St., W.C.2, 5.15 p.m. 'New developments in the use of solar energy' by Harold Heywood.

S.C.I.—Aberdeen: Marischal College. 'The discovery of new drugs' by Dr. A. F. Crowther.

FRIDAY 10 NOVEMBER

R.I.C.—Cambridge: University Chemical Lab., Lensfield Rd., 8.30 p.m. 'Physical methods in archaeological research' by E. T. Hall.

TRADE NOTES

Epoxy resins price cuts

Further reductions in the prices of their epoxy resins are announced by CIBA (A.R.L.) Ltd. as a result of continued expansion in production. The price reductions affect most products of the Araldite range. Full details are available from the company at Duxford, Cambridge.

Polyethylene glycol

Among the new entries in the B.D.H. chemicals catalogue are a range of polyethylene glycols (200, 600, 1000, 1500, 4000 and 6000). Polyethylene glycol 400 is also available, but it has been listed for some years. Polyethylene glycols have been used extensively in pharmaceutical and cosmetics preparations, in the rubber, petroleum and textile industries and in many other fields.

Water deionisers

Deionisers ranging from portable laboratory units to large plants are listed and described in English, French and German in a new 25-page catalogue published by Elga Products Ltd., Lane End, Bucks.

New latex for dipping

A new carboxylic modified butadiene acrylonitrile latex, to be called Hycar 1700/E1, is now being produced by British Geon Ltd., Devonshire House, Piccadilly, London W.1. The latex has been specially developed for the manufacture of rubber articles, such as gloves, by coagulant dipping. Articles made from the new latex are claimed to be exceptionally resistant to hydrocarbon oils and solvents, to detergents and to oxidative degradation.

Full information is given in Hycar Information Sheet No. H110, which besides describing the physical properties of and compounding recommendations for the new latex, also outlines methods for manufacturing both supported and unsupported products.

Chemical and process plant

Evaporators, filters, spray dryers, crystallisers and gas generators for chemical process work are among items described in a booklet 'Industrial furnaces and equipment,' issued by the Incandescent Heat Co. Ltd., Cornwall Road, Smethwick, Birmingham.

Thermofill liquid for instruments

An instrument grade organo-silicate liquid, Hyfil A, is being marketed by Hygrotherm Engineering Ltd., 414 Chiswick High Road, London W.4. It is described as a specially processed organo-silicate liquid which has excellent thermal stability, a wide liquid range and low vapour pressure, making it ideal as a thermofill liquid for thermostats and temperature-indicating instruments operated by fluid expansion. Maximum use temperature is 360°C. A data sheet giving the general properties and typical physical property data of Hyfil A is available from the company.

Terylene industrial hose

The handling of liquid carbon dioxide and other liquid gases; aircraft and rocket fuelling and chemical firefighting are among applications of Terylene reinforced industrial hose illustrated in a new booklet produced by I.C.I. Fibres Division and issued by Imperial Chemical House, Millbank, London S.W.1. Names and addresses of manufacturers of the hose are given at the back of the booklet.

Instruments from stock

The Cambridge Instrument Co. Ltd., 13 Grosvenor Place, London S.W.1, have published a series of leaflets detailing ranges of instruments, made at their Mechanical Thermometer Division and now available from stock. These include dial type thermometers with vapour-pressure and mercury-in-steel systems, temperature regulators, draught and pressure indicators and recorders, and humidity instruments.

Changes of name

Schwarzkopf Ltd., manufacturers of and dealers in chemicals, gases, etc., Norfolk House, Laurence Pountney Hill, London E.C.4, have changed their name to Corionol Ltd.

Pakolor Ltd., photographic chemical manufacturers, etc., 19 Bolton Street, London W.1, have changed their name to Pavelle Ltd.

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OFFICIAL APPOINTMENTS

COVENTRY CORPORATION
Chief Chemist

Within an expanding organisation employing at present over twenty chemical personnel, a vacancy has arisen for a Chief Chemist to be responsible for the team engaged in chemistry of Sewage and Trade Effluents.

Applications are invited from persons of suitable ability and qualifications having the necessary experience of modern sewage purification processes. Encouragement given to the successful applicant to undertake chemical research to assist the engineering personnel in the development of a large modern sewage disposal plant. Modern analytical instrumentation available within combined central laboratory organisation.

Salary offered up to £1,670 per annum. Car allowance and further promotion prospects, depending upon ability to accept responsibility.

Application forms to be returned to the City Analyst, Shortley Road, Coventry, not later than one fortnight after the appearance of this advertisement.

City Laboratories Service—Coventry

Applications invited from professionally qualified men for a Senior Appointment in the City Laboratories. Candidates should have experience of water analysis and a knowledge of water treatment processes would be an advantage.

Salary to be fixed within the range £1,310-£1,480, dependent upon qualifications and experience.

Applications, giving full particulars should be sent to City Analyst, City Laboratories Service, Shortley Road, Coventry.

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THE WEST HERTFORDSHIRE MAIN DRAINAGE AUTHORITY
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Tenders are invited for the supply of Copperas (Ferrous Sulphate Crystals) containing not less than 50% actual $FeSO_4$ to the Board's works at Maple Lodge, Maple Cross, Rickmansworth, Herts. Requirement approximately 1,500 tons per annum from 1st April, 1962. Weekly supplies either delivered to site or ex works. For further particulars apply General Manager. Tenders to be returned by 30th November, 1961. The Board does not bind itself to accept the lowest or any Tender.

SITUATIONS VACANT

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The department is concerned with the study of thermal treatments with interests including diffusion treatment, sintered materials, electrical discharge and special testing techniques.

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Stainless Steel Duplex 'Z' Blade Vacuum Mixer 3′ × 3′ × 3′.
(Thirty) Gardner & other 'U' Trough Mixers up to 9′ 6″ × 3′ × 3′.
(Nine) Condensers 8′ 2″ × 16″ diam. 232—¾″ Brass Tubes 100 w.p.
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PLANT AND MACHINERY FOR SALE: continued

600

HORIZONTAL MILD STEEL OPEN TOP TROUGH POWDER MIXER by **Pott, Cassels & Williamson,** 7 ft. × 4 ft. 6 in. × 5 ft. deep, arranged for drive through reduction gearbox from 10 h.p. motor with starter.

VERTICAL MILD STEEL TOT. ENC. CYLINDRICAL HOMOGENEOUSLY LEAD LINED MIXING VESSEL by **Bamag of Cologne,** 6 ft. 3 in. dia. × 8 ft. 3 in. deep with dished top and bottom, welded construction with side mounting brackets, fitted 17 in. wide water jacket at bottom on straight portion, shallow anchor type paddle agitator at bottom of vessel with footstep bearing. Drive through reduction gearbox by 3 h.p. motor.

UNUSED STAINLESS STEEL JACKETED TILTING MIXING PAN by **Brierley, Collier & Hartley,** inner pan 3 ft. 4 in. × 2 ft. 8 in. deep with hemispherical bottom, stainless steel anchor type agitator overdriven through gearing by hydraulic motor. Max. pressure 1,500 p.s.i., jacketed pouring lip. Tilting by handwheel through gearing with counterbalanced weights. Supported in 'A' frames on base. TWO AVAILABLE.

STAINLESS STEEL DOUBLE TROUGH MIXER by **Winkworth,** trough 3 ft. 6 in. × 3 ft. 4 in. × 2 ft. 8 in. deep with 18 in. high aluminium apron extension. Two stainless steel 'Z' glanded agitators driven by 10 h.p. 380/420/3/50 cycles motor. Trough fitted chains and counterbalance weights over gantry, tilting by .9 h.p. geared motor.

DOUBLE TROUGH MIXER, 34 in. × 27 in. × 26 in. deep, mild steel construction with twin 'Z' blades, plain bearings, single spur gearing. Direct coupled to 20 h.p. 440/3/50 cycles motor with starter and worm reduction gear. Mounted in stand, hand tilting assisted by counterbalance weights. Hinged cover.

VACUUM MIXER/BLENDER by **Peter Kupper,** tinned steel trough approx. 47 in. × 43 in. × 34 in. deep internally fitted domed cover with top centre 2 in. i.d. vacuum connection and counterbalanced side mounted lifting gear. Twin glanded single geared 'Z' blades arranged for direct coupling to reduction gear and motor on separate bedplate. Quadrant tilting gear arranged for direct coupling to reduction gearbox and motor mounted under trough. Motors and starters not available.

ROTOCELL ROTARY VACUUM FILTER by **International Combustion,** drum 4 ft. 6 in. dia. × 18 in. face, cast iron construction with slotted copper filter plates. Mounted in plain bearings in mild steel trough. Usual vacuum connections. Drive from 5 h.p. 400/3/50 cycles motor with starter.

RECESSED PLATE CAST IRON FILTER PRESS, 31 plates, 19 in. sq., alternate plates cored for heating or cooling, 2 in. centre feed, 1 in. and 1½ in. steam connections for extending corner lugs. Independent tap discharge from plates, hand ratchet closing.

CAST IRON PLATE & FRAME FILTER PRESS by **Johnson,** 12 frames, cake size 17½ in. sq. × 1 in. thick, feed and wash connections in extended lugs, individual plate discharge, ratchet screw closing. SEVEN AVAILABLE.

HYDRO EXTRACTOR by **Broadbent,** 48 in. dia. solid mild steel basket 18 in. deep, direct driven by 400/3/50 cycles motor with starter. Hand operated skimmer attachment, three-point suspension. Hand operated brake, basket speed 570 r.p.m.

No. 15 ROTARY DRUM DRIER by **Buell,** approx. 26 ft. × 5 ft. flange bolted in two halves of ⅜ in. riveted steel construction. Drier on two roller paths, arranged solid fuel firing. With high efficiency cyclone, fans, ducting, etc.

SINGLE-ROLL DRIER by **Kestner,** roll 10 ft. × 3 ft. 6 in., pulley driven through gearwheel and pinion. Segmental scraper knife mounted on drum with take-off screw conveyor which has separate motor drive. Two feed hoppers each 6 ft. 9 in. × 2 ft. 6 in.

VACUUM OVEN by **Francis Shaw,** cast iron construction, 6 ft. 2 in. × 7 ft. 10 in. back to front × 5 ft. 1 in. wide internally, with 15 platens of welded construction and heavy cast iron swing door each having four corner wheel operated swing clamps. Usual flanged connections to internal headers with swan neck connections to platens, THREE AVAILABLE.

COMPLETE BALL MILL GRINDING PLANT by **International Combustion,** comprising 8 ft. × 48 in. chrome steel lined Hardinge Ball Mill driven by 220 h.p. motor with vertical feed hopper, constant weight belt feeder, steel cyclone, double cone separator, motorised fan, etc.

PORCELAIN LINED BALL MILL by **Steel & Cowlishaw,** 21 in. × 17 in. internally, 5 in. dia. charge port, mounted in plain bearings on cast iron 'A' frame, overall height 42 in. belt drive on Mill periphery with loose pulley, quantity of pebbles available.

7 ft. EDGE RUNNER MILL by **Clayton Goodfellow,** cast iron tapered pan 9 in. deep at sides, twin tapered rollers average dia. 37 in., fitted scraper and ploughs, no outlet. Underdriven through gearbox, aluminium canopy with side covers. 12½ h.p. required to drive.

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SITUATIONS VACANT: continued

Younger Executive & Technical Appointments Division **MSL** *have been retained to advise on this appointment.*

METALLURGIST
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for the Research and Development department of a steelworks developing new processes. He will be responsible to the Pilot Plant Manager for quality control and process development. He will join a young team applying research findings to actual production.

Candidates, preferably under 30, should have R & D experience in steel or medium/heavy engineering. A degree, preferably on oath, or equivalent in metallurgy is essential. Starting salary £1,250, pension and free life assurance scheme. Location North of England. Details of age, qualification and career should be addressed to S. W. J. Simpson quoting reference LY.4529.

No candidate's identity will be disclosed without permission.

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RESEARCH CHEMIST—Organic Chemist with B.Sc. or A.R.I.C. required to work on the development of new chemicals and synthetic products. Some Research experience desirable but initiative and the will to succeed is more important. Writing giving details of your career, and stating age and salary required to: Assistant Managing Director, COALITE & CHEMICAL PRODUCTS LTD., P.O. Box No. 21, Chesterfield, Derbyshire.

CHEMIST required for Control Laboratory (25-35). Industrial analytical experience essential, preferably in food. Five day week. Pension scheme. Write: Chief Chemist, McDougalls Limited, Millwall Docks, E.14.

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1962

Chemical Age

DIRECTORY

and WHO'S WHO

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Orders are now being accepted for the new edition of this indispensable source of reference to the chemical industry which will be ready for dispatch early in December 1961. In addition to a greatly enlarged Buyers' Guide, now divided into three sections for easy reference—Chemicals, Chemical Plant & Equipment and Laboratory Apparatus & Scientific Instruments—the Directory will contain the following exclusive features:—

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This register is being included for the first time. Consultants are listed under the subjects in which they specialise, as well as alphabetically.

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