Chemical Age

SILICONE EXPANSION PROSPECTS IN U.K.

(page 1019)

VOL. 84 No. 2162

17 December 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

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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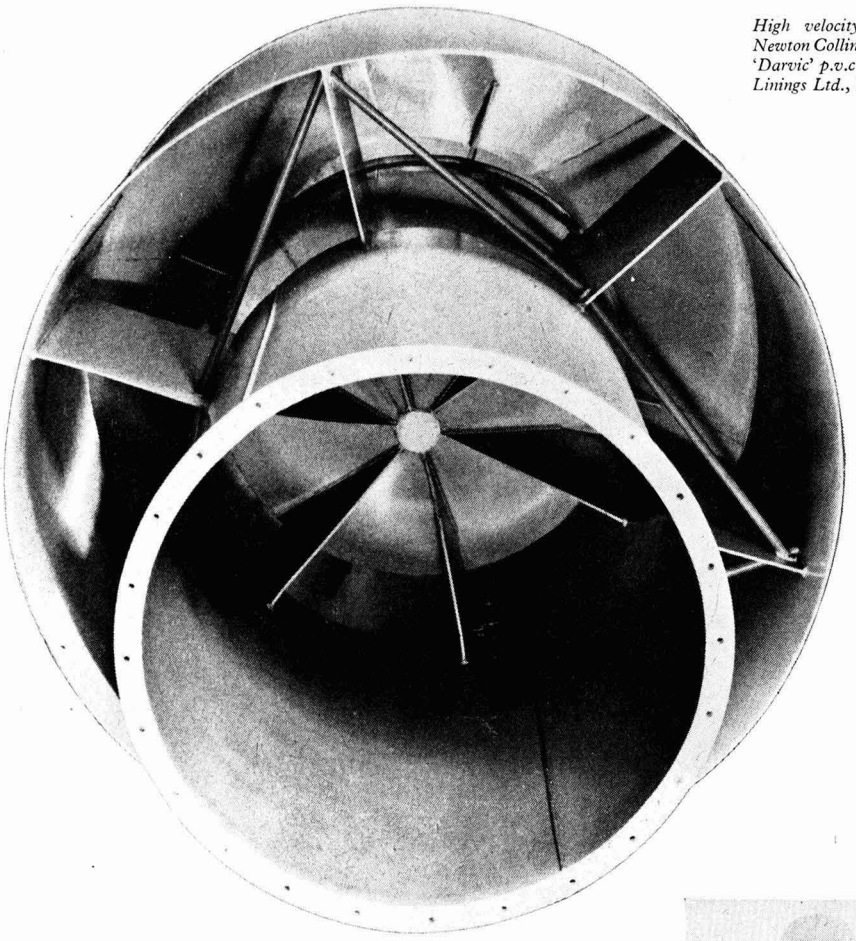

High velocity cowl design by Newton Collins Ltd. and made from 'Darvic' p.v.c. sheet by Tanks and Linings Ltd., Droitwich.

Tough, corrosion-resistant 'Darvic'

clears the air for Serck Tubes Ltd.

This ventilation duct and its cowling were made from Industrial Grade 'Darvic' p.v.c. sheet by Tanks and Linings Ltd. for Serck Tubes Ltd.

'Darvic' is light, rigid even in thin sheets, corrosion-resistant, easily cemented and no trouble to clean. It can be made in a wide range of colours.

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'DARVIC'

'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.

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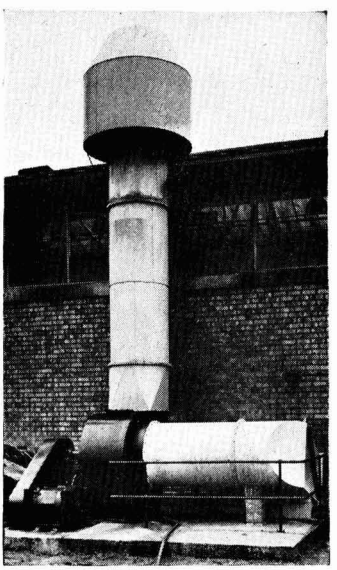

Ducting 3 feet in diameter, with a 5 feet 6 inches diameter, 8 feet high cowl, fabricated from Industrial Grade 'Darvic' by Tanks and Linings Ltd., Droitwich and installed at SERCK TUBES LTD. (Main Contractors, Newton Collins Ltd.)

QUICKFIT Visible Flow

GLASS LINED STEEL VESSELS with GLASS OVERHEAD GEAR

Q.V.F. Glass Condensers and fittings are already widely used with glass lined steel vessels. This partnership enables the principal advantages of glass with its excellent resistance to chemical attack and thermal shock, to be retained in large scale plant.

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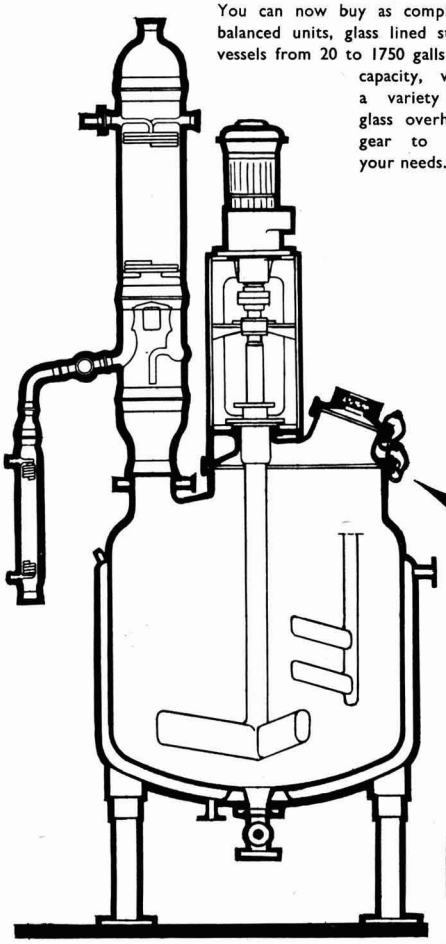

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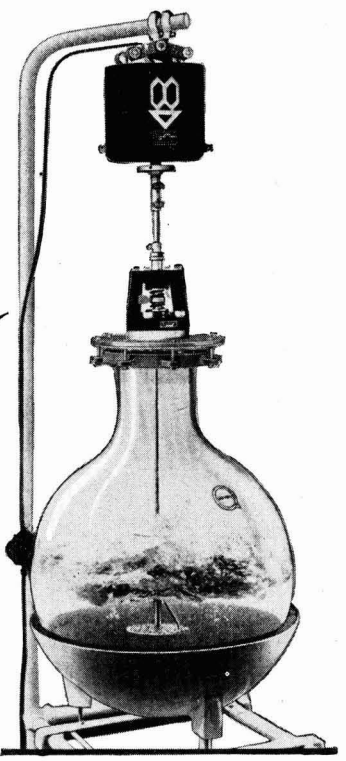

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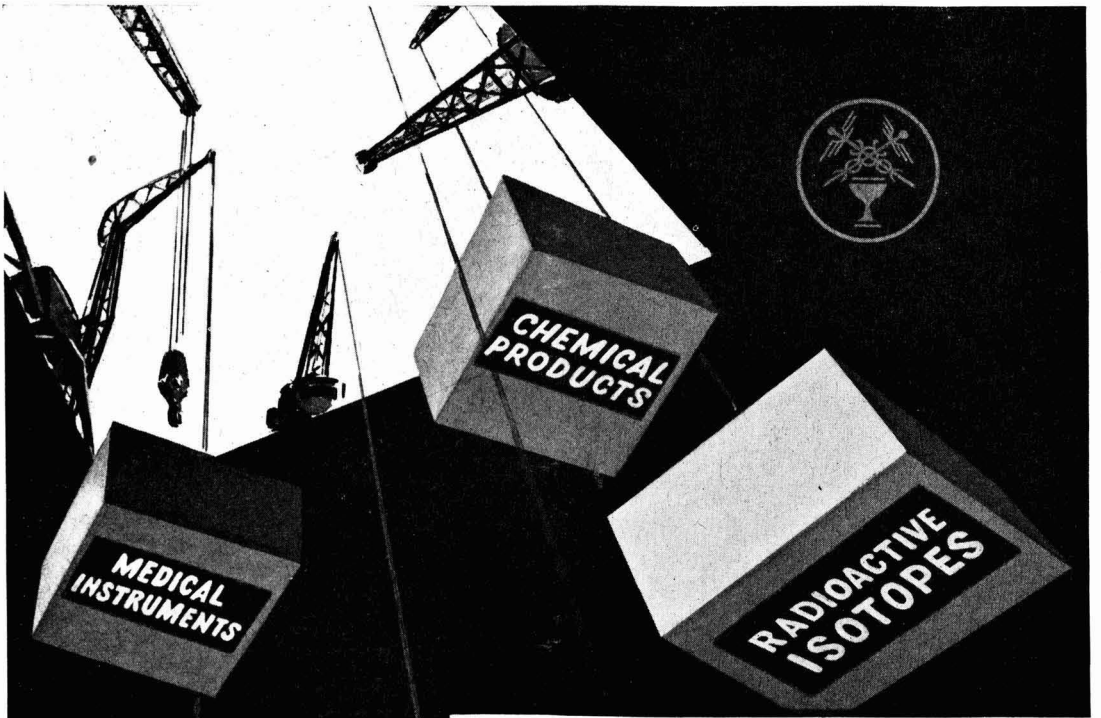
Full details will be found on pages 1037



V/O SOJUZCHIMEXPORT exports various chemical products, medicaments and medical equipment

V/O "Sojuzchimexport" exports:

Pineneedle oil, Minsk retort root pine tar, Archangel tar and other naval stores products; pyridine bases, beta-picoline fraction, coumarone resin and other coke-oven products; potassium carbonate crystals, sodium sulphide, hydrogen peroxide and other inorganic chemicals; methanol, synthetic technical camphor, oxalic acid, aniline dyestuffs, aniline, aniline salt, diphenylamine, rongalite, auxiliary products for dyestuffs and other organic chemicals; white arsenic, arsenic —containing preparations, chloropicrin and other insecticides; essential oils, perfumery and cosmetics, various fine chemicals, radio-isotopes, photo-cinema materials; medical drugs and preparations; pharmaceuticals and medicinal herbs; Tibet medicine products; modern medical instruments and equipment.

Please address all enquiries to: **V/O Sojuzchimexport Smolenskaja-Sennaja, 32/34 Moscow G-200, USSR.**
Cables: Sojuzchimexport, Moscow *Telephone:* G-4-22-84
Telex: Chimexport No. 125.

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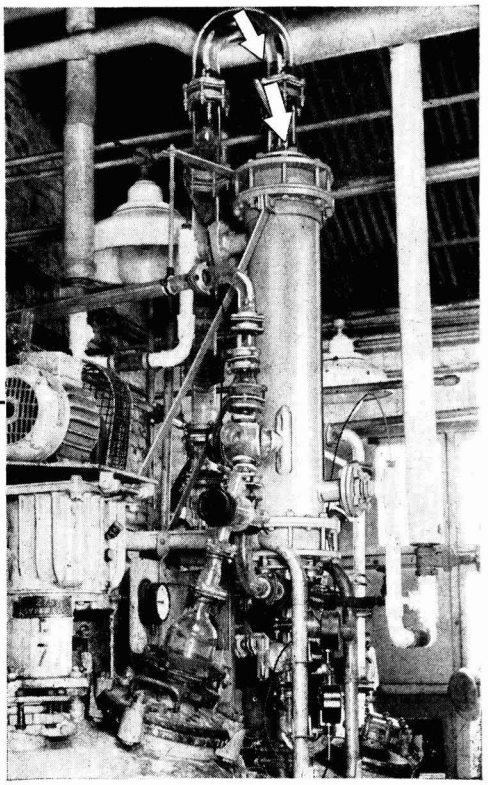
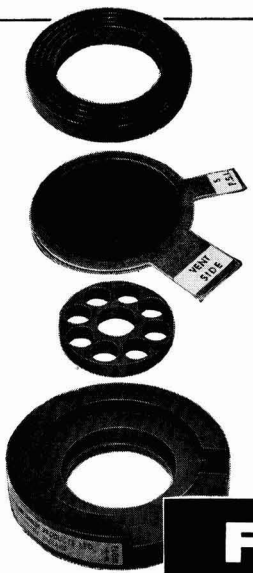
Rugged, compact, efficient; easily installed and maintained. Steel shell protected internally against weak acid solutions and externally against atmosphere. Available for heat transfer areas from 4 to 500 ft.²



20 ft.² Graphite Cartridge Condenser as used in the fine Chemical Industry.
Photograph by courtesy of British Drug Houses Ltd.



DELANIUM GRAPHITE BURSTING DISCS

Will withstand at least 10,000 pressure applications at 75% of stated bursting pressure.
A wide range of standard sizes and pressures from 1 to 400 p.s.i.g.

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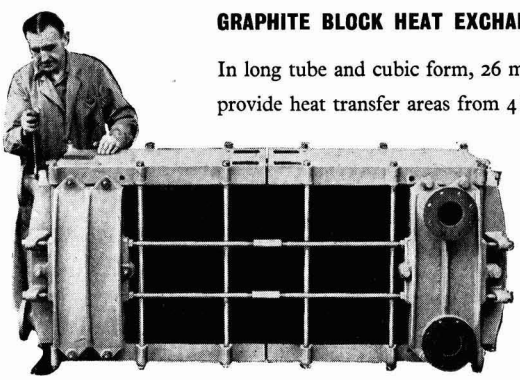
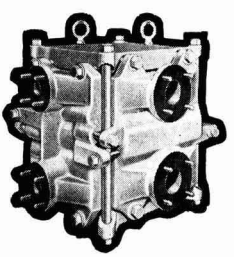
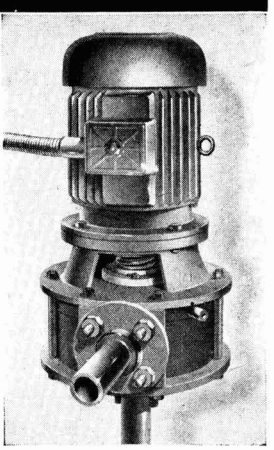
CARBON PRODUCTS LIMITED

GRAPHITE BLOCK HEAT EXCHANGERS

In long tube and cubic form, 26 models provide heat transfer areas from 4 ft.² to 500 ft.²







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CHEMICAL AGE

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SILICONE EXPANSION

ARE silicone sales in the U.K. approaching a big break-through? Both the U.K producers, Midland Silicones Ltd. and I.C.I. Nobel Division, appear to be preparing for a fresh onslaught on the market. Both have projects in hand which should raise silicone production considerably—I.C.I. with their extension at Ardeer, part of which should be ready for operation early next year; Midsil with their extensions at Barry which will more than double silicone fluid capacity, will increase the output of emulsions considerably, and will add to the output of chlorosilane primary and intermediate products.

Capital costs for silicone manufacture are high—something like £2,000 for every ton/year of capacity. Only through large-scale production can the prices of silicone products be brought down from their present high level, and sales boosted. Neither U.K. producer divulges any production figures; Midsil's statement that total capacity for fluids and resins at Barry should be 'between 1 and 4 million lb./year by the end of 1960' is the only clue that has been offered on this score. However, calculating total U.K. production of silicones as 6.5% of the world production, which (excluding U.S.S.R. and East Germany) is in the region of 16,000-18,000 tons, a rough estimate of 1,000-1,200 tons for this year can be arrived at. Again, taking the estimated figure of 850 tons of silicones sold in the U.K. in 1958, as against some 330 tons in 1954, and assuming a similar steady growth of 130 tons/year during the past two years, we arrive at the figure of 1,100 tons for present sales.

Of this total, it can be reckoned that silicone rubbers and resins account for about 25% each, the remainder being oils, emulsions, greases, etc. As to the applications in which this output is consumed there are again no available data, and the picture is complicated by the substantial proportion of silicone output going to military uses. It is certain that the electrical electronics industry uses more silicones than any other industry, chiefly as insulating and encapsulating material and for components. Large quantities of silicone rubber are used in the aircraft industry, while silicone-insulated cables, particularly for Royal Navy vessels, are another big outlet. In consumer uses, polishes have been by far the most spectacular success so far. While some progress has been made with silicones as waterproofing agents for textiles (Midland Silicones claim that some 3 million yards of raincoat material have been silicone treated this year) this use has not caught on so well as was expected. A great miscellany of uses for silicones in a wide range of other industries have been developed and publicised, but the industries concerned have not, on the whole, responded as well as might have been hoped. But silicone prices are being steadily reduced, new products with improved properties are being developed and the next few years may well see a sharp rise in sales.

In the U.S., where commercial development of silicones has been going on for some 15 years, and where production still accounts for over 80% of the free world total, sales have rocketed upwards year after year and there is no sign of any let-up. Giant among the U.S. silicone producers

(Continued on page 1020)

New Chemical Laboratories for London Transport at Chiswick

CHEMICAL research is a major element in the activities of London Transport's new research laboratory at Chiswick, which was officially inaugurated by the chairman, Mr. A. B. B. Valentine, on 5 December.

The new laboratory will enable the scientific staff of the research department to be brought together under one roof for the first time, and it will be the centre of the scientific control and investigation of materials and equipment used throughout London Transport's road and rail services.

A wide variety of work is covered in the laboratory, much of it of a non-repetitive character, but there are also many continuous activities. Among these, for instance, is the control of quality of supplies of materials ranging from metals to adhesives. Much attention is also given to keeping abreast with the latest technical developments of all types of materials and processes with a view to assessing their likely interest to London Transport at the earliest possible stage. Thus work is always in hand with new development in such fields as protection, lubricant additives, plastics and textiles. Longer term investigations in the nature of technical research are also undertaken.

One of the L.T.E. chemical laboratories at Chiswick

The laboratory has five sections and there is a chemical laboratory attached to all but one of these—to the metallurgical, fuels, lubricants and paints sections. A large volume of the chemical work, however, falls outside the scope of such specialised activities and is dealt with by the general chemistry section.

The salient feature of the work of this section is its wide variety. Chemical analysis of virtually any type of material can be undertaken. Products dealt with in this work include detergents, adhesives, inks, disinfectants, abrasives, plastics, weedkillers and papers.

A.B.M.A.C. Refute Charge on Lack of Seed Dressing Research

ALLEGATIONS of the Animal Health Trust that no firm scientific enquiry appeared to have been made into the alleged toxicity of seed dressings has been described as "inaccurate and unjustified", by Mr. H. C. Mellor (Plant Protection Ltd.), chairman of the Association of British Manufacturers of Agricultural Chemicals. Mr. Mellor was replying to a report of trials carried out by the Trust on the toxicity of certain seed dressings to wild life.

It was reported that birds fed on the dressed seed corn ceased to lay and that many died. Three fox cubs which ate the dead birds died after tremors and convulsions. Mr. Mellor declared that considerable toxicological work involving both animals and birds had been carried out over many years and some of the manufacturers' results had been published since the early 1930's.

It was in fact this work that enabled manufacturers to satisfy the Notification and Clearance Scheme Committee of the Ministry of Agriculture, with whom agreed recommendations for safe use are made. For seed dressings, these recommendations include warnings against feeding dressed seed to stock and spillage in the fields.

In one of the experiments of the Animal Health Trust, described in an article in *The Times* of 14 October, no differentiation was made between birds which died from starvation and those which died from a lethal dose of treated grain because no other food was available. The treated grain was so repellent in one test that despite hunger only 15 oz. of grain were eaten by five birds in the test period of 30 days.

Manufacturers, farmers and Ministry were all aware that birds could die if given dressed grain as a sole diet for a 30-day period; that was why precautions were taken. It was certain that if seed was adequately covered with soil during drilling it would not be available to the vast majority of wild birds.

While three of the 10 fox cubs offered carcasses of the dead birds died, in each case its kennel companion remained unaffected although fed on the same diet. This was, added Mr. Mellor, no basis for the assumption or even suggestion that seed dressings could be responsible for the death of foxes.

The association was well aware that there was no short answer to the problem involving the interrelation of higher crop production and the preservation of wild life; it was also fully alive to its responsibilities.

Long and costly research into the whole question was in hand.

N.P.L. Uses New Technique for Far Infra-red Spectroscopy

ELECTRONIC strip chart recorders with digitising units fed from Golay cells for detecting light radiation, are now being used at the National Physical Laboratory, Teddington, in connection with pioneer experiments in far infra-red spectroscopy.

Many problems related to the properties of molecules and the nature of liquids and solids may be studied by passing light through the substances and measuring the wavelengths at which absorption takes place. But in the far infra-red this is experimentally difficult using conventional prism or grating instruments owing to the low energy output of available sources.

The N.P.L. have developed a system of far infra-red spectroscopy which does not use these conventional techniques. The system is based upon the Michelson interferometer and is designed to make more efficient use of the obtainable energy. Using a Golay cell detector, the resultant intensity of two interfering beams is measured as a function of the path difference between them. The output from the Golay cell is recorded as a complex waveform which is uniquely related to the spectrum of the substance by its Fourier transform. Honeywell recorders are fitted with Giannini-Elliot digitisers which give punched paper tape results. These are then fed into a computer which takes the transform and plots the spectrum.

The group at N.P.L., working under Dr. H. A. Gebbie, is believed to be in the forefront of experimental developments along these lines. Sample gases so far investigated include sulphur dioxide, ozone and hydrogen cyanide.

Merseyside Trade Figures

Some interesting facts about the import and export trade of the port of Liverpool in the year which ended on 1 July last, are contained in the annual report of the Mersey Docks and Harbour Board, as follows:

Imports: petroleum 767,629 tons; oils, fats, resins and gums 282,227 tons; seeds and nuts for expressing oils 174,032 tons; chemicals, salt and sodas 131,769 tons; lards, oils and fats 65,198 tons.

Exports: chemicals, salt and sodas 1,130,328 tons; soaps, oils and fats 259,301 tons.

Silicone Expansion

(*Continued from page 1019*)

is Dow Corning Corporation, who, with Albright and Wilson Ltd., are joint owners of Midland Silicones. Midsil, whose Barry plant was brought into production by Albright and Wilson in 1953, are the largest producers outside the U.S. Both Midsil and I.C.I. have been doing a considerable amount of research and development work and it seems that this is bound to be rewarded soon.

Project News

Carrington Heat Exchangers Contract for Lummus

● HEAT Exchanger Division of the **Lummus Co.**, London, have been awarded a £100,000 contract for the design of heat exchangers for installation in the ethylene unit being constructed for **Shell Chemical Co.** at Carrington, Lancs.

Gas Cleaning Plant for Dorman Long Steelworks

● LODGE COTTRELL LTD. have contracted to build for Dorman Long (Steel) Ltd. blast furnace gas cleaning plant for No. 1 furnace at Dorman Long's Clay Lane ironworks. Approximate value of the contract is £300,000 and the plant consists of two scrubber towers and three electro-filter units together with H.T. transformer-rectifier equipment.

It is designed for cleaning 7.8 m. cu. ft./hr. at N.T.P. from the furnace operating at 10 p.s.i. and capable of withstanding a pressure of 25 p.s.i.

Lodge Cottrell will also be supplying Dorman Long with precipitators for the Lackenby steel plant oxygen blown furnace. The approximate value of this contract is £66,000. The plant consists of one 4-stage horizontal-flow high-efficiency electro-filter together with all necessary transformer-rectifier equipment. Ventilations for drag link conveyors rotary seal and dust collecting and pelletising plant.

Flexible Packaging Factory for Metal Box

● FIFTEEN acres of land have been bought by the **Metal Box Co.** as a site for a flexible packaging factory to be built on Merseyside near Bromborough. An industrial development certificate has been received from the Board of Trade and outline planning permission has been given for the factory which will cost in the region of £1 million.

The company plan to move their plastics group's lamination production facilities from Speke to the new factory when the building is completed.

Rising P.V.C. Imports Despite U.K. Expansion Projects

THE big expansion plans now in hand by Britain's two p.v.c. producers—I.C.I. and British Geon—the joint Distillers-B. F. Goodrich company—will not lead to any curb on the present high rate of imports, if demand continues its present growth rate of about 28%. In fact, a further big increase in imports can be expected.

With I.C.I. currently producing some 70,000 tons/year and British Geon's output estimated at about 40,000 tons, U.K. capacity is some 110,000 tons/year. Exports this year will be up 9.9% to between 34-35,000 tons, leaving 75,500 tons available to meet a demand estimated at 110,000 tons, or 28% up on the 1959 figure of 86,000. This accounts for the steep rise in imports, up 101% to an expected 1960 total of more than 35,000 tons.

By mid-1961, I.C.I. capacity will be raised 10,000 tons to 80,000 tons a year and by the same time Geon are expected to have 45-50,000 tons/year, making a U.K. total of 125-130,000 tons. If exports show a further 10% rise, this will leave available 87-92,000 tons to meet U.K. demand. Many think demand in 1961 will go up a further 27% to around 140,000 tons/year, which would leave room for imports totalling more than 50,000 tons. Even if demand growth slackens to a more modest 20% growth, something in excess of 45,000 tons of imports will be required.

Geon have already taken note of these trends and when their current £2 million expansion project is completed at Barry, they will start another major p.v.c. extension.

£500,000 Sulphur Removal Contract for Head Wrightson

● NEARLY £500,000 is involved in a contract awarded to **Head Wrightson Processes Ltd.**, of Yarm and London, a subsidiary of Head Wrightson and Co. Ltd., by the Central Electricity Generating Board, to build a flue gas washing plant, part of the extension to Bankside power station. This plant is designed to remove more than 95% of the sulphur from the oil fired boiler flue gases.

Reactor Control Rod Motors for Nuclear Plant

● AN order from Fairey Engineering sub-contracting to Atomic Power Constructions, for nearly 400 permanent magnet motors for operating the reactor control rods of the Trawsfynydd nuclear power station, has been received by **Lancashire Dynamo and Crypto,** a company in the Metal Industries Group.

The motors will be Class 'H' insulated to operate in an ambient temperature of approximately 100°C.

New Dyestuffs for Terylene

A new range of dyestuffs, specially designed for dyeing Terylene, have been developed for the world market by Compagnie Francaise des Matières Colorantes, of Paris. Technical details were revealed by M. Marian, M.Sc., at a conference in Bradford convened by the West Riding section of the Society of Dyers and Colourers.

The new range—known as the Esterophiles—includes seven colours commercially available; three yellows, two oranges, one red and one blue. A wide extension to the range is planned for early 1961.

The new colours are claimed to have outstanding fastness on Terylene to daylight, to washing and to heat treatments.

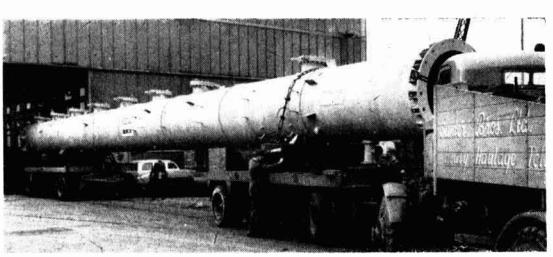
C.J.B. Form Automatic Control Subsidiary

THE Automatic Control Division of Constructors John Brown Limited has been formed into a wholly owned subsidiary company to be known as Automatic Control Engineering Ltd. The services previously provided by the Division to industry at home and overseas will be continued and developed by the new company. These services include consultancy design, works assembly and site installation in the fields of instrumentation, automatic control, remote control and telecommunications, and laboratory engineering.

Directors of the new company will be I. J. Crosthwaite, D.S.O. (chairman); H. D. Walker, M.I.Mech.E., M.Inst.Pet.; R. Riley, B.Sc.(Eng.), A.C.G.I., M.I. Mech.E.; H. H. Rosenbrock, B.Sc.(Eng.), Ph.D., M.I.E.E.; and M P. Atkinson, B.Eng. Mr. R. Riley will also hold the position of general manager and Mr. M. P. Atkinson that of chief engineer.

Headquarters of Automatic Control Engineering Ltd. is at Roxby Place, Seagrave Road, Fulham, London S.W.6.

U.K.-built Refinery Columns for Mexico



This 97 ft. long xylene column is one of three shop-built columns recently dispatched by Whessoe Ltd., Darlington, to the Manatlitan Refinery at Petroleos Mexicanos. The other two are a 116 ft. long benzene column and a 96 ft. long toluene column. The columns were designed and constructed by Fluor Engineering and Construction Co. Ltd.

★ 'EXPORT OR DIE'. That clarion cliché has already been heard once this year and is likely to be repeated when the year's export results are known. Whitehall, which cannot see farther than the end of its bureaucratic nose, must not be disappointed if directors fail to commit themselves to a policy that would be unsound and which would divert them from a profitable home market to chasing nebulous profits overseas.

Are tax incentives the answer? Not at present. I.C.I. chairman Mr. S. P. Chambers, writing on 'The curbs in British exports' in *The Financial Times* recently, brilliantly diagnosed the disease and prescribed a remedy. Unbalance due to budgetary weakness cannot be righted by the misuse of monetary controls, or by export drives, tax exemption for exports or other devices directed to superficial symptoms instead of to the underlying disease itself.

Chambers seeks a three-pronged study of ways of cutting Government spending. Subsidies use taxpayers' money to bolster inefficiency are a double evil—Sir Clavering Fison has already called for an end to fertiliser subsidies. Losses incurred by State industries and their capital spending are item No. 2 on Mr. Chambers' list; third is the problem of running the Government efficiently.

Expenditure on all three should be brought into line with revenue, achieving a budget balance by cutting spending and not by raising taxation. When that has been done there is a case for recasting the tax structure and giving incentives to industry and trade. Then an export drive would make sense.

★ I HAVE heard a good deal of speculation about the nature of the Soviet caprolactam process that I.C.I. is interested in acquiring (p. 987 last week) and whether a new route has been discovered. The recent news that Allied Chemical have acquired rights to the Snia Viscose process, which uses toluene, suggest that this process has the edge over processes using phenol. But according to all accounts, the Soviet route uses phenol. In their present caprolactam plant, V.E.B. Leuna-Werke Walter Ulbricht, East Germany, produce phenol from brown coal (C.A., 9 January 1960, p. 83). But, as stated, they are now turning to a new Soviet process for the production of phenol and acetone, via cumene (C.A., 29 October, p. 727). As inferred at the time, this process will sound familiar to The Distillers Co.

Current nylon production in the U.S.S.R. is concentrated on nylon 6, which is known there as Kapron. Some time ago it was reported that the Russians were developing nylon 7, called Enant, produced from the lactam of oenanthic acid. Cheaper raw materials are the spur here, while the fibre is claimed to have improved heat stability and resistance to ultra-violet light.

★ IN connection with the foregoing, it is interesting to note that the apparent swing-over in the U.K. from nylon 66 to nylon 6, which has only been produced here in small quantities so far, but which British Enka, Courtaulds and I.C.I. now seem all set to produce, is likely to have some effect on the quality of the fibre offered to the textile industry. The yarn produced from nylon 6 retains traces of caprolactam, due to the slight decomposition of the polymer during spinning. This results in dye acceptance, a softer 'hand' and also cuts down the amount of 'static' generated, static being a drawback when nylon is used for garments.

★ THE recent widespread floods caused havoc in a number of U.K. chemical factories, among the hardest hit being the two Treforest, Glamorgan, gelatine factories of P. Leiner and Sons, which were both covered to a depth of 5 ft. in flood water. The water ruined entire stocks of edible, pharmaceutical and photographic gelatines, and, with raw material stocks similarly affected, the process has been temporarily brought to a standstill. Of the manufacturing plant, the mechanical and electrical installations were the most badly affected.

Brighter side is that large supplies of raw materials, which missed the flood catastrophe, are waiting to be taken in, so that, after the plant has been completely sterilised, production will at once return to the normal 24-hour basis. The company plan to resume full production by 27 December and to recommence deliveries of gelatine two or three days later.

★ LAST Monday I attended the inaugural meeting of an organisation that promises to have some lively discussions at its meetings. It is the new U.K. counterpart of the U.S. Association of Cost Engineers and its aim, as summed up by the chairman, Mr. J. H. Herbert of Kellogg International, is "to advance the science and art of cost engineering" in the U.K.

Knowing the reluctance of chemical and chemical engineering firms to release cost data—even outdated data dealing with obsolete operations—I was curious to know how this situation would be reconciled with the aims of the new association. But it seems that the A.C.E. hopes to succeed here where others have failed, and to spread the gospel of "enlightened self-interest" among firms from which its membership (open only to individuals) is drawn.

The meeting drew a good response from engineers—they came mainly from the larger chemical companies and chemical plant manufacturers. One thing brought out at the meeting was that there is a world of difference in the cost estimating needs of those who are mainly concerned with the smaller plant project, and the methods used by the big contracting companies with their complex estimating organisation geared to the larger projects. Another subject that aroused much interest was how much a cost estimate ought to cost, and the case was cited of a contracting organisation which spent over £1 million on bringing out a tender—and didn't get the job!

Although the A.C.E. intends to cover other aspects of cost engineering besides capital cost estimating, I should like to record my hearty enthusiasm for any move to lift this particular engineering headache out of the crystal-ball gazing rut into which it has generally fallen in this country.

★ ATTENTION all polymer chemists! Gather round, you rubber technologists and macromolecular wizards! Here is your chance to win universal fame and the undying gratitude of engineers and designers all the world over. All you have to do is to develop an ideal, all-purpose rubber, as follows:

> The material must be a mono-elastomer available in massive and in latex forms, having the transparency of the acrylics, the low power factor of polyethylene, and the easy processability of natural rubber. It must be storable indefinitely in the open without massing; completely resistant to fungi, moulds, rodents and marine borers; and soluble in the usual rubber solvents. Suitably compounded and cured it must resist all aviation and rocket fuels, hydraulic fluids, extreme pressure lubricants, corrosives (including boiling nitric acid); an operating temperature range extending from that of liquid helium to that of molten copper is mandatory. Besides the usual good mechanical properties of well cured natural rubber vulcanizates, it must be unaffected by high energy radiation, X-rays, and particles, neutrons, positrons, electrons, and cosmic rays (including neutrinos, protons, mesons, tauons, thetons, and hyperions). Desirably it should give off a non-toxic odour resembling that of lavender or violets in conditions of incipient decomposition. The price is a matter of indifference provided always that it does not exceed the price prevailing at the time for natural rubber.

The foregoing specification is advanced, more in humour than in hope, by the Rubber and Plastics Research Association of Great Britain (known until recently as the Research Association of British Rubber Manufacturers) and is quoted in a booklet entitled 'New Ways with Rubber' which has just been published by the Department of Scientific and Industrial Research. This illustrated booklet gives a useful summary of the properties and applications of the steadily growing range of elastomers which go under the rather misleading name of 'rubber'.

Alembic

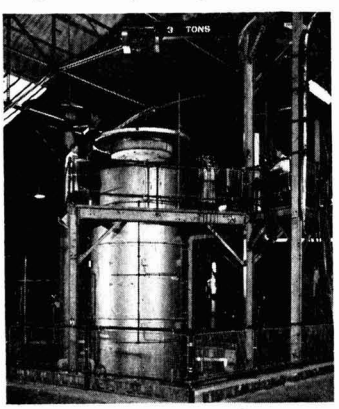
NEW PROCESSES IMPROVE GRAPHITE

Furnaces Designed for Non-porous Graphite Plant

GRAPHITE, ideal for use as fuel element cans in high-temperature gas-cooled reactor systems since it does not absorb neutrons, has the disadvantage that the method of its manufacture leaves the material porous. Graphite is produced artificially by the Acheson process in which powdered anthracite or coke dust mixed with sand is heated in an electric furnace to white heat. With the use of the porous material in fuel element cans there is the danger of radioactive gases being absorbed into the carbon and hence causing contamination of the cooling gas by radioactive particles.

The requirement of a non-porous graphite for the nuclear field led to development on graphite by the Hawker Siddeley Nuclear Power Co. at Langley, and after two years research they have evolved processes for reducing the porosity of the element.

The work started by using the furfuryl alcohol process, first developed successfully by the Royal Aircraft Establishment, and subsequently sponsored by the U.K. Atomic Energy Research Establishment at Harwell. This process consists of impregnating the graphite with furfuryl alcohol; pyrolisis causes carbonisation at about 1,100°C leaving carbon in the pores of the graphite. Hawker Siddeley Nuclear Power Co. were responsible for developing this process up to production stage. The Company has evolved derivations of the original R.A.E. process and in addition has developed a number of new processes, involving different liquids and methods of impregnation, designed specifically to meet needs of a range of grades of graphite and thus expand the applications of the new material into the chemical, electrical and general engineering fields. The process is a polymerisation brought about by heating the impregnant and developing a resin in the pores of the carbon.



Complete graphitising furnace

The experimental aim of the treatment has been to achieve near impermeability to gases and fluids, and at the same time to improve the mechanical properties of the normal graphite. The treated material is high vacuum tight holding for several hours a vacuum of better than 10 microns, while heated at the same time to 1,800°C, under inert gas conditions.

Applications of the new material include equipment for handling molten metals, where with the normal type of equipment a certain proportion of the molten metal goes into the crucible. Use of the non-porous graphite naturally constitutes a considerable saving in the cases of precious or rare metals, including uranium. For similar reasons the new graphite is suitable for toxic fluid or gas containers and for liquid-cooled electrodes. Corrosion resistant grades of the new graphite are available for use in chemical plant and heat exchangers and also oxidation resistant graphite for use in oxidising atmospheres.

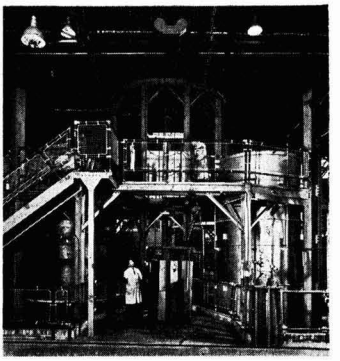
New Equipment

Associated with the development of the new materials has been the development of suitable plant. Early in the research period it became evident that, in order to produce the new material in the production quantities required, both in the nuclear and non-nuclear applications, it would be necessary to design and manufacture special furnace equipment not then available to industry. The basic concept of the Hawker Siddeley Nuclear Power Co. is a production facility which comprises four carbonising furnaces and two graphitising furnaces arranged in a semi-circular layout and complete with ancillary equipment and control gear. Instructions to proceed with construction of the plant were given in July 1959.

At present only one furnace of each type is installed but it is planned to increase the capacity at the earliest opportunity.

The process consists of first impregnating the graphite with the particular solution required and then curing in a carbonising furnace. The resin produced is first cured and then carbonised as the temperature is slowly raised to 1,000°C. The waste products of the carbonisation, mainly water vapour and sulphur dioxide, are given off and the carbon produced remains in the pores of the graphite.

The 1,000°C carbonising furnace, designed, manufactured and installed by Sintering and Brazing Furnaces Ltd., is a vertical cylinder, arranged for charging batchwise through the top. The charge



View of the plant showing the loading bay. Graphitising furnace is on the left and carbonising furnace on the right

is contained in a muffle chamber fitted with recirculation ducts. The temperature of the work space is measured by several selectable thermocouples. Fine temperature control is exceedingly important. In some applications a slow, steady cure of carbon products may take five days, during which time the temperature is raised steadily and accurately. Any sudden temperature change could ruin the product. The furnace is designed to use an inert atmosphere, which at present is nitrogen. The first furnace of this type was completed and installed by the end of 1959.

Carbonisation in the 1,000°C furnace is often all that is necessary, but for some applications, notably in the nuclear field and others requiring uniform thermal or electrical properties, a more homogeneous material is required. The demand is met by regraphitising at about 2,700°C, hence causing changes in the crystal structure.

The graphitising furnace needed to be designed specially since it has to accommodate a charge of up to 10 ft. in length, must operate with a power supply of 800 kVA at a temperature of 3,000°C and be of a vertical arrangement to reduce the chances of the long thin specimens, used in nuclear applications, bending when white hot. In effect this meant a furnace four times larger than anything similar known to exist.

In July 1959, Spembly Ltd. was approached by the Hawker Siddeley Nuclear Power Co. to undertake a design study for a very large graphite element furnace of the type required. The design study was completed by January 1960 and installation, began in June, was completed by early December. Commissioning started in mid-December.

The inert atmosphere of the furnace prevents impurity pick-up during graphitisation, a known problem in conventional graphitising furnaces. Because of the high temperatures involved the whole of the interior construction of the furnace had to be of graphite, only obtainable in small pieces, and a suitable heating ele-

ment consisting of jointed vertical graphite rods had to be evolved.

The capacity of the plant at present is about 100 tons per year but expansion will begin as soon as possible and a capacity in the region of 400 to 500 tons per year is expected by the end of 1961.

Although the processing of graphite in this way increases costs it does make graphite available for applications for which it could not be used before. In these applications the cost of the graphite does not compare with the cost of the high quality metal used hitherto.

New Head Wrightson Subsidiary in India

To handle Head Wrightson's expanding interests in India, a new company, Head Wrightson India Ltd., is being registered.

With its administrative headquarters in Calcutta, this company will be a wholly owned subsidiary of Head Wrightson and Co. Ltd., Thornaby-on-Tees. It will act as a contracting company for the supply as far as possible from Indian sources of various types of plant to the designs of the parent company.

Fullest use will be made by the new company of the rapidly growing manufacturing facilities in India for the class of work concerned, in both the public and private sectors.

This is a first step in strengthening Head Wrightson's participation in India's development. As a further move, it is hoped to incorporate a rupee company within the next three years.

Head Wrightson have maintained a close link with India for many years and has been responsible for supplying much industrial plant. The company is at present playing a major part in the Durgapur steelworks project, and are supplying all the iron-making plant together with much of the ancillary equipment.

Chairman of the Indian firm will be Mr. Peter Wrightson, who is also vice-chairman of Head Wrightson and Co. Ltd., and Mr. V. Pendred has been appointed managing director.

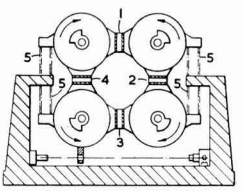
B.A.C. Liverpool Apparatus Exhibitions

THE Liverpool Section of the British Association of Chemists, whose last exhibition of scientific apparatus at Liverpool University was a marked success, will in future hold biennial exhibitions. This is to give exhibitors reasonable time in which to include something new in each succeeding exhibition.

The next exhibition will take place in the week following Easter in 1962 and will again be held in the Donnan Laboratories, Liverpool Universities. Formal invitations to firms wishing to exhibit will be sent out about the middle of 1961, but reservations can be accepted at any time by Mr. H. L. Haigh, exhibition organiser, care of McKechnie Brothers Ltd., P.O. Box 4, Ditton Road, Widnes, Lancs.

Fifty-fold Increase in Grinding Rates Claimed for New Mill

GRINDING rates fifty times those attainable in normal commercial mills are claimed to be possible with a new process, using a vibrating ball mill, that has been devised by Dr. H. E. Rose and Dr. R. M. E. Sullivan of Kings College. Available under licence from the National Research Development Corporation, 1 Tilney Street, London W.1, the process is thought to have wide applications for the production of granular materials in the chemical and allied industries.



The diagram shows four mills arranged to vibrate in anti-phase. By this means, the disturbing force acting on the frame is minimised. Components 1, 2, 3 and 4 are the primary or stiff suspension. 5 is the secondary or soft suspension

Hitherto, the potentialities of the vibration mill do not appear to have been fully explored, and work by Rose and Sullivan suggested that a 50-fold increase in grinding rate could be obtained by a moderate increase in the speed of rotation of the out-of-balance weight shaft of the mill. Any attempt to do this by a mere increase in the speed of driving of a conventional mill would, however, introduce great mechanical problems; radical changes in the basic design of the machine are called for to achieve the desired speed-up.

Theoretical study suggests that to achieve a high rate of grinding, operation of vibration mills at high frequency is essential. In a large mill the bearing loads and bearing friction losses become prohibitive, but this obstacle may be overcome by operation at resonance. The bearing load is zero and friction losses are very small at exact resonant speed.

Such operation requires the use of stiff or strong springs. These springs are the probable limitation on what can be achieved by this method. Overall efficiencies between 65% and 75% are feasible and would show a substantial improvement over many types of mill available at the present time. The largest possible fraction of the energy absorbed by the mill charge should be converted to energy associated with new surface. Theoretical equations show that use of grinding media of the highest possible density are required. Similarly, it is considered that there is an optimum mill filling ratio and also that the powder filling ratio has an effect on efficiency.

The type of motion imparted to the mill is also important and a circular motion has been found to give a rate of grinding 20 times greater than the same amplitude of motion in a wholly horizontal plane.

Investigations into Cross-linkage of Natural Rubber

PROPERTIES of crossed-linked rubber depend not only on the number of cross-linkages present but also on the disposition of the chains prior to cross-linking. This conclusion has been reached as a result of investigations being carried out by the U.S. National Bureau of Standards into the effect of cross-linkage on the physical properties of natural rubber. This research is part of a continuing programme being conducted at the Bureau to investigate the fundamental physical properties of macromolecules.

Natural rubber represents one of the simplest types of macromolecular systems, consisting as it does of chains comprised of the same repeating unit. A high degree of orientation can be induced in this polymer by stretching at elevated temperatures and allowing it to crystallise by cooling. Cross-linked networks are formed from either random or orientated chains by chemical reaction or by the action of high energy ionising radiation. Such a network is insoluble in the usual rubber solvents and is characterised by reversible long-range elasticity in the liquid state.

For the investigations orientation of the molecules was achieved by stretching thin strips of the polymer to 11 times their original length at 80°C, and following by rapid cooling to 20°C. Cross linkage was produced in these orientated chains by the action of gamma rays from either a 50- or 200-curie cobalt-60 source. The stretched samples were immersed in boiling water after irradiation to ensure retraction.

It was found that the isotropic length —the length of the amorphous (liquid state) network in the absence of external forces—of orientated chains increases as cross-linkages are introduced, unlike that of random chains which is unaltered by cross-linkage, and for a given amount of radiation twice as much cross-linkage was produced in orientated chains as in the random chains. Cross-linking of random chains produced a large depression of the isotropic melting temperature whereas little change was noted in cross-linked orientated chains.

Chemico's New Urea Process Saves Steam, Water and Capital Costs

USING a novel technique for recycling ammonium carbamate solution, the new process developed by Chemical Construction Corporation, New York, is claimed to provide nitrogen fertiliser manufacturers with a means of producing urea with reduced initial investment and lower utility and maintenance costs. Conservation of heat evolved in the process is said to result in savings in steam, power and cooling water. The carbamate solution recycle facilitates complete consumption of the ammonia and carbon dioxide feed materials, simplifies the equipment and utilises only a small quantity of water for the recycle of unconverted ammonia and CO_2. This results in a nigh concentration of product urea before the evaporation stage.

A further advantage claimed for the process is that it provides a longer on-stream time, allowing the plant to be run without shutdown for maintenance and adjustments. The new process has already emerged from a period of successful operation at the Lawrence, Kansas, plant of the Cooperative Farm Chemicals Association.

Chemico, so far the only American chemical engineering firm to develop and licence their own urea process, have previously offered a once-through process, as is now operated at the El Dorado, Arkansas plant of Monsanto Chemical Co., which started urea production by the Chemico process some two years ago.

In the older Chemico process, there is a moderate of excess of ammonia in the feed to the autoclave or reactor, which is operated at a pressure of some 170 atm. and a temperature of 345-365°F. Ammonium carbamate is decomposed and excess CO_2 in the evolved gas from the decomposer is absorbed in monoethanolamine, ammonia then being recovered by compression and liquefaction.

In the new Chemico process, it would appear from a description in *Chemical Week* (12 November, p. 69) that both decomposition and absorption are carried out in two stages, ensuring that the reactor effluent components—ammonia, CO_2, urea and carbonate—are kept separate. The reactor operates at 2,800 p.s.i. and 345°F to yield ammonium carbamate, which breaks down to urea and water. Carbamate is in equilibrium with ammonia and carbon dioxide on one hand, and with urea and water on the other, so that careful control of temperature, pressure and flow rate is necessary to avoid solidification of the solutions. To overcome this, the new Chemico process avoids recycling of the carbamate solution from a second absorption stage back to the first, as in most processes; instead, the carbamate solution is mixed with a gaseous stream. This results in a release of heat which ensures that, in the final decomposition step, the urea-carbamate equilibrium is on the ammonia side. Steam savings result while the yield of urea may be raised.

A further distinctive feature of the process is that most of the recycled ammonia is taken directly from the top of the first absorption stage, rather than through an intermediary step. A special pressure zone keeps the ammonia at sufficient pressure to be condensed with normal cooling water. Unlike some other processes, water is not needed as a carrying medium for the ammonia, while aqueous urea solution leaving the process is claimed to have a higher urea content (76%) than in other processes.

Background to Urea Production

Urea is synthesised commercially by the reaction of ammonia and CO_2 to give ammonium carbamate. indirect dehydration of the carbamate yielding urea (about 70%) and water. Solid urea is obtained by crystallisation and centrifuging, a smaller percentage of urea being processed in the liquid state for use as liquid fertiliser.

There are a number of commercial processes available—including the previously established Chemico process, the Inventa, Montecatini and Pechiney-Grace processes, while Du Pont operate their own process at Belle, West Virginia. Other processes operated outside the U.S. include the Dutch State Mines, Lonza and Toyo Koatsu processes. All these processes differ in the ratio of ammonia to CO_2 in the feed, the reaction temperatures and pressures, the arrangements for the decomposition of the carbamate, and the means employed to recycle unconverted ammonia and CO_2.

In all processes, corrosion problems call for the use of silver, lead or high-nickel alloys in the reactor linings, while pipework and fittings employing titanium and expensive alloys are sometimes called for. Further measures to minimise corrosion include the removal of promoters such as oxygen and sulphur from gases.

In addition, the nature of the reaction necessitates close control of temperatures and pressures. Process conditions must be controlled to ensure maximum yield of urea of an acceptable market quality, one important requirement for fertiliser urea being a minimum content of biuret, formed during the evaporation of the aqueous urea solution.

U.K. Entry Wins International Aerosol Packaging Contest

FOR the first time a non-American aerosol has won the Grand Award as the best designed product in the international aerosol packaging contest organised in U.S. by the Chemical Specialities Manufacturers' Association. It is the Durazone-Choice Sprayclean spot remover. The company also won three other first prizes for pack design.

The competition attracted a record number of entries from all over the world. The entries were judged on the basis of good design and general sales appeal. Durazone-Choice, with their total of four awards out of a possible 16, won the highest number ever achieved by a single manufacturer.

Since aerosols were first introduced in U.K. in 1950, sales have soared from 1 million units in 1951 to 25 million units in 1959. Marketing director of Durazone, Mr. G. F. Keen, estimates that total aerosol sales in U.K. will reach the 50 million mark in 1960.

50 Tons of Insecticide Delivered by Air

FIFTY tons of insecticide was flown from Holland to the Sudan last week—the day after the order for it was received by Shell International Co. in London from the Sudan Gezira Board at Khartoum. The insecticide, Endrin Emulsifiable Concentrate, used for the control of pests in cotton crops, was flown in six special charter aircraft. There were 10,000 gall. of it in more than 200 cans.

Believed to be the largest consignment of insecticide ever sent by air, it was supplied from the Shell plant at Pernis in Holland.

Scotland's Only Seed Crushers Celebrate Centenary

Only remaining seed crushing firm in Scotland, Wilson and Sons (Dundee) Ltd., Caledonia Oil Mills, Dundee, have celebrated their centenary. Founded in 1860 when seed crushing was a considerable industry, the firm has developed steadily over the years maintaining its linseed cale and cotton cake and oil trades, and developing into the feedstuffs and allied fields as producers of protein concentrates and animal feeds. Chairman is Mr. Guthrie B. Wilson, grandson of the founder; his colleague, Mr. Jack Easson, is a director.

New Techniques in Bulk Storage and Transport of Liquid Chemical Reagents

LATEST techniques for the bulk storage, handling and transport of a number of important chemical reagents were discussed at a meeting of the North-Western Branch of the Institution of Chemical Engineers, held in Manchester recently. Some points from the papers presented are as follows.

Hydrogen Peroxide handling and storage problems were discussed by K. H. Rawsthorne and J. A. Williams. The strengths of hydrogen peroxide usually stored are 35, 50, 70 and 85 to 90% w/w. Hydrogen peroxide decomposes exothermally into water and oxygen under certain conditions; at concentrations over 65% by weight the heat released is sufficient to vaporise all the water present. Storage tanks are constructed of 99.5% aluminium. A typical storage tank for 35% grade holds 1,250 gall.; it takes delivery from a 1,000-gall. road tanker that carries its own pump to deliver to a height of 30 ft. above the road surface.

This horizontal tank is mounted on piers or stillage from which it is insulated by strips of p.v.c. to prevent corrosion; it is fitted with a bottom exit operated by a lever plugstick valve accessible at the top of the tank. The tank is filled through the top of a man-hole cover that carries a vent which cannot seal, yet allows no airborne contamination to enter.

If the concentration is greater than 35% the storage tank is located away from organic solvents; no protection against frost is necessary as the freezing point is lower than our extreme winter temperatures. The storage tank for such concentrated hydrogen peroxide is emptied by a self-priming pump through a suction pipe entering the turret mounted on the man-hole of the tank which also carries the filling line. The top cover carries a breather which is secured to the turret by aluminium shear wires, this acts as a 'blow-off' top if pressure builds up in the tank. The tank is surrounded by a wall or bund; water is available to dilute all leaks before they run to waste. Storage tanks should be horizontal cylinders, with dished ends, of rolled sheet and welded by an inert gas electric arc process. The tanks are cleaned and passivified by dilute nitric acid, washed and sprayed or covered with hydrogen peroxide solution.

The delivery tankers are of 1,000 or 2,000 gall. capacity for 35 or 50% grades. The 85 to 90% grade is distributed in 600-gall. tankers that carry a pump and an additional tank filled with water for dealing with accidental spillage. For shipping purposes a 500-gall. demountable tank with a 'blow-off' top turret is fitted with specially strengthened cradles.

Phthalic Anhydride. A simple installation for handling molten phthalic anhydride was described by Dr. B. Shaw. Produced as a liquid, phthalic anhydride melts at 131°C, has a flash point of 150°C. It is stored and transferred above 135°C in an atmosphere of nitrogen, the maximum storage temperature being 140-145°C to avoid the risk of discoloration. The lagged storage vessel is made of stainless steel and the PA is kept at 145°C by a coil containing steam at 80 p.s.i.g. Contact with moisture or steam produces phthalic acid which corrodes mild steel.

Liquid PA flows readily and is transferred from a road tanker to a storage tank by a flexible hose. The reactor is mounted on a weighing machine, the anhydride is fed into the reactor until the desired weight is obtained and the line is drained back into the storage tank.

Stabilised Liquid Sulphur Trioxide was the subject of bulk handling techniques dealt with by B. O. Davis and A. T. Royle. Liquid gamma sulphur trioxide (SO_3) freezes at 16.8°C, boils at 44.8°C and readily polymerises to the beta form (M.Pt. 32.5°C) then to the alpha form (M.Pt. 62.3°C variable to 91°C). The polymerisation is inhibited by the addition of about 0.1% non-volatile boron compounds which restrict it to the relatively innocuous beta form; although this form, on long standing, may sink to the bottom of a storage vessel no trouble has so far arisen where the outlet is at the bottom because the contents are mixed by the addition of each new load of SO_3.

The polymers melt to produce the gamma form and, if this is done in a closed vessel, the pressure will rise considerably. The tendency to polymerise is catalysed by traces of moisture such as are present in the atmosphere, therefore stabilised liquid SO_3 must be kept dry and out of contact with the atmosphere. Exposure to the atmosphere producers corrosive white fumes. SO_3 must be kept at about 30°C to prevent it freezing in pipes and storage tanks. Venting, a necessity on storage tanks and filling units, must be through a scrubber over which 95-98% sulphuric acid is circulated. Pipelines must be traced or jacketed by warm water. Vent lines are steam traced to prevent condensation of SO_3 vapours.

Mild steel is used for most equipment for dry SO_3, valves and pumps are made of a stainless steel. Glands sealing against liquids are to be avoided wherever possible and PTFE rings make the most suitable joints. All pipes should be self-draining back to the storage tank if possible, otherwise a drain-off valve should be placed at the lowest point; it is desirable to remove the last traces of SO_3 with a current of dry air. Flexible pipes made of Fluon are now available for use in loading tankers. The construction of the road tanker used for liquid SO_3, and safety consideration in loading and unloading, were also discussed. Other papers presented at the meeting were on 'The bulk supply of hydrogen' by Dr. G. J. Lewis and 'The handling of solids' by Mr. R. Lee.

New Division for Parkinson Cowan

Two of the operating divisions of Parkinson Cowan Ltd. — Parkinson Cowan Instruments and Measurement Ltd.—are to be unified as a new division to be known as Parkinson Cowan Measurement. It will be headed by Mr. C. H. Chambers, previously divisional manager of Parkinson Cowan Instruments. Mr. H. P. Barker, chairman of Parkinson Cowan Ltd., explains that this reorganisation is for the purpose of "pursuing more efficiently the rapid growth of business now in prospect" and to "allow marketing efforts to be further concentrated".

Products of the new division include metering and automatic control equipment, a range of specialised hydraulic pumps and remote control and telemetering equipment.

Programme Announced for 1961 Temperature Symposium in U.S.

The technical programme is now complete for the 1961 symposium on 'Temperature, its measurement and control in science and industry,' to be held in Columbus, Ohio, March 27-31, 1961. The conference is sponsored by the American Institute of Physics, the Instrument Society of America, and the National Bureau of Standards. The 200 papers are organised into 16 sessions, devoted to such topics as: Basic concepts of temperature; Temperature scales; Thermocouples; Resistance thermometers; Gas thermometers; Spectroscopic methods; Pyrometry; Miscellaneous methods; Automatic methods for measurement and control; Measurement in dynamic systems; Special sources of temperature; Cryogenics; Plasmas; Temperature measurement in geophysics; in Astrophysics; and in biophysics and medicine.

Protective Wrapper Contains Antibiotic

An Australian patent has been granted for a protective wrapper, for extending the shelf life of moisture-containing meat, of cellulosic sheet material containing an absorbed aqueous solution of a C_2-C_6 polyhydric alcohol softener and a broad-spectrum antibiotic. The antibiotic is present at a concentration of 5 to 25 mg. per square m. of sheet surface. The antibiotic and the softener are adapted to diffuse readily into the surface of the meat on contact.

Mercury and Phenylmercury Derivatives of Fluoroacetamide Show Fungicidal Properties

ACETAMIDE forms a mercury derivative (1) in which the metal atom replaces hydrogen in the amide group; the resulting compound is soluble in cold water and has the nature of a salt since acetamide has slight acidic properties. (Sodium acetamide: $CH_3CO.NH.Na$, mercury acetamide $(CH_3CO.NH)\ Hg_2$).

Fluoroacetamide has now been shown to form an analogous compound $(F.CH_2\ CO.NH)_2Hg$; it also forms a similar compound, phenylmercury fluoroacetamide, with phenylmercury hydroxide. The preparation of these slightly water soluble crystalline, sharp melting compounds is described.

Both have fungicidal and insecticidal properties and are being tested for control of the fungus, phoma betae, which affects sugar beet seed causing black leg in sugar beet, as possible substitutes for the highly toxic ethyl mercury phosphate (EMP). The mammalian toxicity and other biological properties of these new compounds will be published in due course.

Their chemical constitution contrasts with that of phenylmercuriammonium fluoroacetate (2) which is a true salt; mercury fluoroacetamide and phenylmercury fluoroacetamide are N-substituted metal derivatives:

$FCH_2COO\ \overset{+}{Hg}\ \overset{-}{NH_3}—O\ CO\ CH_3$
Phenylmercuriammonium acetate
$FCH_2CO.NH.HgC_6H_5$
Phenylmercury fluoroacetamide

This series of compounds is the subject of provisional patent applications.

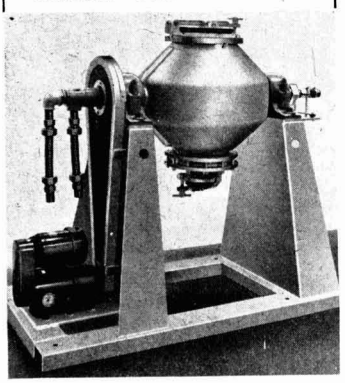
Preparation of Mercury Fluoroacetamide. Fluoroacetamide (7.7 g.) is refluxed in 150 ml. of water with yellow mercuric oxide (5.4 g.); after 30 minutes, the mixture is filtered from undissolved mercuric oxide. On cooling, colourless crystals of mercury fluoroacetamide separate. These are filtered off, washed with limited amounts of cold water and are dried.

They do not melt up to 230°C and analyse as follows: Hg, 57.4; N, 7.9; $C_4H_6O_2N_2F_2Hg$ requires Hg, 56.8; N, 7.95%.

Preparation of Phenylmercury Fluoroacetamide. Fluoroacetamide (7.7 g.) with phenylmercuric hydroxide (14.7 g.) and (200 ml.) is refluxed until practically complete solution is obtained; filtration while still hot, followed by cooling, causes the separation of colourless white crystals of phenylmercury fluoroacetamide, m.p. 164-165°C. (Found, Hg, 56.0; N, 3.9; C_8H_8ONFHg requires Hg, 56.8; N, 3.9%).

M. A. PHILLIPS.

GLASSED STEEL BLENDER



This glassed steel equipment can be used to dry and blend corrosive materials to produce a homogeneous product, drying being achieved by subjecting the product to vacuum and heat, and speeded by a tumbling action which mixes the materials. The glass lining avoids metallic contamination and is claimed to resist product adherence, reducing clean-up losses and labour and improving heat transfer. Makers of this unit are Enamelled Metal Products Corporation (1933) Ltd., Artillery House, Artillery Row, London S.W.1

Russians Behind in Developing Acetylene Chemistry, says U.S. Report

A REPORT released recently by the Office of Technical Services of the U.S. Department of Commerce has some very scathing things to say about Soviet chemistry. Soviet progress in developing an organic chemistry industry is severely handicapped by lack of originality on the part of Russian chemists and by their reluctance to learn and apply modern chemical structures and reaction theories. Thus, concludes a report, 'Soviet research in acetylene chemistry', which is said to be an analysis of available Russian information.

The main reason for this lack of development, says the report, is that the Soviets have not gone as far as the more scientifically advanced nations of the West in providing a sound organic chemical industry. In the acetylene field, Soviet chemists are synthesising a multitude of compounds without appreciably increasing the degree of sophistication of their knowledge of acetylene chemistry. Apparently, Soviet progress in plastics, drugs, synthetic rubber, adhesives and chemical intermediates will be retarded because of their backwardness in fully exploiting the conversion of the vast stores of oil and natural gas in the Soviet Union through the acetylene route.

While this may be true of the acetylene field, it does not follow that the Russians are showing the same lack of originality in other sections of their organic chemistry industry—at least not according to the report published in CHEMICAL AGE, 3 December, p. 950. Gains are certainly being made too in industrial output. Figures issued by the Central Statistical Board of the U.S.S.R. Council of Ministers show that industrial output was up by 10% for the first nine month of this year compared with the same period of a year ago. During the same period, output in the chemical and rubber industry increased by 111% over the year before.

A breakdown of the figures show that the output of mineral fertilisers was up 107% to 10.1 million tons, sulphuric acid 107% to 4 million tons, and man-made fibres 116% to 152,000 tons. Organic chemicals production figures are not given but the Central Statistical Board says that the output of synthetic resins and plastics increased by 12%, phenol-formaldehyde resins by 16%, carbamide resins by 53%, polyethylene by 54%, polystyrene and copolymers of styrene by 24% and ethyl alcohol by 15%.

Polymer Symposium

A SYMPOSIUM on inorganic polymers, sponsored by The Chemical Society, will be held at Nottingham University from 18 to 21 July 1961. The symposium will consist of main lectures and contributed papers, and the opening address will be given by Dr. J. S. Anderson, F.R.S. (National Chemical Laboratory).

Speakers who have agreed to give main lectures include J. C. Bailar (University of Illinois), A. B. Burg (University of Southern California), G. Gee, F.R.S. (University of Manchester), A. W. Laubengayer (Cornell University), O. Schmitz-DuMont (University of Bonn), and E. Theilo (Deutsche Akadamie der Wissenschaften, Berlin).

Those wishing to present papers should submit the title and a summary of about 250 words not later than 1 January 1961 to the secretary, International Symposium on Inorganic Polymers, Chemistry Department, The University, Nottingham.

Colombia Duty Reduction

The Government of Colombia has reduced import duties on petrochemical equipment by from 10 to 25%.

CHEMICAL AGE DIRECTORY, 1961

100 More Pages and 'Who Owns Whom' Feature for New Issue

NEXT edition of the "Chemical Age Directory and Who's Who", that for 1961, will contain 20 more pages than the current directory. Due to be published on 16 December, it is the only publication of its kind providing a comprehensive guide to the products of the chemical and chemical equipment industries. Highlights of the 1961 edition are :

- **A new feature on the structure of the British chemical industry, entitled 'Who Owns Whom'**
- **76-page Who's Who of the Chemical Industry—10 more pages than last year.**
- **Much enlarged Buyer's Guides for Chemicals and Chemical Plant, containing references to more than 4,000 different products and their suppliers.**
- **A Master Index which includes the names of 1,700 companies, 550 more than in the 1960 edition.**
- **A handy Diary and Calendar section.**

The newly introduced 'Who Owns Whom' will list the names of companies operating in the British chemical industry, giving under the name of the parent company, the titles of subsidiaries and associated concerns in this country. Countries of origin of the parent firms are indicated.

The Who's Who section, which continues to be expanded each year, will name well over 4,000 executives in the chemical industry, as well as senior chemists and chemical engineers in Government, industry and University circles. This well-established feature includes qualifications, present position, organisation and address, and, where applicable, offices held in learned societies or trade associations, medals awarded, etc.

All other sections have been revised providing a unique work of reference to the British chemical industry. In addition to the editorial features mentioned, it also lists more than 200 learned societies, professional bodies and trade associations, giving addresses, telephone numbers and names of secretaries.

The Department of Scientific and Industrial Research is the subject of a separate entry in which the principal headquarters staff, and the research stations, with addresses and names of principals, are listed. In addition, similar details are given for 46 U.K. research associations. Agricultural research organisations are also dealt with comprehensively. These include units and laboratories controlled by the Agricultural Research Council, the Ministry of Agriculture, Fisheries and Food and the Scottish Department for Agriculture.

A 6-page feature dealing with Government departments and State undertakings is an invaluable guide to commercial sections of interest to the chemical and allied industry, both as regards export and import trading. This section covers Government research centres, apart from D.S.I.R. and A.R.C. which are covered separately, Alkali and Factory Inspectorates, national and local research centres for gas and electricity, Royal Ordnance Factories, and the Atomic Energy Authority.

The special 7-page section dealing with U.K. teaching facilities for chemistry, chemical engineering, etc., which was introduced last year, has been brought up to date with the inclusion of the latest appointments in universities, colleges of technology, etc. This feature provides a guide to Professors, heads of departments, senior staff in Universities of Colleges of Technology as well as more than 200 technical colleges that have courses in chemistry.

The Directory should find a place on every executives desk in the chemical industry, for in addition to a unique collection of data that readers will want to refer to from day to day, it also contains a full diary for 1961, plus calendars.

Buyer's Guide

The Buyer's Guide will contain 600 more product headings than in 1960, the 1961 total exceeding 4,000. About 1,800 will deal with chemicals and some 2,200 with plant and equipment. Occupying nearly 90 pages of the new edition, the Buyer's Guide lists under each heading the names of the various suppliers—an invaluable aid to buyers of a wide variety of products, including chemicals of all kinds, chemical plant and equipment, laboratory apparatus, scientific instruments, safety clothing, etc. This section is also a pointer to new sales outlets.

Also greatly expanded are sections covering trade names and trade marks; the 1961 Directory, for instance, will include 734 trade names, nearly 200 up on last year's total.

Completing the 1961 edition will be a key feature—the 28-page Master Index to manufacturers and other suppliers. This provides a rapid cross-reference to the Buyer's Guide, giving alphabetically the names and addresses of 1,700 companies. Telephone numbers and telegraphic addresses are included.

THE CHEMICAL AGE DIRECTORY AND WHO'S WHO is the only publication of its kind, giving under one cover a mine of information on the British chemical industry that is not obtainable from any other single source. Copies, priced 42s each, may be reserved by completing and returning as soon as possible the coupon on page 1038.

Letter to the Editor

Plastics Chemical Plant

SIR,—We note the letter in your edition of 1 October 1960 from the joint managing director of Kestner Evaporator and Engineering Co. Ltd.

We must express our sympathy with Kestner's that their plastics fabrications are so very heavy. This sheer weight, however, does not of course reflect size in any way nor does it reflect the suitability for any particular purpose. Our own materials, now made in very large size, are very much lighter than Keebush, which is admirable in its field, and we would therefore draw the attention of your readers to this so that they should not be guided purely by the question of weight. Were this so, of course, lead would probably be the only material used for chemical plant construction.

Yours, etc.,
P. W. MICHELSON,
Director.

Tough Plastics Ltd.,
Byfleet Road,
Addlestone,
Surrey.

Croxson Memorial Lecture

The Society of Non-Destructive Examination announces that the first Croxson Memorial Lecture, in commemoration of the late Mr. Charles Croxson, founder chairman of the Society, will be presented on Friday, 17 February 1961, at 6.15 p.m., in the Caxton Hall, Westminster, by Dr. L. Mullins, Ph.D., F.R.P.S., A.I.M., F.Inst.P., on: 'The Evolution of Non-Destructive Testing.'

Obituary

Mr. C. S. Garland, B.Sc., A.R.C.S., F.R.I.C., M.I.Chem.E., vice-president of the National Union of Manufacturers, past-president of the Institution of Chemical Engineers and the British Association of Chemists, and also a former vice-president of the Society of Chemical Industry, has died at the age of 73. A former M.P., he took part in the formation of the Parliamentary and Scientific Committee. He was also a member of the National Production Advisory Committee for Industry.

Overseas News

LAPORTE TO ESTABLISH TITANIUM OXIDE PLANT IN W. AUSTRALIA

AN agreement for the establishment of a £3½ m. titanium oxide plant at Bunbury, 115 miles south of Perth, Western Australia, has been made by Laporte Industries Ltd., with the Western Australian Government. The plant is to have a production capacity of 10,000 tons/year and is expected to start production by 1964. The plant is sited near sources of the main raw material, ilmenite, and agreements have been made with the Western Australian government whereby Laporte have been granted docks and harbour facilities, water supplies, housing and a building site. The state Prime Minister said it marked a major advance in the Government's decentralisation policy, and was a vital breakthrough into the chemical industry. Products of the new industry are expected to be worth more than £A2,500,000 a year.

Mr. P. D. O'Brien, chairman and managing director of Laporte Industries, and Mr. W. Woodhall, a member of the Board and Managing Director of Laporte Titanium Limited, are at present in Australia. In his statement with the last annual report, Mr. O'Brien said the company had confidence in the future sale of titanium oxide as a pigment for a variety of purposes.

It was recently announced (C.A., 26 November, p. 895) that Laporte was taking a 15% interest in a joint venture with American Potash and Chemical Corporation to manufacture titanium oxide in California. In the U.K. Laporte is expending £3.5 m. on the expansion of its titanium oxide plant at Stallingborough, near Grimsby.

Laporte Industries Limited already has a subsidiary company in Australia: Laporte Chemicals (Australia) Pty. Ltd., manufacturing hydrogen peroxide and peroxygen compounds at Botany, New South Wales.

Swedish Chemicals for E. Germany

Products worth a total of 194 million Swedish crowns and including chemicals and pharmaceuticals are next year to be exported by Sweden to the Soviet-occupied zone of Germany under a trade pact between the two countries.

Chlorine and P.V.C. Plant for Hungary

The Hungarian Ministry for Heavy Industry has issued details of the country's new chemical plant—Hungary's third biggest—which is being set up under the name of the Beremend Chemical Works. In its first stage of production the unit will produce annually some 10,000 tonnes of chlorine and up to 6,000 tonnes of polyvinyl chloride, as well as quantities of gaseous chlorine, caustic soda, acetylene and vinyl chloride. Acetylene output, based initially on calcium carbide processing, will later be converted to a base of Rumanian natural gas. After the completion of the second stage of construction at the Beremend plant annual capacity is to be increased to some 16,000 tonnes of plastics per year. Orders have been placed by the Hungarian trading authorities with French manufacturers for the gaseous chlorine unit and with West Germany

Site Picked for Monochem Chemical Complex

The site has been picked near Baton Rouge, La, for the $50 million chemical plant of Borden and U.S. Rubber. The plant will be operated by a joint subsidiary, Monochem Inc, and will produce acetylene and vinyl chloride monomer from hydrocarbons for use by the parent companies in plants to be built adjacent to the Monochem plant.

Construction will begin shortly and the plant is scheduled for completion in 1962. Initially the capacity will be 80 million lb. of acetylene and 150 million lb. of vinyl chloride monomer per year.

Gulf Oil to Build $20 m. Refinery in Denmark

Plans to construct its first European oil refinery at an estimated cost of $20 million have been announced by Gulf Oil Corporation. The refinery will be in Denmark—at Stigsnaes in South Western Zealand—and should be in full production by the end of 1962. It will process 1½ million tons of crude oil annually together with a wide range of petroleum products. Some 1,000 construction personnel will be involved in the project, which will have harbour facilities for the largest tankers. No details have been released as to the contractors involved. Direction of the new refinery will be under Mr. Paul Siecke, who is at present based in London as manager, refining, for Gulf Eastern Co.

Major Plastics Expansion for Grace in U.S.

A major plastics expansion programme announced by W. R. Grace for their Polymer Chemicals Division includes a 50% increase in production facilities at the Baton Rouge, La., high density polythene plant and additions to the Polymer Chemicals Division's product line of a complete range of polystyrene resins as well as a full span of low and medium density polythene resins.

In announcing the programme, the company states that the new Baton Rouge project will enable Grace to supply polymers of a more closely controlled molecular architecture to meet recent advancements in fabricating technology, such as blow moulding and vacuum forming.

Grace's polystyrene resins are produced by Cosden Petroleum Corporation, a subsidiary concern, at Big Spring, Texas. Cosden is increasing its production capacity for polystyrene, including high-clarity, general purpose moulding and extrusion resins as well as medium and high impact formulations. Low and medium density Grex polythene resins will be produced to Grace's specifications by U.S. Industrial Chemicals Co. at their Houston, Texas, plant, using ethylene supplied by Grace.

New Synthetic Rubber rom Hüls

Chemische Werke Hüls AG, have announced that they have completed tests for the production of polybutadiene and that production totalling 20,000 tons a year could be started in 1963. They have also developed the polyisoprene type of synthetic rubber.

Small scale production of an ethylene and propylene synthetic rubber, called AP-Rubber, is now in progress. The material is heat, weather and acid resistant.

U.S. Rubber-Rumianca P.V.C. Plant in Italy

A 10,000 tonne per year polyvinyl chloride plant is to be built by U.S. Rubber and Rumianca, S.p.A. at Pieve Vergonte, Italy. U.S. Rubber has licenced Rumianca to produce and sell p.v.c. and has agreed to furnish technical know-how and engineering services for the design and initial operation of the plant. The plant, costing $3 million, is expected to be in production by mid-1962.

New Fibres Plant for Japan

Asahi Chemical Industry Co. Ltd., of Japan, plans the opening next May of a 4-million-dollar plant for the production of acryl fibres at Kawasaki. Initial capacity of the unit will be 15 tonnes daily. Asahi will build the plant in co-operation with the Standard Oil of Ohio subsidiary Prospect International Co.

Chemical Industry in Austria

Austria's chemical industry now virtually ties with the textile industry for third place in the country's industrial set-up, it is announced in Vienna. Present chemical output in Austria is running at an annual rate of some 20,000 million Schilling (73 Schilling equal £1).

More Petrochemicals for Germany?

According to the German financial daily *Handelsblatt*, a group of German and non-German oil companies are at present carrying out studies into the possibility of erecting a new oil refinery and processing plant in the Frankfurt-on-Main area of the Federal Republic. These studies are said to be based on

the wish of the big Frankfurt chemical producer Farbwerke Hoechst AG to expand its petrochemical production programme. For such expansion increased quantities of olefines and synthetic gas would be needed by Hoechst. A Frankfurt refinery could be fed by an extension of the projected Lavéra-Carlsruhe oil pipeline or by water transport from Carlsruhe or Cologne. Hoechst has stated that it would "greet" the building of such a refinery, even though it would not participate in the costs nor guarantee to buy the refinery's products.

Italian Reactors for U.S. Polypropylene Plant

Novamont Corporation at Neal (West Virginia, US) have recently received from Italy four large reactors built by *Fonderie e Officine Meccaniche* operated by Montecatini in Pesaro. They will be used in production of isotactic polypropylene Moplen patented by Montecatini.

Montecatini/Japan Polypropylene Agreements Approved

The Japanese Government has approved the Montecatini polypropylene agreements with Mitsui Chemical Industry and Mitsubishi Petrochemicals. The contracts cover the production in Japan of isotactic polypropylene plastics, fibres and films. Montecatini will supply know-how and technical assistance to both companies.

Westinghouse to Build 1-million Gallon Sea Water Conversion Plant

A CONTRACT for a 1 m. gall./day plant to convert sea water to fresh water, which will be the largest multi-stage flash evaporator plant in the U.S., has been awarded by the U.S. Department of Interior's Office of Saline Water to the Westinghouse Electric Corporation. The plant will be located at Point Loma near San Diego, California, and its daily output will go to the city of San Diego. Westinghouse will operate the plant for a shake-down period of 75 days, including 30 days at the full daily output.

The flash evaporation process used in the San Diego plant will consist essentially of spraying heated sea water under pressure into a chamber that is at a lower pressure and temperature. A portion of the water 'flashes' into vapour and is then condensed, providing water that is nearly free of impurities. The remaining salty water passes through a series of additional chambers where the flashing process is repeated. At each additional stage the condensed, salt-free water is piped off.

The Westinghouse heat transfer department will have full responsibility for the construction and start-up operation of the plant. The architect-engineering services were handled by Fluor Corporation Ltd. of Los Angeles. Construction is scheduled for completion in exactly one year from a starting date of 3 November and the Ralph M. Parsons Co. of Los Angeles will participate in the engineering and construction of the plant.

In awarding the contract, Dr. A. L. Miller, director of the office of Saline Water, pointed out that the Point Loma plant will be one of five demonstration plants for processing sea or brackish water for agricultural, industrial and domestic uses.

Ionics Dispute Legality of Desalting Plant Contract

ACTIONS by officials of the U.S. Department of Interior, described as "technically unsound and legally questionable," may seriously handicap the nation's efforts to demonstrate a practical method for desalting brackish water, according to charges brought by Ionics Inc.

A contract, valued at $482,200, has been awarded to the Japanese firm, Asahi Chemical Industries Co., for the construction of a 250,000 gall. per day brackish water conversion plant at Webster, S. Dak., but, say Ionics, the plant is to operate on the 'electric membrane' or 'electrodialysis process' for which Ionics hold basic patents in the U.S. and many foreign countries, including Japan.

Protests of the award have been sent to President Eisenhower and Secretary of the Interior, and the House Committee of the Interior has been requested to conduct an immediate investigation of the Japanese award and to withhold the contract until all facts have been aired.

Ionics say that the Japanese plant as designed will not operate at required capacity on the particular water at Webster because of scaling and resulting high labour and membrane replacements costs. On a 20-year operating basis it will cost the American taxpayer substantially more than an already tested Ionics design.

Ionics complain Asahi Chemical have no commercial experience in desalting brackish water as required in the bid specifications put out by the Office of Saline Water.

"Our objection to the Asahi contract award," say Ionics, "is strictly on the basis that this selection is technically unsound, legally questionable and is not in accordance with the published objectives of demonstrating processes which have been previously proved through field experience."

Ionics have backed up their charges by offering open access to all their correspondence and technical evaluations.

British Standard for Symbols Amended

SIX years ago the British Standards Institution took a step towards meeting the need for a standard notation in which chemists, physicists, engineers and other technologists could express their ideas, when it published B.S. 1991, 'Letters, symbols, signs and abbreviations.' It has now been decided to make a comprehensive revision of Part I to reflect the considerable progress that has been achieved nationally and internationally, during recent years. This will be published early in 1961, together with four additional parts.

In the meantime the B.S.I. has issued an amendment to Part I, PD 3920, which can be obtained from B.S.I., British Standards House, 2 Park Street, London W, free of charge, to all those holding copies of B.S. 1991. This amendment brings into effect the most important modifications which are necessary to avoid inconsistency between the various parts.

British Standard for Polystyrene

Polystyrene extruded sheet is the subject of a new British Standard (B.S.3290: 1960). Requirements are specified for two types of toughened polystyrene sheet: the plain type and the type cased on one side with a thermoplastic foil. Details are included of the required composition, dimensions with tolerances and physical properties.

Copies of the standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1., price 3s.

Manufacture of Pressure Vessels

Those parts of British Standard 1500, Part 1, dealing with manufacture, workmanship, inspection and testing of pressure vessels have now been produced in a handy and convenient form for the use of personnel who are primarily concerned with the manufacturing aspects of pressure vessels. This publication includes the whole of Sections 4 and 5, and Appendix A of B.S.1500, Part 1: 1958, together with the relevant illustrations and other appropriate information.

Copies are available from the British Standards Institution, Sales Branch, 2 Park Street, London W.1, price 12s 6d net.

New Edition of Booklet on Man-made Fibres

The fourth edition of the booklet 'Facts about man-made fibres' has recently been issued by the British Man-made Fibres Federation. Only minor revisions have been necessary to the descriptions of various fibres, but additions to the sections on bulked and textured yarns have been included.

Will

Mr. Thomas Griffith Hughes, of Sunnyside, The Parade, Parkgate, Cheshire, formerly of Salisbury Road, New Brighton, Cheshire, retired manufacturing chemist, who died on 10 August last, left £30,310 gross, £29,423 net (duty paid £9,522).

Bookshelf

ORGANIC CHEMISTRY TEXTBOOK IS WIDE IN SCOPE

A CONCISE ORGANIC CHEMISTRY. By *J. G. Guy* and *S. D. Woods*. Blackie and Son, 1960. Pp. vi + 501. 27s 6d.

This book comprises 25 pages of introduction in which the nature of organic compounds, their purification and analysis are discussed, some 200 pages on aliphatic chemistry, 70 pages on aromatic compounds and 80 pages on theory and present-day applications of organic chemistry. Examination questions (mainly Oxford and Cambridge scholarship) with answers to numerical problems are also included.

Although the authors claim that the material is chosen for A level and first M.B. examination—the section on theory being intended for scholarship candidates—the scope of this book is very wide. Carbohydrates, diethyl malonate, ethyl acetoacetate and the theory of aromatic substitution are discussed at some length whereas the chemical evidence for the structure of benzene is only briefly mentioned. The mechanism of the Friedel-Crafts' reaction (p. 270) is at variance with modern views. Useful and concise accounts of the evidence for the structure of such important compounds as ethylene, ethanol and acetaldehyde are given. Esterification of carboxylic acids is contrasted with the neutralisation of acid by base but the authors fail to make the point that in the former process the acid supplies the hydroxyl group.

The inclusion of experimental instructions for the preparation of representative compounds and for the carrying out of tests considerably lengthens the book. There is also a section on the separation and identification of organic compounds. The general scheme of anaylsis is not systematic and is so brief as to be of little value from a practical point of view.

The book is well produced and, with careful selection of topics for study, teachers should find this a useful addition to sixth form textbooks.

Properties of Carbon

CARBON, PROCEEDINGS OF THE 4TH CONFERENCE AT BUFFALO, N.Y. Pergamon, London, 1960. Pp. xii + 778. £7 10s.

This extremely well-produced volume contains the research papers presented at the Fourth Conference on Carbon, June 1959. The sub-divisions are: Surface properties, adsorption and reactivity; electronic properties; carbonisation, graphitisation and structure; mechanical and thermal properties; carbon technology, friction and wear. There are author and subject indices.

While the papers in the technology section are of a restricted significance, many of the others are of a largely academic research character. The electronic properties—including electron spin resonance spectra, semi-conductivity, and magnetic properties—receive considerable analysis and there are detailed studies of crystallite structure and substructure, including the role of dislocations in graphite.

The standard of production and bulk of the volume account in part for the price. The next Carbon Conference is scheduled for June 1961.

Nuclear Technology

PROGRESS IN NUCLEAR ENERGY, SERIES IV; TECHNOLOGY, ENGINEERING AND SAFETY, VOL. 2. By *R. Hurst, R. N. Lyon* and *C. M. Nicholls*. Pergamon Press, London, 1960. Pp. xvi + 790. 105s.

This volume is a collection of papers by many contributors to the Second Conference on the Peaceful Uses of Atomic Energy held at Geneva in 1958. Chapter I is concerned with reactor chemistry and deals with carbon dioxide and graphite, the ion-exchange properties of inorganic hydrated oxides, liquid metal fuel reactors, molten fluorides, etc. Chapter II has articles on reactor materials—the effects of radiation, corrosion and high temperatures. Chapter III describes engineering experiences with, e.g. liquid metal fuels and the handling of high radiation sources. Chapter IV describes further engineering studies such as heat exchange, high temperature reactors and the cooling of water-water reactors. Chapter V deals with reactor safety and design; examples are burst slug detection, shielding and volatile fission products. The 34 articles are liberally illustrated by diagrams, plates and graphs and each has its own set of references. Having regard to the time-lag of two years, the book is of value to chemists, metallurgists and engineers concerned with research and development work in reactor technology.

Organo-metallic Compounds

ORGANO-METALLIC COMPOUNDS. By *G. E. Coates*. Methuen, London, 1960. Pp. xiv + 366. 45s.

This is a second edition of the book published in the Monograph series by Methuens in 1956. The original work has been thoroughly revised and expanded in length and format to cover the chemistry of the transition elements which has been a very active field of research in the last few years. Treatment of the compounds of non-transition metals still proceeds along formal lines. Preparation and the more 'chemical' properties occupy most of the space.

This book is the best available discussion of the fashionable and important subject of organo-metallic compounds. It is the right size and level for the honours student. The last chapter in particular will be of great value to chemists who recieved their formal education before the days of cyclopentdienyls. The book should be in all chemical libraries. It is to be hoped that the publishers reward for bringing the work out at a reasonable price will be additional large sales to individuals.

Inorganic Preparations

HANDBUCH DER PRAPARATIVE ANORGANISCHEN CHEMIE, 2ND EDITION, VOL. 1. Ferdinand Enke Verlag, Stuttgart, 1960. Pp. xv + 885. DM124.

This handbook of inorganic preparations is a direct descendent of the classic work of Vanino. It begins with a chapter of 111 pages on preparative methods which includes high vacuum and high and low temperature techniques. The detailed instructions for the selected compounds each of which occupy one or two pages are written by the editor and 27 distinguished collaborators. Typically the formula is first given, then the preparative reaction (with molecular weights), followed by the necessary instructions for preparation and purification, a few lines on the properties of the compound and two or three selected references to the literature. Occasionally several methods are listed. There are 280 line drawings of apparatus. This volume largely omits the compounds of the transition elements. When the work is complete it will be a uniquely convenient and comprehensive work for all interested in the preparative details of inorganic chemistry.

Microchemistry

PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON MICROCHEMISTRY AT BIRMINGHAM UNIVERSITY. Pergamon Press, London, 1959. Pp. xxvi + 583. 100s.

This book contains the four plenary lectures and 57 papers delivered at the 1958 Symposium together with full reports of the ensuing discussions. Its scope covers most aspects of microchemistry with the main emphasis on quantitative analytical methods. The papers are arranged in classified groups dealing with qualitative analysis, wet oxidation methods for organic matter, weighing, the determination of physical constants and with biochemicals, chromatographic, polarographic, radiochemical, spectrochemical, titrimetric and complexometric analytical methods.

Reasonably up-to-date references are given at the end of each paper and some general reviews are supported by extensive bibliographies. These, together with an author index and a complete directory of the addresses of participants constitute a valuable aid to research workers and other specialists in microchemistry.

TRADE NOTES

Mixer and Blenders

Winston Electronics, Ltd., Waring Products Division, Shepperton, Middlesex, have, under their agreement with the Dynamics Corporation of America, become the sole marketing agent—and later the British manufacturers—of the Waring series of mixers and blenders. These range from domestic, catering and hospital models to industrial mixers and blenders.

Cementable Teflon Film

A new Teflon FEP-fluorocarbon film which can be anchored with common adhesives to a variety of engineering materials has been announced by Du Pont de Nemours International S.A.

The new cementable type of FEP film which offers a wide range of new industrial applications as an anti-stick or protective surface, is now available in developmental quantities in widths up to 30 inches in gauges from 1 to 40 mils.

Matthew Hall Move

Matthew Hall and Co. Ltd., oil refinery, chemical and industrial engineers, are shortly moving into new headquarters Office Building in Tottenham Court Road, London. This building, which will be called Matthew Hall House, will accommodate an administrative and drawing office staff of over 1,000. The move is scheduled to be completed by the end of this year.

Industrial X-rays

With equipment which is now commercially available in U.K. for the first time, it is possible to obtain industrial X-ray pictures that can be developed in 15 sec. The process, known as Xeroradiography, does not require the use of a dark room or wet chemicals and in many cases reveals faults that are difficult to detect by conventional X-ray methods. The equipment is manufactured by Rank-XeroX Ltd. and is marketed by Watson and Sons (Electro-Medical) Ltd., Industrial Division.

I.C.I. Silicones

A booklet on the properties and products of I.C.I. silicones is available from Imperial Chemical Industries Ltd., Nobel Division, Steveston, Ayrshire, Scotland. After dealing with the structure and properties of silicones generally, the booklet lists I.C.I. silicones, fluids, resins, rubbers and miscellaneous, with information on their nature and uses.

Vinatex P.V.C. Plastics

Vinatex Ltd., Devonshire Road, Carshalton, Surrey, have issued a publication dealing with the use of Vinatex p.v.c. pastes in hot dip coating, hot dip moulding, rotary coating, slush moulding and spray coating.

Q.V.F. Mexican Agent

Sole agent for the complete range of Q.V.F. chemical glass plant and pipeline in Mexico will be Bezaury, S.A., 3a. Calle Lago Xochimilco No. 21, Colonia Anahuac, Mexico 17, DF.

Filters from U.S.

Available from Croll-Reynolds Engineering Co., 1122 Main Street, Stamford, Conn., U.S., is an eight-page brochure about the ClaRite filter and its operation. The brochure focuses on the filtration of steam condensate in supercritical generating stations, but ClaRite filter systems are also used in other fields such as chemicals, cosmetics, pharmaceuticals, plastics, synthetic fibres and electroplating.

Market Reports

INDUSTRIAL CHEMICALS REMAIN STEADY

LONDON Steady trading conditions have been reported from most sections of the industrial chemicals market with buyers giving more attention to contract renewals. Home call for the routine soda products has been well maintained and there has been a good demand for hydrogen peroxide, borax and boric acid.

Copper sulphate is a quiet market, the current price showing a 20s/ton rise at £77 10s/ton, less 2% f.o.b. Liverpool. Prices elsewhere are steady and have moved within narrow limits.

The coal tar products market continues firm for the most part.

MANCHESTER From the point of view of new business, trading conditions on the Manchester market for chemical products have shown signs of end-of-the-year dullness. The recent enquiries have resulted in a moderate aggregate weight of orders for both spot and forward deliveries coming on to the books. In the meantime steady contract supplies are going forward to the textile and allied trades and to other industrial outlets.

Prices generally have been well maintained with an advance to £77 10s/ton in copper sulphate (as mentioned under ' London ').

SCOTLAND There has been little change in conditions generally during the past week. Buying continued steady and fairly well distributed between spot and contract requirements. There is still considerable interest relating to 1961, contracts where the level of quantities involved have been maintained.

The demand for industrial chemicals for the textile and allied industries has been satisfactory. Prices have shown little change and from the most part have remained fairly steady. The seasonal quietness in agricultural chemicals still prevails.

PEOPLE in the news

● **Mr. John C. Garrels, Jr.**, of Springfield, Mass., U.S., has been elected a member of the board of Monsanto Chemicals Ltd. and has been appointed deputy managing director of the company. He has been an assistant general manager of Monsanto Chemical Co.'s Plastic Division since 1956. He will assume his new responsibilities early in 1961, as soon as he can establish residence in Britain. Mr. Garrels went to Monsanto as a chemical engineer in 1942. He joined the Plastics Division in 1946 as manager of a plant Monsanto then operated at Lockport, N.Y. In 1948 he was promoted to manager of the Springfield plant. He became divisional production manager in 1950 and director of manufacturing in 1954. In 1955 he was appointed assistant general manager in charge of manufacturing. When he assumed his present position he was placed in charge of marketing, research, manufacturing, engineering and personnel relations for the division.

● **Mr. J. R. Jarratt,** manager of the Beeston chemical works of Boots, has been awarded the Lampitt Gold Medal

Mr. J. R. Jarratt

of the Society of Chemical Industry. He joined Boots as a laboratory assistant in 1928, and became manager of the Beeston works in 1945. He has been hon. secretary of the Nottingham Division of the S.C.I. since 1948.

● **Mr. G. U. Hopton, B.A., B.Sc., M.I.Chem.E., M.Inst.Gas E.,** has been appointed the new director of the Gas Council's London Research Station at the Fulham Laboratories. He was senior research chemist of the North Thames Gas Board from 1952, until the retirement of Dr. R. H. Griffith in August, when he became acting director.

● Whitehaven Corporation have decided to confer the Freedom of the Borough on **Mr. Frank Schon,** chairman of Marchon Products Ltd., and **Mr. F. Marzillier,** former financial executive to the firm. The award is in recognition of the contribution made to Whitehaven's prosperity since Marchon Products was established there.

● **Mr. I. F. E. Coubrough** has been appointed a director of B.X. Plastics, of London.

● At the Annual General Meeting of the British Tar Confederation held on 29 November, **Mr. C. Lord** (chairman of Lancashire Tar Distillers Ltd.) was elected President of the Confederation and Chairman of the Executive Board; **Mr. L. W. Blundell** (controller of By-products, North Thames Gas Board) was elected Hon. Treasurer and **Messrs. W. K. Hutchison, C.B.E.** (deputy chairman of Gas Council) and **C. M. Frith** (South Yorkshire Chemical Works Ltd.) Vice-Chairmen of the Executive Board. The Executive Board consists of 10 representatives nominated by each of the Association of Tar Distillers, the British Coking Industry Association and the Gas Council, and one representative nominated by the Low Temperature Coal Distillers Association of Great Britain Ltd.

● **Mr. D. Bradley, M.Sc. (Chem. Eng.) B.Sc., A.M.I.Chem.E.,** has been appointed technical manager of Sharples Centrifuges Ltd. He has been with the United Kingdom Atomic Energy Authority, engaged in research and development work, particularly problems relating to separation equipment. His most recent responsibilities have been concerned with technical assessment and plant design. His present appointment will also carry the responsibility of supervision of the Sharples pilot plant installation and field experimentation, and he will also head the Sharples Process Development Group in the U.K.

● Three new appointments affecting Shell Chemical Company's Northern Sales Region, Industrial Chemicals Division, are announced.

Mr. G. J. Tordoff, formerly General Chemicals Sales Manager, is appointed Solvents Sales Manager. **Mr. G. B. Green,** formerly assistant to the General Chemicals Sales Manager, becomes General Chemicals sales Manager. **Dr. A. L. Bull** has been appointed a representative in the engineering and surface coating fields.

● **Dr. F. A. Tatford,** director of contracts of the Atomic Energy Authority, has been elected president of the Institute of Public Supplies for a second year. He has also been appointed a director of the National Institute of Governmental Purchasing, Inc., U.S.

● **Mr. A. M. Hudson Davies, O.B.E., M.A.,** has been elected chairman of the Institution of Works Managers for the year 1960-61. Managing director of Fibreglass Ltd. since 1946, he joined the board of Pilkington Group Ltd., the parent company, in 1952. His past career includes a period (1928-33) as assistant commercial manager at the Billingham Works of I.C.I.

I.C.I. Reorganise Executive Set-up

A MODIFIED scheme of organisation involving a redistribution of responsibilities among the Executive Directors will be brought into effect by I.C.I. on 1 January. By combining research and development and discontinuing economic planning, the number of functions has been reduced from eight to six. The functional directors will be as follows: Commercial, **Mr. W. D. Scott;** Finance, **Mr. P. T. Menzies;** Overseas, (A) Western Hemisphere and Africa south of 15° N. latitude, **Mr. R. C. Todhunter;** (B) Europe, excluding U.S.S.R. and Eastern Europe, **Dr. A. Caress;** (C) rest of the world, **Dr. J. S. Gourlay;** Personnel, **Mr. C. M. Wright;** Research and Development, **Dr. J. Ferguson;** Technical, **Dr. R. Beeching.**

The manufacturing Divisions have been re-grouped, and the number of Groups reduced from six to five. The Group Directors will be as follows: Group A (comprising Alkali and General Chemicals Divisions), **Dr. J. Ferguson;** Group B (comprising Dyestuffs, Paints and Pharmaceuticals Divisions), **Mr. G. K. Hampshire**; Group C (comprising Fibres, Heavy Organic Chemicals and Plastics Divisions), **Mr. C. Paine;** Group D (comprising Billingham and Nobel Divisions, Wilton Works and Severnside Works), **Mr. R. A. Banks;** Group E (comprising Metals Division), **Dr. J. Taylor.**

Dr. R. Beeching

Dr. A. Caress

Dr. J. Ferguson

Dr. J. S. Gourlay

Commercial News

- 7% Rise in Distillers' Half-year Profits
- Glaxo Group Trading Profit Up 25%
- Hüls and Houdry Form Joint Company
- Norsk Hydro Dividend Up By 1%

Distillers Co.

A 7% rise in Distillers' half-year profits and an interim dividend raised one point to 6% as forecast, were accompanied by a warning that the tendency in the current half-year is towards lower profit margins. The group's trading surplus for the six months ended 30 September was £15,922,000 (after charging depreciation), and there was a sharp rise in income from trade investments to £556,000. After various other charges, the pre-tax profit works out at £15,931,000 against £14,798,000, but almost all of the increase is offset by higher tax charges so that the net profits are not significantly higher than for the previous half-year.

The pattern of trade in the last two months has not shown any material change and the board reports that all branches of the group are experiencing keener competition. Consequently trading profits for the year are expected to show only a similar increase to that achieved in the first half, which implies that net profits and earnings for ordinary dividend will show little overall change.

Chemische Fabriken Oker

The Oker, West Germany, chemical concern Chemische Fabriken Oker und Braunschweig AG announces an unchanged dividend for the 1959 financial year of 8% for priority shares and 7% for founders' shares on a total capital of DM880,000.

British Industrial Plastics

Group profits of British Industrial Plastics Ltd. for the year ended 30 September were £1,484,185 (£1,113,026). Group net profit, after tax of £543,000 (£357,300) and depreciation of £351,366 (£310,110), was £589,819, or some 32% higher than a year ago.

Coalite and Chemical

Coalite and Chemical Products Ltd. have declared an interim of 5% on capital raised by one-for-two scrip issue (5%).

Shell Italiana

The Italian subsidiary of the Royal Dutch Shell group, Shell Italiana of Genoa, has raised its capital from Lire 12,000 m. to Lire 22,000 m. In the 1959 financial year the company recorded a working loss of Lire 1,071 m., as compared with a loss of Lire 1,614 m. for the previous financial period.

Glaxo Laboratories

During the year the Group Trading Profits increased by rather more than 25% and, provisions for taxation having absorbed about the same proportion of profits this year as last, a similar percentage increase, amounting to £743,000, will be observed in Group Net Profit after tax.

Consolidated sales of the group at home and abroad were 11% higher than in 1958/59.

Once again it has been decided to capitalise part of the company's capital reserve. Sir Harry Jephcott, company chairman comments, however, that it must not be assumed that the total sum distributed by way of dividend for the current financial year will be any greater than that to be paid out for the year to 30 June last.

Chemische Werke Huls

The West German company Chemische Werke Hüls AG, of Marl, and the Houdry Process Corporation, of Philadelphia, Pa (USA) have set up a joint company—known as Katalysatorenwerke Houdry Hüls GmbH, at Marl—in which the parent companies will each hold an equal interest.

The new company will produce and distribute catalysers of types manufactured by the parent companies. Behind the move lies the increasing demand for catalysers among European chemical manufacturers. The catalysers, to be manufactured by Houdry Hüls, will be used principally by the petroleum and petrochemical industries.

Pierrefitte

The French chemical producer Pierrefitte, Société Générale d'Engrais et de Produits Chimiques announces the recording of a net profit of NF4.1 m. (1.4 m.) for the financial year ended 30 June, 1960, in which total turnover rose by 31% from NF49.4 m. to NF64.8 m. A dividend of 7% is suggested. In the previous financial year the issue of one gratis share per 20 existing shares was made in lieu of dividend. Dividend is paid on a capital of NF40.6 m.

Norsk Hydro

The Norwegian chemical producers Norsk Hydro, of Oslo, announce a dividend of 9% for the financial year ended 30 June, 1960, as compared with only 8% for the previous financial year. This rise in capital is in the face of a fall in net profit from 22.4 m. Norwegian crowns in 1958/59 to 20.6 m. (the equivalent of £1.03 m.) in the past period. Sales rose over the year from 515 to 562 m. crowns, of which latter total 395 m. was accounted for by export sales. Better results than those for the 1959/60 financial year are expected for the current period.

Schering AG

The German chemical concern Schering AG, of West Berlin, announces that it is to suggest to an extraordinary general meeting to be held on 27 January 1961 the raising of the firm's capital by DM14 million (almost £1¼ million) by the issue of new shares at 150% face value and with dividend rights from 1 January 1961. The company also states that its 1960 turnover will be some 14% higher than that for last year.

Saint-Gobain Nucléaire

Saint-Gobain are to set up a special company to deal with work connected with nuclear chemistry and physics under the title of Saint-Gobain Nucléaire. The new company will have an initial capital of N.Fr.25 million.

Zellstofffabrik Waldhoff

The Mannheim, West Germany, cellupose producer Zellstofffabrik Waldhof plans to raise its capital by DM15,600,000 to a new level of DM78,000,000. The new shares, whose issue will be decided upon at an extraordinary general meeting to be held on December 22, will be issued one new share for four old shares at 150 per cent face value. The company expects a repeated dividend of 8% for the current financial year.

INCREASES IN CAPITAL

ASPRO-NICHOLAS LTD., 16 Berkeley Street, London W.1. Increased by £1 million, beyond the registered capital of £2 million.

BRILLO MANUFACTURING COMPANY OF GREAT BRITAIN LTD., North Circular Road, London N.W.10. Increased by £225,000, beyond the registered capital of £234,000.

ENFIELD CHEMICALS LTD., Adam House, 1 Fitzroy Square, W.1. Increased by £55,000, beyond the registered capital of £10,000.

P. LEINER AND SONS LTD., manufacturers of glue, gelatine, etc., 7/9 Gracechurch Street, E.C.3. Increased by £150,000 beyond the registered capital of £100,000.

PALLAS CHEMICALS LTD., 37 Lovaine Place, Newcastle upon Tyne 1. Increased by £30,000 beyond the registered capital of £20,000.

NEW COMPANIES

CURTIS CHEMICAL COMPANY LTD. Cap. £100. Manufacturers and distributors of and dealers in chemical substances and products including bonding adhesives, cements, glues, mastics, resins, etc. Directors: A. H. Winterbotham, J. H. Marshall, L. Stark, D. W. Norris-Curtis. Reg. office: 5 Unity Street, Bristol 1.

MOLYKOTE (GREAT BRITAIN) LTD. Cap. £20,000. Manufacturers, distributors, importers and exporters of and dealers in chemical products of all kinds, manufacturers of lubricants on the basis of molybdenum-disulphide and other solids, etc. Solicitors: Buckeridge and Braune, 3/4 Clements Inn, London W.C.2.

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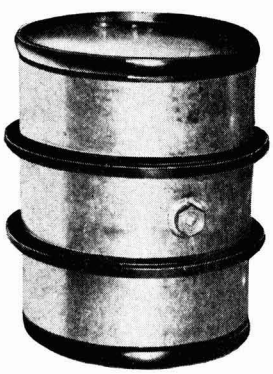

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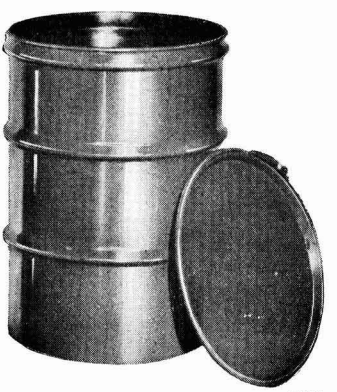

AP191

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 18 January

Process for producing crystalline ortho, ortho^1-bis (para-1,1,3,3-tetramethylbutylphenol) monosulphide and nickel derivatives thereof. Ferro Corp. **858 890**

Vulcanisation accelerators. Farbenfabriken Bayer AG. **858 995**

Process for the preparation of organosilicon esters. Midland Silicones Ltd. **859 375**

Method of processing barium sulphide leaching residues to produce barium hydroxide. Kali-Chemie AG. **859 249**

Process for enriching phosphate minerals. Montecatini. **859 155**

Copolymers of acrylamide and vinyl aromatic sulphonates. Dow Chemical Co. **859 269**

Polyethylene coating composition. American Viscose Corp. **859 250**

Process for reducing organic nitro-compounds to amines, and a catalyst for same. Du Pont de Nemours & Co., E. I. **859 251**

Process for the preparation of finely-divided silica. Henkel & Cie GmbH. **859 271**

Aqueous dispersions of butyl rubbers and methods of producing the same. D'Eichtal, B. A. H. **859 252**

Process for the thermal dealkylation of aromatic compounds. Shell Internationale Research Maatschappij NV. **859 079**

Gum plastic material. United States Rubber Co. **859 080**

Method for preparing substituted tris amino boranes. United States Borax & Chemical Corp. **859 187**

Process for the purification of paraxylylene dichloride. Vereinigte Glanzstoff-Fabriken AG. **859 110**

Hydrogen peroxide. Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler. **786 237**

2,2^1-dihydroxy-4,4^1-substituted benzophenones for preserving coloured and non-transparent rubber or rubber-like substances. Fairweather, H. G. C. **786 762**

Diketene. Distillers Co. Ltd. **800 974**

Open to public inspection 25 January

Pharmaceutical preparations. Rabinovitch, H. **859 555**

Electrodialysis processes. Permutit Co. Ltd. (Permutit AG). **859 377**

Quaternary ammonium compounds. Glovers (Chemicals) Ltd. **859 770**

Plasticised synthetic elastomers. Dunlop Rubber Co. Ltd. **859 812**

Process for producing free acidity in surface coatings containing carboxylic acid derivatives. Boake, Roberts & Co. Ltd., A. **859 466**

Phosphate esters and insecticidal compositions containing same. Fisons Pest Control Ltd. **859 735**

Production of phenthiazine derivatives. Egyesült Gyogyszer es Tapszergyar. **859 379**

Process for the manufacture of pure chloroprene. Knapsack-Griesheim AG. **859 401**

Production of unsaturated derivatives of 2,6-dimethyl octanes. Glidden Co. **859 567**

Process for preparing polyesters from lactones. Union Carbide Corp. **859 639**

Diisocyanate-modified polyesters and a process for their preparation. Union Carbide & Carbon Corp. **859 640**

Diisocyanate-modified polyesters and a process for their preparation. Union Carbide Corp. **859 641**

Lactone polyesters and a process for their preparation. Union Carbide Corp. **859 642**

Process for the preparation of lactone adducts and polyesters. Union Carbide Corp. **859 643, 859 645**

Process for preparing polyesters from lactones. Union Carbide Corp. **859 644**

Method for production of sulphur-containing carboxylic-ester adducts and products so-called. Rohm & Haas Co. **859 773**

Stabilised acrylonitrile polymers. Chemstrand Corp. **859 506**

Process for the manufacture of metal-ion exchanger resins capable of forming chelate complexes. Farbenfabrik Wolfen Veb. **859 776**

Production of 1-phenylcyclo-hexane-1-hydroperoxide. Montecatini. [Addition to 841 157.] **859 850**

Manufacture of halogen-androstarienes. Ciba Ltd. [Addition to 779 989.] **859 747**

Process for the manufacture of aromatic hydrocarbons. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning. **859 439**

Resin compositions. Minneapolis-Honeywell Regulator Co. **859 573**

Process for separating olefinic hydrocarbons from hydrocarbon mixtures. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning. **859 440**

Monoazo-dyestuffs of the oxdiazole series insoluble in water and process for their manufacture. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning. **859 444**

Basically substituted butyric acid anilides and process for their manufacture. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning. **859 385**

Basically substituted alkyl xanthine derivatives and acid addition salts thereof and a process for their production. Chemiewerk Homburg AG. **859 445**

Phosphoric and thiophosphoric esters and compositions containing them. Montecatini. **859 737**

Process for the production of borohydrides. Farbenfabriken Bayer AG. **859 468**

Ion-exchange resins. United Kingdom Atomic Energy Authority. **859 834**

Treating trade effluents electrolytically. Armour Hess Chemical Ltd. **859 417**

Apparatus for the control of chemical processes. Imperial Chemical Industries Ltd. **859 500**

Organolead compounds. Ethyl Corp. [Addition to 824 849.] **859 478**

Process for the manufacture of stable aqueous resin emulsions of the oil-in-water type. Ciba Ltd. **859 709**

Preparation of polyester resins. Legendre, P. E. **859 710**

Saturated long chain aliphatic dicarboxylic acid polyketones. Centre National de la Recherche Scientifique. **859 740**

Aliphatic organic diphosphines. Imperial Chemical Industries Ltd. **859 391, 859 741**

Monoazo triazine dyestuffs. Imperial Chemical Industries Ltd. **859 989**

Tetra-iodophthalamic acids and their salts. Glaxo Laboratories Ltd. **859 818**

Dicarbocyanines. Ilford Ltd. **859 452**

Macrocyclic thialactones and process for the preparation thereof. Chemische Fabriek Naarden NV. **859 392**

Esters in rosin sizes. Wieger, P. K. **859 787**

Preparation of linear poly (cyclo) acetals. Union Carbide Corp. **859 483**

Insecticidal compositions containing amides. Leek Chemicals Ltd. **859 714**

Method and installation for producing chemical foam. Dion-Biro, G. **859 512**

Pyrimidines and their salts and a process for their production. Cilag-Chemie AG. **859 716**

Unsaturated acids and esters thereof and a process for the manufacture and conversion of same. Roche Products Ltd. **859 897**

Method of polymerising compounds. American Cyanamid Co. **859 717**

Process for the continuous production of copolymers of ethylene. Farbenfabriken Bayer AG. **859 743**

Process for preparing substituted tetracyclines. Bristol-Myer's Co. **859 394**

Polymerisation of vinyl aromatic compounds. Koppers Co. Inc. **859 517**

Hydrogen peroxide compositions. Ashe Chemical Ltd. [Addition to 827 331.] **859 550**

Modified polyethylene terephthalate. Union Carbide Corp. **859 489**

Production of 12 α-deoxytetracyclines. American Cyanamid Co. **859 580**

Deoxyanhydrotetracyclines. American Cyanamid Co. **859 581**

Phenthiazines derivatives. Rhone-Poulenc. **859 727**

Monoazo dyestuffs derived from benzthiazole. Imperial Chemical Industries Ltd. **859 899**

Preparation of perchloryl fluoride. Pennsalt Chemicals Corp. [Addition to 834 594.] **859 492**

Adhesive for polythene and method of using same. Imperial Chemical Industries of Australia & New Zealand Ltd. **859 728**

Pigmented amino plastic resinous materials. National Lead Co. **859 729**

Process for the production of polypropylene and catalysts therefor. Rhone-Poulenc. **859 730**

Monoazo triazine dyestuffs. Imperial Chemical Industries Ltd. [Divided out of 859 989.] **859 990**

Production of polyglysidyl ethers of tetrakis (alkyl-substituted hydroxyphenol) alkanes. Bataafse Petroleum Maatschappij NV. [Addition to 774 663.] **859 456**

2-Substituted 2,6-dimethyl octane derivatives. Glidden Co. [Divided out of 859 567.] **859 568**

Process for separating polymers from solution. American Cyanamid Co. **859 493**

Acetylenically unsaturated alcohols and a process for the manufacture thereof and for the conversion thereof into the corresponding ethylenically unsaturated alcohols. Roche Products Ltd. [Divided out of 859 897.] **859 898**

Stabilised acrylonitrile polymers. Chemstrand Corp. [Divided out of 859 506.] **859 507, 859 508, 859 509, 859 510**

Coating compositions containing metal alcoholates and alkyl esters. Esso Research & Engineering Co. **859 695**

Composite metal-polymer compositions. National Lead Co. **859 696**

Apparatus for producing ozone. Forderung der Forschung an der Eidgenossischen Technischen Hochschule Gesellschaft Zur. **859 871**

Vulcanisation of butyl rubber. United States Rubber Co. **859 398**

Difunctional polymers and methods for their preparation. Goodyear Tire & Rubber Co. **859 470**

Preparation of polymers or copolymers of butadiene wherein the butadiene units have at least 90 per cent 1,4-microstructure. Goodyear Tire & Rubber Co. **859 698**

Catalytic hydrocracking. Socony Mobil Oil Co. Inc. **859 400**

Process for the production of polyacrylamide solutions. Henkel & Cie GmbH. **859 407**

Monoazo dyestuffs derived from benzthiazole. Imperial Chemical Industries Ltd. [Divided out of 859 899.] **859 900**

Heat formable synthetic resin compositions. United States Rubber Co. **859 703**

International Patents Office Under Negotiation

In reply to questions asked in Parliament recently concerning the possibility of creating an International Patents Office, Mr. Erroll, Minister of State to the Board of Trade, said that the President had already arranged for the views of experts of countries—members of the European Free Trade Association as well as those of the European Common Market—to be sought on the possibility of creating an International Patents Office, and some preliminary consultation has already taken place. The establishment of such an office would tend towards the unification of the patent laws of all countries which recognised it.

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OFFICIAL APPOINTMENTS

THE NORTHERN GAS BOARD

CHIEF CHEMIST

Applications are invited for the position of Chief Chemist to the Board from chemistry graduates of a British University or persons holding an equivalent qualification.

A wide rather than a highly specialised knowledge of the chemical aspects of industry, with practical experience of chemical control in industrial processes is desired.

The appointment relates to the Board Headquarters as well as the Tyneside Division, the laboratories being situate at Redheugh, Gateshead on Tyne. Duties will be two-fold: to advise upon specific problems concerning any of the Board's operations and development, conducting such investigations as may be necessary for the purpose; and to maintain a general oversight of the work of the chemical control staffs at the Board's Tyneside gas-manufacturing stations.

Salary Scale in Group D Senior Staff, £1,695 per annum 4×£50.

The successful applicant will be required to take up his appointment not later than 31st March, 1961, and will be subject to satisfactory medical examination and agreement to enter the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, giving the names of two referees, should be sent to the undersigned not later than 4th January, 1961.

JOHN F. JACKSON,
Secretary,
30 Grainger Street,
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Age limits: (a) at least 26 and under 32, (b) at least 21 and under 29. Extension for regular Forces service and Overseas Civil Service. Qualifications: normally a degree, or a Diploma in Technology, with first or second class honours in science, mathematics or engineering, or equivalent attainment; additionally for (a), at least 3 years' relevant post-graduate experience. Selection by interview. London salaries: (a) £1,330-£1,640, (b) £730-£1,205; provision for starting pay above minimum. Promotion prospects. Write Civil Service Commission, 17 North Audley Street, London, W.1, for application form, quoting (a) **S/53/60,** (b) **S/52/60.** Closing date 31st December, 1960.

BOX NUMBERS : *Reply c/o "Chemical Age" Bouverie House, Fleet Street, E.C.4*

PUBLIC APPOINTMENTS: continued

LOTHIANS RIVER PURIFICATION BOARD
Pollution Prevention Department

Applications are invited for the undermentioned superannuable post in the Pollution Prevention Department:

SENIOR CHEMIST. Male, B.Sc., or A.R.I.C., and preferably A.M.Inst.S.P. Experience in Water, Sewage and Trade Effluent Analysist and staff control essential. Salary range, £1,310-£1,480 p.a.

Applications, together with the names of two referees, to be submitted within 10 days to :

The River Inspector,
LOTHIANS RIVER PURIFICATION BOARD,
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SITUATIONS VACANT

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Further opening for Qualified Chemist or Chemical Engineer (age up to 32) interested in the economic side of chemical industry and with a few years of industrial experience.

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PRINCIPAL SCIENTIFIC OFFICER (CHEMIST)
required by the United Kingdom Atomic Energy Authority, Production Group, Springfields Works, Salwick, Preston, Lancashire, to lead and direct a small team of Chemists and Assistants engaged on laboratory and small pilot scale development of chemical processes associated with extraction of uranium from ore; production of uranium metal, oxide and other intermediates; recovery of values from a wide range of complex residues and treatment of effluent liquors.
The work involves considerable study of the chemistry underlying processes used in this large modern Works, which has responsibility for extraction of uranium from ore and concentrates and its fabrication into a wide variety of fuel elements for nuclear reactors.
At least a second class honours degree, or equivalent, in Chemistry, together with wide research experience in physical and inorganic chemistry, are essential. Development experience, including a period as section head or team leader, on operation and control of small pilot plants used in chemical process work, is desirable.
Salary between £1,740 and £2,460 according to age, qualifications and experience. Housing Assistance Schemes. Contributory Superannuation.
Send postcard for application form, quoting reference SF.79/J.11, to Works Secretary at above address.
Closing Date: 31st December, 1960.

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