Chemical Age

SHELL-U.S. LINK ON POLYOLEFIN FILMS
(page 195)

VOL. 84 No. 2143

6 August 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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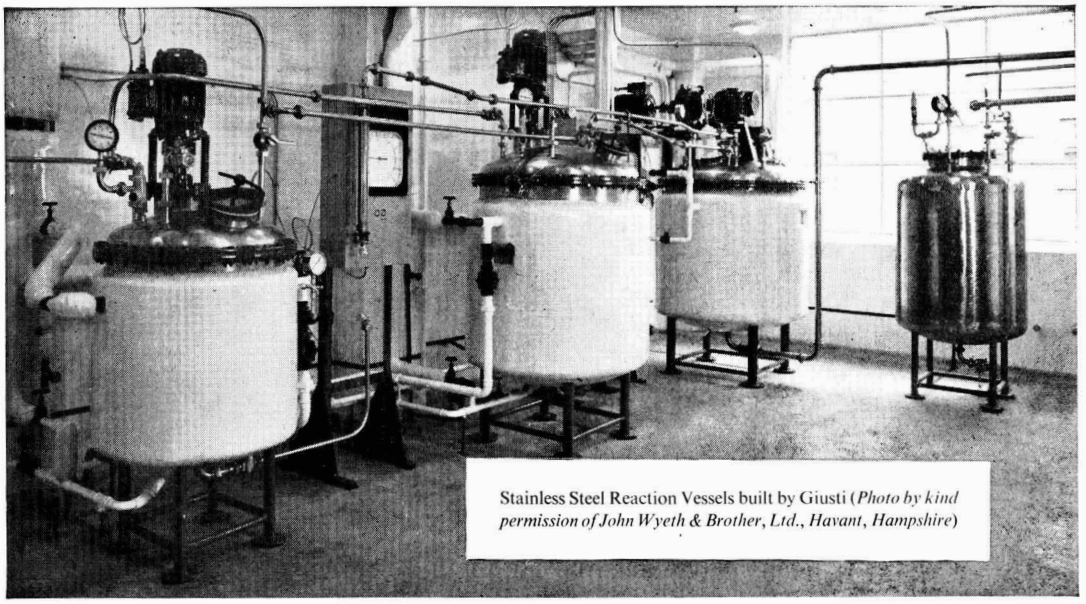
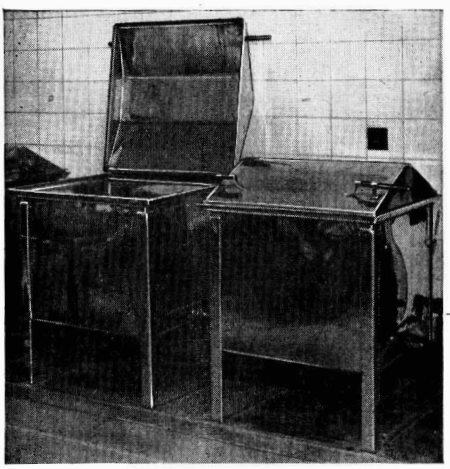


Stainless Steel Reaction Vessels built by Giusti (*Photo by kind permission of John Wyeth & Brother, Ltd., Havant, Hampshire*)

HIGH EFFICIENCY— LONG-LASTING

stainless steel plant by



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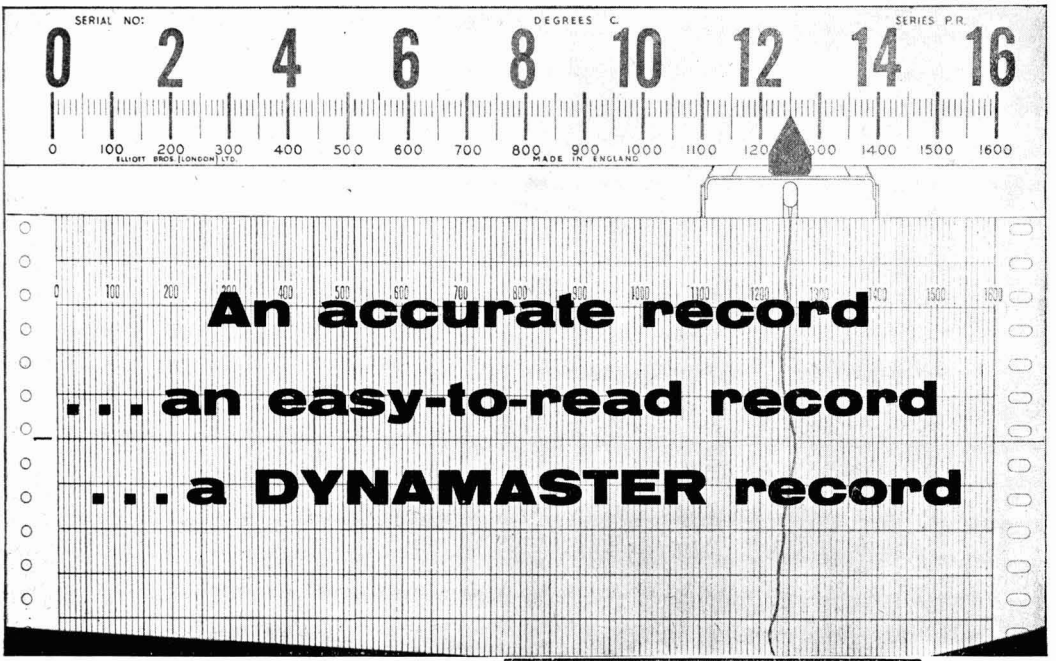

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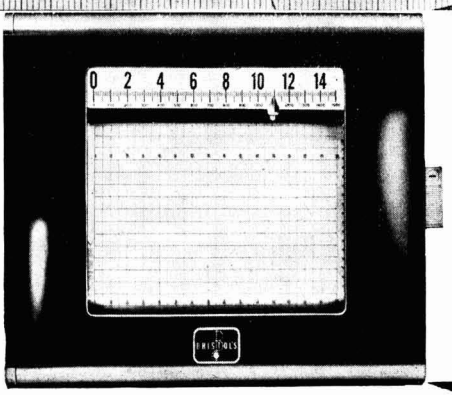

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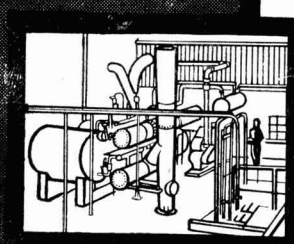

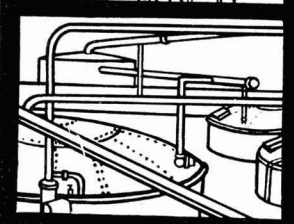

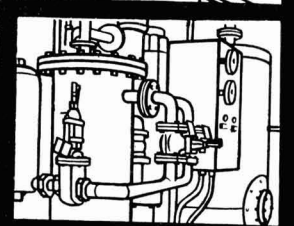

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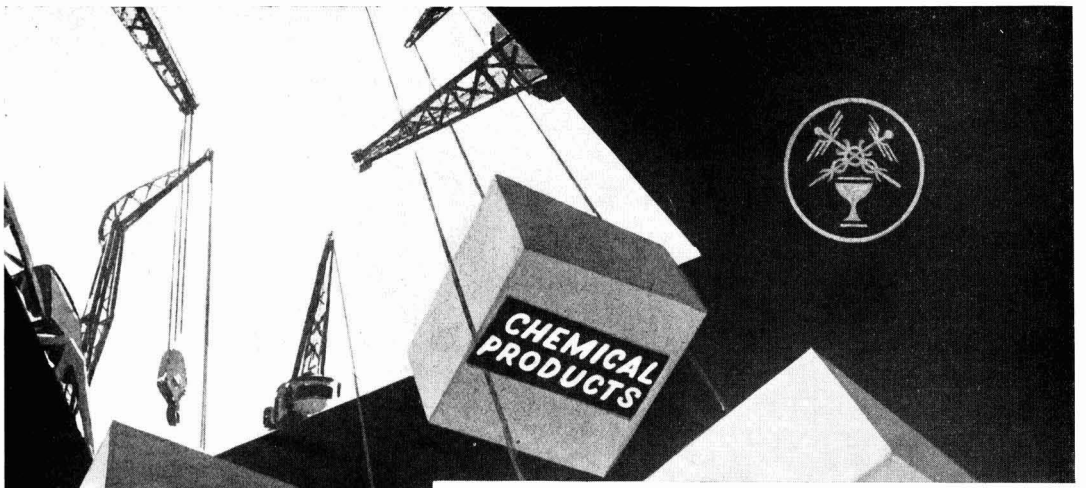

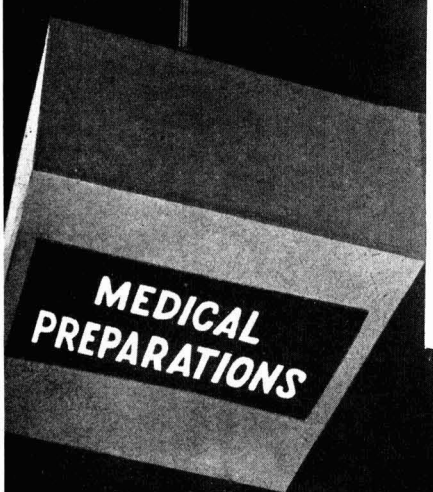

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IN THIS ISSUE

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CHEMICAL AGE

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NUCLEAR POWER PROBLEMS

WITH the civil reactor programme fairly well marked out, and research and development work progressing steadily, the bigger question marks hanging over U.K. atomic power plans at present seem to be economic ones. For instance, how much money does the Atomic Energy Authority stand to lose through the pile-up of uranium supplies due to the atomic power slow-down? Storage costs are relatively unimportant, but the annual interest on capital locked up in these extra stocks may well amount to several million pounds. Apart from the stocks already held in the U.K., there are still some supplies to come in from current contracts with uranium producing countries. It is thought that all this uranium will be enough to last about 10 years.

It is small consolation to know that the U.S. Atomic Energy Commission's appetite for consuming the large extra supplies of uranium now available from Canada is not as great as had been anticipated, and that current supply contracts are being spread over a longer period. The decision of the U.S.A.E.C. not to take up its options on Canadian uranium after the current contracts expire makes it unlikely that the U.S. atomic energy industry will be placing any new uranium orders outside the U.S. for many years. To soften the blow to the Canadian uranium producers, the U.S.A.E.C. and the U.K.A.E.A. got together with Canada's Eldorado Mining and Refining Ltd. to work out 'stretch-out' proposals, which involve advance payments to enable the surviving mines (effectively the lower cost producers) to meet the current loan obligations of those mines whose contracts they have taken over. In thus helping Canada's uranium industry to meet its financial difficulties, however, the U.K.A.E.A. has not solved its own where uranium over-stocks are concerned.

But another economic question of much greater significance comes to the fore with the slow-down of the U.K. atomic power development. A nuclear power plant now being ordered will cost about 30% more than the conventional type but nuclear power will be cheaper when higher temperatures are achieved in the heat cycle. The immediate problem—that we cannot achieve the same top temperature in the heat cycle that is achieved with the conventional fuels—is entirely due to conditions within the reactor.

These problems concern the fuel elements, the moderator, reactor stability and control and engineering materials. They were discussed recently by Sir Christopher Hinton, during the Royal Society tercentenary celebrations.

As far as fuel elements are concerned, little advance can be expected until magnesium alloys (magnox) are replaced as canning materials. The two alternatives are stainless steel and beryllium, both of which increase the cost of the fuel elements. This increase in cost must be offset by higher ratings and by achieving higher burn-ups, both of which requirements entail a departure from the use of metallic uranium as fuel. They can only be achieved by the use of uranium in ceramic form.

The chemistry and physics of graphite under reactor conditions are not completely understood. Problems arise both from the oxidation of the graphite by activated carbon dioxide and also from the displacement of

carbon atoms by fast neutrons having energy greater than the bond energy in the crystal.

Past history of reactor development and the present state of knowledge has led the Atomic Energy Authority to design the advanced gas cooled reactor which does use ceramic uranium dioxide fuel elements and experiments are being carried out at Windscale on the suitability of beryllium and stainless steel as the canning material. (CHEMICAL AGE, 4 June 1960, p. 913.) It is estimated that the capital cost of the first industrial reactors of this type will be between £95 and £80 per kw sent out and that they will generate power at a cost of between 0.55d and 0.50d per unit.

Advances have also been made in the magnox reactors: in the increase in pressure in the gas circuit, which means a greater amount of power can be drawn from the reactor; improved utilisation of pressure vessel volume; and increase in fuel element and coolant temperatures. There is little doubt that the initial generating cost estimated for A.G.R. shows little, if any, advantage over an improved Calder reactor, but it is difficult to withstand the urge to move forward to the type which gives prospect of using higher temperatures.

There is little prospect at present of reducing research and development cost to below 30% of capital expenditure for nuclear plants (compared to 5% in the conventional field). The high temperature gas cooled reactor, which is in the project stage at Winfrith Heath, is an effort to meet the problem by using the graphite as the canning material for the fuel, so that it is replaced as the fuel elements are changed, or alternatively using heavy water as the moderator so that radiation damage can be repaired or removed during circulation.

Remembering that it is improbable that sufficient British-mined coal will be available to meet total fuel requirements by some date early in the 1970's, it appears reasonable to aim at continuing the high rate of advance of nuclear technology to a point where nuclear power breaks even in cost with conventional power.

WORLD PYRIDINE SHORTAGE

THE U.K. market has long been used to the 'ups and downs' in demand for pyridine. Recent developments, however, suggest that the current shortage, which has seen prices for the domestic product (pure pyridine 2°) rise by some 12s 6d to 15s per gall. to about 62s 6d per gall. over the past six months, is more than a passing phase. Prices for imported pyridine are generally nearer 70s.

U.K. production of pyridine bases in 1959 totalled about 365,000 gall. of which approximately 95,000 gall. were exported (C.A., 9 January, p. 78). The five main producers are Midland Tar Distillers Ltd., the largest, Yorkshire Tar Distillers Ltd., North Thames Gas Board, Lancashire Tar Distillers Ltd., and United Coke and Chemicals Ltd.

To cope with current demand, the import duty of 33⅓% on pyridine has been temporarily removed until 30 September, mainly at the request of I.C.I., who are now in large-scale production of Reglone, their new potato haulm destroyer, in which the material is incorporated. Pyridine is, of course, also used in the pharamaceutical industry, in the production textile auxiliaries, particularly for waterproofing, the production of rubber accelerators, as a solvent and reagent, in dyestuffs manufacture, for photographic chemicals and in some protective coatings.

One potentially large new use for pyridine is seen in the U.S. as stemming from research on the part of the Quartermaster Research and Engineering Centre, Natick, Mass., to discover improved water repellent finishes for Army clothing. Called Quarpel, the new process depends on the synergestic effect of two standard waterproofing agents. One is stearamidopyridinium chloride; the other is a nonionic emulsion of a perfluoracrylic ester, marketed as Scotchgard FC-154 by Minnesota Mining.

Used alone neither can withstand repeated washing nor dry cleaning, together it is claimed that they confer permanent water resistance on fabrics. The method used of application is the simple one of immersing the fabric to be treated in a pad bath containing the two chemicals, plus any other finishing agents. The treatment is said to give a better water repellent finish to outer garments than anything at present on the market.

The shortage of pyridine is world-wide and last year's prolonged steel strike tightened supplies in the U.S. In 1959 the U.S. imported 141,356 gall. from Europe, including 87,000 gall. from the U.S.S.R. The U.S. is now finding it difficult to get Soviet pyridine, although the U.S.S.R. is currently exporting quantities to India at about $1,316 per ton, well below the U.K. price. Also, the Soviet Union has contracted to sell large quantities to Italy.

In the U.S., Reilly Tar and Chemical, who have been producing synthetic pyridine since 1954, are doubling the capacity of their facilities. This is not likely to do more than slightly ease the current position because U.S. reports, confirming experience in this country, say that most of the major producers are sold months ahead. Among new user trends in the U.S. is the bigger demand from plastics producers. Pyridine is also sought for polycarbonate resin, pyridine-borane (Callery Chemical) and 2-fluoropyridine, a reaction intermediate (K. and K. Laboratories). Reilly Tar and Chemical say that solvents and reagents; drug synthesis; textiles and rubber each account for 25% of pyridine produced; with photochemicals and dyestuffs taking 5% and 'undisclosed new uses and miscellaneous' accounting for 20%.

GLASS TO RIVAL STEEL

A NEW technique for effecting an overall increase in the strength of glass by combined chemical and thermal treatment suggests the possible replacement of metals by glass as structural material, since the bending strength of glass treated by this new method becomes greater than that of certain widely-used steels. The technique has been developed at the D. I. Mendeleex Institute of Chemical Technology, Moscow, and is to be reported in Vol. 129 of the *Proceedings of the Academy of Sciences of the U.S.S.R. Chemical Technology Section.*

The experiments were carried out with industrial sheet glass, which was first softened by heating in a furnace to 200°C, and then quickly immersed in a heated organosilicon liquid bath. Hardening was achieved by constant decreases in temperature of the organosilicon liquid by steps of 20°. The glass specimens were then removed from the bath and dried at 200°, since higher temperatures bring about considerable relaxation of stresses.

This process was found to increase the bending strength of 3 mm. thick glass by as much as 11 times—to 55 kg. per mm.^{2}—while with thicker glasses the bending strength was increased by an even higher ratio. This marked increase in strength is due to the simultaneous hardening of residual stresses, and the formation (at the moment of quenching) of a silicon-oxygen polymer which heals the microcracks in the glass surface. It is interesting to note that the internal residual stresses produced in this way are only slightly greater than those produced in the normal hardening of glass in air. It is therefore evident that the success obtained depends on the nature of the polymeric film formed, which acts as a unique 'armour', cementing the glass surface.

An English translation of this work will shortly be available from Consultants Bureau, 227 West 17th Street, New York 11.

Project News

FREEPORT TO JOIN GOULDINGS IN IRISH ACID PRODUCTION

DIRECTORS of W. and H. M. Goulding Ltd., fertilisers and sulphuric acid manufacturers, Dublin, have reached an agreement under which the company will become associated with the Sulphur Export Corporation of the U.S., for the purpose of sulphuric acid production in the Republic of Eire. Freeport Sulphur, one of the owners of Sulphur Export, will co-operate.

This news follows the announcement in May that Goulding's were to build a second sulphuric acid plant for installation at East Wall, Dublin, to supplement that at Marina, Cork. A new company, named Sulphac, in whom Goulding will hold the major stockholding, is to be set up and will own and operate the two 70,000-tons-a-year plants at Cork and Dublin. The former will come into production this month and the latter should be completed in a further 12 months.

The £1 million acid unit at Cork, built by Simon-Carves Ltd. is a sulphur burning contact-type unit. The facilities include plants for the production of 200,000 tons/year of superphosphates and compound fertilisers. The fertiliser units will reach full production in the next two months.

Concurrently with the large-scale production of acid, Gouldings are to be reorganised so that certain smaller acid units will in due course be taken out of production and other activities of the factories re-directed. Most of the acid produced in the two plants will be used by Goulding group companies for fertiliser production.

Earlier this year Gouldings disposed of their 51% holding in Richardson's Chemical Manure Co. Ltd. and Ulster Manure Co. Ltd., who have plants at Belfast and Londonderry, to I.C.I.

● A SUCCESSFUL start-up of sulphuric acid plant designed by Chemical Construction Corporation, New York, for Border Chemical Co. Ltd., has been announced. The first acid plant in Manitoba, it is producing well above 50 tons/day rated capacity. Although operating with Canadian sulphur, the plant will shortly be converted to produce sulphur dioxide gas from the roasting of New Manitoba Mining and Smelting Co.'s sulphide concentrates.

● P.G. ENGINEERING LTD., Stockton-on-Tees, have received a contract from Tokai Ryuan K.K.K., Japan, for the design and engineering of process plant to treat ammonia synthesis gas. The plant is designed to deal with about 500,000 cu. ft. of synthesis gas an hour and consists of a P.G. high-pressure carbon monoxide conversion unit, using P.G. manufactured catalyst for high-pressure use, followed by hydrogen sulphide and carbon dioxide removal in a two-stage plant employing the Vetrocoke process (this process was described in CHEMICAL AGE, 21 May, p. 842).

Engineering will be carried out at Stockton-on-Tees and completion of the contract is planned for early next year. The value of the contract, which was obtained through the company's associates in Japan, Mitsubishi Chemical Machinery Manufacturing Co. is about £300,000.

● CONSOLIDATED Mining and Smelting Co., Canada, building at Trail, B.C., a chlor-alkali plant, have awarded a contract for engineering services for the new $2,600,000 plant to J. T. Donald and Co. Ltd., Montreal. The new Cominco plant, which will be in operation by the end of this year, will produce liquid chlorine and caustic soda to be used at the $50 kraft pulp mill of Celgar Ltd., being constructed at Castlegar, about 20 miles north of Trail.

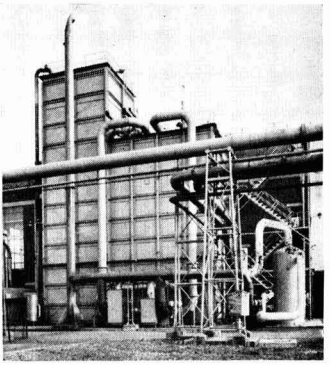
● NAGATUCK CHEMICALS has moved a step nearer to production of basic pesticide in Western Canada with completion of preliminary engineering for Western Canada's first such plant to be situated in Edmonton, Alberta. Nagatuck, which produces pesticides at its Elmira, Ontario, plant will invest nearly $1.6 million in the new Edmonton plant. The plant will produce three general herbicides as part of an agricultural chemicals expansion programme, together with a wood preservative, pentachlorophenol.

● A CONTRACT worth about £4,200, for an electrodialytic desalting plant to be used in the Kirkuk oil fields, has been awarded by the Iraq Petroleum Co., to William Boby and Co. Ltd., Rickmansworth, Herts.

● INSTRUMENTATION contract, worth £200,000, for a new Soviet chemical plant has been placed with Honeywell Controls Ltd., Greenford, Middlesex. The £2 million plant is being built by Vickers-Armstrongs (Engineers) Ltd. to the design of Zimmer's, chemical process engineers, Frankfurt, and will produce chemicals used in the manufacture of nylon.

The main contract was placed by Techmashimport of Russia early in 1959. The new Honeywell instrumentation subcontract includes a 100 ft. semi-graphic control panel containing full size electronic and miniature pneumatic instruments for controlling temperature, liquid level, pressure and flow. Full instrumentation and installation engineering is included in the contract. There will be 70 temperature control loops, 30 level, 30 differential pressure and 50 flow and blending loops.

Honeywell Controls are being assisted by their German and Italian associates in this project, but most of the equipment will be made at the company's Newhouse, Lanarkshire, factory.



First tonnage oxygen plant to be owned and operated by a U.K. steel company at the Corby works of Stewarts and Lloyds. It was built by Air Products in association with Butterley (C.A. last week, p. 159)

● THE Iraqi Ministry of Industry seeks tenders by 31 August for the erection of a fertiliser plant at Abul Flus. Tender forms are obtainable at $70 a set from the consulting engineers for the project, Embank and Partners Ltd., 10-11 Grosvenor Place, London S.W.1.

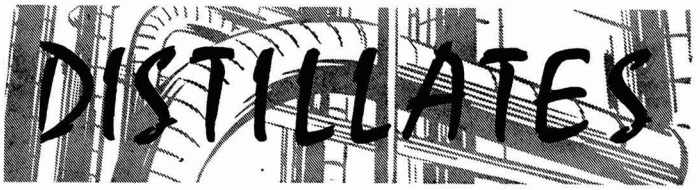
● WORK has now started on construction of the new polyisoprene plant at Pernis of the Royal Dutch/Shell Group. According to *The Financial Times*, the factory will consist of an isoprene plant and a polyisoprene plant, to be completed in 1962. The two together will represent an investment of about £7 million. Polyisoprene output is said to be in the order of 25,000 tons a year.

Shell Link with U.S. Firm to Make Plastics' Films

PLANS for the production and marketing of polyolefin film and plastics packaging materials outside the U.S. and Canada are to be developed by a new joint company that is being formed by Shell International Chemical Co. Ltd., London, and National Distillers and Chemical Corporation, New York. Companies of the Royal Dutch/Shell Group—including Shell Chemical Co., at Carrington—have substantial interests outside North America in the production of polyolefins.

National Distillers, one of the world's largest polythene producers, also own the Kordite Co., U.S., manufacturers of plastics films for packaging. They have also recently established a company in Switzerland to cover sales and development of polythene.

The new Shell-National Distillers company will operate from London. It will be headed by Dr. W. L. J. De Nie, a senior executive of Shell Development Co., New York, with Mr. Werner T. Meyer, in charge of Kordite's foreign operations, as his deputy.



★ I HAVE before drawn attention to the much quicker on-stream times that U.S. chemical companies seem to achieve compared with the rate of building new plants in this country. The speed with which Constructors John Brown Ltd. have built the Propathene polypropylene plant for I.C.I. has already proved that there are exceptions to every rule. Now comes news of what must be the fastest building project in this country and one that has probably not been bettered elsewhere, even in that land of pace, the United States.

To an I.C.I. construction engineering team headed by Mr. A. Forbes goes the credit of having put a new chemical process to work directly from pilot stage to a full-scale 100-ft. high plant in just under 14 weeks. New techniques of what is termed 'crash planning' and intensive overlapping of civil engineering, physical construction and mechanical engineering led to plant completion in the record time of 11 weeks.

It then took plant operatives and maintenance crew less than three weeks to get the new process plant on stream. The plant is a continuous, largely automatic, glycol recoveries unit at the Terylene works, Wilton, of I.C.I. Fibres Division researchers evolved the process, details of which are not available. This military-style attack to streamline all stages of building is described in page 197.

★ I WONDER if the new British Standard laying down sizes of process vessels will receive such a warm welcome from many plant designers and users as it will get from fabricators. Idea behind the standard is to save fabricating firms having to keep so much press and other equipment at hand to meet the variety of vessel sizes called for today. With the modern trend towards the use of plate material for vessels, the cost of dies and other items for pressing to shape is quite considerable. Only when vessels are made as castings—a declining practice—can the fabricator cater for a wide variety of sizes economically.

Certainly the capacity and dimensions of process vessels are often decided upon without any reference to the fabricator's problems, or any thought of standardisation. Occasionally, dimensions that are just impossible from the fabrication point of view are called for, while at other times they are based on vessels made to metric standards on the Continent. All very trying to fabricators.

The new standard, B.S. 3161, 'Sizes of process vessels for chemical and allied industries', specifies dimensions of process vessels of the 'vertical cylindrical open' and 'vertical (or horizontal) cylindrical closed' types, and the so-called 'boat' pans. Range of capacities is 5 to 5,000 Imp. gall. Bravely, the standard also attempts to clear up some of the confusion regarding the names of the various types of process vessels by including definitions of such terms as 'pan', 'mixer', 'evaporator', 'dryer', 'still', 'autoclave' and 'separator'.

★ I DID not think that Pendennis of *The Observer* would emerge unscathed following his recent article on the Royal Society (see Distillates last week). *The Observer* this week carries a letter from Dr. D. C. Martin, assistant secretary of the Royal Society who says that Pendennis made 10 factual errors and that the opinions quoted were therefore based on a very unsound foundation.

As to the 'premium on old age,' Dr. Martin points out that the average age of the Fellows on election is 47. Pendennis quoted the view of two Fellows that the council, like Mussolini's Fascist Council, proposed Councillors and Fellows without giving voters a choice. Dr. Martin points out that the council, in addition to the officers, consists of 16 members who change completely every two years. At any moment, about 180 Fellows are involved in "the elaborate committee business of the Society" and they change every few years.

He adds that the Society's many activities can be seen in clearer perspective in *The Times* supplement of 19 July. Pendennis replied saying that his article, which was full of praise for the Royal Society, was intended to give a less "formal and monolithic picture" than that available in *The Times*.

★ THE large market for packaging films and materials (some 10% of the 120,000 tons of polythene to be produced in the U.K. this year is scheduled for the production of films) has doubtless led to the link between Shell International Chemical Co. Ltd. and National Distillers of the U.S. The two companies are to develop plants for the production and marketing of polyolefin film and plastics packaging materials as stated in p. 195.

The only other major link in this country between a producer of polyolefins and a manufacturer of film is that between I.C.I. and their wholly-owned subsidiary, British Visqueen Ltd. Neither the Distillers Plastics Division, who through British Resin Products handle sales of Rigidex, nor Union Carbide, whose polythene is marketed by the associated Bakelite Ltd., nor Monsanto Chemicals Ltd. have any controlling interest in a film fabricating company. Distillers, however, have a minority interest in B.X. Plastics, who make some film material.

There are about 30 large producers of film in the U.K. who provide a ready market for film-grade polythene.

★ HAVING suffered personally, like so many other British holiday makers, from the nuisance of oil pollution on our beaches, I was glad to learn that the Government is now taking more positive action to combat this menace, and that the D.S.I.R. is already tackling the subject, with a definite research programme as a likely development. I also learn, from an authoritative source, that the D.S.I.R. has tucked away, for possible future use, information on those two very different anti-oil pollution preparations, Oilsink and Polyclens, which, as noted on page 201, have recently been tried out in the U.K.

But it should be noted that the brief that the D.S.I.R. has been given by the Minister for Science, Lord Hailsham, is the investigation of effective methods of clearing *beaches*. So the D.S.I.R. is not, at present, concerned with methods of clearing oil patches from the sea itself. But it may well be that, if a suitable programme of research is formulated, study of this approach will later be included.

It does not seem likely that any one treatment or decontaminating agent will be discovered as a general panacea for oil pollution problems. The method of beach clearing in any particular locality will obviously depend on a number of factors, such as the extent of the pollution and the nature of the shore—for instance, a treatment which works well on a rocky coast may not be at all effective on sand. Whatever methods are eventually proposed, the question of cost will undoubtedly be the dominant one and presumably local authorities will be hard-headed enough to wait until the most economical solution is presented to them.

★ Now available in development quantities from American Cyanamid's Petrochemicals Department, New York, is pimelic acid, a white crystalline solid, which could be the precursor of new polyester and polyamide resins and films.

Pimelic acid reacts as dibasic acids forming amides which are easily dehydrated to nitriles. Also formed are pimelic esters considered as potentially useful plasticisers. Although it has seven carbon atoms, pimelic acid has a lower melting point and higher water solubility than other dibasic acids, and is suggested as likely to produce novel products.

Alembic

B.I.P. in Mexican Aminoplastics Venture

A NEW company, Materials Moldeables S.A. de C.V., has been formed by British Industrial Plastics Ltd. and the Borden Co., U.S., to manufacture amino moulding compounds in the Mexico City area. Mexican capital is being invited to participate in the new company.

The company will have an initial capacity of 1,000 tons a year, states Mr. C. H. Glassey, chairman of British Industrial Plastics.

B.I.P. will be responsible for designing the new plant and for supplying 'know-how.' Overall operation will be handled co-operatively. The new company will erect a two-storey building with a total floor area of about 15,000 sq. ft. for warehousing of raw materials and finished products, plus office accommodation.

Obituary

Mr. E. A. Bearder, M.B.E., M.Sc., F.R.I.C., with a record of 36 years' outstanding service to the dyestuffs and chemical industries, has died at the age of 73. He was at one time delegate director of I.C.I. but in 1945 was seconded to the Allied Control Commission organisation to take part in the important task of controlling the German chemical industry, being made director-general. He retired in 1947, when this work ended with the dissolution of I. G. Farben. Mr. Bearder started his career in industry in 1911 as a research chemist with Levinstein Ltd., dyestuffs manufacturers, and in 1921 became adviser to the Dyestuffs Advisory Licensing Committee to the Board of Trade, his services earning him the award of the M.B.E. In 1930 he joined the British Dyestuffs Corporation Ltd., which later became the I.C.I. Dyestuffs Division, and was appointed commercial manager in 1940. When Imperial Chemical (Pharmaceuticals) Ltd. was formed, Mr. Bearder became its secretary and was shortly afterwards made a delegate director. In 1945, I.C.I. agreed to his secondment to the Allied Control Commission for Germany and Austria.

Mr. L. M. Hesse, London area manager of the Geigy Company Ltd., died on 13 July. He had been with Geigy all his working life and moved from Manchester to London as area manager shortly after the last war.

Mr. H. Lowe, M.Sc., F.R.I.C., public analyst for the six North Wales counties and also for Chester, Shropshire, Shrewsbury and Wrexham, has died, aged 72. He held these appointments for more than 30 years, having succeeded his father, Mr. W. F. Lowe, who was the last combined public analyst and assay master in Chester.

Institute of Packaging

The Institute of Packaging has moved to larger premises on the ground floor of Malcolm House, Empire Way, Wembley Park, Middlesex (Wembley 8263).

I.C.I. Have New Glycol Recovery Plant Built and Working in 14 Weeks

A NEW glycol recovery process has been engineered direct from pilot stage to plant scale in 11 weeks and recently brought on stream at the Terylene plant on I.C.I.'s Wilton site. The process will substantially improve output figures as well as the method of recovering glycol after it has passed through the polymerisation process.

An additional glycol recoveries plant has been constructed in a 100 ft. high steel structure and new techniques were evolved by I.C.I. engineers for 'crash planning' as well as an intensive overlap of job stages in order to meet a call for speedy completion. The plant was, in fact, built and working in 14 weeks, for in less than three weeks from handover it was producing high purity glycol up to specification standard.

The need for an additional glycol plant arose from the Terylene III extensions programme, which will help to boost Wilton Terylene output to 50 million lb. a year. Now well advanced in this project are three new plants—terephthalic acid, dimethyl terephthalate and polymer.

Refined glycol supplied to I.C.I. Fibres Division from the Heavy Organic Chemicals Division contains, after passing through the polymerisation process, four major impurities—water, methanol, glycol acetate and solids. The new recoveries plant removes these impurities, bringing the glycol back to a high purity state. Previously, purification was effected in two batch stills. The new unit operates a continuous recovery process which is largely automatic.

Following development of the continuous process by the Harrogate research department of Fibres Division, a pilot plant was set up at Wilton. Close co-operation and integration was called for to translate pilot operations to plant scale in the shortest possible time. In overall control of design work, Fibres Division anticipated the need for an adequate supply of raw materials and these were on site at the right time. Detailed method study and programming were applied to construction work so that civil work was completed within the three weeks allotted and steelwork was completed in the scheduled four weeks. The mechanical stage was condensed into eight weeks despite difficulties.

To save time, much of the 10,000 ft. of pipework was fabricated on site, while the 60 major items of plant—distillation columns, heaters, condensers and other vessels were being installed. One of the most difficult problems was the installation of vessels, most of them on high-level platforms. The structure is open only on one side, and even there access was limited to a few feet by adjacent storage tanks.

At one stage of construction more than 100 tradesmen and others on various stages of the project were working on the structure at the same time. The rate of instrument installation was almost doube the previous average rate at Wilton.

While construction was in progress, plant process and maintenance men worked alongside the construction team to familiarise themselves with the plant in detail as it was being built. Since the operators had worked on the pilot stage of the new process, start-up was effected smoothly. The new plant operates on quantities about 80 times larger than those of the pilot plant.

Midland Tar Link with Schenectady Varnish for U.K. Production

PRODUCTS of Schenectady Varnish Co. Inc., Schenectady, New York, are to be manufactured and sold in the U.K. by a new company which has been formed jointly by Schenectady Varnish and the Midland Tar Distillers Ltd., Oldbury, Birmingham. Linked with the project are Midland Tar's plans to expand their activities by the manufacture of chemical derivatives obtained from tar distillation products. The plant will be situated at the Four Ashes refinery, which has been developed during the last 10 years.

Products of Shenectady Varnish Co., founded in 1906 for the manufacture of insulating varnishes and magnet wire enamels for the electrical industry, now includes industrial resins and coatings used in rubber compounds, rubber based adhesives, emulsion floor polishes, brake linings, laminated papers, reinforced plastics, paints, varnishes and enamels. They are based on phenolic, polyterpene, epoxy, urethane alkyd, polyester, pure hydrocarbons and fortified natural resins. Until the new company is in production, delivery of Schenectady resins will be made from stocks held at Four Ashes.

The announcement of the new venture follows the recent intimation by the Midland Tar Distillers chairman, in his annual statement, that the company's policy was "to extend our chemical manufacture by isolation and development of the constituents of our tar, by the manufacture and development of chemical derivatives of the finished products so obtained, and by the adoption of other processes of chemical manufacture, which either use one or more of our existing products, or may depend on quite other raw materials."

Glaxo's New £100,000 Analytical Laboratories at Ulverston

NEW laboratories built for the analytical department of Glaxo Laboratories Ltd. at Ulverston, at a cost of £100,000 are now in operation. One of the most interesting features of the new laboratories is a unique multi-stage dilution apparatus, evolved by Mr. T. E. V. Horsley, head of the department, which carries out dilutions up to 1 in 10,000. The prototype and two other units, each costing £1,000, are now in operation.

Among the modern and up-to-date equipment installed is a Technicon Auto-Analyser for carrying out repetitive sampling and testing. The unit can deal with up to 40 samples an hour.

The department, which has a staff of over 100 including a number of university graduates, provides specialised analytical technical services for the quality control of pharmaceuticals produced at Ulverston, the two major drugs being the antibiotics penicillin and streptomycin. The aim is to improve quality over and above the levels of international standards.

On the ground floor are the offices, and the chemical and instrument laboratories. The main chemical laboratories, interconnecting, incorporate facilities for inorganic and organic analytical chemistry with a 'dark area' for the operation of projection microscopes and colour measurements.

Facilities for the assay of Vitamin A away from the effect of bright sunlight have been provided. An instrument section dealing with infra-red and ultra-violet spectrophotometric methods of analysis is situated adjacent to one of the chemical laboratories and accessible from others. In one corner, available to all these areas, is a solvent room.

On the main entrance corridor, is a stores and sample reception room, equipped with facilities for the preparation of samples in a convenient form for general analysis.

Biological assay section, sterility testing laboratory and a laboratory kitchen, are the main units on the first floor. Biological assay section relies on an air-conditioning system designed to provide ample ventilation free from local draughts. This area is without opening windows in order to prevent the access of foreign dust particles which might interfere with the work. The sterility test laboratory is fully air-conditioned and separated from the kitchen by incubators with access from both the laboratory and from the kitchen, and also by the bacteriological control laboratory which is directly associated with the work in both the kitchen and the sterility laboratory.

Main contractors for the building, which is steel framed with brick panelling, were Taylor Woodrow Ltd., London.

I.C.I. Strikers Go Back To Work

EIGHT-DAY unofficial strike of 2,000 craftsmen at I.C.I.'s mid-Cheshire and Runcorn works ended with a return to work on 29 July. Following a decision of the Northwich strikers to return to work, the Runcorn strikers decided, at a mass meeting, that they would also go back. Discussions on the striker's grievances will now take place between the unions and the company.

The Runcorn men went back to work on the understanding that negotiations would re-open on revision of basic pay, the incorporation of basic pay in the grading scheme, and re-organisation of the bonus scheme. Executives of the unions concerned—the Boilermakers' Society, E.T.U., and National Federation of Building Trades Operatives—were influential in getting the men to return to work.

In Parliament

Regulations on Colours in Foodstuffs

THE Minister of Agriculture, Fisheries and Food, Mr. John Hare, has presented a written reply to a request that he should list in *Hansard* the dyes used in colouring foodstuffs, and that he should also list those which were in use and are now forbidden and give the reason for refusing to allow their use any longer.

The colours which may be used in colouring foods, as shown in the 1st Schedule to the Colouring Matter in Food Regulations, 1957. have accordingly been listed in *Hansard* for 25 July. col. 87. To this the Minister adds that, before these regulations were made, any colour, except for a small number specifically prohibited by the Public Health (Preservatives, etc., in Food) Regulations, could be used in foods (other than milk). It is not known how many colours were used in food before 1957. The Food Standards Committee confined itself to examination of 98 colours submited by the food industry and the chemical manufacturers; these are listed in Appendix II of the committee's report on colouring matters (H.M.S.O. 1954) and paragraph 14 of the committee's supplementary report on colouring matters (H.M.S.O. 1955). The grounds on which the committee recommended some of these colours as suitable for use in food, and rejected others, are explained in the committee's report; the Minister said he could not add to this. The Government had accepted the committee's recommendation that the permitted list should be reviewed after five years.

Bleaching Agents and Improvers in Flour

Asked what bleaching agents or improvers are in use for the treatment of flour since agene was forbidden, and what evidence was that these are not also harmful to health, the Minister of Agriculture listed the bleachers and improvers in use as: chlorine dioxide, potassium persulphate, benzoyl peroxide, nitrogen dioxide, chlorine and sulphur dioxide.

On the health question, the Minister said he understood that the Food Standards Committee's Report on Bread and Flour, which he expected to receive soon, would include a study of the evidence on this question.

Lord Wakehurst Opens Neoprene Plant

At the opening of the Du Pont neoprene plant (C.A., 30 July, p. 161): l. to r., John C. Weyrich, general manager, W. S. Carpenter, chairman of E. I. du Pont de Nemours, Lord Wakehurst, N.I. Governor, and W. H. McCoy, managing director, Du Pont Co. (U.K.) Ltd.

Three New Countries Join I.A.E.A. Board

BELGIUM, Finland and Poland replace Czechoslovakia, Norway and Portugal as designated members of the board of governors of the International Atomic Energy Agency for 1960-61. The 10 other designated members—Australia, Brazil, Canada, France, India, Japan, South Africa, U.S.S.R., U.K. and U.S.A. —are members of the present board.

Besides the 13 members designated by the board itself, there are 10 other members elected by the Agency's General Conference. But this year it will elect only five members, since five others were elected last year for two years.

Treatment of Chromate Wastes Using Liquid Sulphur Dioxide

Introduction of a batch process for treatment of chromate waste at the Pontiac, Michigan, plating works of General Motors Corp. has shown a number of advantages over the continuous process previously used. This article, based on a paper presented by Mr. A. J. D'Orazio to the 15th Annual Purdue Industrial Conference, describes the new method

CHEMICALS used in electroplating solutions are extremely toxic to aquatic life, and are detrimental to the efficient operation of sludge digesters in sewage treatment plants. However, more important than the danger to aquatic life is the danger to human life. All wastes at the Pontiac Motor Division of General Motors Corporation are completely treated before being discharged to the municipal sewage treatment plant. The waste treatment plant consists of five separate treatment systems: (1) cyanide system, (2) metallic acid, (3) alkali acid, (4) alkali oily, (5) final treatment.

Hexavalent Chromium

The copper, nickel, and chromium plating wastes are treated in the metallic acid system. The following discussion deals mainly with the treatment of hexavalent chromium in the metallic acid system. The volumes of waste to be disposed of in this system vary from 400,000 to 700,000 gall./day. The following table shows the volumes and concentrations treated in this system over a five-day period.

Batch No.	Volume in galls.	Concentration in p.p.m. Cu.	Ni.	Cr^{+6}
1	407,500	2.8	212	4.5
2	380,300	43	110	6.0
3	271,700	63	87	24
4	244,500	184	235	92.5
5	309,700	80	100	10
6	326,000	100	165	12
7	255,400	39	110	40
8	326,000	45	163	38
9	298,300	33	100	10

It will be seen that the concentrations of hexavalent chromium are lower than the concentrations of nickel and copper. This is due mainly to the fact that the chromium wastes are recovered in the plating plant by means of ion exchange followed by vacuum evaporation. By this method 550 lb. of chromic acid are recovered daily. Also sodium hydrosulphite is used in the plating plant, by additions to the rack strip and cleaning solutions in the continuous plating line, to reduce chromic acid that is trapped by the plating racks in the chrome plating tanks, and that is not removed by cleaning and rinsing processes.

This usage of hydrosulphite automatically reduces the demand of chromium reduction process in the waste plant.

When waste flows were determined from a plant survey, the use of gaseous sulphur dioxide on a continuous basis seemed to be the best available method for reducing hexavalent chromium and was adopted. Although copperas is less expensive than sulphur dioxide, its use was not given too much consideration because of the problems presented by its use. Since it requires 8 lb. of $FeSO_4 7H_2O$ to reduce 1 lb. of chromic acid, the excessive sludge formation would add to the cost of sludge disposal. Also, the use of copperas presents troublesome feeding problems due to caking of the salt.

In processing this waste on a continuous basis using gaseous sulphur dioxide, considerable difficulty was encountered. The equipment originally installed to reduce the chromium from the hexavalent to the trivalent state consisted essentially of two 20,000-gall. Koroseal plastics lined tanks provided with agitators, two sulphur dioxide feeders, and provisions for two 1-ton cylinders of sulphur dioxide. The sulphur dioxide was introduced into a water stream passing through the venturi in the feeder. Since no evaporator had been provided, vaporisation occurred in the supply tanks and at a rate below requirements because of the tendency to freeze when the vaporisation rate was too high. There was also some loss of gas from the surface of the treatment tanks. The addition of two more supply cylinders into the system did not make up the deficiency so it was decided to change to batch treatment in the storage tanks by use of sulphur dioxide in the liquid state.

Treatment of Waste

The waste treatment plant is provided with two large holding tanks which are now used as storage as well as treatment tanks for the metallic acid waste. They are steel tanks lined with Koroseal each having a capacity of 520,000 gallons. This large holding capacity tends to equalise the concentrations. Each tank is provided with an agitator of the Vorti Mix type.

The treatment of the waste is started after a holding tank becomes half full. A sample of the waste is obtained and a check made for hexavalent chrome concentration and pH. The sample is later analysed for total chrome, nickel and copper concentration.

Concentrated sulphuric acid is pumped into the holding tanks to lower the pH to 2.5. This generally takes 5-20 minutes, depending on the pH and volume of waste. The waste solution is air agitated during the acid addition to ensure proper mixing. The required amount of sulphur dioxide is calculated from the hexavalent chrome concentration. Liquid sulphur dioxide is then added to the waste to completely reduce the hexavalent chrome. The liquid sulphur dioxide is drawn from two 1-ton cylinders placed on the platform of a Toledo weighing machine. The sulphur dioxide is added through a stainless steel diffuser placed directly beneath the agitator after passing through a regulating valve, a rotameter and a check valve. The sulphur dioxide flows from the cylinder through the ¾ in. iron pipe, through a rotameter having a maximum flow rate of 250 lb./hr. The flow through the rotameter is controlled by a stainless steel regulating valve. From the rotameter the SO_2 flows through a ¾ in. stainless steel pipe which passes into the holding tank and is connected to the stainless steel diffuser. The feed line is also provided with a stainless steel check valve to prevent siphoning of the waste through the line. The equipment in the holding tank is made of stainless steel to protect against the corrosive action of the waste solution when the pH is lowered to 2.5. The stainless steel pipe and diffuser are held in position by means of Plastisol-coated steel rods. After each addition of SO_2 the valves on the cylinders are closed, allowing the line to purge itself. Air is then forced through the line to remove the remaining SO_2. Provisions have been made to bypass the rotameter should it become necessary to add SO_2 at a rate greater than 250 lb./hr.

Experience has shown that the SO_2 requirements vary from 3 to 9 parts per part of chromium. The excess is greatest when the hexavalent chrome concentration is below 5 p.p.m. The excess also varies with the copper concentration. The higher the copper concentration the higher the SO_2 requirement.

The chromium is reduced according to the following reactions.

$$SO_2 + H_2O \rightarrow H_2SO_3$$

$$2H_2CrO_4 + 3H_2SO_3 \rightarrow CR_2(SO_4)3 + 5H_2O$$

From the holding tank the treated waste is pumped into the former chrome reduction tanks. These tanks can now be eliminated The waste is then pumped from the reduction tanks into one of the three polishing tanks where lime is added to raise the pH to approximately 7.0. From the polishing tanks the waste is pumped into one of the final clarifiers where lime is added to raise the pH to 9.5. The chromium is precipitated in the final clarifier according to the reaction:

$$3Ca(OH)_3 + Cr_2(SO_4)_3 \rightarrow 2Cr(OH)_3 + 3CaSO_4$$

Advantages

The main advantage of the batch treatment process using liquid sulphur dioxide over the continuous process using gaseous sulphur dioxide has been the ability to reduce hexavalent chrome completely regardless of chrome concentration. In the continuous process a limitation was imposed by the capacity of the feeders and the number of cylinders of SO_2 connected to the feeders. Since complete reduction is mandatory it has been possible to reduce SO_2 consumption. A slight excess of SO_2 was required in the continuous process over a 20-hr. period whereas in the batch treatment system an excess is required on two occasions since two tanks are processed per day. Furthermore, it has been possible to eliminate two reaction tanks, two sulphur dioxide feeders and three pumps.

U.S. STUDY INDICATES STEADY GROWTH FOR PRODUCTION OF CARBON TETRACHLORIDE

ALTHOUGH present production capacity exceeds demand, there may well be a steady expansion of carbon tetrachloride manufacture in the U.S. during the next few years. The two chief factors contributing to this situation are: (1) the likelihood that many existing carbon tetrachloride plants will be converted to the manufacture of the lower chlorinated methanes, so that new plants will be needed to replace them; and (2) despite the present surplus of production capacity, consumption of carbon tetrachloride is expected to increase steadily.

A comprehensive study of carbon tetrachloride production economics has been completed by Dr. C. M. Thacker, technical director of Taylor Fibre Co., Norristown, Pa., who recently developed a process for producing carbon disulphide—a raw material of carbon tetrachloride manufacture—from low-cost sulphur-bearing fuel oils (see CHEMICAL AGE, 25 June, p. 1065). He predicts that construction of the new carbon tetrachloride plants will begin in the "reasonably near future" and will continue for 5-10 years. He notes that demand for lower chlorinated methanes, such as methylene chloride and chloroform, is increasing rapidly. The most economical method for producing these products, including in many cases methyl chloride, is by the direct chlorination of methane. Production of carbon tetrachloride by the methane chlorination method gives rise to the problem of disposing of the hydrogen chloride which is formed in the process, and because of this problem, it is believed that the chlorination of carbon disulphide (at present used for 60-65% of carbon tetrachloride production) will be the preferred route for new carbon tetrachloride plants.

Dr. Thacker maintains that, even if an economical process for the extraction of chlorine value from hydrogen chloride is successfully developed as an answer to the disposal problem in carbon tetrachloride manufacture, production of carbon tetrachloride from carbon disulphide will still be more economical than by chlorinating methane. To substantiate this he points out that under present conditions the captive production of carbon disulphide and its subsequent chlorination to carbon tetrachloride will give a more attractive return than a methane chlorination unit unless at least 75% of the chlorine value can be extracted consistently from the by-product hydrogen chloride.

Carbon tetrachloride is a basic raw material in the manufacture of chlorofluoromethanes, which are widely used as propellants in aerosol containers. Both applications of chlorofluoromethanes are growing steadily. About 65% of U.S. carbon tetrachloride production is consumed in the manufacture of chlorofluorohydrocarbons, with the remainder used for solvents in industrial cleaning, grain fumigation, fire extinguishing and spotting and cleaning. Forecasters believe that the present 350 million lb. annual production rate for carbon tetrachloride will reach 500 million lb. by 1970.

Synthetic Rubber Institute Formed in U.S.

ORGANISED by 15 U.S. and overseas producers, the International Institute of Synthetic Rubber has been formed in New York as a result of the continued growth of the world's synthetic rubber industry. Purpose of the new institute is to provide an effective means of promoting international trade in synthetic rubber.

World production of the commodity has increased almost four times in the past 10 years and in 1959 the combined production from all countries totalled 1,640,000 tons (440,331 tons in 1949). The institute will also provide a forum in which producers and scientists may exchange ideas and information to encourage scientific advances within the industry.

RAW MATERIALS

	Imported sulphur	*Recovered sulphur, H_2S and filter cake*	*Pyrites*	*Spent oxide*	*Anhydrite*	*Zinc concentrates*
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Stock at April 1	53,428	4,446	120,482	87,243	9,865	49,635
Receipts	106,315	18,117	87,593	60,265	191,563	62,531
Use	89,706	15,630	84,145	61,268	188,065	49,884
Adjustments*	2,452	−346	237	627	—	−187
Stock at 30 June	67,585	7,279	123,693	85,613	13,363	62,469
Acid Made from above Raw Materials						
Tons 100% H_2SO_4 (total 654,200 tons) ...	262,300	44,500	109,600	81,600	113,700	42,500
Per cent of total	40.1	6.8	16.7	12.5	17.4	6.5

* Overall effect of stock adjustments, transfers and uses for purposes other than sulphuric acid manufacture.

NOTE: These summaries exclude all Government plants.

U.K. Output and Use of Sulphuric Acid

CONSUMPTION of sulphuric acid in the second quarter of this year totalled 673,589 tons (100% H_2SO_4), compared with 700,193 tons in the first quarter of 1960 and 603,221 tons in the second quarter of last year. According to the quarterly summary issued by the National Sulphuric Acid Association, 85.9% of acid capacity was in use in the period 1 April to 30 June, compared with 88.7% in the previous quarter and 81.1% in the second quarter of 1959.

Acid used in the production of industrial phosphates in the second quarter of 1960, at 1,144 tons was almost double the figure in the corresponding period of last year. There were big increases in the tonnages used by the main industries.

SULPHURIC ACID AND OLEUM

(100% H_2SO_4 *New Acid*)

	Contact	*Chamber & Tower*	*Total*
	Tons	*Tons*	*Tons*
Stock at 1 April ...	72,637	19,602	92,239
Production ...	546,140	108,071	654,211
Total ...	618,777	127,673	746,450
Stock at 30 June...	62,904	19,976	82,880
Apparent Use ...	555,873	107,697	663,570
Total capacity represented (Tons/quarter)	622,890	138,720	761,610
Per cent of capacity in use	% 87.7	% 77.9	% 85.9

U.K. CONSUMPTION OF SULPHURIC ACID AND OLEUM

	(*Tons* 100% H_2SO_4) 1 April–30 June 1960	1 April–30 June 1959
Trade uses		
Accumulators	3,497	3,029
Agricultural purposes ...	689	589
Bichromate and chromic acid	5,657	4,532
Bromine	5,407	4,104
Clays (Fuller's earth, etc.) ...	3,034	2,896
Copper pickling	584	653
Dealers	3,327	4,142
Drugs and fine chemicals ...	5,145	5,187
Dyestuffs and intermediates	27,351	24,599
Explosives	2,870	2,965
Export	881	902
Glue, gelatine and size ...	128	98
Hydrochloric acid	12,106	13,080
Hydrofluoric acid	3,213	3,277
Iron pickling (inc. tin plate)...	34,880	29,421
Leather	947	993
Lithopone	4,195	3,665
Metal extraction	688	757
Oil refining and petroleum products	20,381	15,657
Oils (vegetable)	2,212	1,902
Paper, etc.	2,243	2,028
Phosphates (industrial) ...	1,144	580
Plastics, n.e.c.	15,561	11,585
Rayon and transparent paper	67,022	55,845
Sewage	3,427	3,323
Soap, glycerine and detergents	32,447	29,526
Sugar refining	115	119
Sulphate of ammonia ...	71,217	65,412
Sulphates of copper, nickel, etc.	8,013	7,539
Sulphate of magnesium ...	43	37
Superphosphates and other phosphatic fertilisers ...	148,630	144,253
Tar and benzole	5,898	6,947
Textile uses	4,164	2,902
Titanium dioxide	115,778	99,035
Unclassified	60,695	51,642
Total	673,589	603,221

Permutit — U.S. Agreement on Polymer Emulsion

OVERSEAS production and distribution of Ubatol polymer emulsions are the subject of a new joint venture on the part of the Permutit Co. Ltd., London, and the U.B.S. Chemical Co., Cambridge, Mass., a division of the A. E. Staley Manufacturing Co., Decatur, Ill. The polymer products will be produced at Permutit's chemical works in Glamorgan, for distribution to the floor polish industry in the U.K. and on the Continent.

During the past seven years, U.B.S. developed a range of emulsions under their Ubatol trade mark. Permutit, a major producer of water treatment equipment and ion exchange resins, will share their manufacturing capabilities with U.B.S., when facilities now being erected begin come into operation for the production of polymer emulsion.

Previously, overseas markets for Ubatol have been supplied from Cambridge, Mass., with supplies shipped to distribution points in England and at Rotterdam. The new venture will cut freight costs speed deliveries and permit users to carry lower stocks.

Growing Use of Glycerine in Paints

THE quantity of glycerine used annually in the paints and resins industry continues to increase despite the many new competitive products which have been introduced in recent years. Opinions differ widely as to the manner in which alkyd resins are best employed in each of the specialised fields of paint application, but for most applications glycerine-based alkyds are still said to be the primary choice.

A new booklet, 'Glycerine in Paints and Resins', touches on manufacturing methods of alkyds and other resins, and includes useful data on the physical properties, specifications, storage and handling of glycerine. There is as well a short section of the most common applications of glycerine in the paints and resins field.

Of interest to manufacturers, laboratories and students, single or multiple copies of the booklet are available on request to the United Kingdom Glycerine Producers' Association, 5 Bridewell Place, London E.C.4.

Fisons to Join State Pension Scheme

Fisons Ltd. are to join the graduated State pension scheme in respect of all employees. The company's decision was taken because long-term it was considered that participation was in the best interests of staff and work people.

Although employees will pay extra additional contributions the company's own scheme will be continued and they will also receive a pension from that scheme. The company's own scheme is to be improved so far as existing pensions and future retirement benefits are concerned.

'Oilsink' and 'Polyclens' Show Up Well Against Oil Pollution

TWO different chemical compositions, in two quite unconnected large-scale experiments, have recently given very encouraging results as a means of combating oil pollution of beaches. One is Oilsink, a Danish invention, consisting of a pulverised mixture of various solvent minerals and cementing additives, and its particular virtue, as the name implies, is its ability to sink patches of oil in the sea before they reach the shore. The other preparation, which has been used to clean oil from beaches as well as to eliminate oil patches on the sea, is a liquid combination of solvents and surface-active agents produced by Polycell Products Ltd., London, and marketed commercially as Polyclens paint-brush cleaner.

Oilsink, which is produced as a powder, was developed by a team of chemists working in collaboration with a Hamburg firm. When sprayed over the water surface by compression or carrier gas the powder combines with the oil to sink it in solidified flakes which mix with bed sludge after an alteration in the oil film's specific gravity. It can also be used in filters for the absorption of oil from oil-water mixtures. The powder is almost completely insoluble in water and results in no ill effects to flora and fauna. The sunken oil cannot possibly rise to the surface again. Tests with harbour sludge after treatment with Oilsink showed that no great difference had taken place in the growth-preventive properties of untreated bed sludge.

The same group of chemists who developed Oilsink have also produced a spray powder, marketed under the trade name of Novästhol which within a few seconds breaks down foam banks formed on watercourses. The Oilsink preparation is marketed by N. E. Wilhelmsen and Co., Hamburg 13, and produced under the licence Speiko-Kripke of Dr. Speier and Co. GmbH, Hamburg-Wandsbek. A British firm, Specialist Business Services (London) Ltd., have now obtained exclusive rights for Oilsink in the U.K. and Commonwealth countries.

The effectiveness of Oilsink in removing oil patches on water was demonstrated in a recent trial on a lake near Alton, Hants, a canvas raft being used as a container for the oil. Oil was discharged from the raft and spread over the surface of the lake but after several sprayings of Oilsink from an aircraft the oil disappeared completely.

While this was going on, another experiment in clearing up oil was nearing completion at Milford Haven, where on 9 July a 36,000-ton Esso tanker exploded, causing widespread pollution. The material selected for cleaning up was Polyclens, which was sprayed on to the shore by a team of workers. This treatment was followed by a washing down with sea water. Patches of oil on the water off the shore were sprayed from boats with the cleanser, which is said to emulsify oil equal to 200 times its own volume. The experiment is reported to have been completely successful.

The Department of Scientific and Industrial Research is at present examining the possibility of devising a programme of research into methods of clearing beaches of oil—see 'Distillates', p. 196.

New U.S. Publication on Spectrometer Calibration

WITH the influx in recent years of finer prism and small grating spectrometers, a need has arisen for more thorough and precise calibration in the infrared region. A 20-page monograph published by the U.S. National Bureau of Standards helps fill the need by remeasuring and tabulating the absorption bands of common gases to obtain an accuracy of about 0.03 cm^{-1} throughout the 2 to 16 micron range, and to provide good calibration points at frequent intervals. Some 600 rotation-vibration lines are illustrated in 20 spectrograms. Wavenumbers are listed in companion tables with considerable intercomparison with data obtained in other laboratories. Characteristic features of the individual bands are also discussed briefly.

Entitled 'Vibration-Rotation Structure in Absorption Bands for the Calibration of Spectrometers from 2 to 16 Microns,' by E. K. Plyler, A. Danti, L. R. Blaine, and E. D. Tidwell, N.B.S. Monograph 16 is available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., price 25 cents.

East Germans Visit I.C.I. Wilton

A party of East German chemical engineers recently visited the Wilton works of I.C.I. Their tour of the works included an inspection of Wilton services installations, nylon works and the No. 4 polythene plant. The visitors included the director of an East German State industrial organisation and a representative of the State Planning Commission.

Rock Salt Deposits Found

New large deposits of salt, estimated at some 400,000 million tons, have been discovered in the Cheshire basin as a result of deep boring carried out by the Geological Survey of Great Britain. One borehole proved saliferous beds of a total thickness of 1,952 feet. The production of salt in the U.K. in 1957 was about 5 million tons, the majority of which was used in the form of brine for the production of soda-ash.

Fertiliser Programme Called for to Assist F.A.O. Freedom-from-Hunger Campaign

A PANEL of fertiliser industry representatives, which met in Rome recently to study further the proposals for a fertiliser programme to operate within the F.A.O. Freedom-from-Hunger Campaign, has recommended that F.A.O. undertake a $2 million, five-year programme, financed by the industry, to expand and improve the use of fertilisers in crop production. Represented at the meeting were the International Potash Institute, the International Superphosphate Manufacturers' Association, the Centre d'Etude de l'Azote, and the Sulphur Institute. Observers were present from the National Plant Food Institute (U.S.A.), the Foundation for International Potash Research, and the Olin Mathieson Chemical Corporation.

The intention is for the industry to make a firm commitment on the basis of figures reviewed at the meeting for the first two years of the programme's operation, with the understanding that if the programme develops to the satisfaction of all concerned, further support will be given for the following three years. The budget evolved by the panel, in collaboration with the F.A.O. secretariat, calls for expenditure of $350,000 in the first year and $450,000 in the second. The programme would make an annual contribution of $30,000 to the central operating fund of the Freedom-from-Hunger Campaign.

In the course of the meeting, the representatives drew up a suggested scale of contributions from various sectors of the fertiliser industry, which will be submitted to individual fertiliser associations and companies for their action. All representatives pledged the support of their sectors for the programme itself, and a number indicated that this support would be reflected by a contribution of the level put forward in the scale.

Aim of the programme is to stimulate the interest of governments and farmers of less-developed countries in the efficient use of fertilisers, and to provide governments with the advice and information necessary for developing national fertiliser programmes. It would achieve this through a field programme of fertiliser tests and demonstrations and through developing soil-testing laboratories and services as a means of improving the use and management of fertilisers. Another major part of the programme is the preparation of marketing and development studies in the field of fertilisers for the use of governments in their programmes of agricultural improvement.

Growth of Soft Rot Fungi Accelerated by Chlorination?

A STUDY has been started by the D.S.I.R. Forest Products Research Laboratory at Princes Risborough, to determine the effect of treatment with chlorine on the susceptibility of wood to attack by soft rot fungi. An earlier experiment had indicated that chlorination of wood under rather drastic conditions might accelerate the subsequent growth of *Chaetomium globosum* on the wood.

Annual report of the laboratory for 1959 (H.M.S.O., price 5s 6d net) states that the experiment is being repeated using a less severe chlorination treatment that approaches more closely to the conditions that might arise in water cooling towers. The tests include two levels of concentration of chlorine and two periods of time. The results should show whether and to what extent exposure of wood to low concentrations of chlorine promotes the growth of soft rot fungi on it.

Wood Polysaccharides. Hydrolysis of extractive-free beechwood yielded a mixture of sugars in which L-fucose was identified by the formation of the crystalline *p*-toluene sulphonylhydrazone. Also present in the hydrolysate were very small amounts of methylated sugars, tentatively identified as 2-*O*-methyl-xylose and 2-*O*-methyl fucose. Work on the separation of these components continues.

Wood Extractives. Crystalline dihydromorin and dihydrokaempferol have been isolated from both mulberry and fustic while an extract of osage orange yielded dihydromorin penta-acetate on acetylation. Neither maclurin nor 2,4,6,4-tetrahydroxybenzophenone could be detected in the heartwood of mulberry. Of particular interest was the identification of the 'cudranin', previously isolated from mulberry, as 2,4,3,5-tetrahydroxystilbene.

Methyl Bromide. Further work carried out on the toxicity of methyl bromide to the common furniture beetle indicated that only the highest dose of 200 mg. h/l had consistently prevented emergence of beetles by killing both larvae and pupae.

Contact Insecticides. Further tests with death-watch beetles had shown that an exposure period of 48 hours to dieldrin deposits of 0.04 mg./sq. cm. were necessary to prevent egg-laying when the beetles were transferred to untreated, decayed, oak sapwood.

High-amylose Starch Yields Strong Films and Fibres

FROM the U.S. Department of Agriculture comes news of possible development in the field of starch-based industrial products including coating adhesives. This is the result of the efforts of chemists, plant breeders and industry who have succeeded in producing a starch which contains 50 to 60% amylose, or about twice the amount present in ordinary corn starch.

Amylose is a linear polymer of glucose, and its molecules can form strong, flexible films and fibres, whereas amylopectin forms only very weak films. The potentialities for the development of new and improved coating adhesives from this starch depend upon the relative physical and chemical properties of its components, amylose and amylopectin. Preliminary studies on oxidation, hydroxyethylation and carboxymethylation of high-amylose starch have been carried out.

The new starch is available in semi-commercial quantities and the development of starches of still higher amylose content is well under way.

Electrolytic Polishing of Stainless Steel

STAINLESS steel articles of "any reasonable size" can now be electrolytically polished in processing tanks of 3,000 gall. capacity or more, it is revealed by Electropol Processing Ltd., Trading Estate, Farnham, Surrey. The company started this process in a very small way in 1948 and early orders were mainly for the electro-polishing of trafficator arm covers for motor vehicles, and also of car bonnet mouldings. A factory was built in 1951-52, since when there have been a number of additions. The company gradually took over the processing of components. Filter plates, heat exchanger plates, pipes and tubes are examples of articles that have been processed.

The Electropol process is virtually a reversal of the electro-plating process, the article being immersed in a sulphuric acid solution so that when an electric current is passed through the article it becomes the anode. Roughly .0005 to .001 in. of metal is removed to give the article a highly polished surface.

Advantages claimed for the process over mechanical polishing are that it is cheaper, can deal with complicated fabrications and enhances corrosion resistance of the metal by removing any inclusions that may be present.

Faraday Society Meeting on Aerosol Chemistry

The Faraday Society will hold a general discussion on 'The physical chemistry of aerosols' at Bristol University on 13 to 15 September. The following subjects will be covered: nucleation, homogeneous and heterogeneous; growth of particles; and physical and chemical properties.

Overseas News

SVENSKA SHELL PLAN JOINT FACILITIES AT GOTHENBURG FOR PETROCHEMICALS

A NUMBER of plans have recently been made known for the setting-up of a mineral oil and petrochemical industry on the Swedish coast to the north of Gothenburg. The Swedish wood-processing and chemical concern Mooch Domsjö plan to invest some Crowns 50 million on the erection of new production units in the area.

Svenska Shell A/B, the Swedish member of the Royal-Dutch Shell group, who have just decided on the issue of Crown 76 million of new shares, have confirmed reports that they were planning together with the Stora Kopparberg company the development of a petrochemical industry at the jointly-owned refinery. There is now also talk of U.S. interests entering the field to build a new refinery and oil-processing plant, probably in the same area.

Shawinigan Subsidiary Buys Merck's Reagent Stocks

McArthur Chemical Co., marketing subsidiary of Shawinigan Chemicals Ltd., have purchased Merck and Co.'s stocks of fine and reagent chemicals. Facilities for laboratory control and packaging of these chemicals have been set up in Montreal.

Sun Chemical Form International Division

The Sun Chemical Corporation, U.S., have formed an international operations group to handle operations in important foreign markets. Sun are planning a new plant in Mexico for the production of pigments.

Indonesia Calls for Tenders for Chemical Supplies

The Indonesian State organisation, Pusat Perkebunan Negara, has called for tenders for 200 tonnes of sodium sulphate (in 50 kg. drums); 40 tonnes of formaldehyde (in 200 kg. drums); 150 tonnes of talcum powder, technical, white, 325 sieve index (in new doubled 50 kg. jute sacks); 100 tonnes of soda (in new doubled 100 kg. jute sacks); 100 tonnes of cuprous oxide (in new doubled 100 kg. jute sacks); and 40 tonnes of oxalic acid (in 200 kg. wooden casks), all to be shipped by 30 September. Also required are 200 tonnes of formic acid, of at least 90% concentration, in 25 kg. carboys, for shipment by 11 October. Offers should be addressed to Mr. Endro Martodiwirto, Purchasing Agent, Pusat Perkebunan Negara, Djakarta, Indonesia.

Japanese Aid for Bengal Urea Plant

Some 100,000 tonnes of urea and 60,000 tonnes of nitro-phosphate are to be produced at a fertilisers plant to be erected with Japanese aid in West Bengal. The Mitsui Bussan Kaisha concern of Japan will hold shares worth Rs.25 million in the project (49% of total capital), as well as undertaking erection.

Japanese Rubber Plant Due on Stream Soon

Production is soon to start at the Yokkaichi plant of Nippon Gosei Gomu (Japan Synthetic Rubber Co. Ltd.). Over next year the Yen 2,500 million concern hopes to produce some 45,000 tonnes of synthetic rubber.

Montecatini Urea Plant for Portugal

Montecatini, Milan, and Uniao Fabril do Azoto, Lisbon, have signed an agreement for the erection of a synthetic urea plant at Lavradio, on the Portuguese River Tejo. The plant will produce 40,000 tonnes of urea annually by the Fauser-Montecatini process.

Goodrich in Joint Columbian Venture to Produce P.V.C.

A company is to be formed in Colombia by B.F. Goodrich, U.S., and Colombian interests for the erection of a plant to produce p.v.c. at Zipaquira, near Bogotá. Building is to begin in the near future and is hoped to be completed by 1962. Chlorine will be supplied from the nearby works of Planta Colombiana de Soda.

Celanese Corp. to Double Output of Acrylics

The Celanese Corporation of America are to increase the capacity of their plant at Pampa, Tex., by almost 100%. At present 15 million lb. of acrylic chemicals are produced at the plant; the capacity is now to be increased by 14 million lb.

Large Soda Ash Refinery Planned in Wyoming

A plant with a capacity between 150,000 and 200,000 tons a year of soda ash is planned by Stauffer Chemical for building near Green River, Wyoming. Scheduled for completion by late 1962, the plant will double the company's soda ash capacity, and will use a process developed by Stauffer for upgrading trona into soda ash.

Allied Chemical Plan Fluorocarbon Expansion

A 35 million lb./year extension to their existing 100 million lb./year plant for Genetron fluorocarbons is planned by the General Chemical Division of Allied Chemicals, U.S. This expansion involves the building of a new plant at Elizabeth, N.J., and it is expected to be completed early next year.

The Solvay Process Division of Allied Chemical is to build a polyethers plant at Baton Rouge, La., which will use propylene oxide as the starting material. With an initial capacity of 20 million lb./year, the plant is due on stream in the middle of next year.

Phillips Expand Cis-4 Capacity

An increase of 5,000 tons a year in production capacity of their new *cis*-4-polybutadiene rubber is announced by Phillips Chemical Co., wholly-owned subsidiary of Phillips Petroleum. This expansion of the company's Borger, Tex., synthetic rubber plants is an addition to the 20,000 ton a year *cis*-4 plant now being constructed, and results from strong demand for the new Phillips developed rubber. Phillips expect to have this 25,000 ton a year plant in full operation in the fourth quarter of this year.

Phillips have licensed their new *cis*-polybutadiene process to two companies in the U.S. and one in Italy. Other companies are seeking licences from Phillips.

Indian Project to Produce Liquid Fuel from Coal

An experimental plant is being set up by the Department of Chemical Engineering of the Indian Institute of Technology at Kharagpur for the production of liquid fuels from coal and blast furnace gases. The pilot plant has a daily capacity of 450 litres.

Naphthalene Plant at Tidewater Oil Refinery

Tidewater Oil Co., of the U.S., with the Collier Carbon and Chemical Co., Los Angeles, are to build a naphthalene plant with an annual capacity of 50 million lb. at their Wilmington refinery. Construction of the plant is to start before the end of the year and should be completed by the end of 1961. High-quality pure naphthalene will be produced by the Union Oil Co. of California process for sale in the eastern States as chemical base product.

Foster Wheeler Build $33 M. Sumatra Fertiliser Plant

Construction has started on a fertiliser factory project in Palembang, South Sumatra, financed by an Eximbank credit of $33.2 million. The plant, to have an annual output of 100,000 tons, is being built by Foster Wheeler, New York, and will be completed by the end of 1962.

New Process for Aluminium

A basically new process for the production of aluminium has been developed over a number of years by Aluminium Limited. Laboratory and pilot plant trials have been successfully completed and production on an experimental scale, for which new facilities are to be constructed at Arvida, Quebec, has been approved. The process, covered by patents in a large number of countries, uses bauxite of a roughly similar grade

to that used for the conventional process. A reduction of the large power requirements of the aluminium process is not expected but it is hoped that there will be substantial savings in other elements of production costs. The capital cost of the new facilities, which are expected to be available in about two years, will be in the order of $4 million. The capacity will be 6,000 to 8,000 tons a year.

Cyanamid to Co-operate in Formosan Antibiotics Plant

The long-planned project for the production of antibiotics in Nationalist China is to be put through, with the signing this month of an agreement between American Cyanamid International and Taiwan Sugar Corporation. The plant is to be built at Hsincho. The U.S. firm will invest some $605,000 and take up a 55% holding in the company which will operate the unit.

New Austrian Plant For Maleic Anhydride and Fumaric

By the end of 1960 Oesterreichische Stickstoffwerke AG, Linz, plan to open a new plant for the production of maleic anhydride and fumaric acid. The company also plans a further expansion of capacity for phthalic anhydride.

German Plastics Output Should Reach 1 Million Tonnes in 1960

The German chemical trade association Verband der Chemischen Industrie e.V., Frankfurt, states that should West Germany's plastics production continue at its present rate, some 1 million tonnes will be produced during 1960. Last year the annual output was no more than 795,000 tonnes. In the first five months of this year output was up by 37% over the corresponding period of 1959, output of polymerisation plastics having risen by 48%. Polymers now account for 49% of all plastics output in West Germany and condensation plastics, 31%.

The U.K. follows Holland as Germany's best plastics customer, while holding the leading position as plastics supplier. Sales of British plastics to West Germany for this year as far as statistics have been made are three times those for the same period of 1959.

I.C.I. to Build Australian Store for 950 Products

Imperial Chemical Industries of Australia and New Zealand Ltd. will build the biggest store in Australia. It will be 380 ft. by 270 ft. and have 100,000 sq. ft. of storage space and will hold all the company's 950 separate products, except fabrics and chemicals with a low flash point. The single storey building will permit clear stacking to a height of 16 ft. at the side of each bay and to 22 ft. at the centre.

Norwegian Ilmenite Plant Due on Stream in October

A large plant expansion programme is nearing completion by A/S Titania at Tellnes in Southern Norway. The company is investing £3.75 million to exploit vast deposits of ilmenite, containing at least 200 million tons of ore and probably as much as 350 million tons. Work on the new processing plant, together with new road and harbour, began shortly after the concession was granted in April 1957. Operations will start in October 1960.

With up-to-date equipment from the U.S., the U.K. and West Germany, the plant will initially be able to process 1 million tons of ore annually. This is estimated to yield 300,000 tons of ilmenite concentrate and well over 22,000 tons of magnetite plus 680,000 tons of worthless shale.

Philippines Sell State Fertiliser Plant for 12 Million Pesos

Sale of Philippine Government-owned Maria Cristina fertiliser plant at a price of 12 million pesos to the Marcelo Tire and Rubber Co. has been approved by the Cabinet. Stocks are to be paid for at their production cost, estimated at 1.2 million pesos. The 12 million pesos purchase price is to be paid by a 25% down payment, the balance being payable in 30 equal semi-annual instalments, with interest accruing on the outstanding balance at the annual rate of 6%.

Low-cost Electrodialysis Desalter Installed in U.S. City

What is claimed to be the largest and lowest cost brackish water desalting unit ever to be operated in the U.S., was designed by Ionics Inc., Cambridge, Mass, for the city of Oxnard, Calif. The desalting unit, installed near the city's main water production plant, is removing over half a ton a day of excess dissolved salts and minerals from a 250,000 gall. a day of Oxnard's highly mineralised municipal well water. Total cost of demineralisation is about 20 cents per 1,000 gall. or $65 per acre foot.

The new equipment is based on the electrodialysis process. The desalting unit houses a 6ft high stack of 550 thin plastics membranes, each 18 in. wide by 40 in. long. Each membrane is about 1/50 in. thick and each pair of membranes is separated by a plastics gasket about 1/25 in. thick. The separating gaskets are cut away inside so that water can be confined in them and directed in a thin film flowing between the membranes. In the Oxnard unit, about 22% of the water fed to the unit is currently wasted as a brine containing about 3,000 p.p.m. total solids; however, in later operation, it is expected that water wastage can be reduced to about 10%.

U.S. Rubber Chemicals Output Rises 24%

Increased production of cyclic accelerators is said to be responsible for the 24% rise from 129 million lb. to 210 million lb. in the U.S. production in 1959 of rubber processing chemicals (accelerators, antioxidants and peptisers). Sales of rubber processing chemicals last year totalled 159 million lb. ($102 million), compared with 123 million lb. ($80 million).

Lonza to Enter Oil Processing Field

Lonza, Elektrizitätswerke und Chemische Fabriken AG, chemical producers, Basle, are to undertake large investments, mainly in mineral oil processing in West Switzerland, with the opening of the pipeline from Genua to Aigle.

Processing of Low-duty Intermediates Hits U.S. Industry, say Dyestuffs Producers

IN the hearings of the U.S. Tariff Commissioners which were concluded recently, strong representations were made by dyestuffs producers for greater protection from imports. It was stated that overseas manufacturers were setting up subsidiaries in the U.S., importing low-duty intermediates and by a simple operation turning out finished dyestuffs that undercut U.S. producers.

Higher duties were sought on anthraquinone, dicalcium phosphate, iron blue, cadmium colours, H acid, azoic colours and saccharin. Mr. J. M. Fasoli of American Cyanamid declared that failure to raise the import duty on anthraquinone would be to make a gift of the U.S. market to foreign producers. American Cyanamid had a new anthraquinone plant and process going into operation; the present price of about 70 cents per lb. was unprofitable, but imported anthraquinone was selling at a duty-paid price of about 2 cents below that.

A Monsanto Chemical spokesman alleged that imported feed-grade dicalcium phosphate could undersell the U.S. product by about $7.50 a ton. About 96% of U.S. imports were coming from a Belgian plant, which with a domestic market for 20,000 tons a year, had a yearly capacity of 200,000 tons.

Protests were made against any duty cuts on titanium dioxide, vanillin, barium compounds, sodium hydrosulphite, calcium hypochlorite, cyclohexylamine and citric acid. Both Du Pont and National Lead stated that in titanium dioxide the U.S. market was static, exports dwindling, and imports growing, having quadrupled between 1958 and 1959. Imports in the first half of 1960 were said to equal those for the whole of 1959.

Standard Ultramarine, believed to be the only remaining U.S. producer of ultramarine blue, American Cyanamid having ceased production in 1955, said that the tariff rate had been cut four times in the last 12 years. The present level was 2½ cents/lb. Imports had risen from 702,000 lb. in 1953 to more than 3 million lb. in 1959. The total U.S. market remained static at about 8 million lb. a year. Producers in West Germany, the U.K. and the Netherlands could sell ultramarine in New York at a duty-paid, landed price of 18 cents/lb., several cents under that of Standard Ultramarine.

Commercial News

- 14% Rise in B.O.C. Pre-tax Profits
- W. J. Bush Propose One-for-two Scrip Issue
- 90% Acceptance for Offer for P.G. Shares
- Du Pont Half-year Sales Up, Profit Down

Borax (Holdings)

The directors of Borax (Holdings) Ltd. have declared an interim dividend for the year to 30 September of 3% on the deferred ordinary stock.

British Oxygen

For the six months ended 31 March, sales of the British Oxygen Co. Ltd. rose by £3 million, or 11%, to £29.5 million, and pre-tax profits were higher by 14% at £4,951,000. Net attributable profits were up by 20% at £2,219,000. The interim dividend has been raised from 4 to 6% and the directors state that profits for the second half of the year should be at about the same level. Earnings of about 42% (37%) are indicated for the year.

The £17,047,166 ordinary stock of the British Oxygen is to be reconverted into 68,188,664 ordinary shares of 5s. each and the 5,452,834 unissued shares of £1 each are to be sub-divided into 21,811,336 shares of 5s each. This action has been taken because a freer and wider market will result from the adoption of smaller units having a proportionately lower value. Ordinary stockholders will thus be given four shares of 5s each for each £1 of ordinary stock held and one vote for each such share instead of one for each £1 of ordinary stock as at present.

Burt, Boulton and Haywood

Group net profit of Burt, Boulton and Haywood, chemical producers, tar distillers and timber merchants, for the year were £148,218 (£100,654) after tax of £131,919 (£85,180). Final dividend of 6%, making 10% on capital increased by a one-for-two scrip issue, is declared on ordinary (12% on former capital).

W. J. Bush

Results for the first five months of 1960 show an encouraging rise in turnover over the same period of last year, said Mr. Eric L. Bush, chairman of W. J. Bush and Co. Ltd., in his annual statement. In spite of uncertainties of trade in Europe, the directors' aim is to continue their policy to expand the group's capacity and to raise efficiency by utilising the company's financial resources which are available for the development of the business. It is intended to use the capital reserve of £526,120 and part of the general reserve amounting to £73,880 for a scrip issue of 600,000 "A" ordinary shares of £1 each on a one-for-two basis.

W. and H. M. Goulding

The directors of W. and H. M. Goulding Ltd., Dublin, producers of fertilisers and sulphuric acid, forecast dividends of not less than 7% for the year ending 30 June 1961, on capital to be increased by a 40% scrip issue, compared with the equivalent of 5 5/7% recommended for 1959-60. The increase in capital is due to the sale of part of the ownership of fertiliser manufacturing companies of Northern Ireland for a consideration that materially exceeded balance-sheet values. (See also p. 195.)

Cambridge Instrument

Cambridge Instrument Co. announce 100% acceptance of their offer to the shareholders of Electronic Instruments Ltd., Richmond, and the merger between the two companies has been completed. Electronic Instruments will continue to trade under their own name and trade mark (see also 'People in the News').

I.C.I.

About 1,200 of the 67,803 I.C.I. 5½% loan stock holders failed to exercise their right to convert their holding into ordinary shares, a right that expired on 31 July. According to provisional figures the amount of unconverted stock was around £250,000.

Johnson, Matthey and Co.

Development of industrial uses for the precious metals, notably platinum and silver, has greatly widened the horizon for Johnson, Matthey and Co. Ltd., said the chairman, G. C. H. Matthey, at the annual meeting. Some 70% of silver sales were for industrial purposes, while industrial applications for platinum accounted for probably 90% of total sales. Although supplies of Russian platinum had been freely available at slightly below Johnson Matthey's price (£28 10s/oz. until January, then increased to £30 5s), they had at no time been so low as to undermine the company's position with its old-established customers.

To cope with expanding demand for cadmium pigments and colours, a 14-acre site has been purchased at Kidsgrove, near Burslem, and production at the two Burslem works will be transferred there.

Power-Gas

The offer made by Davy-United to acquire the issued ordinary capital of the Power-Gas Corporation Ltd. has been accepted by holders of more than 90% of the capital. It is proposed in due course to acquire compulsorily the remaining shares; the offer remains open for acceptance until further notice.

Air Liquide

At an extraordinary meeting of the French chemical concern L'Air Liquide, the company's shareholders gave their consent over a period of five years to the raising of the company's capital—now N.Fr. 81,250,000—by N.Fr.300 million. This consent carried with it the condition that only N.Fr.200 million of this sum must be raised by the issue of new shares the rest to be taken from reserves.

Reddish Chemical Co.

Share capital of the Reddish Chemical Co. Ltd. is to be increased from £5,000 to £20,000 by the creation of £15,000 ordinary shares of £1, each ranking *pari passu* with the existing ordinary shares, it was announced last week by Mr. W. J. Hipkins, chairman and managing director.

B.F. Goodrich Co.

Net profit of B.F. Goodrich Co., U.S., for the first half of the current year was $18.3 million ($19 million). Net profit per share was $2.02 ($2.18). Sales rose over the period, however, to $403.8 million ($383.4 million). Fall in profits is due mainly to the inclusion last year of $2.2 million in profits from sale of subsidiaries.

Carlo Erba

Carlo Erba, Milan, are to distribute a dividend of 17% (same). In the last financial year net profit was Lire 498.9 million (Lire 381 million) after depreciation of Lire 892 million (Lire 820 million). The company faced increased competition with acceleration of production, the improvement of pharmaceutical installations and extension of the installations for dietary foods and veterinary products. A plant for the output of nicotinic acid opened at Rodano during the year is to double its production in the second half of this year due to heavy demand. Work has begun on what will be the biggest reagents plant in Italy. Capital is to be raised to finance further expansion projects.

Dow Chemical Co.

Dow Chemical Co., U.S., expect sales for the first quarter of the current financial year to be between 5% to 10% above those for the same quarter of last year—some $192 million. Net profit for the quarter, which ends on 31 August, is expected to be at last year's level of $22.3 million, or 84 cents per share.

E. I. du Pont de Nemours

E. I. du Pont de Nemours and Co. report second quarter net sales and operating revenue of $568,650,000 ($568,739,000) equal to $2.22 a share ($2.44). First half 1960 figures were: $1,110,174,000 ($1,083,425,000) equal to $4.32 ($4.61).

United States Borax

Sales of the United States Borax and Chemical Corporation, the U.S. operating company of Borax (Holdings) Ltd., were a record both for the second

quarter of 1960 and for the nine months to 30 June. Sales of $18,578,174 for the June quarter were 6% up on the same period of last year, while the nine months' sales, at $51,203,881, were up by 8%. Net income after taxes for the three months period was $2,095,269 ($2,036,716). For the nine months net income amounted to $1.17 per common share ($1 per share). A dividend of 15 cents per common share is announced (nil, due to heavy start-up expenses of new plants at Boron, Cal.) Price increases on agricultural and industrial grades of potash have restored average prices to about the 1957 levels.

Farbwerke Hoechst AG

Farbwerke Hoechst AG, Frankfurt-on-Main, have introduced DM11.8 million (£1 million) of new shares, thus raising their share capital to DM630 million (some £52.5 million).

Sigdo Koppers S.A.

Koppers International C.A., a 100% subsidiary of the Pittsburg plant construction concern, Koppers Co. Inc., have formed a company with the name of Sigdo Koppers S.A. in Santiago, Chile. The company is part of the Koppers expansion programme in South America.

National Distillers

National Distillers and Chemical Corporation of the U.S. announce a net profit of $11.7 million for the first half of the current year, the same sum as for the corresponding period of 1959. Net profit per share fell from $1.05 to $1.04 as the result of a slight capital increase. Sales for the period totalled $280.7 million ($279.3 million).

Oesterreichische Stickstoffwerke

The Austrian nitrogenous chemicals producers, Oesterreichische Stickstoffwerke AG, of Linz, are to pay a dividend of 3% (4½%) for the 1959 financial year on their Sch.385 million (over £3.75 million) capital. Despite an increase of production by 8½% to a total of 1,080,000 tonnes, turnover fell from Sch.1,258 million to Sch.1,153 million and gross profits from Sch.396.5 million to Sch.383 million. Net profit for the year amounted to Sch.17.7 million. The company's business is stated to have improved in 1960.

Union Carbide and Carbon Co.

Union Carbide announce a net profit of $81.2 million for the first half of the current year ($90.4 million). This represents a per-share profit of $2.70 ($3.00). Sales totalled $771 million ($760 million). The fall in profits is attributed to difficulties in the U.S. steel industry.

INCREASE OF CAPITAL

W. H. COWBURN AND COWPAR LTD., chemical merchants, etc., 26 Pall Mall, Manchester 2. Increased on 5 January, by £25,000, in 5,000 "A" and 20,000 unclassified shares of £1 each, beyond the registered capital of £25,000.

Shell's Catalysis Studies Using Emission Microscope

CATALYSIS has a part to play in almost every branch of chemistry, but to be of the most effective use, more knowledge of the mechanism of catalysis is required. Fundamental studies are being carried out at the Amsterdam laboratories of the Royal Dutch/Shell Group, particularly into the mechanisms of the catalytic reforming and cracking of petroleum.

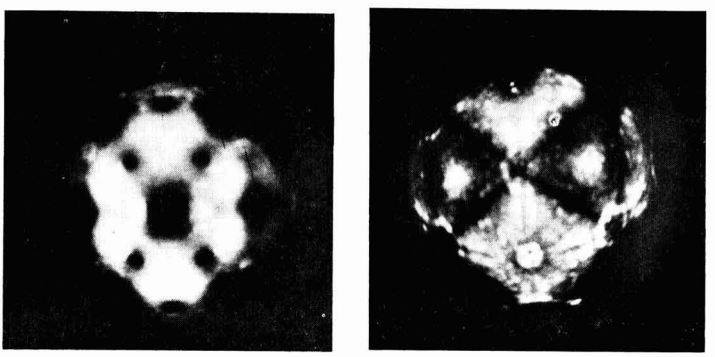
A study into the activity of metallic catalysts is being carried out with the aid of a Müller projector, a field emission microscope, an instrument which operates on the principle that most substances will emit electrons when a high voltage is applied to their surface. The essential feature of the emission microscope is a cathode ray tube. Electrons emitted from the surface of the catalyst crystal are accelerated towards the fluorescent screen by an electric field of the order of 30 million volts per cm. and form a greatly magnified image of the catalyst surface; a linear magnification of one million can readily be achieved.

In metallic catalysis the molecules are adsorbed on the surface of the catalyst, and the emission microscope is being used to study the nature of the interaction of these adsorbed molecules and the catalyst surface, and the mechanism of the adsorption. Various crystal faces of the catalyst differ in catalytic activity as a result of differences in geometric structure. Ionisation on the surface of the catalyst causes an intense local emission of electrons which can be readily followed on the screen, as can changes in the orientation of active sites which take place with change in temperature.

Little is known about the meaning of the patterns shown by the electrons or of the type of reaction which takes place on the surface of the catalyst, but with this evaluation of the activity of metallic catalysts in general, Shell hope to throw some light on to the specific problems involved in the chemical reactions on which the petroleum industry depends.

An understanding of the nature of the catalytic activity of the expensive and poisonous platinum might possibly lead to its replacement by a cheaper but equally effective substance.

The Müller projector has been under development for use as a research instrument for the last ten years, but Shell believe that this is the first time it has been used in the industrial field.



An image of a clean tungsten crystal (left). Surface of the crystal covered with positive ions (right). The individual bright spots represent groups of 4 to 6 ions

Autumn Meeting of Society for Water Treatment

The autumn meeting of the Society of Water Treatment and Examination will be held from 14 to 16 September at St. Peter's Hall, Oxford, when the following papers will be presented: 'Breakdown of soft synthetic detergents at Luton and Harpenden'; 'Microscopy on fresh water'; 'Water treatment problems in Ghana'; and 'Monitoring of radioactivity in fresh water.'

International Dyestuffs and Auxiliaries Exhibition

Larger venue and a longer period for the exhibition are announced by the organisers of the First International Textile Dyestuffs and Auxiliaries Exhibition. The exhibition will now take place at the New Exhibition Hall at Harrogate, and the date fixed for 4-9 September 1961 inclusive. Organisers are Clarke and Rhodes Ltd., 274-276 The Corn Exchange, Manchester.

Successful First Year for Quality Control Society

With the first annual meeting of the Midland Society for Quality Control, established on 8 December 1959, a number of aims were approved; including the promotion of interest in the control of quality; dissemination of new ideas, and the fostering of co-operation between all interested groups. Arrangements are in hand to establish a section of the society based in Nottingham.

Czechoslovakia's Five-year Plan for 25% Chemical Expansion

LIKE most of the East European satellites, Czechoslovakia is putting a great stress on the expansion of its chemical industry, and is also planning to expand production at a rate faster than that of industry in general. By 1965 the country's chemical production should be 25% above the 1957 level.

Development in the next five years is to be based on the use of new raw materials; particularly of coke-oven gases, natural gas and Soviet crude oil. A large oil combine is planned for Bratislava

Production is to be started during 1960-65 of synthetic rubber, and plans for the erection of a plant for the processing of such rubber are in hand. At present Czechoslovakia, whose domestic output of industrial rubber goods is increasing only very slowly, is importing considerable quantities from abroad. The country has one of the highest per-capita figures in the world for rubber consumption.

Plastics and Synthetic Fibres Expansion

The expansion of the plastics industry is to be accelerated to a total of 180,000 to 190,000 tonnes—or about 13 kg. per head of population—by 1965. Last year this overall total was one of no more than 53,556 tonnes. Output of thermoplastics is to be expanded at a quicker rate than that of other materials. Quality of plastics is to be improved and the range increased, particularly in the fields of polystyrene and polythene.

Synthetic fibre output—last year only 58,142 tonnes—is in 1965 planned to reach an annual level of about 105,000 tonnes, some 20% of which will be full-

OUTPUT OF SOME MAJOR CHEMICALS

	1957 Tonnes	1958 Tonnes	1959 Tonnes
Sulphuric acid ...	445,144	462,538	513,301
Caustic soda	88,140	92,823	100,304
Calcium carbide ...	84,357	90,296	97,108
Methanol	33,003	34,968	36,611

PLASTICS PRODUCTION PROGRESS

	1957 Tonnes	1958 Tonnes	1959 Tonnes
Plastics, total: ...	37,351	43,452	53,556
Phenolplastics ...	14,342	17,405	19,686
Aminoplastics ...	6,893	7,366	9,693
Polyvinyl chloride ...	4,038	4,913	6,165
Cellulose-derivatives	3,404	3,735	6,069
Polyamides	1,380	1,118	1,038
Polyacrylates ...	671	644	805
Ion-exchange resins	402	490	648
Epoxy resins ...	256	392	416

SYNTHETIC FIBRE OUTPUT

	1957 Tonnes	1958 Tonnes	1959 Tonnes
All chemical fibres: ...	48,118	54,866	58,142
Rayon	13,621	13,644	15,663
Polyamide fibres ...	765	1,038	1,375
Cellulosic wool ...	32,874	39,740	41,868

synthetics. Present production represents a per-head output of under 4 kg.; by 1965 this should be increased to some 7 kg. A plant for the production of polyamide fibres recently came on stream at Humenné, in Eastern Slovakia; planned for the future is the commercial scale output of acrylic fibres.

Increases in production of natural gas-based and coke-oven gas based nitrogenous fertilisers are planned. For fertiliser production, an increase of 84% is sought by 1965, compared with 1960, with the stress on concentrated, mixed and granular fertilisers. In 1959, 132,940 tonnes of nitrogenous and 135,198 tonnes of phosphoric fertilisers were produced in Czechoslovakia.

In the cellulose field, a graduated increase is to be carried out in the production of quality cellulose, so that by 1965 this should account for a quarter of all cellulose production. As a base for this expansion, increases are projected in the output of wood products.

By 1965, about 1 million tonnes of sulphuric acid will be produced. Other expansion plans include the erection of a new plant for tar chemicals and a further production unit for the processing of natural gas.

For the chemical industry as a whole, 1965 productivity is expected to be 62% above that for the current year and production costs lower by 12%.

Esso Research Team Seek New Rocket Fuels in U.S.

WHETHER chemical fuels can provide enough energy to conduct men to the moon, and rockets with or without men to the distant planets, will depend on intensive research now being made for a more powerful propellant than any yet known. This is stated in the summer edition of *Esso Magazine*, published by Esso Petroleum Co. Ltd. At present in the U.S., the company has a special projects unit of 33 research workers and 19 technicians which has been at work for 18 months.

Aim of this work is not to improve existing compounds, but to create new ones. Their studies may start with any material having a promising carbon skeleton, including the hydrocarbon molecules of oil as well as compounds of the lighter elements, such as nitrogen and hydrogen. Then a chemical reaction is induced which, by rearranging the molecular structure, yields a substance calculated to produce a larger blast of heat upon combustion.

So far more than 600 possible fuels and oxidisers have been tested and those that are not worth further study have been eliminated by the use of a computer. The next step is to try and synthesise the others; the new compound is then analysed, a step that is followed by tests to prove its combustion properties, using increasingly large samples. Finally the fuel is tested in a miniature rocket engine.

All the space achievements so far made have been with chemical fuels. Liquid hydrogen as a fuel with a fluorine compound as an oxidiser gives a velocity up to 4.5 kilometres a second; the liquid hydrogen is also an excellent coolant. But it is difficult to store and handle and its low density—a cubic foot weighs little more than 4 lb.—offsets its high yield of heat in combustion. The boron hydrides also give high efficiency, but are neither very stable nor good at cooling. They can be improved by further processing, but only at great expense. Fuels derived from oil are said to give a comparably good performance when all requirements are taken into account; they are stable and present no serious problems of handling and storage.

Solid fuels, notably cordite and nitroglycerine, have been used in experiments in recent years. They comprise a single package, containing fuel and oxidiser and need no complex systems of pumps and valves; they also have no toxic or corrosive effects as do some liquid fuels. But their performance does not match the best of the liquid fuels and they cannot be used for cooling; because solid-fuel engines cannot easily be shut down once started, the rockets they power must be expendable.

Higher Purity Uranium Metals by New U.S. Process

SHIPMENT to Argonne National Laboratory, U.S., of 1290 kg. of highly enriched uranium metals, valued at $20.64 million, has been completed by Mallinckrodt Nuclear Corporation, wholly-owned subsidiary of Mallinckrodt Chemical Works. Value of the contract, which in cases like this is usually a small percentage of the value of delivered product, was not revealed. This was the largest single procurement of enriched solid uranium fuel ever obtained by Argonne from any source. Just before receiving this contract, Mallinckrodt put on stream a new uranium conversion process. To meet the rather tight delivery schedule, the hematite plant was operated around the clock and the uranium metal produced under normal operating conditions of the new process exceeded contract specifications. These called for a delivered product of 99.85% pure uranium. By actual analysis the purity averaged 99.97% for the entire order. This compares very favourably with the old process which usually yielded uranium metal around 99.94-99.95%.

Another important feature of the new process is stated to be the high yield of delivered product as related to the raw material fed into the process. Both the old and new processes use uranium hexafluoride (UF_6) as raw material, but the new process converts UF_6 directly to UF_4 and thence to metal by conventional means.

TRADE NOTES

Carbon Black Prices

Prices of GPF and HAF carbon blacks have been reduced by ½d and ¼d respectively from 27 July by the Anchor Chemical Co. Ltd., Clayton, Manchester, 11.

Lustrex Price Reduction

The price of Lustrex G.P. crystal polystyrene and colours was reduced by 3d per lb. from 1 August, by Monsanto Chemicals Ltd., 10-18 Victoria Street, London S.W.1. The price of all toughened grades remain unchanged.

New Telephone Number

Telephone number of Walker, Crosweller and Co. Ltd., Whaddon Works, Cheltenham, Glos, has been changed to Cheltenham 56366.

Change of Name

Cookson Produce and Chemical Co. (Fertilisers) Ltd., 51 Eastcheap, London E.C.3, have changed their name to Cookson Produce and Chemical Co. (Trading) Ltd.

New Causeway Division

Causeway Reinforcement Ltd. (one of the Amber Group) have formed a new installation division.

In addition to providing Hexmetal retaining armour, studs and reinforcement mesh for refractory linings, the division is now available for the actual installation of these products. Where Hexmetal is employed as a flooring armour, this same division will lay the armour ready for receiving the appropriate type infiller. Enquiries should be directed to the division, at Five Ash Works, Dover Road East, Northfleet, Kent.

Bakelite Polythene Resin

Full technical details of a new Bakelite polythene resin PY.300 are contained in Advance Information Sheet D.48 available on request to Bakelite Ltd.

PY.300 is a tough, high impact polythene film for use in produce prepacking and industrial applications in the packaging industry. Tests have shown that this new resin will produce a standard clarity film of high impact strength without sacrificing extrudability or other desirable fabricating properties. In addition to their uses in pre-packing, Bakelite say that films based on the new material will be of particular advantage in the handling of hygroscopic materials, as backing for industrial tapes and for applications in the building and agricultural industries.

Shell Cut Epikote Prices

Shell Chemical Co. Ltd. have reduced prices of their solid grades of Epikote epoxy resins. The reduction per ton of each grade, varying from 4% to 7%, is Epikote 1001, £25; Epikote 1004, £31; Epikote 1007, £42; Epikote 1009, £28. These reductions are effective from 1 August.

Metallised Films

Metallised films and textiles, including p.v.c. films, cellulose acetate, cellulosic films, and various polyester and polyamide films, are now being produced and used commercially by E. S. and A. Robinson Ltd., Redcliffe Street, Bristol, who claim that this is the first comprehensive range of metallised materials to become available from a company engaged mainly in the packaging, converting and allied fields. A high vacuum metallising technique is used. Obvious uses for these materials is in packaging and display work but it is expected that they will also prove useful for electrical goods, thermal insulation of buildings, toys and fancy goods, and other purposes.

Research and development work is continuing into producing metallised papers.

B.D.H. Chemicals

Further additions have been made to the B.D.H. range of laboratory chemicals. They are: 2:3-dichloro-5:6-dicyano-*p*-benzoquinone (DDQ), which with its extremely high oxidation-reduction potential is suitable for transfer-hydrogenation; florescein *iso*-thiocyanate and rhodamine B *iso*-thiocyanate which can be used as markers for conjugation to antibody proteins; and diamino-ethane-tetra-acetic acid N/50, a water hardness reagent. B.D.H. have also published leaflets on materials for chromatography and Whatman cellulosic ion-exchangers.

Titanium for Chemical Plant

A variety of chemical plant and components fabricated in titanium is illustrated in 'I.C.I. Titanium for Chemical Plant, No. 10', issued by I.C.I. Metals Division, P.O. Box 216, Birmingham 6. In an introductory note, it is pointed out that, although titanium is at present more costly than conventional structural metals, there are many instances where its unique properties may permit redesign of equipment to reduce its size. The cost of a lined vessel is only just over twice that of a vessel made wholly in stainless steel and, taking into account the saving in maintenance and lost production time which can be achieved, the higher initial cost of titanium can be fully justified. Moreover, the selling price of I.C.I. titanium and titanium alloys has already been considerably reduced—it is less than half that of five years ago—and this trend will continue as the scale of production increases.

Smiths Industrial Division

S. Smith & Sons (England) Ltd., have formed a new division to integrate their business in industrial products, which have hitherto been made or marketed by Smiths Industrial Instruments Ltd., Kelvin & Hughes (Industrial) Ltd. and David Harcourt Ltd., all Smiths subsidiaries. The assets and undertakings of these three companies have been transferred to S. Smith and Sons (England) Ltd. The undertaking so transferred, together with the appropriate manufacturing activities of the parent company comprise the Industrial Division with the trading style 'Smiths Industrial Division'.

PEOPLE in the news

● **Dr. Russell A. Kurtz** has been appointed marketing manager for neoprene and other Du Pont synthetic rubber products in Europe, Africa and Australasia. Working from Geneva, he succeeds **Mr. Samuel W. McCune** who is general sales manager of the Du Pont Company (U.K.) Ltd. **Mr. Robert H. Walsh** is assistant marketing manager and will also move to Geneva. During the last year he has been co-ordinating elastomer sales in Europe from London. **Dr. Hans Horn** is appointed promotion manager. To co-ordinate better du Pont's activities in Europe, the Continent is divided into northern and southern districts. **Mr. Tibor Gabris** is appointed supervisor of the northern district (Scandinavia, Holland, Germany, Austria, Belgium and Switzerland) and he will operate from Hamburg. **Mr. E. S. Voutetakis** is appointed supervisor of the southern district (France, Italy, Spain, Portugal, Greece, Middle East and Yugoslavia) and will operate from Paris.

● **Mr. L. A. Armstrong** has been appointed chief designer of K.D.G. Instruments Ltd., Crawley, Sussex, and is to be responsible for all pressure elements in the company's tank contents gauges, pressure and differential gauges, pressure switches and thermometers.

● **Mr. Julian M. Leonard,** managing director and deputy chairman of Carless, Capel and Leonard Ltd., London, has been elected president of the Institute of Petroleum for 1960-61.

● **Dr. F. A. Vick, O.B.E.,** deputy director of the Atomic Energy Research Establishment, Harwell, has been appointed director; **Dr. R. Spence, C.B., F.R.S.,** chief chemist, has been appointed

Dr. R. Spencer, right, new deputy director at Harwell, seen escorting the Queen on a tour of the A.E.R.E.

deputy director; and **Mr. L. Grainger,** head of the Metallurgy Division, has been appointed assistant director, with responsibility for applied research. These appointments are effective from 1 September. **Sir Basil Schonland, C.B.E., F.R.S.,** continues as director of the Atomic Energy Authority's Research Group, of which A.E.R.E., Harwell, is part. Dr. Vick was Professor of Physics at the University College of North Staffordshire from 1950 to 1959, when he became deputy director at Harwell. Dr. Spence, educated at King's College, Newcastle upon Tyne, and Princeton University, was a lecturer in physical chemistry at Leeds from 1931 to 1939. He was chemical warfare adviser to A.O.C. Middle East from 1942 to 1944 and was appointed to the Atomic Energy Research Group under Sir John Cockcroft in Montreal in 1945, moving to Chalk River later in that year. Dr. Spence became head of the A.E.R.E. Chemistry Division at Harwell in 1947.

● **Mr. Donald A. Bennett** has been appointed managing director of the International Synthetic Rubber Co. Ltd., Hythe, Hants.

● **Mr. C. E. H. Verity,** managing director of Foster Wheeler Ltd., London, largest subsidiary of the Foster Wheeler Corporation, New York, has been elected to the board of the parent concern.

● **Mr. D. R. Ward Jones,** recently appointed general manager of United Steel's ore mining branch, has now become a director of United Coke and Chemicals Co. Ltd.

● **Dr. M. C. R. Symons, Ph.D., D.Sc., A.R.I.C.,** lecturer in chemistry at Southampton University, has been appointed Professor of Physical Chemistry, a newly established Chair, at Leicester University.

● **Mr. G. C. H. Matthey** has relinquished his position as chairman of Johnson Matthey and Co. Ltd., but will continue as a director. Mr. Matthey, who has been a director of the company for 47 years, is succeeded as chairman by **Mr. A. B. Coussmaker.**

● **Mr. W. G. B. Grant** has been appointed a director of CIBA Clayton Ltd.

● **Mr. H. Taylor** and **Mr. N. R. Kirkby** have been appointed directors of Croda Ltd., Goole, Yorks, from 1 August.

● **Mr. Paul Goudime, M.A.,** managing director of Electronic Instruments Ltd., Richmond, has joined the board of Cambridge Instrument Co. Ltd., Cambridge House, Grosvenor Place, London S.W.1, following completion of the recent merger (see 'Commercial News'). **Dr. P. Dunsheath, C.B.E.,** chairman, Cambridge Instrument Co., **Mr. H. C. Pritchard, B.A.,** managing director, and **Mr. W. E. Lamb,** director, have joined the board of Electronic Instruments, of which **Mr. A. C. W. Norman, O.B.E.,** will continue to be chairman, **Mr. Paul Goudime, M.A.,** managing director, and **Mr. D. A. Pitman,** sales director.

● **Mr. J. Simpson** has become deputy chairman (group) of Woodall-Duckham Construction Co. Ltd. Other changes and additions in the board, also effective from 1 August are: **Mr. E. N. Wenborn,** appointed vice-chairman; **Mr. C. D. Muntz,** appointed a joint managing director; three members of the staff who join the board are: **Mr. A. F. Cottrell,** director-in-charge of operating department; **Mr. H. E. Dyble,** director-in-charge of construction department; and **Mr. R. O. Richards,** director-in-charge of design and development department.

● **Mr. J. E. Marjoram, A.M.I.Mech.E., A.I.W.M.,** formerly a senior mechanical engineer engaged on the Blue Streak project at de Havillands, Hertford, has been appointed chief engineer of Aeropreen Products Ltd., High Wycombe, Bucks. This is a newly-created post and his responsibilities will include Aeropreen's 4 tons/hr. foaming plant, believed to be the largest in Europe. His main work, however, will be the development of new and improved methods of manufacture and fabrication.

● **Mr. E. T. Browne, B.A.,** has been appointed chairman and managing director of Merck, Sharp and Dohme Ltd., Hoddesdon, Herts, in succession to **Mr. T. W. Rayner.** Mr. Browne joined Merck and Co., the parent company of Merck Sharp and Dohme, in 1951, and following the merger of Merck and Sharp and Dohme in 1953 was transferred to the then newly-created International Division to become director of personnel and later was appointed to his position in the European area. Before coming to England as administrative director, Merck Sharp and Dohme Ltd., Hoddesdon, he served for four years as director of field operations, administering operations in the European-Near East area for the parent company's International Division.

E. T. Browne

D. B. Mulholland

● **Dr. D. B. Mulholland, M.Sc., Ph.D., A.R.I.C., M.I.Chem.E.,** has been appointed head of the Department of Chemical Engineering at West Ham College of Technology. He will take up his duties in September.

● **Mr. E. J. Ambrose, M.A.,** senior lecturer at the Institute of Cancer Research, Royal Cancer Hospital, has been appointed London University reader in

(*Continued in p. 211*)

NEW PATENTS

By permission of the Controller, HM 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 7 September

Steroid compounds and their preparation. Sterling Drug Inc. **846 920**

Process for the production of ester mixtures by the inter-esterification of fatty acid triglycerides. Mahler, E., and Gattefosse, M. **847 517**

Process for the production of boron hydrocarbons. Studiengesellschaft Kohle. **847 518**

Antiseptic detergent compositions and chlorothiocarbanilides used in the production thereof. Monsanto Chemical Co. **846 922**

Salts of methyl-4-beta-halogenethyl-5-thiazoles. Charonnat, R., Lechat, P., Chareton, J., and Boime, A. **847 520**

Fractionating apparatus. Marston Excelsior Ltd. **847 523**

Process of polymerisation. Monsanto Chemicals Ltd. **847 602**

Neutral bis-dithiophosphoric acid esters and process for their manufacture. Farbwerke Hoechst AG Vorm. Meister Lucius & Brüning. **847 105**

Preparing polymer solutions and emulsions. Esso Research & Engineering Co. **847 525**

Olefin polymerisation process. Esso Research & Engineering Co. **847 113**

Method and apparatus for condensing the vapours of metal chlorides. Ciba Ltd. **847 119**

Polymerisation method and apparatus therefor. Phillips Petroleum Co. **847 529**

Method and apparatus for polymerisation of olefins. Phillips Petroleum Co. **846 932**

Antifungal substance pimaricin and method of producing same. American Cyanamid Co. **846 933**

Polyester compositions. Distillers Co. Ltd. **847 532**

Polyesters and their method of preparation. British Petroleum Co. Ltd., Birch, S. F., Gould, P., and Critchley, S. W. **847 592**

Production of organo-silanes. Imperial Chemical Industries Ltd. **847 397**

Unsaturated polyesters. Bergwerksverband GmbH, formerly Bergswerksverband Zur Verwertung Von Schutzrechten Der Kohlen technik GmbH. **847 407**

Preparation of Δ^{16}-20-keto-pregnenes. Merck & Co. Inc. **846 946**

Organic sulphamoyl azides and the use thereof as blowing agents in the preparation of cellular organoplastic materials. American Cyanamid Co. **847 135**

Colour photographic process. Imperial Chemical Industries Ltd. **847 136**

Metaliferous monoazo dyestuffs containing halogenotriazinylamino groups. Imperial Chemical Industries Ltd. **846 949**

Organic cuprous compound and process for its production. Uclaf. **846 952**

Anthraquinone dyestuffs. Imperial Chemical Industries Ltd. **847 142**

Colour photographic materials. Ilford Ltd. **847 143**

Compositions comprising benzene hexachloride. Imperial Chemical Industries Ltd. **847 408**

Finishing of polyester fabrics. Du Pont De Nemours & Co., E. I. **847 147**

Process for the production of melamine formaldehyde resins. Suddeutsche Kallstickstaffwerke AG. **847 154**

Silicone compositions for imparting water-repellency. Monsanto Chemicals Ltd. **847 414**

Organosilicon polymers. Midland Silicones Ltd. **846 978**

Recovery of hydrocarbons from spent caustic. Esso Research & Engineering Co. **847 289**

Ferromagnetic ferrite material and methods of making such materials. Kikuchi, Y. **846 981**

Hypoglycaemic sulphonamide derivatives. Astra, Apothekarnes Kemisha Fabriker A.B. **846 984**

Synthetic resin coating compositions. Du Pont De Nemours & Co., E. I. **847 421**

Production of organophillic and hydrophobic pigments. Fabriques De Produits Chimiques De Thann Et De Mulhouse. **847 007**

Organopolysiloxane water-repellent compositions. General Electric Co. **847 426**

Benzene monoazo-naphthalene-dyestuffs and their metal complexes. Farbenfabriken Bayer AG. **847 434**

Liquid oxygen-carbon explosive and method of producing same. Great Lakes Carbon Corp. [Addition to 807 487.] **847 015**

Process for the prepartion of and compositions comprising methyl mercuric nitrile. Berke & Co. Inc., F. W. **847 016**

Recovering halogenated copolymers. Esso Research & Engineering Co. **847 544**

Giberellic acid. Merck & Co. Inc. **847 435**

Linear condensation copolymers. Du Pont De Nemours & Co., E. I. **847 024**

Process for the production of liquid polymeric substances. General Mills Inc. **847 028**

Synthetic elastomers. Du Pont De Nemours & Co., E. I. **847 164**

Water-insoluble dis-azo dyestuffs. Farbenfrabiken Bayer AG. **847 546**

Benzene-monoazo-benzene dyestuffs. Imperial Chemical Industries Ltd. **847 175**

Benzothiadiazine compounds. Lepetit S.p.A. **847 176**

Phosphonic acid esters. Farbenfabriken Bayer AG. **847 550**

Organopolysiloxanes. General Electric Co. **847 556**

Water-insoluble monoazo pyrazolene dyestuffs. Farbenfabriken Bayer AG. **847 181**

Process for improving the water-absorption capacity of textiles made from synthetic linear polyamides. Farbenfabriken Bayer AG. [Addition to 788 688.] **847 194**

Method for the preparation of pigmented polyesters and articles manufactured from these polyesters. Onderzoekingsinstituut Research N.V. **847 059**

Process for the manufacture of pyridyl acetic acid sodium salts and esters therefrom. Farbenfabriken Bayer AG. **847 330**

Process for the manufacture of ethylenimine derivatives. Hoffmann-La Roche & Co. AG, F. **847 205**

Method of preparing unsaturated aldehydes from olefins. Montecatini Soc. Generale Per l'Industria Mineraria E Chimica. **847 564**

Process for the production of isonitrones. Farbenfabriken Bayer AG. **847 338**

Bleaching and oxidising agents. Hedley & Co. Ltd., T. **847 566**

Metal-containing phosphosulphurised hydrocarbon derivatives. Esso Research & Engineering Co. **847 339**

Stabilisation of epoxidised fatty acid ester plasticisers. Food Machinery & Chemical Corp. **847 343**

Lubricants containing salts of oxygen-containing acids of phosphorus. Esso Research & Engineering Co. **847 346**

Cycloheptyl and cyclo-octyl derivatives of thiourea and weed-killers containing same. Badische Anilin- & Soda-Fabrik AG. **847 573**

Steroid derivatives. Soc. Des Usines Chimiques Rhone-Poulenc. **847 445**

6-Chloro-7-sulphamyl-3:4-dihydro-1:2:3-benzothiodiazine-1:1-dioxide and its salts and the preparation thereof. Ciba Ltd. **847 064**

Method of shortstopping polymerisation of monoolefinic monomers. Chemstrand Corporation. **847 577**

Production of alkyl and cycloalkyl dihaloborines. American Potash & Chemical Corporation. **847 455**

Polymerisation catalyst for mono-olefinic polymerisation. Chemstrand Corporation. **847 583**

Low pressure polymerisation catalyst. Esso Research & Engineering Co. **487 585**

Polymerisation of a diene. Bataafsche Petroleum Maatschappij N.V., De. **847 456**

Process for the selective polymerisation of isobutylene. Bataafsche Petroleum Maatschappij N.V., De. **847 065**

Process for the isomerisation of butylene-1 to butylene-2. Bataafsche Petroleum Maatschappij N.V., De. **847 066**

Stabilising dimers and trimers of acetylene. Du Pont De Nemours & Co., E. I. **847 464**

Preparation of chlorinated ethylenes. Du Pont De Nemours & Co., E. I. **847 467**

Polymerisation process. Monsanto Chemicals Ltd. [Divided out of and Addition to 847 602.] **847 603**

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Process of oxidising plutonium. Coryell, C. D. **847 641**

Refining of materials. Brennan, J. B. **847 643**

Apparatus for generating a pressurised fluid. Spalging, D. B. **847 793**

Production of a stream of combustible gases by the gasification of liquid fuel. Fraser, R. P. **848 319**

Pesticidal synthetic resin coating compositions. National Research Development Corporation. **847 644**

Manufacture of 5-nitro-furan derivatives. Smith, Kline & French Laboratories Ltd. **847 645**

Agricultural chemical compositions. Fisons Pest Control Ltd. **848 327**

Thermal decomposition or pyrolysis of hydrocarbons. Fraser, R. P. **848 320**

Electrolytic processes for the refinement of metals. United Kingdom Atomic Energy Authority. **847 912**

Manufacture of artificial filamentary materials of high bulk from copolymers of acrylonitrile and vinylidene chloride. British Celanese Ltd. **848 402**

Preparation of resinous polymeric materials and aromatic compounds. Petrochemicals Ltd. **847 915**

Salt crystals. Imperial Chemical Industries Ltd. **848 328**

Apparatus for the chemical cleaning of textiles. Böhler, M., and Weber, F. [trading as Böhler & Weber Komm Ges.]. **847 808**

Methods of manufacturing alloy *p-n* junctions in germanium. Philips Electrical Industries Ltd. **848 331**

Smelting of ores. Genders, R., and Kemmish, W. B. **847 654**

Pesticidal compositions comprising dithiophosphoric acid derivatives. Food Machinery & Chemical Corporation. **847 655**

Manufacture of compounds of the steroid series. Ciba Ltd. [Addition to 779 989.] **847 798**

Electrostatic precipitators. Lueder, H. **848 446**

Process for effecting organic condensation reactions involving the elimination of water. *Cellulose-Polymers et Derives* "Cepede" S.A. **847 799**

Hydroxy-halogen-pregnenes and process for their manufacture. Ciba Ltd. **847 951**

Method for forming metal sulphide coatings. Alpha Molykote Corporation. **847 800**

Process and apparatus for the production of combustible gases. Soc. De Construction D'Appareils Pour Gaz A. L'Eau et Gaz Industriels. **847 660**

Adhesives. Crocker, G. J. **848 455**

Oxygenation of steroids. Lepetit, S.p.A. **847 610**

Apparatus for the chemical cleaning of textiles. Böehler, M., and Weber, F. [trading as Böehler & Weber Komm. Ges.] **847 809**

Diazo-type processes. Ilford Ltd. **848 458**

Process for utilising mycelium waste from the production of citric acid in the conversion of starch in amylaceous raw material to fermentable carbohydrates. Burger, M., Beran, K., and Fencl, Z. **847 935**

Curable polyethylene compositions. General Electric Co. **847 816**

Cross-linking of hydrocarbons. Oster, G. **848 414**

Method and apparatus for air and gas treatment. Southern Lightweight Aggregate Corporation. **847 612**

Hydroxy anthracenones and the preparation thereof. Pfizer & Co. Inc., C. **847 817**

Alpha-cyanoalkylsilanes and process for their production. Union Carbide Corporation formerly Union Carbide & Carbon Corporation. **847 801**

Process for producing cyanoalkylsilanes. Union Carbide Corporation, formerly Union Carbide & Carbon Corporation. **847 802**

Cyanoalkylsilanes and process for their production. Union Carbide Corporation, formerly Union Carbide & Carbon Corporation. **847 803**

Beta- and gamma-cyanoalkylsilanes and process for their production. Union Carbide Corporation, formerly Union Carbide & Carbon Corporation. **847 804**

Tetrahydropyranyl- and alkyltetrahydropyranyl-substituted spiro heterocyclic phosphorus compounds. Union Carbide Corporation, formerly Union Carbide & Carbon Corporation. **847 822**

Method of polymerising substituted butadienes. Goodrich Co., B. F. **847 824**

People in the News

(Continued from p. 207)

physical chemistry at the institute. The title of reader in chemistry, London University, has been conferred on **Mr. G. M. Timmis, M.Sc.**, in respect of his post at the institute.

● **Sir Clavering Fison** has resigned as chairman and director of Burton, Son and Sanders Ltd., 43 Eastcheap, London E.C.3, and **Mr. John Langdon Macfadyen** has been appointed chairman.

● **Mr. J. Romney, Mr. N. E. F. Hitchcock** and **Mr. G. H. J. Simmons**, all senior executives of the Castrol research and technical departments, have joined the board of Edwin Cooper and Co. Ltd., a subsidiary of Castrol Ltd. **Mr. S. H. Oliver** has been appointed manager of the purchasing department of Castrol Ltd., in succession to the late Mr. A. J. Stafford.

● **Dr. D. R. Marshall, Ph.D.**, and **Mr. T. D. Smith, M.Sc.**, have been appointed lecturers in chemistry at the University College of North Wales, Bangor.

Market Reports

SEASONAL SLACKNESS IN HOME TRADE DEMAND

LONDON Demand in most sections of the chemicals market has been fairly steady, but there has been the usual seasonal contraction in call for supplies to home consumers. The flow of export enquiries has been maintained at about recent levels. Prices generally are well held, but zinc oxide quotations have been changed, with white seal now at £107 10s/ton, green seal, £105 10s/ton and red seal, £102 10s/ton.

Business in fertilisers has been reported as fairly active for the period.

There is no change in the position for coal tar markets, with most products in steady request.

MANCHESTER As usual the Bank Holiday week has been one of the quietest of the year on the Manchester market for chemicals and allied products. Owing to holiday stoppages in the textile and allied trades and in other industrial outlets there has been a falling off in contract deliveries to home users and in the amount of fresh business placed, although an early return to normal and more active trading is anticipated. The effect on the export movement of chemicals has been less in evidence than in the home section. Prices generally have continued on a steady basis.

SCOTLAND The effect of the holiday period is still being felt, and in particular, business in the Glasgow area has been very quiet; however, the position has been better in those areas not yet affected by holidays. From them, buying has been concerned with demands to fulfil production programmes, as well as forward booking for starting after the holidays. In regard to agricultural chemicals, conditions have been rather quieter during the week. Prices generally have remained firm with little alteration.

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