Chemical Age

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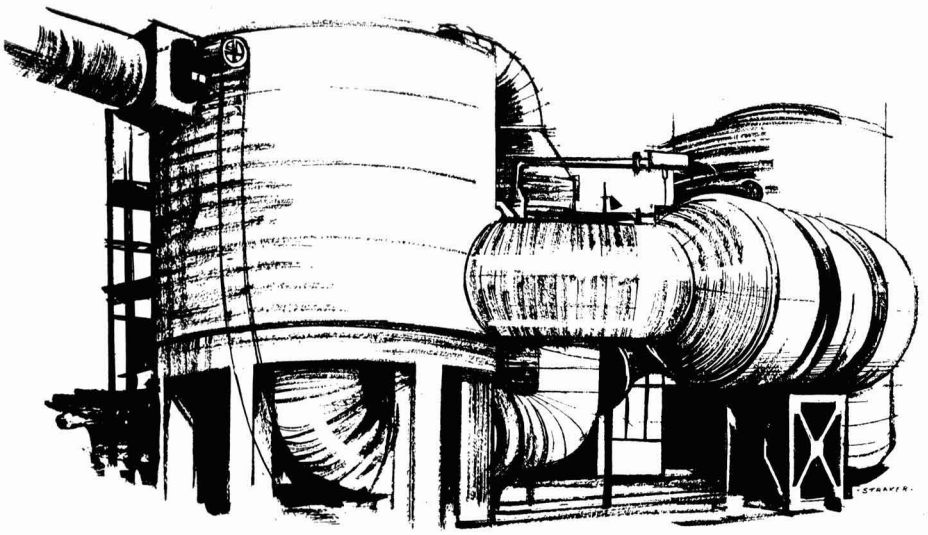
PETROCHEMICALS and POLYMERS

VOL. 85 No. 2183 13 MAY 1961



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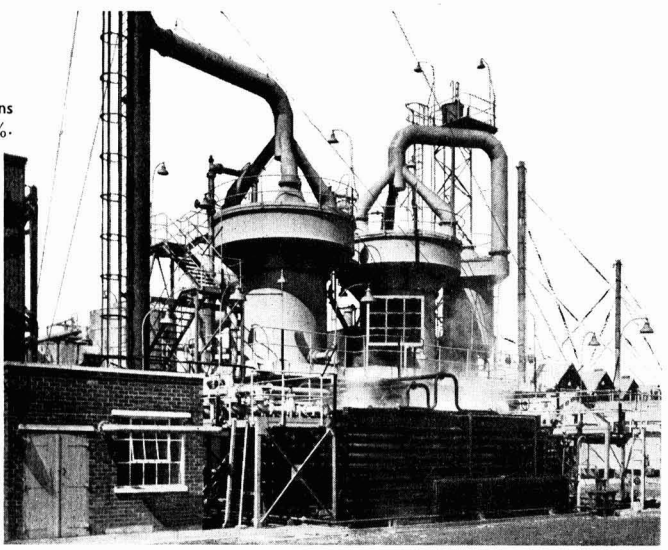

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INDEX TO ADVERTISERS

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

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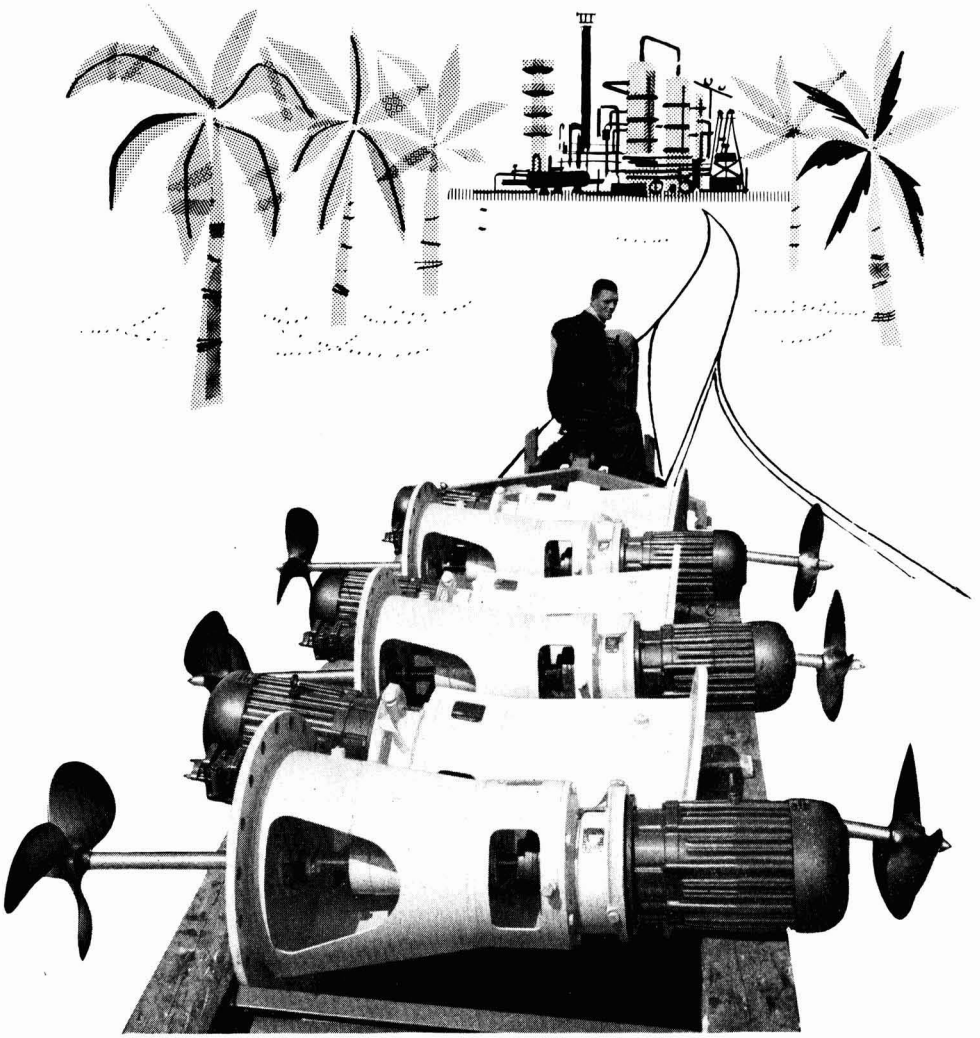

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MAY 13 1961

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Chemical Age

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PETROCHEMICALS and POLYMERS

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IN THIS ISSUE

Annual subscription is: home, 57s 6d, overseas, 65s, single copies 1s 9d (by post 2s)

BALANCE OF CHEMICAL TRADE

EXPORTS of chemicals from the U.K. during the first quarter of this year reached a value of £85.1 million, a 5.3% increase over the £80.8 m. for the last quarter of 1960. However, during the same period, imports also increased by the same percentage—the value of chemical imports reaching £46.9 m. as compared with £44.6 m. for the fourth quarter of 1960. A comparison of imports with exports shows that imports represented 55% of exports in the first 1961 quarter, this percentage being the same as for the last 1960 quarter. In comparison, the quarterly average of £34.6 m. imported in 1959 represents only 47% of the £73.3 m. worth of chemicals exported. Thus, encouraging though the overall increase in exports is, the increase in the ratio of imports to exports presents a sombre picture to those who are concerned with the balance of trade.

The fact that other countries, particularly those in the European Economic Community, were increasing their chemical exports at a greater rate than the U.K. was pointed out in CHEMICAL AGE, 6 February 1960, page 232. A comprehensive survey of export trends which appeared in the *Board of Trade Journal* of 5 May confirms that this tendency was still evident when figures for the first half of 1960 were compared with those for the first half of 1959. Exports of all the major groups of chemicals from the U.K. were higher than in the first half of 1959, although the increase of 18% in manufactured fertilisers was only a partial recovery of the big fall experienced a year earlier and the increase in exports of perfumery, cosmetics, soap, etc., still left them below the level of the first half of 1957. The increases on a year earlier in U.K. exports of the other groups of chemicals were less than those achieved by the E.E.C., but compared with the first half of 1958 the U.K. performance in these groups was not markedly different from that of the European countries.

To obtain a picture of the current trend in U.K. chemical trade with Europe we must turn to the Trade and Navigation Accounts for March 1961 (H.M.S.O., 22s 6d). This shows that chemical exports to the E.F.T.A. countries reached a value of £9.1 m. in the first three months of this year, compared with £7.9 m. in the 1960 period. The biggest percentage increases were to Sweden—£3.1 m. against £2.6 m. and to Austria, £587,915 against £359,445. Imports from E.F.T.A. increased to a somewhat lesser degree at £4.9 m. (£4.5 m.), with big increases from Sweden, Portugal and Denmark and a slight decrease in imports from Norway.

U.K. exports of chemicals to the E.E.C. countries increased only comparatively slightly, from £13.81 m. to £13.84 m., with a decline from £3.2 m. to £2.6 m. in exports to Germany. Imports from the E.E.C. countries showed a rather greater increase, from £18.9 m. in the first quarter of 1960 to £19.5 m. in the 1961 quarter. Notable increases are from Italy, to £2.1 m. from £1.7 m. and from the Netherlands, to £4.4 m. from £3.8 m.

Commercial Fuel Cells Not Ready in Near Future—R.I.C. Lecture

RECENT publicity has given the false impression that commercial development of fuel cells could be expected in the very near future, according to Dr. H. H. Chambers of Sondes Place Research Institute who addressed a joint meeting of the Royal Institute of Chemistry and the Society of Chemical Industry recently. The true position, said Dr. Chambers, was that, although technical feasibility had been demonstrated, there was some way to go before economic feasibility was proven. This required more engineering development and more basic research.

The high efficiency of a fuel cell resulted from the fact that electrochemical oxidation could be made to approach more closely to conditions of thermodynamic reversibility than could any process of power generation involving chemical oxidation and a thermal cycle. In a fuel cell, oxygen-containing anions were formed at an air electrode and they migrated across an electrolyte barrier, which physically separated the air from the fuel, to a fuel electrode where they oxidised the fuel. The porous electrodes provided a large contact area between electrode, gas and electrolyte. Special precautions were necessary to avoid flooding of the pores by the electrolyte or bubbling of the gases through the electrodes into the electrolyte.

For high output efficiencies the internal resistance of the cell must be low and the electrodes must be effective catalysts for the electrode reactions, but they must not catalyse side reactions which lead to end-products other than carbon dioxide and water. In cells where the reaction products were not removed continuously, there was a progressive fall in voltage as the oxidation proceeded and the partial pressures of carbon dioxide and water built up. This represented an energy loss which was unavoidable in a single cell, but which could be almost completely eliminated in a multi-stage battery where the fuel was oxidised stepwise in successive cells.

It was difficult to produce electrodes with sufficient activity to oxidise hydrocarbons at low temperatures, although low-temperature cells for hydrogen and possibly also alcohols were feasible. Hydrocarbons could be oxidised efficiently and completely in high-temperature cells with fused salt electrolytes, but there was a risk of carbon deposition by thermal cracking above about 400°C. The Sondes Place cells operated between 500°C and 700°C. In this range carbon deposition could be avoided if the fuel was subjected to the steam reforming reaction before entering the cell. The overall heat balance was satisfactory and the loss of cell efficiency was not more than a few per cent.

Dr. Chambers said that fuel cells might become commercially available in three to five years. Research and development activity in the U.S. was at a level where inevitable duplication of work would lead to a complex patent situation which could only be resolved by extensive cross-licensing. The regrettably small effort in this country was likely to place us in a poor bargaining position.

New Carbon Process to be Used in U.K. Cuts Time from Weeks to Minutes

A NEW process for the manufacture of industrial carbon products which reduces the production time cycle from eight weeks to less than eight minutes is licensed to Union Carbide Ltd., London, whose subsidiary, British Acheson Electrodes Ltd., produces carbon products at its Sheffield works. Union Carbide Ltd. are among a number of licensees for the process appointed by Union Carbide Europa S.A., Geneva. The other licensees are Union Carbide do Brasil S.A., Sao Paolo, Brazil; Skandinaviska Grafitindustri A/B, Trollhattan, Sweden; Electrografite di Forno Alliono, Milan, Italy; and Union Carbide Asia Ltd., Kowloon, Hong Kong.

The process involves the shaping of carbon products in giant presses while electric current simultaneously heats the product. This permits the forming and baking to take place at the same time. The process is used in the manufacture of carbon brick for blast furnace linings, carbon brushes for motors and generators, and nuclear graphite for atomic reactors as well as a wide range of similar materials used throughout industry.

The entire process is automated as completely as possible for greater product uniformity and closer quality control. Instantaneous determination of physical properties is made easy for experimental purposes on a wide range of new specifications.

A.E.A. Uranium Drilling on Solway Ended

DRILLING operations in Kirkcudbrightshire, which were being carried out by the Atomic Energy Division of the Geological Survey on behalf of the U.K. Atomic Authority in order to investigate the nature and occurrence of uranium mineral deposits, have come to an end.

The existence of uranium ore was proved but the overall content was too poor to warrant the extension of tests in depth at present.

Obituary

Mr. R. D. Linford, Midlands, London and East Anglia representative for G. H. Zeal Ltd., manufacturers of thermometers and scientific instruments, died suddenly on 20 April.

U.K. Aerosol Association Reports Progress

THE British Aerosol Manufacturers' Association, formed in January this year, reports that the implications of the Weights and Measures Bill on the marketing of aerosols have been discussed with the Board of Trade and it is hoped that there will be amendments as a result of the representations made when the Bill is next given consideration by Parliament. The British Standards Institution has set up a technical committee to prepare British Standards for aerosol containers; furthermore, the Ministry of Transport has been approached on the problem of suitable outer containers for aerosols for export.

This year the B.A.M.A. expects to become a member of the Federation of European Aerosol Associations (F.E.A.) as the national body representing the U.K. industry. An invitation from the F.E.A. to organise the 1962 International Aerosol Congress and Exhibition in the United Kingdom has been accepted.

Secretary of the B.A.M.A. is Mr. W. A. Williams, M.B.E., Cecil Chambers, 86 Strand, London W.C.2.

Comprehensive Trade and Industry Directory for U.K.

A multi-lingual guide to U.K. products and their manufacturers, the *Kompass Register*, is to be published in the spring of 1962 by Kompass Register Ltd., Therese House, 29/30 Glasshouse Yard, Aldersgate Street, London E.C.1. Based on the Swiss *Kompass*, the register uses a special classification and cross-reference system aimed at simplicity and clarity, and is designed to fill the need for a comprehensive and authoritative work of reference on British industry, for use at home and overseas.

The U.K. version of *Kompass* will be divided into three main sections: a five-language index to products and services, which will probably contain upwards of 30,000 items; a second section, also in five languages, which cross-references the products to their manufacturers and suppliers; and a 'company information' section which will give details of firms arranged alphabetically under county, city and town.

Compensation for Eye Trouble Caused by Quinone

"Ocular ochronosis", due to exposure to quinone or hydroquinone—a condition which has been found to affect the eyes of workers engaged in the manufacture of hydroquinone powder—has now been included in the list of prescribed industrial diseases. A person contracting the disease at work will be covered for the benefits of the Industrial Injuries Scheme from 28 April.

This is the effect of 'The National Insurance (Industrial Injuries) (Prescribed Diseases) Amendment Regulations 1961. S.I. 1961, No. 691' (H.M.S.O., 3d) made by the Minister of Pensions and National Insurance after consultation with the Industrial Injuries Advisory Council.

Project News

Chemico Start Work on New Ammonia Plant at Flixborough

WORK is under way on a synthetic ammonia plant for **Nitrogen Fertilisers Ltd.** at Flixborough, Lincs, by **Chemical Construction (G.B.) Ltd.**, London, who have been awarded a contract covering the complete supply of the plant. Capacity of the plant is not revealed, but it is stated that it will more than double the overall ammonia production capacity of Nitrogen Fertilisers Ltd. It will be located next to an existing plant and completion of the project is expected in the latter part of 1962.

Raw material for the plant will be hydrocarbon gases from nearby steel mills at Scunthorpe. Output of the new ammonia unit will be delivered to the two parent companies of Nitrogen Fertilisers — Fisons Fertilizers Ltd., Felixstowe, and West Norfolk Fertilisers Ltd., King's Lynn. It was recently announced by Fisons that nitrogen fertiliser capacity of these two companies would be increased.

Boiler Plant for Lurgi Gas-making

● CONTRACT, worth about £1 m., for boiler plant and auxiliary equipment for the Lurgi gasification project of the **West Midlands Gas Board** at Coleshill, Warwickshire, has been awarded to the **John Thompson Group.**

Simon Engineering's Project Progress

● PROGRESS of many of the projects recently or currently undertaken by the **Simon Engineering** group of companies is reported in the group's house journal. The chemical plant department of Simon-Carves Ltd. has well over 40 contracts in various stages of progress in a dozen different countries, recent orders at home including a 100-ton sulphuric acid plant ordered through I.C.I. for Richardsons Fertilisers at Belfast. From Uganda has come an order for a 30-ton sulphuric acid plant and a single superphosphate plant as part of a new fertiliser factory near Tororo. Other export orders include a 150-ton sulphuric acid plant for Egypt. Simon-Carves (Australia) have a contract from the North Shore Gas Co. for a precipitator to treat 10 m. cu. ft. of gas a day at Oyster Cove.

In the gasification and ammonia fertilisers department, site work is in full progress for the East India Distilleries fertiliser factory in Madras, while at home, the pilot Rummel gasifier plant for the Bromley gasworks of the North Thames Gas Board is under erection and the plant is expected to be put to work during the summer.

A substantial contract received by Chemical Engineering Wiltons Ltd. last year was for an extension of the phthalic anhydride plant recently built for Howards of Ilford; it is reported that steelwork erection is in progress. Other new orders include a batch tar still for Scottish Tar Distillers and naphthalene crystallisers for the Normanby Park Supply Co.

New Stretford Plant Order for W. C. Holmes

● THE Chemical Engineering Division of **W. C. Holmes & Co. Ltd.** has received a further order for a Stretford Liquid Purification Plant. This plant, to be supplied to the **Northern Gas Board's** West Hartlepool works, is designed for complete removal of hydrogen sulphide from 3 m. cu. ft./day of coke oven gas. The plant is scheduled to be in operation in May 1962.

Arrangements are also being made to remove hydrogen cyanide from the gas prior to entering the main Stretford plant. This will reduce operating costs by preventing the formation of sodium thiocyanate in the washing solution of the Stretford plant.

W. C. Holmes are one of the licensees appointed for the Stretford process patented by the North Western Gas Board and Clayton Aniline Co., and built a Stretford plant at the Whitchurch works of the N.W.G.B. Receipt of a second order for a Stretford plant by R. and J. Dempster Ltd., another licensee, was reported in C.A., 8 April, p. 577.

Consultants for Effluent Treatment Plant

● CIVIL and chemical engineering consultants for a new effluent treatment plant for **Henry Wiggin and Co. Ltd.** at Hereford are **W. S. Atkins and Partners,** London. Contract for manufacture and erection, worth £35,000, has been awarded to **Bates Brothers (Engineers) Ltd.,** Manchester.

New Calor Gas Filling Station

● NEW filling station of the **Calor Gas (Distributing) Co. Ltd.** at Neath (Glamorgan), with a designed annual capacity of 10,000 tons, based on 250 eight-hour working days, is due on stream in September. Two sister plants, at Ellesmere Port, Cheshire, and Grangemouth, Stirlingshire, both of similar capacity, are expected to be operating by the end of this year and next spring respectively.

Vinyl Acetate Extension Boosts Hedon's Hull Capacity 60%

COMPLETION of extensions to their vinyl acetate plant at Salt End, near Hull, is announced by Hedon Chemicals Ltd. The vinyl acetate plant was initially commissioned in September 1956 and the recent expansion will increase the original productive capacity by some 60%. The plant is situated on the 100-acre site owned by the Distillers Co. Chemical Division. Hedon Chemicals is jointly owned by D.C.L. and Shawinigan Chemicals Ltd. of Canada.

Demand for vinyl acetate monomer in the U.K., as in all parts of the world, has been growing steadily, important uses including emulsion paints, adhesives and many other uses. Hedon Chemicals are one of the two major U.K. producers of vinyl acetate monomer, the other being the Courtaulds subsidiary, British Celanese Ltd.

Imports of vinyl acetate monomer totalled 333,977 tons in the three months ended 31 March 1961, as compared with 274,637 tons in the comparative period of 1960. Towards the end of last year an application was made for the imposition of an anti-dumping duty on cut-price imports of the monomer from the Continent; this application was, more recently, withdrawn.

Laporte Form Australian TiO_2 Company

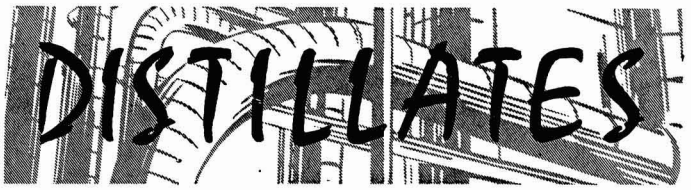
FORMATION of the company, under the name of Laporte Titanium (Australia) Pty. Ltd., which is to manufacture titanium oxide at Bunbury, Western Australia, is announced by Laporte Industries Ltd., London. Announcement of the £3½ million project appeared in C.A., 17 December 1960, p. 1029.

Chairman of the new company is Mr. R. I. Ainslie, Q.C., partner in a Perth firm of solicitors, while another member of the board will be Mr. Noel G. Humphries, general manager and director of H. L. Brisbane and Wunerlich Ltd., Perth, and chairman of two of that company's subsidiaries, Bouchers Industries Ltd. and Lusterite Plastics Products Pty. Ltd.

Mr. W. S. Duffield, managing director of Laporte Chemicals (Australia) Pty. Ltd., has been appointed a director of the new company, together with two members of the Laporte Industries Ltd. board in the U.K., Mr. Geoffrey Hickson and Mr. William Woodhall, managing directors of Laporte Chemicals Ltd. and Laporte Titanium Ltd., respectively.

Dunlop Use More Synthetic Rubber

Consumption of synthetic rubber by the Dunlop Rubber Co. Ltd. in 1960 increased from 39% to 44%. Synthetic rubber remained at a steady price of just under 20d/lb during 1960, while the natural product ranged between a peak of 40d/lb and 25d/lb.



★ TRANSPORT troubles seem to follow me around. Ten days after being towed home from the R.I.C. conference at Southampton with big-end trouble, I spent six hours at Geneva airport on Tuesday last week while flying to Rome. With the double assignment of covering the Royal Tour of Italy from the industrial point of view for the Benn Group of trade journals as well as to tour the Italian chemical industry, my enforced stay at Geneva meant passing up an invitation to dine at the historic Quirinale Palace, Rome, with the Queen and President of Italy.

The following day, I was able to meet two expatriate Britons working in Rome. Dr. T. G. Harris of Bombrini-Parodi and Dr. H. L. Richardson, seconded from I.C.I. to manage the fertiliser programme under the Freedom-from-Hunger Campaign of the Food and Agriculture Organisation. Dr. Richardson's office at the top of the F.A.O. skyscraper gives him a magnificent view over Rome's rooftops—with the Alban Hills in the distance on one side and the Coliseum only half a mile away on the other.

Twenty-four hours later I was in the office of Enrico Mattei, at the top of E.N.I.'s 14-storey administrative block at San Donato with a grand-stand view of 'Methane City', San Donato, or 'Methanopolis', as it is known to Milanese. While at E.N.I. I met Professor Dinelli, head of the San Donato research centre. From him I was interested to learn of the development of an E.N.I. polyisoprene process—but Dr. Dinelli would say no more than that the catalysts used were different from any others described in the patents. In other words they are not based on lithium or an organo/aluminium compounds; the process is being worked on a pilot plant. This month, the associated A.N.I.C. petrochemical producers come on stream at Ravenna with a polybutadiene plant.

★ "EVERY director should make it a point of honour to wear the appropriate protective clothing whenever he pays a visit to the works—indeed, in this matter a little ostentation is not only permissible but desirable."

This counsel is given in a paper by Dr. G. H. Beeby, chairman of British Titan Products Co. Ltd., at the National Industrial Safety Conference which is taking place at Scarborough this weekend under the auspices of the Royal Society for the Prevention of Accidents. Mr. Beeby points out that a surprising number of companies, especially those which have grown from small beginnings, reach a considerable size without realising that their accident prevention machinery has not kept pace with their growth. He urges that, in such cases, the directors appoint one of their number to be personally responsible for safety.

Dealing more with a particular aspect of industrial safety is a paper by Mr. J. Howlett, director, D.C.L. Chemical Division, and general manager of Distillers' Hull site, on the handling of highly flammable liquids. Mr. Howlett sounds a warning against placing too heavy a reliance on definitions of 'flammable' or 'highly flammable' liquids—in fact, if not in law, all flammable liquids should be treated as highly flammable if stored or used at temperatures at which they can flash in the presence of a means of ignition. Mr. Howlett points out that so-called highly flammable liquids do not suddenly become safe because of a marginal increase in flash point; precautions must be a matter of applied common sense.

★ MOCK-SERIOUS boos and catcalls from a few of his audience interrupted Mr. Erroll, Minister of State, Board of Trade, when he spoke, chiefly on exports, at the annual luncheon of the British Chemical and Dyestuffs Traders' Association (reported in CHEMICAL AGE last week, p. 730). He took it all in good humour—reports a colleague who attended the luncheon—and with all the charm and aplomb of a seasoned Parliamentarian, turned the tables on his playful antagonists, so that before he finished his speech there were was enthusiastic applause. This bears out my colleague's report that Mr. Erroll's precipitous exit from the dining room before the speech-making was over was necessitated solely by a pressing official duty and not by any other considerations.

To many, the Board of Trade seems a much more human and more cooperative organisation to deal with than some other Government Departments.

★ I HAVE been informed by a usually reliable South African correspondent that if an overseas scientist had not made an analytical error in 1949, the weed which is now covering 240 square miles of the Kariba Dam would not have reached the terrific proportions it has today, and the Federal Government would have been more than £500,000 in pocket, for that is what it will have to spend if the *salvinia auriculata*—the creeping death—is to be cleared.

What is worrying the Federal Government is that reports indicate that the water immediately below the weed is infested with bilharzia snails (jocularly known in Rhodesia as Bill Harris), constituting a danger of infection to anyone who fishes in the lake.

The weed, which is menacing the proposed fishing industry in the lake, may be tackled in two ways. The *salvinia* may be encouraged to grow and then tackled with various weedkillers in an effort to find one which combines economy with effectiveness and does not constitute a danger to the fishing, or on a long-term basis, it is hoped to discover a means of controlling or irradicating the weed by biological means, and the Government is backing a research institute to undertake this work.

Some people have also been seeking to find a commercial use for *salvinia* but so far without any sign of success.

★ WITH the formation of the new Laporte subsidiary that will manufacture titanium oxide at Bunbury, Western Australia, it would seem that a number of Laporte personnel will now have a legitimate excuse to do a little 'Bunburying' now and again. Not, of course, in the style of the chief character in Oscar Wilde's play 'The Importance of Being Earnest', who indulged in 'Bunburying' whenever he wanted to escape from the clutches of a somewhat autocratic aunt. Algernon's 'Bunbury', play-going readers will recall, was a fictitious invalid who lived in the country and whose welfare demanded Algernon's frequent attentions.

Bunbury, Western Australia, is no invalid, but a thriving coastal town some 112 miles south of Perth. Washed by the Indian Ocean it seems as good a place as any to go 'Bunburying', either to escape from an aunt or to build a new industry in real earnest.

★ CHEMICAL seed dressings are under fire again—this time on the grounds that some of them may be carcinogenic. In answer to the anxiety expressed in the House of Lords about the effect of agricultural dressings on the incidence of cancer, a Government spokesman said that there was no evidence in this country on that point.

During the debate, it was suggested that artificial preparations are connected with the increasing incidence of cancer and coronary thrombosis. Lord Hastings replied that several committees had discussed the matter. The British Industrial Biological Research Association was set up last year with a 50% Government grant for the purpose of examining food additives and other substances.

Alembic

New U.K. Benzole Hydrorefining Plant Yields Exceptionally Pure Products, Sulphur Below 2 p.p.m.

AN 'open day' was held at the new benzole hydrorefining plant of Port Talbot Chemical Co. Ltd. on 9 May, those present including representatives of the consumers, crude benzole producers, and the contractors and consultants responsible for the plant. The plant has been in production since October 1960 (C.A., 19 November 1960, p. 860) and yields products of exceptional purity, with low sulphur (under 2 p.p.m.), a notable feature, while benzene can be made with a crystallising point of 5.4° (99.7% pure).

The plant is believed to be the first of its kind in the U.K. to produce pure benzene by hydrorefining, although a similar plant is refining gas works benzole at the Cadishead works of Lancashire Tar Distillers Ltd. (an associate company of Lincolnshire Chemical).

The new plant at Port Talbot was built to refine the crude benzole from the coke ovens of the Steel Company of Wales Ltd. (who, with the Lincolnshire Chemical Chemical Co., are joint owners of the Port Talbot Chemical Co.) but is capable of refining 6½ million gall./year of crude benzole. Construction took only nine months, and commenced three months after placing the original order. Considering that this is the first U.K. plant of its kind to produce pure benzene, remarkably few troubles have been experienced and apart from the Christmas break has been continuously on stream.

In addition to chemically pure benzene, toluene of similar high purity is available, while solvent toluene, xylole and naphthas are characterised by being sweet smelling, exceptionally colour stable and free from gum as compared to the conventional acid washed material.

The hydrorefining plant was built by Lurgi of Frankfurt in conjunction with Simon-Carves of Stockport, and the distillation plant by R. and J. Dempster Ltd., Manchester.

The plant has been designed to process 4½ million gall. of crude benzole a year, although guarantee runs have shown it capable of very comfortably exceeding that figure. The plant occupies an area of 4.2 acres, and has been laid out for further plant extensions and also possible future 'doubling up'. The services to the plant, notably steam, cooling water, electricity and coke oven gas, are purchased from the Steel Company of Wales.

The crude benzole comes in by road tanker, and storage has been provided for 200,000 gall. Ample intermediate storage exists and the finished product storage area has a capacity for three weeks or more of storage for all products when the plant is operating on full throughput.

The hydrorefining plant uses the B.A.S.F.-Scholven process, whereby basically the crude benzole is evaporated and passed under pressure through a reactor containing a fixed bed catalyst in the presence of coke oven gas. Here the sulphur compounds and unsaturated bodies in the crude benzole are removed in the form of H_2S or are fully saturated with hydrogen contained in the coke oven gas. Some of the gas is recycled though a portion is continually removed and returned to the main in order to ensure a sufficiently high partial pressure of hydrogen. The hydrorefined benzole, now termed raffinate, is passed to the distillation plant and the creosote residues in the crude benzole to the sales storage tanks.

The distillation plant consists of two sections, the continuous plant which continuously takes off a forerunnings fraction containing the undesirable paraffins and a pure benzene stream, leaving a residue of toluene, xylene and naphthas for working up in the batch still.

The continuous plant consists of a main column (which is in two sections comprising 50 and 24 Montz plates) to which the raffinate is fed and from which the forerunnings are taken overhead, together with a side stripper column (60 Montz plates) from which pure benzene is drawn as a product from the base of the column. The columns operate using steam at 150 p.s.i. as a heating medium and under atmospheric pressure. The toluene, xylene and naphthas are taken from the base of the main continuous column to storage and thence to the vacuum batch still (50 Montz plates) again using steam as the heat medium, where pure toluene, 2/3° xylene and the hydrorefined solvents H.R.S. 170 and 190 are made direct.

The plant has been laid out as a flameproof area in accordance with the latest practice and in particular according to the A.B.C.M. Code of Practice, modified where necessary to eliminate all unnecessary hazards. Where flame-proofing is required, motors and instruments are either flame-proof or are air purged, and the whole of the control room is pressurised in this way.

Main products of the plant are pure benzene (all grades including low sulphur and high crystallising point material), motor benzene, nitration toluene, 90's toluole, 2/3° xylene, hydrorefined solvent 170, hydrorefined solvent 190. The plant is also capable of producing special fractions.

Formation of Ozone by Gamma Radiation Studied by U.S. N.B.S.

OZONE, because it is more reactive than oxygen, is useful in some chemical processes, for instance in the selective oxidation of double bonds in organic molecules, but its presence is undesirable in certain reactions. Because of this, and because ozone is formed when systems containing molecular oxygen are exposed to ionising radiation, it is necessary to obtain basic knowledge on the kinetics and mechanisms of the reactions of other substances with oxygen, in order to further low-temperature studies of radiation-induced processes. It is to this end that, while studying the effect of ionising radiation on the mechanisms of processes under low temperature conditions, the U.S. National Bureau of Standards determined the yield of ozone as a function of radiation dose in undiluted oxygen and in oxygen mixed with nitrogen, argon and krypton.

The procedure adopted was to irradiate the sample contained in an ampoule placed in a Dewer flask. Ozone content after irradiation was determined either by chemical methods or by dilatometry.

In determining the effect of dilution and energy on the yield of ozone, oxygen was mixed with argon, krypton and nitrogen, respectively. Neither argon nor krypton can form stable compounds, but these diluents absorb some of the incident radiation and so can reduce the yield of ozone. Some nitrogen dioxide is formed in the presence of nitrogen but the yield of ozone should also be reduced because less energy is absorbed by oxygen.

It was found that dilution with moderate amounts of inert gases does not radically change the amount of ozone produced, suggesting that the energy absorbed from the γ-radiation is transferred from the diluents to the oxygen. The stationary ozone concentration in undiluted oxygen is about 13%.

A.E.C. Report on Use of Radioisotopes in Detergents

THE potential use of radioisotopes in the synthetic detergents and soap industry is the subject of a U.S. Atomic Energy Commission report, No. TID-6088.

The report surveys the present use of radioisotopic techniques in process control in the industry, notably in liquid level monitoring and specific gravity measurement. Possible uses of radioisotopic methods are cited: in research and development, including analytical procedure development; in the development of detergent formulations; and in analytical separations, including activation analysis, and radiation absorption methods.

Copies of the report may be obtained from the U.S. Department of Commerce.

N.P.L. Research on Polymers Will Yield Practical Data for New Applications

THE wide range and variety of applications of polymeric materials in plastics, synthetic rubbers and fibres make the discovery of the relationship between the structure of their long chain molecules and their electrical and mechanical properties of great practical importance. Such a study is part of the work of the National Physical Laboratory, and is described in the 1960 report of the laboratory which is available from H.M. Stationery Office at 9s 6d.

The structural factors of polymeric materials which are of particular importance are the flexibility of the molecular chains, intermolecular forces and distances and the size and geometrical arrangements of repeat units along the chain. These factors together determine the mode of packing and the motion of the molecules under given conditions which in turn determine the macroscopic properties of the material. If the chain segments are small and each have the same special configuration, the ease of packing will often give rise to polymers which contain both crystalline and amorphous regions.

Polyoxymethylene Study

The polymer chosen for an initial study was polyoxymethylene, a commercially available material having the chain structure $(CH_2O)_n$, each molecule terminating in ester groups. The molecules are linear and are not complicated by side branches, although they readily crystallise to a material having about 70% crystallinity in weight. The number average molecular weight is approximately 40,000.

Measurements have been made of the dynamic shear modulus and the internal damping. A furnace was used above room temperature, and low temperatures were produced by passing a stream of nitrogen gas through a copper tube surrounding the specimen. The results indicate that molecular flexibility is increasing over the entire temperature range. Onset of molecular motion appears to be concentrated mainly in two temperature regions. Since both regions are found to be affected by the addition of liquids, which are known to enter selectively the amorphous regions of the polymer, it is likely that they are associated with motions in these areas.

The low temperature dispersion region —centred around −77°C—is probably due to motions of the chain backbone associated with the amorphous glass-rubber transition.

The existence of a high temperature loss peak at 87°C is typical of the results found for other highly crystalline polymers, but is absent for wholly amorphous polymers. It is tentatively suggested that the processes occurring at these temperatures are a continuation of those occurring in the low temperature region. It is suggested that the presence of crystallites prevents the free expansion of the amorphous material at low temperatures and thus reduces the amount of free volume necessary for the molecules to move.

Under the old name of Control Mechanisms and Electronics, the Autonomics Division of the National Physical Laboratory was a pioneer in the fields of computing, servo control and data processing. These techniques were quickly passed on for development by British industry leaving the laboratory free to start new research in anticipation of the industrial needs that would lie ahead. At that stage computors were doing largely arithmetic but now they are being set tasks such as mechanical translation which is a programming problem of the highest order.

By a discovery of the underlying principles by which man is capable of accurate control without mathematical analysis, a big step forward might be made in the automatic control of complicated industrial processes. The work of the Division is, therefore, being extended to include studies with biologists who have been recruited to investigate the problems of learning and perception by animals and man.

In industrial practice, a control decision has often to be made on an insufficient basis of data. Computors in ordinary use cannot give much help in decisions of this kind. Special computors are needed which make efficient use of available data and which quickly examine the results of their own decisions so that they can always adapt their future output to the best information available. Some parts of any realistics adaptive control computation must be carried out at very high speed. The first steps have been taken, with encouraging results, towards the building of an exceptionally fast analogue computor.

Optimal control of complicated industrial processes by trial-and-error statistical methods is now an accepted necessity. It takes various forms from data logging and statistical analysis in a general purpose computor to supervision by a special purpose learning machine. Optimisation of design by the steepest descent methods is of the same basic nature. Gains of 4% by this approach have already been achieved. A general purpose computor is unnecessarily expensive for this work; a special purpose computor can be permanently attached to a plant and always be learning, as imputs and demands change. It is hoped to demonstrate such a system attached to a simulated distillation column within about two years.

New Quaternary Ammonium Compounds Show Promise As Plant Fungicides

A NEW family of quaternary ammonium compounds, the phenacridiniums, show marked effectiveness under laboratory and greenhouse conditions as protectants against downy mildew of lima beans—and the chemicals might be effective against other plant diseases.

This is the first reported use of these compounds in plant disease control. The compounds were synthesised and studied for clinical use by industry and appeared promising as preoperative and laundry sterilants in hospitals, and against a wide range of bacteria and fungi affecting man and animals.

However, medical adaptation of the compounds has not been exploited because of the indelible yellow stain left when used. This staining characteristic is not objectionable, however, from the concentrations used for plant disease control, according to scientists of the U.S. Department of Agriculture.

The parent compound, phenacridane chloride [9-(*p*-*n*-hexyloxyphenyl)—10—methylacridinium chloride], and several close relatives were from four to eight times more effective in laboratory tests than one of the commercial fungicides used against downy mildew. The U.S. scientists are now investigating the effectiveness of the compounds against other crop diseases such as anthracnose of snap beans.

The compounds are fungicidal rather than fungistatic in their action. Although phenacridane chloride and certain relatives are effective in protecting lima bean plants from infection, they do not appear effective in curing plants that already have downy mildew.

Besides good fungitoxicity, some of the compounds display other desirable characteristics for plant fungicides. All active compounds studied have surfactant properties (ability to wet leaf surfaces) and some have low water solubility (may result in high retention on leaf surfaces during rain).

Other quaternary ammonium compounds are used for weed control, as dyes, in chemical analysis, as sterilants, and antiseptics in medicine.

Although the new compounds appear promising in laboratory and greenhouse studies, research is continuing to determine their effectiveness under field conditions. No recommendations for use of phenacridinium compounds on edible crops are made.

F.A.O. Campaign

WORLD MAY NEED 100 MILLION TONS OF NPK BY A.D. 2000

WHEN the Duke of Edinburgh visited the Food and Agriculture Organisation of the United Nations in Rome on Thursday, 4 May, he learned something of the struggle to maintain basic food supplies in the underdeveloped countries of the world in the face of a mounting world population that is outstripping the rate of growth of food production.

On the face of it, a rise in world population between 1959 and 1960 of 1.6% was slightly exceeded by the growth in world food supplies—excluding Mainland China—of 2%. However, the greater part of the increase in supplies of foodstuffs came from the more highly developed countries of the West or that part of the world in which population growth was smallest. In other words, food production rose least in those countries where the growth in population was the largest.

Freedom-from-Hunger

This is the main reason for the F.A.O. Freedom-from-Hunger Campaign—to increase agricultural production in those countries where hunger is extensive and chronic. The ultimate aim is to raise standards of living—at present the main task is to maintain what to the West must be extremely low standards. The success of this campaign depends considerably on the rate at which fertiliser use can be raised in the countries where hunger persists.

The importance of fertilisers is shown by the fact that in those countries using little or no fertiliser, the average yield of grain ranges from 800 to 1,400 kg. per hectare. As the use of fertiliser increases to around 60 kg. of plant food per hectare, the average yield of grain crops increases to 2,000 kilos/hectare. By further increasing the use of fertilisers to 200 or more kilos of plant food/hectare, several countries have achieved average yields of 3,000 or more kilos. Although these increases cannot be attributed to the use of fertilisers alone, the data collected by F.A.O. clearly show that the use of fertilisers is associated with other improved farming practices.

In 1959-60, world annual fertiliser consumption was around 23 million tons of plant food (N, P, K), but it is concentrated in the more developed countries. If only one half of the additional food required by the end of this century to feed the estimated additional 3,000 million population of the world (double the present total), is to be produced through the use of fertilisers, world consumption of those nutrients would have to approximate 100 million tons. A large proportion of this increase would be used in Asia, the Near East, Latin America and Africa. Vigorous efforts must therefore be made to accelerate the increased use of fertilisers in the less-developed countries of the world.

From January this year the F.A.O. fertiliser programme started as an integral part of the Freedom-from-Hunger Campaign. For the past two months it has had as its manager, Dr. H. L. Richardson, until this week president of the Fertiliser Society, who was seconded to F.A.O. from his position as overseas development manager, Central Agricultural Control, I.C.I.

Over the next five years, the fertiliser programme will extend its activities, conducting a very extensive field campaign in about nine selected countries in three different areas in order to show farmers the benefits of efficient fertiliser use. The programme will supply more precise and effective information on the efficiency of fertiliser use in the project areas and on the factors limiting their use.

In the initial stages, this programme will not call for large quantities of fertilisers—a few tons are sufficient to demonstrate the effectiveness of plant nutrients in agriculture. But it is foreseen that demand will build up in the areas selected for field activities and eventually the need may arise for plants to be set-up in some of the countries concerned. Such plants would not be economic at present, for the areas chosen are those where there is little or no current fertiliser usage. The areas concerned—from each of which three countries will be chosen for the campaign—are (1) the Near East, stretching from Morocco to Afghanistan, (2) West Africa, and (3) Central and Latin America, including Mexico.

Response to Appeal

It is envisaged that the immediate need will be for N and P_2O_5 followed by K_2O. Already the fertiliser industries of the world have responded to the F.A.O. appeal for contributions; these have been made 'with no strings attached'. F.A.O.'s fertiliser programmers may buy their fertiliser needs from anywhere in the world. To help administer the programme, there is a Fertiliser Industry Advisory Panel, which comprises representatives of world organisations. In addition, at F.A.O. headquarters in Rome, there is a liaison officer who permanently represents the fertiliser industry and who is able to report back regularly on the work and needs of F.A.O.

If, when demand builds up in the countries concerned to the stage when it would be economic to build a plant, this would be a matter for the governments concerned.

Objectives of the fertiliser programme are:

(1) To promote the efficient use of fertilisers so as to raise food supplies in food deficient areas, as well as to increase feedstocks to help boost animal production and to raise farmers' incomes by increasing food levels as a result of efficient use of fertilisers and other improved soil and croft management practices.

(2) To assist governments in collecting the necessary information and data from which they can develop national programmes of fertiliser use and production.

(3) To assist in selecting the methods of disseminating information in fertiliser needs and use in the most effective way.

(4) To develop guide-lines regarding fertilisers in foreign aid programmes.

Studies to be undertaken under the fertiliser programme will include economic studies of production mainly meant to draw attention to the economics of fertiliser use and to the balance between fertiliser prices and costs, and to increased returns from their use as affecting the extent to which farmers will have sufficient incentive to use fertilisers in adequate quantities. Studies will also be made to provide data for use by governments in developing their own national fertiliser programmes and in planning their agricultural development. These and other technical studies will be published in reports and may also be used as basic documents at the World Food Congress in 1963.

By 'Alembic'

(Benn Brothers Special Correspondent with the Royal Tour of Italy)

Proposed budget for the fertiliser programme will call for $2 million over a five-year period of which $1.4 million would go for field activities, $450,000 to marketing and development studies and $150,000 as a contribution to the Freedom-from-Hunger Campaign. The world's fertiliser industry has stated its intention to make firm commitments on the basis of this budget for the first two years when an expenditure of $3,450,000 will be called for with the understanding that if the programme develops satisfactorily further support will be given for the following three years.

The Far East has been excluded from the current programme because this area was the subject of a lengthy report, entitled 'Preliminary Report of the Survey of the Fertiliser Economy of the Asia and Far East Region' published in Rome. Among the mass of statistical data covered by this report and its appendices, this showed the following estimates of fertiliser consumption in 1963. These were based on the average annual rates of growth in consumption between 1950 and 1958 as well as the general level of fertiliser usage.

Estimates of Fertiliser Consumption, 1963

	N	P	K
Ceylon	40,000	20,000	35,000
India*	800,000	350,000	130,000
Indonesia ...	35,000	30,000	15,000
Malaya/Singapore	35,000	35,000	12,500
Pakistan	98,000	14,000	2,500
Philippines ...	30,000	11,000	14,000
Thailand† ...	15,500	15,230	5,500

* 1963-67
† 1964

Progress in Chemical Processing of Coal at B.C.U.R.A.

PROGRESS in work under contract for the Ministry of Power on complete gasification of coal, commended by the Wilson Committee on Coal Derivatives, is among the subjects discussed in the annual report of the British Coal Utilisation Research Association, Randalls Road, Leatherhead, Surrey. Main emphasis of the complete gasification investigations has been placed on developments likely to lead to high thermal efficiency and throughput and to reliable performance, especially in relation to slag removal.

Satisfactory slag removal and granulation has been achieved with one design of hearth. When, in addition to the lump coke forming the fixed bed, 35% of the potential heat input was supplied as finely powdered coal (100% below 30 microns), the overall efficiency was somewhat higher than that obtained with normal pulverised coal (80% below 76 microns), though lower than that when no pulverised fuel was injected. However, in view of predictions about the relative prices of coal suitable for the fixed bed and of coal too fine for this purpose, lower priority has been given to experiments with pulverised fuel injection.

Improvements in the design of the plant have been made to increase the contact between solid and gas, and uniformity in operation; and tests have begun with a new design of hearth in which the slag outlet is central.

Many measurements of the temperature-viscosity characteristics of slags have been made and improved correlations with chemical composition have been developed. This work, primarily directed to the gasifier project, has also included the study of slags produced in a cyclone furnace at Barking Power Station.

Nuclear Graphite. Research into graphite moderators for nuclear reactors, by arrangement with the Atomic Energy Authority, has been satisfactorily continued and extended. Assessment of chlorofluorocarbons produced from coal has progressed but no conclusion regarding commercial applications has yet been reached.

Coal Chemistry. Further advances have been made in understanding the structure of the coal molecule. Production, in the laboratory, of anion exchangers from coal is believed to be sufficiently promising to warrant continued investigation.

With the support of a Member firm, chlorofluorocarbons produced from low rank coals by reaction with chlorine trifluoride have been further examined to assess their potential value in industry. A more economical means of increasing the resistance of the products to alkaline hydrolysis has been devised.

One distillation fraction, after further chemical treatment, showed no change in appearance or deterioration in properties after refluxing in air at 240°C (464°F) for 20 hours. A high-boiling fraction, a brittle solid at room temperature, was converted by pyrolysis to an oil in about 60% yield. A by-product was found to be an effective fungicide.

Coal has also been treated with fluorine, in collaboration with Professor Tatlow at the University of Birmingham. Fluorinated oils and fluoro-acids were produced, though in a total yield small compared with the best yields when chlorine trifluoride is used.

Export Organisations Could Help Chemical Firms, Says B.C.D.T.A. Chairman

MERCHANTS have made a substantial contribution to the expansion in export trade in chemicals and allied products and materials, and there is undoubtedly much scope to develop wider markets for British chemicals, dyestuffs and drugs, Mr. Denis F. Waugh, chairman of the British Chemical and Dyestuffs Traders' Association, told members at the annual meeting. He went on to point out that manufacturers who have never hitherto exported and who intend to enter overseas markets would be greatly assisted in their endeavours if they were to utilise the services of the established export organisations. In this connection, the Association welcomed the extended facilities offered by the Export Credits Guarantee Department, but did not think they had gone far enough for the merchant organisations.

Other subjects reviewed by Mr. Waugh included Import Duty questions, anti-dumping legislation, and the effects of the London dock strikes on import-export trade.

The following officers of the B.C.D.T.A. were elected: *president*, Mr. G. S. Bache (James Beadel and Co. Ltd.); *vice-president*, Mr. C. W. Lovegrove (Chas. Page and Co. Ltd.); *chairman*, Dr. C. J. Bell (Chas. Zimmermann and Co. Ltd.); *vice-chairman*, Mr. Kingsley Williams (K. W. Chemicals Ltd.); *hon. treasurer*, Mr. J. Berthoud (R. W. Greeff and Co. Ltd.); *council*, Mr. D. E. Flaherty (Guest Industrials Ltd.); Mr. B. B. Keegan (Keegan Dyestuffs and Chemicals Ltd.); Mr. L. A. Quick (Langley-Smith and Co. Ltd.); Mr. J. D. Ross (James Miller Son and Co. Ltd.); Mr. R. H. Stein (Victor Blagden and Co. Ltd.); Mr. Denis F. Waugh (Tar Residuals Ltd.).

Annual luncheon of the Association was reported in CHEMICAL AGE last week (p. 730).

New British Standards for Photographic Chemicals

Two more British Standards for photographic chemicals have just been published. They are B.S. 3311:1961, 'Sodium tetraborate (borax) photographic grade', and B.S.3312:1961, 'Aluminium potassium sulphate (potash alum) photographic grade'. Each standard lays down physical and chemical characteristics for the material it covers, together with appropriate methods of test, including limit tests for certain impurities.

Copies may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1, price 3s each (postage extra to non-subscribers).

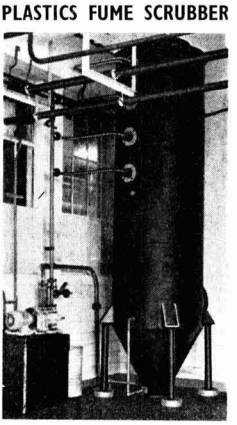
Rubber Federation Now Represents 90% of the Industry

The Federation of British Rubber and Allied Manufacturers, under its new scheme for direct membership of individual firms, now has 170 rubber manufacturing member firms, who represent between 85% and 90% of the industry. In addition, 21 trade associations and product groups are included in the ordinary membership, while 47 firms supplying synthetic rubber, machinery, chemicals and components to the industry are associate members.

Radiation Questions Answered

The U.S. Atomic Energy Commission receives frequent requests for information about nuclear radiation and radioactivity presented in brief and non-technical form. A booklet answering some of the questions has been published and is on sale at the U.S. Government Printing Office, Washington 25, D.C.

PLASTICS FUME SCRUBBER



Tufplas plastics fume scrubbing tower, fabricated by Tough Plastics Ltd., Addlestone, Surrey, installed in the Munich works of Elektrochemische Werke Munchen AG. Owing to an error in the printing works which was beyond the control of 'Chemical Age' editorial staff, this photo was printed upside down in last week's issue (p. 734). Apologies to our readers and to the companies concerned

TRANSPORT OF CHEMICALS IN SCOTLAND

Freight Transport by Road Exceeds Rail Deliveries for First Time

A NEW and important development in British transport took place in 1960. For the first time the amount of freight carried by road exceeded that carried by rail and recent figures show that road transport is maintaining this lead.

Industrial concentration in new industrial areas, prefabrication involving loads too large to be carried by rail and the despatch of industrial products in bulk direct to their users have favoured this development. These trends have been particularly marked in regions such as Scotland where factories have been built in areas which are not served directly by rail.

The chemical industry has been very much affected by this development. While like many other industries much of the raw materials used are transported by rail, the semi-finished or finished industrial material goes directly by road from the chemical plant to the industrial user.

Bulk Liquid Chemicals

Road transport is very suitable for the transport of bulk liquid chemicals which have to be maintained at a given temperature in transit. In many cases the transfer of such liquids from rail transport to road transport en route would be most unsuitable, but if these liquids can be carried from a rail siding direct to a suitably equipped rail sited factory then rail transport would be effective. The British Transport Commission are very much alive to this problem and are giving every consideration to the development of tankers which can be used both by rail and road. Unfortunately a large part of this programme has not as yet got beyond the blueprint stage.

This aspect was vividly illustrated at Glasgow on 9 April, when James Hemphill & Co. Ltd., road hauliers, Glasgow, applied to the Licensing Authority Scottish Traffic Area for three road tankers, each with a capacity of between 2,000 and 3,000 gall. The purpose of the application was to carry Surfix C Compound for the British Bitumen Emulsion Co. (Scotland) Ltd.

Some 330,000 gall. of this new road waterproofing and sealing compound had been carried by the applicant company in 1960, but 1 million gall. would probably have to be carried in 1961. It was essential that this product be transported in a tanker which maintained a minimum temperature of 190°F. It was pointed out during the hearing that the only other Scottish private haulier doing this type of work could not supply tankers as, owing to the great development in this traffic, the other company, Hoggs of Tranent, were also short of transport. British Railways, who opposed this application, were asked to supply a list of vehicles which could be made available to carry this traffic, but were unable to do so.

For B.B.E. (Scotland) Ltd., it was stated that British Railway tankers had been used, but these had difficulty in maintaining temperatures at out of way stations. British Railways had informed them that it would cost £84 per 24 hours (by employing a locomotive) to keep their product at the correct temperature, more than the whole product was worth. If there was no convenient rail siding the position was hopeless as their product could not be transferred from rail to road transport. At the same time the company explained that that part of their traffic which had been carried by rail would still be carried by rail and if the application was granted it would make no difference to the amount of their traffic already being carried by rail.

This application also illustrated another development in industry, the transfer of C licence vehicles to A contract and A licences. The company concerned had sold one of their tankers to Hemphill and wanted it operated by this road haulage firm.

Many firms in the chemical and other industries are finding it worthwhile to have a large proportion of their products carried by road haulage contractors who specialise in vehicles equipped for their type of traffic. It also saves the worry of insurance and many other problems involved by running one's own transport.

It is interesting to note that the Rail and Road Tribunal in appeals from decisions of the Traffic Licensing authorities have laid down that in granting increased traffic facilities the interests of the public (i.e. the customer) must take precedence and that the customer is entitled to say how his goods should be carried. If a firm seeks to use the services of a road haulier the firm concerned should always, when the application is being heard, see that a witness who is fully competent to state what the firm's transport needs are, is present in the goods traffic licensing court to give evidence. Otherwise there is a good chance the application will fail. It should be noted that the British Railways representatives usually oppose all such applications.

A recent visit to the Scottish "capital" of the chemical industry, Grangemouth, revealed the big part road tanker transport is playing. On average, one road tanker every five minutes passed through the town en route to the various chemical plants or to destinations outside Grangemouth.

Firms engaged in this traffic in Scotland include Wm. Dobson (Edin.) Ltd., Edinburgh, J. and A. Smith of Maddiston Ltd., Forth Haulage Co. Ltd. and Hoggs Ltd., Tranent. The British Transport Commission, through their ownership of Pickfords Ltd., have a large share of the road tanker traffic.

One of the largest road tanker operators is James Hemphill Ltd., Glasgow. This firm has a fleet of 60 to 70 road tankers, many of which are specially equipped to carry bulk chemicals.

These tankers are glass-lined, plastics or rubber-lined, depending on the type of load to be carried, and this fleet is a good example of how road transport is developing to meet the needs of the chemical industry.

Liquids carried include industrial solvents and acids and alkalis in general including phosphoric acids for the fertiliser industries such as S.A.I. Ltd., and sulphuric acid for the textile industries.

Other materials carried include: paraffin wax (Manchester to Glasgow for Bryant May Ltd.). temperature 180°F.; liquid pitch, bitumen pitch, 300°F.; materials for the printing ink and colours industries; sea water for use in developing distillation plants (Weirs Ltd., Glasgow), emulsions for road work, liquid fats, fruit pulp and pectins. Steam coils inside the tanks are used to maintain temperatures. When carrying inflammable liquids, the danger of fire is controlled by filling the tanker first with nitrogen which blankets the fluid and expels all oxygen in the tanker. Bacteria is prevented from contaminating liquid foodstuff ingredients by the use

A tanker of James Hemphill of Glasgow for transport of bulk liquids

of carbon dioxide as a blanket. A plastics spray used before filling a tanker with paint prevents the formation of a coat on the paint.

The next development in road tanker haulage in Scotland will be special road tankers to carry butadiene gas for the synthetic rubber industry.

Earthing cables are used with these tankers to prevent trouble arising from static electricity. Special valves and pumping machinery are fitted.

For the past few years, Scottish road haulage firms specialising in carrying products for the chemical industry have been doing their best to cope with this fast increasing traffic, and there can be little doubt that, in 1961, there will be a further increase in the size of the road fleets devoted to this traffic in Scotland and England.

In conclusion, it should be noted that the various cross-channel ferry services between Scotland and Ireland, such as Anglo-Continental, Irish Ferry Services, Burns-Laird are carrying an increasing number of special tanker containers to N. Ireland for the textile and fast growing synthetic industries in Ulster.

Cohen Drug Recommendations Will Hinder Research Says Pharmaceutical Industry

THE attitude of the Association of British Pharmaceutical Industry to the advice given to doctors by the Cohen Committee on proprietary preparations (see CHEMICAL AGE, 25 March 1961, p. 502) was commented upon in the annual report of the Association for 1960-1961 published last week. The Association believes that if the principal conclusion of the Committee is generally accepted by doctors then the industry's future contribution to therapeutic advance through research and development will be seriously jeopardised. The Association has reserved its detailed comments on the report until this can be discussed by members. A survey of research and development expenditure in 1959 showed that in their research establishments in Britain members of the Association spent £6,257,025 on the discovery and development of new drugs—an increase of more than £1 million on 1958. In addition to their own research expenditure, members of the Association donated £273,013 to independent research organisations.

The Annual Report revealed that the cost of the pharmaceutical services in Great Britain was £84.5 million in 1959-1960. It is generally accepted, says the report, that among the more important factors responsible for the increase are the introduction of new drugs—many of which materially reduce the length of hospitalisation, and an increase in the quantity of drugs required for an increasing population which is living longer at least partially as a result of improved methods of disease control. The important new drugs discovered and/or developed by pharmaceutical manufacturers since the Health Service began include broad spectrum antibiotics, vaccines and corticosteroids.

On the question of manufacturers profits, the report stated that if the pharmaceutical industry is to progress and if medicine is to be supported by new and improved drugs, it must be permitted to operate under conditions which encourage research, the results of which are less predictable than in any other field of industrial research. Profits, says the report, have never been derived solely from N.H.S. business. Many manufacturers have substantial exports and incomes from overseas subsidiaries and also engage in other markets, for example veterinary medicine, foodstuffs, fine chemicals etc.—all of which come in profit figures quoted recently.

B.D.H. Oral Contraceptive Still On Trial

CLINICAL trials on human beings of substances discovered by B.D.H. (see CHEMICAL AGE, 12 March 1960, p. 443) which show great promise as oral contraceptives are continuing. Mr. G. C. R. Eley, chairman of B.D.H., revealed in his annual statement issued last week that the trials were being carried out in the U.K. in collaboration with the Council for the Investigation of Fertility Control.

The results so far obtained fully confirm the findings from animal studies, said Mr. Eley, but sufficient clinical evidence to support a decision to market is unlikely to accumulate before the end of the year.

The great advantage of the B.D.H. contraceptive, if it proves satisfactory in all respects, will be its low cost. It is said that the tablets would market at about 1d, making the cost for a month's supply 1s 8d compared to 23s 6d for Conovid, at present the only oral contraceptive available in this country (see CHEMICAL AGE, 4 February 1961, p. 209). News that research was being undertaken on oral contraceptives was released by B.D.H. to their shareholders at the time when they were considering a bid made by Fisons for the company.

Much interest has been aroused throughout the world by the news of the B.D.H. discoveries and the company has recently agreed to clinical trials in Canada, the U.S. and New Zealand. Arrangements are also being made with the appropriate medical and family planning authorities for the extension of the trials to other countries particularly in the East, where the need for population control is especially urgent.

Improved Bulk Handling with Vyon Plastic

CONVEYANCE of powders through pipelines has long been regarded as the preferred method since it provides a neater and more simplified form of production flowline, cutting down, as it does, the danger of respiratory disease and the risk of fire or explosion caused by the dispersion of powder.

Various methods have been developed in recent years for the pumping of dry powders and Mono Pumps Ltd., Clerkenwell Green, London E.C.1, have undertaken research in order to achieve controllable gravitational flow of powders from storage hoppers and containers. Vyon, a tough, flexible and easily adaptable porous plastic made from high density polythene, was eventually adopted as the air-permeable material most suited to the requirements.

Vyon is manufactured by Porous Plastics Ltd., Dagenham Dock, Essex, and for the first time is being shown in the U.S. at the forthcoming Ninth National Plastics Exposition in New York.

As well as its applications in air fluidised powder conveying, it has been used for air and liquid filtration, in electrolytic diaphragms and de-ionising equipment and in other fields. The plastic is ideal as a filter material since it is completely free from detachable fibres and its smooth surfaces make mechanical cleaning easy.

Quickfit List New Lab. Glassware Products

THE 1961 catalogue of Quickfit and Quartz Ltd., manufacturers of interchangeable laboratory glassware, Stone, Staffs, contains details and illustrations of many new items. These include an electrically heated circulatory evaporator unit and automatic water stills. There is an extended range of separating funnels, now standardised with interchangeable keys. Interchangeable stopcock keys have also been introduced, where appropriate, on other items.

Q. and Q. have extended the range of shapes and sizes of the wide-neck reaction vessels, making them more suitable for other purposes, such as culture vessels. Smaller capacities are now available—50 ml, 100 ml, 250 ml and 500 ml. The popular sizes of Quickfit conical joints are now manufactured to sizes and tolerances recommended by the International Standards Organisation. The new joints are completely interchangeable with corresponding older conical joints.

Biochemical Engineering Symposium

A symposium on biochemical engineering is to be held at 2.30 p.m. on 30 May at the Royal Commonwealth Society, Craven Street, London W.C.2. Subjects to be discussed include fermentation on the industrial, laboratory and pilot-plant scale; aeration and agitation. The symposium is organised by the Institution of Chemical Engineers, 16 Belgrave Square, London S.W.1.

Overseas News

NEW GRAFT CELLULOSE EXPECTED TO BROADEN USES OF COMPOUND

A NEW material expected to broaden the uses for cellulose has been developed by Rayonier Inc. Cellulose grafting, as the new process has been termed, is a means of tailor-making cellulose compounds to give particular properties. A variety of compounds have been marketed along these lines, but Rayonier claim that their process is more fully controllable, continuous and more readily adaptable to automation. A fully automated unit is in fact currently on stream at Fernandina Beach, Fla.

The new compound, Ethylose—a high-quality, purified wood cellulose modified or grafted with a small amount of ethylene oxide—is a potential raw material for paper coating, and for the textile, ceramics, paints and food industries. The material is insoluble in water, and can be readily dissolved in aqueous alkali to render stable and useful solutions. The amount of substitution of ethylene oxide is 4%. It differs from Viscose in that it is stable in the pellet form in which it is prepared as well as in solution.

Ethylose is the first of a whole family of modified cellulose in which various chemicals and polymers are grafted on to a basic cellulose chain.

New U.S. Company to Distribute Plastics

A new, wholly owned subsidiary of Catalin Corporation of America, named Macaw Corporation, has been formed and operate as a distributor of a large variety of plastic raw materials including polystyrene, polyethylene, polypropylene, nylon and others.

Mitsubishi Compound Fertiliser Plant Near Completion

The Mitsubishi Chemical Industries' compound fertiliser plant under construction at their Kurosaki plant is nearing completion. Test operations will be carried out this month. The plant has a capacity of 50,000 tonnes per year and will produce only 16-16-16 quality fertiliser.

Sweden's First Polythene Plant Will Allow for Exports

Further details of the projected polythene plant in Sweden are given in a statement by Union Carbide International Co., New York. This reveals that the project—in which Union Carbide Corporation with the Swedish electrochemical concern Fosfatbolaget—will be completed in 1962 and will have a capacity of 35 million lb./year (CHEMICAL AGE, 12 November 1960, p. 821, gave a figure of about 15,000 tons/year). The first polythene plant in Sweden, and located in the vicinity of Gothenburg, the new plant will be able to satisfy not only the Swedish market but also to serve as a source of exports for the Scandinavian area generally.

The polythene plant will draw its supplies of ethylene from the steam cracker to be built at Stenungsund by Esso. It was reported in C.A. last week (p. 727) that the contract for the engineering and procurement for the steam cracker had been awarded to Fluor Engineering and Construction Co. Ltd., London.

New Canadian Producer of Polyester Resins

First Canadian company west of Ontario to manufacture polyester resins and other basic material for the reinforced plastics industry will be the newly organised Multi-Chem Products Ltd.—a joint subsidiary of British American Paint Co., Victoria, B.C., and Chemical Oil and Resin Co., Toronto.

Multi-Chem will produce Polychem polyester, used in fabrication of reinforced plastics boats, furniture, flat and corrugated panelling, swimming pools, bowling alley equipment, etc.

Rise in U.S. Chemical Investments

Some $1,730 million will probably be spent by the U.S. chemicals and allied products industry on new plant and equipment over the current year, according to a current survey of the Office of Business Economics, a branch of the United States Department of Commerce. This figure compares with a $1,600 million for last year and only $1,230 million for 1959.

Since the estimated investment figures for both the first and second 1961 quarters are exactly the same as those recorded for the corresponding periods of last year, it is apparent that the second half of 1961 will see a particularly high rate of investment.

U.S.S.R. Chemical Output Increases

Gross output of the Soviet chemical industry for the first quarter of 1961 is reported to be 114% of that for the first quarter of 1960. Tonnage outputs given for the first 1961 quarter include: sulphuric acid, 1.4 million tons (104% of first-quarter 1960); mineral fertilisers, 3.7 million tons (110%); artificial and synthetic fibres, 61,600 tons (125%); while the value of chemical equipment produced is estimated at 55.5 million roubles (114%).

Production of "synthetic tars and plastics" is claimed to have increased by 24%.

Rumanian Chemical Export Plans

Rumania plans to increase chemical exports over the current year to 35% above the 1960 level. Particular export increases are foreseen for sodium products, chlorine and chlorine compounds, aromatic hydrocarbons, carbide and such finished items as dyestuffs, pharmaceuticals, plastics, synthetic detergents and organic pigments.

Products to be exported for the first time this year are p.v.c., synthetic resins and certain forms of plastics, lacquers and paints.

Bulgarian Soda Output Up

Bulgarian production of calcined soda reached 135,000 tonnes and that of caustic soda 18,000 tonnes last year. These figures are, respectively, 13% and 6% higher than those recorded for 1959.

Texas Butadiene May Build Styrene-Maleic Resin Plant

A commercial plant to produce low molecular weight styrene-maleic anhydride resins may be built by Texas Butadiene and Chemical before the end of 1961. The company already has a 1 million lb. a year plant operating at South Miami and is also building a pilot plant to produce low molecular weight polymers of butadiene.

Du Pont Polythene Capacity to be Raised 25%

Overall polythene production capacity of E. I. Du Pont de Nemours will be raised by some 25% to about 400 million lb./year by an expansion of the company's conventional polythene plant at Orange, Texas, from 200 to 280 million lb./year.

A plant to produce a new copolymer, Elvax, using ethylene and vinyl acetate, is also included in the Orange project. This material, at present produced only in experimental quantities, is claimed to impart toughness, flexibility and adhesion to paraffin wax and other brittle, low molecular weight materials.

Israel Refinery Investment

The Haifa Refineries, Israel, now operating at only 40% capacity, are reported to be investing I£4 million to reactivate one of their three cracking and distilling units which has been idle since the end of the British Mandate.

Four petrochemical plants which will produce carbon black, ethylene, polythene and dodecyl benzene are being built near the refineries at an investment of $16 million by an American, a Latin American and two Israeli groups. Production is to start in two years.

Canadian Company's Increased Sulphur Sales

World demand for sulphur by 1965 should be 23-24 million tons as against consumption in 1960 of 17.25 million tons, according to H. H. Walet, Jr., president of Jefferson Lake Petrochemicals of Canada Ltd. Canadian production by the end of 1962 is estimated at 1.5-1.6 million tons/year.

Mr. Walet gave these estimates at the company's annual meeting in Montreal,

when he revealed that Jefferson's sulphur sales and earnings for the first quarter of 1961 were substantially over the corresponding over the corresponding 1980 period. He said net income in the first quarter would probably be about two-thirds of the net income of $86,311 for the whole of 1960.

The company's new plants at Calgary East and at Savanna Creek should both be in production by mid-1962. The Calgary East plant will produce daily 100 million cu. ft. of pipeline gas, about 2,000 barrels of liquids and 860 tons of sulphur. Savanna Creek will have a designed capacity of 385 tons/day of sulphur.

Nylon 6 Plant for Japan

The Japanese company, Kureha Spinning Co., has signed a technical co-operation agreement with the Hans J. Zimmer chemical plant concern of West Germany concerning the production of nylon 6. Kureha Spinning is understood to be planning to build a plant at Osaka, Japan, with a daily production of some 15 tonnes of nylon 6 and other nylon yarns.

New Section for U.S. Experimental Still

Fractionation Research Inc., U.S., have completed an 8-ft. dia. tower section on their 4-ft. dia. commercial size experimental distillation unit at Alhambra, California. The new section will permit a substantial increase in tray and packing types studied in the $250,000 pilot plant facility. It is designed to permit easy changing of internals and is rated for full vacuum to 165 p.s.i.a.

Fractionation Research—a co-operative non-profit organisation formed in 1952 to develop design information on the construction and operation of full-scale fractionating columns—is internationally supported by 58 major oil, chemical and engineering companies.

Border Complete Plant for Copper Sulphate Production

Second stage of an industrial chemical complex in Manitoba has been completed with the construction of a $250,000 copper sulphate plant near Transcona, Manitoba. Border Chemical Co. built the plant, assisted by a loan from the Manitoba Government. The company last summer opened Manitoba's first sulphuric acid plant nearby. A third related chemical plant is planned for the future. The copper sulphate plant will reach production of 6,000,000 lb./year.

Japanese Firm Clear on U.S. Patents

Asahi Kasei Chemical Co., who have applied for official approval for a tie-up with Firestone Co. of the U.S. for the manufacture of polybutadiene and polyisoprene, has given details of the patent situation. According to Asahi, patents for polybutadiene are already held in Japan by Distillers, the Japan Fabric Institute, Bridgetone Tire and Phillips but Firestone's patent which uses alkyl or aryl lithium as a catalyst is unique and consequently there will be no infringement on the patents of the others. Similarly, in the case of polyisoprene, the use of aryl lithium catalysts will not infringe on the patent held by Goodrich.

Stauffer Buy Alcoa's Fluorine Chemicals Plant

Stauffer Chemical have bought Alcoa's fluorine chemicals plant at East St. Louis, Ill. The plant produces sodium fluoride, sodium bifluoride, fluoboric acid, sodium fluoborate, and other fluoride and fluoborate compounds.

Armour Plan Joint Canadian Potash Venture

Pittsburgh Plate Glass Co. and Armour and Co., U.S., are planning a pilot plant and test wells in Canada for the solution mining of potash. The exact location is not revealed. Drilling already is under way on property 18 miles east of Moose Jaw, Sask. Should the test prove successful, the companies plan a joint operation to produce muriate of potash in a multi-million dollar plant.

Cyanamide Buy Plant Site in Sicily

Cyanamid Italia have purchased a site of 157,000 sq. m. in the industrial area of Pantano d'Arci, Catania, Sicily.

Polyvinyl Chloride Pipe Aids Efficiency in Sulphuric Acid Plant

SUCCESSFUL use of p.v.c. pipe for a sulphuric acid mixing header, where 98% sulphuric acid is mixed with water to produce 5% sulphuric acid in solution, is reported by the Falcon Chemical Corporation, Lake Charles, La., U.S.

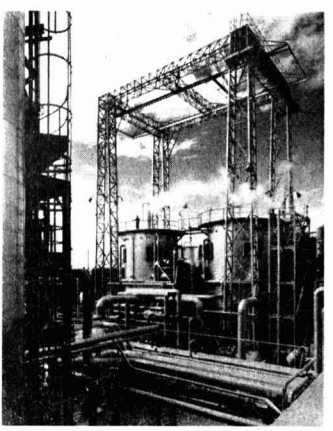
Shortly after the plant went into operation, the original 316 stainless steel in this application presented a considerable maintenance problem. After a month of operation, the stainless mixing header had been patched heavily, some sections having four patches one over another. Factors to be considered in choosing a suitable material for this service included corrosion resistance, pressure, temperature, and support, while one particular problem was a general heating difficulty during start-up. Use of p.v.c., supplied by A. M. Byers Co., Pittsburgh, Pa., helped to eliminate this problem. The p.v.c. has low thermal conductivity. Also, the concentrated sulphuric acid was injected closer to the header's centre. Operating pressure and temperature, estimated at 60 lb. and 100°F maximum, fell within range limits of p.v.c.

The installation consists of 2-in. dia. pipe for water service, a 6-in. dia. pipe for the header and 1½-in. dia. pipe for 5% sulphuric acid discharge. These sizes match the p.v.c. to existing piping. Connections were made with p.v.c. flanges to existing ferrous flanges. Acetone was used to clean fitting sockets and pipe ends prior to solvent cementing. The only tools used during installation were a hack saw to cut pipe and a file to smooth saw tooth marks. The installation was placed in service on 1 October 1959 and a recent inspection indicated that the p.v.c. was still in its original condition. No leaking has been experienced.

New High Pressure Reforming Furnace Eliminates a Compression Stage

ATTAINMENT of a pressure of 250 p.s.i.g. in a gas reform furnace, recently brought on stream at an ammonia plant built for the Office National Industrial de l'Azote (O.N.I.A.) in southern France, is claimed as a major breakthrough in gas reforming by the Chemical Construction Corporation, New York, who built and installed the furnace. According to Chemico, no other gas reformer has ever operated at pressures above 175 p.s.i.g.

It is claimed that the production of synthesis gas at this new high pressure eliminates the necessity for one of the numerous compression stages normally required in a plant of this type. The new design is also stated to result in improved heat recovery in the combined gas reforming and CO_2 removal system, allowing heat to be exported to the rest of the plant. In the carbonate CO_2 removal section, absorption pressures are regulated to allow new levels of regeneration efficiency.



A view of the Chemico gas reforming furnaces at the O.N.I.A. ammonia plant in southern France

Commercial News

- Horlicks' £4 m. Offer for Burt Boulton
- A. B. Fleming Declare 15% Dividend
- Montecatini Report Record Turnover
- Olin's First-quarter Sales Down 1.9%

Horlicks-Burt Boulton

Horlicks, the milk products concern, are to make a take-over bid for Burt, Boulton and Haywood, timber importers and merchants, tar distillers, paint and chemical manufacturers. Horlicks already hold about 11% of the equity of B.B.H. and are to make a £4.1 m. offer for the remaining ordinary stock. The B.B.H. directors are not recommending acceptance of the offer and say they see no advantage in becoming a subsidiary of Horlicks. Horlicks have a pharmaceutical division, which, however, represents only a small proportion of their activities, while Burt Boulton have a number of chemical subsidiaries.

Ordinary capital of B.B.H. is £1,318,622, of which Horlicks hold £147,950. For the remaining £1,170,672, Horlicks are offering four of their 5s ordinary shares plus 60s in cash for every £3 of stock.

A. B. Fleming

A. B. Fleming (Holdings) has declared a final dividend of 15%, making 20% (same) for year to March 31, 1961. Group profit £761,100 (£732,290), before tax £380,400 (£351,221). Net profit £380,700 (£381,069).

U.S. Borax

The United States Borax and Chemical Corporation, 74% of whose equity is held by the British Borax (Holdings), report an improvement in domestic sales in the March quarter, which, the board say, may presage recovery from the 1960-61 recession. Sales of consumer products reached record levels, and borax export business remained "strong".

Net sales for the period totalled $17,181,730 (against $16,920,737), making $32,838,168 ($32,625,707) for six months. Net income, after income taxes, fell to $1,619,844 ($1,842,012), and the total for six months to $2,732,718 ($3,298,921).

Chemische Fabriek Naarden

Chemische Fabriek Naarden, one of Holland's leading chemical producers, is to pay 12% (same) on old shares for the past financial year and 9% on new shares.

W. R. Grace

W. R. Grace and Co., U.S., reported operating earnings of $3,619,000 for the first quarter of 1961 as compared with $2,814,000 for the same period of 1960, in its first quarterly report to stockholders. Earnings per common share of 71 cents were 29% higher than operating earnings of 55 cents in 1960.

Chemical profits continued to show substantial growth, representing the greatest part of the increase. Sales of the company's chemical divisions rose more than 20%, primarily because of higher sales of agricultural chemicals and increased sales to the packaging industry both in the United States and overseas. Grace's Polymer Chemicals Division showed a profit, as sales for the first quarter more than doubled those of the previous year.

Celtex

The French holding company for French and foreign synthetic and artificial fibres interests. Celtex, reports a recommended dividend of 7.5% for 1960. This is in spite of the fact that the number of 100-franc Celtex shares has risen over the year from 1,500,000 to 2,700,000 following a scrip issue. Net profit stood at Fr.24,680,000 (Fr.15,770,000). The company recently took over the three concerns Société de Participations de Rayonne (Sopara), Le Cellophane and Etablissements Marechal.

Montecatini

The leading Italian chemical concern Montecatini announce a turnover for last year of 167,000 million lire, or some 4,000 m. lire more than in 1959. Over the same year the turnover of the Montecatini group as a whole rose from 283,000 m. lire to 350,000 m. lire.

The parent company recorded, after depreciations of 15,500 m. (14,500 m.) lire a 1960 net profit of 13,120 m. (12,410 m.) lire. Dividend is to be paid of 11½% (same). It has further been decided to float a 50,000 m. lire loan at an interest rate of 5½%.

Olin

Sales of Olin Mathieson Chemical Corporation in the first quarter of 1961 were $159,959,000, 1.9% less than the record of $163,132,000 in the initial quarter of 1960. Net profits were $5,115,000 or $0.38 per share, compared with $8,567,000 or $0.64 per share a year ago.

While profits improved during March, the increase was not sufficient to offset the lower levels of the first two months, Thomas S. Nichols, chairman, reported. He attributed the decline in profits to the continuing cost-price squeeze.

INCREASE OF CAPITAL

SOCIETÀ EDISON, Italian chemical producers, are to raise their capital from 200,000 million lire to 240,000 million lire. The increase will be by the issue of 20 million new shares with a nominal value of 2,000 lire and to be sold to existing shareholders at a rate of 1:5 against old shares and a price per unit of 4,500 lire.

Market Reports

FIRST-QUARTER EXPORTS SHOW INCREASE

LONDON Home trade demand for chemicals has been well sustained during the past week with interest spread over most of the consuming industries. On the export side a steady flow of inquiry has been reported, while the export statistics for the first quarter of the year show a satisfactory increase over the corresponding period in 1960.

The price of copper sulphate has further advanced to £80/ton less 2% f.o.b. Liverpool.

Activity in the fertiliser market has been fairly good with the seasonal pressure less in evidence. The position of the coal tar products is more or less unchanged. Pitch demand is only moderate but refined tar continues in good call on home and export account.

MANCHESTER The advance in the price of copper sulphate (see under 'London') has been the only movement of consequence on the Manchester chemical market during the past week. Textile bleaching, dyeing and finishing chemicals are being taken up in reasonably good quantities against contracts and there is a steady movement of hydrogen peroxide, refined glycerine, borax and boric acid, and industrial solvents to other outlets.

Fair buying interest is being shown in the barium compounds, formaldehyde, and lump and ground alum. Demand for most lines on overseas account seems to have been well maintained.

SCOTLAND The level of trading has been very well maintained, with quite varied demands for the home market apart from the usual range of basic chemicals. Deliveries against contract requirements also featured well with quantities steady. Enquiries, too, were quite numerous both in regard to immediate and forward requirements.

Agricultural chemicals are still showing interest with demands steady in keeping with seasonal requirements. With few exceptions, prices have remained unchanged.

PEOPLE in the news

● **Professor J. R. Partington** has been awarded the Dexter Award of the American Chemical Society for his work in the history of chemistry. The Award consists of a money prize and a plaque and it is expected that it will be made at a meeting of the Chemical Society in London in the Autumn by **Dr. Edelstein,** president of the Dexter Chemical Corp., New York.

● **Academician A. N. Nesmeyanov,** president of the Academy of Sciences of the U.S.S.R., Moscow, who is distinguished for his contributions to organic chemistry, particularly on organometallic compounds, was recently elected a foreign member of the Royal Society.

● **Mr. R. E. Moore** has been appointed to succeed **Lieut.-Colonel S. C. Guillan, T.D.,** who retires on 30 April, as secretary of the Institute of Metals.

● **Mr. Russell C. Nelson,** director of sales of Du Pont de Nemours International S.A., has been promoted to deputy managing director. He will assist in the overall management of the Swiss subsidiary of E.I. du Pont de Nemours and Co., of Wilmington, Delaware, U.S.

● **Mr. T. L. Birrell** is retiring from the board of the British Xylonite Company on 30 June and will join the Board of Yarsley Research Laboratories. He joined the Xylonite group in 1928, and since 1947 has been a director of the parent company.

● **Lord Rothschild,** a director of the company since 1959, has been appointed vice-chairman of "Shell" Research Ltd. In this capacity he will not only continue as a scientific adviser but will become the company's principal representative in matters relating to academic, government and private research in Britain when the present general manager, **Dr. C. G. Williams,** retires in October.

● **Mr. W. S. Duffield,** managing director of Laporte Chemicals (Australia) Pty. Ltd., has just returned to Australia

W. S. Duffield

after visiting the Laporte companies in the U.K. He is one of the directors of the new company, Laporte Titanium (Australia) Pty. Ltd. mentioned on page 763.

● **Mr. A. F. Much,** packaging advisor, I.C.I. Ltd., has been elected national chairman of the Institute of Packaging for the coming year.

● **Lord Clitheroe, P.C.,** has been appointed a vice-chairman of Tube Investments Ltd., The Adelphi, London W.C.2. **Sir Ben Lockspeiser, K.C.B., F.R.S.,** director of the Fulmer Research Institute, having reached retirement age, and **Sir Francis de Guingand, K.B.E., C.B.,** have resigned from the board. Sir Francis is returning to the Union where he will continue to be in charge of T.I.'s interests in Southern Africa. **Dr. J. M. Kay,** Professor of Nuclear Power at Imperial College, has been appointed to the T.I. board as director of research and development from 1 July.

● **Mr. Louis Soulal,** works manager for Mobil Oil, Birkenhead, has been elected chairman of the Birkenhead Chamber of Commerce. Mr. Soulal joined London and Thameshaven Oil Wharves Ltd. as a process chemist in 1926, becoming refinery manager in 1937; he joined Mobil in 1943.

● **Mr. L. W. Curtis** has been appointed a director of H. A. Smith Ltd., Braunston, near Rugby, manufacturers of adhesives and emulsions. He was previously general manager, having joined the company as technical representative in 1947.

● **Mr. P. E. Rousseau,** managing director of the South African Coal, Oil and Gas Corporation Ltd. (Sasol) has been apppointed chairman of the corporation in succession to Dr. F. J. Du Toit, who died recently while on a trade mission to the Far East. Mr. Rousseau will continue as managing director for the time being.

W. E. K. Piercy, appointed to board of W. J. Bush (see C.A., 6 May, p. 738)

TRADE NOTES

MS Silicone Rubbers

Midland Silicones Ltd. have recently carried out a review of their principal grades of silicone rubber, which reveals that, of the grades which account for about 90% of the total sales of MS silicone rubbers, nearly two-thirds have been developed by the company's own technologists at their laboratories at Barry, Glamorgan, in the last five years. New and established grades are described in a booklet entitled 'Silastomer and other MS silicone rubbers—a summary of the most important grades'. The booklet is available upon request from the company at 68 Knightsbridge, London S.W.1.

Boby Plant

Watermasters (Pty.), of Johannesburg, is to produce and market in South Africa plant designed by William Boby and Co., of Rickmansworth, Herts. The agreement between the two companies applies to the whole range of Boby water treatment equipment.

Emulsion Polish Formulation

Copies of the formulation of Wax Emulsion Polish Formula W-51878, issued by the Durez Plastics Division, are available, together with data sheets of the resins, samples and prices from Omni (London) Ltd., 35 Dover Street, London W.1.

Herreshoff Furnace

A new laboratory-size Herreshoff furnace—used for roasting, calcining and desulphurising—is described and illustrated in a pamphlet from Huntington, Heberlein and Co. Ltd., Simon House, 28-29 Dover Street, London W.1. Larger than its predecessor and incorporating superior refractories, the new furnace has castings made of heat-resisting alloy and is designed for a wider range of temperature applications and gradients.

Baker Perkins

Growth of the Baker Perkins Group, the development and expansion of its design, development and manufacturing facilities, and its export activities, are described in an illustrated brochure available from Baker Perkins Ltd., Westwood Works, Peterborough.

Andrew Air Conditioning

Andrew Air Conditioning Ltd. have become a member firm of the Powell Duffryn Group. The company say that this will enable them to offer customers a more fully integrated and comprehensive service covering, for instance, activities in other branches of the air conditioning field which were considered hitherto as purely ancillary to the company's prime objects.

Change of Address

As from 15 May the British Anhydrous Ammonia Co. Ltd. (incorporating the business formerly conducted by Athole G. Allen (London) Ltd.) will be at larger premises at Magdala Works, 518-520 Woolwich Road, Charlton, London S.E.7 (telephone Greenwich 5806).

Bookshelf

Translations of Russian Work on Fluorine Have Wide Appeal

SOVIET RESEARCH IN FLUORINE CHEMISTRY. 1957-58. CHEMISTRY COLLECTION SERIES. Consultants Bureau, New York, 1961. Pp. 212. $25.

Keeping abreast of developments in Russia is still a problem to many chemists, and the appearance in a single volume of translations of significant papers in a particular field will appeal to all. This volume includes 55 articles reprinted from the publishers' comprehensive translations of Russian periodicals, which appeared originally in the two-year period up to the end of 1958. The coverage is wide, about half the papers dealing with organic fluorine chemistry (the influence of fluorine or trifluoromethyl groups in aromatic systems, and the chemistry of compounds derived from perfluoroalkyl radicals), the remainder treating physical and inorganic chemistry (including analysis and the catalytic properties of boron trifluoride in the Friedel-Crafts reaction). It is unfortunate that the delay in publication of this series following the appearance of the original, is so great, for much of the material has by now become common knowledge among all fluorine chemists. However, this venture will no doubt be welcomed by institutions specialising in fluorine chemistry, who have had difficulty in obtaining the material otherwise.

Fission Products

ATOMIC ENERGY WASTE. Edited by *E. Glueckauf*. Butterworths, London; Interscience, New York, 1961. Pp. xi + 420. 95s.

There are two main problems associated with the fission products produced in nuclear reactors, namely their disposal and storage, and finding suitable uses for them. Both aspects form the main topics of this collection of 17 articles by specialists.

The first two papers are concerned with the fission process and the alpha emitters in reactor wastes. This well-written and informative material is followed by equally interesting accounts of the physical, chemical and biological effects of radiations, while the middle section of the book contains seven articles on various aspects of waste disposal and storage. These range from discourses on treating low activity wastes at various establishments, the treatment of high activity wastes together with the conversion of these to glass or ceramic forms, the dispersion of activity from chimney stacks and some account of separation techniques.

Up to the present time, the main uses of fission products are as sources of radiation. After a description of such units, three articles are given on applications in agriculture, for food preservation and a range of chemical reactions that are induced by radiations.

Apart from obvious potential readers such as reactor chemists, much of this book is a source of valuable material for academic and technological chemistry departments. Furthermore, both biologists and organic chemists will benefit from the seven articles concerned with the effects of these powerful sources of gamma rays.

Natural Gas

NATURAL GAS AND METHANE SOURCES. By *James Lawrie*. Chapman and Hall, London, 1961. Pp. xvi + 204. 35s.

Most successful scientific books are written for a specific class of readers whose needs the author seeks at all times to meet. The present author gives little evidence of such a definite purpose. His book is evidently not primarily for chemists for he considers it necessary to give, on page 5, the full structural formulae of methane, ethane, propane and *n*-butane. Nevertheless the chemist will find much to interest him in the volume, starting with the first chapter in which the author discusses some of the everlasting fires of the ancient world and the generation of methane in living animals. All the major problems of production, transport, fuel and chemical uses are discussed as fully as the allotted space permits. Only 96 references are given, many of them slight. Many of the plates, which must appreciably increase the cost of the book, could be eliminated.

Co-ordination Chemistry

INTRODUCTION TO CO-ORDINATION CHEMISTRY. By *D. P. Graddon*. Pergamon Press, Oxford, 1961. Pp. viii + 111. 25s.

The claim in the blurb that this is a thorough and scholarly introduction to coordination chemistry is excessive for so brief a work. The book should however prove useful to honours students and chemists who were educated before the recent great developments who want a short survey of the field. After a historical introduction (13 pp.), the author considers Modern Theories of Coordination Chemistry (26 p.), Polymerization and Coordinate Saturation (11 pp.), Stability of Complex Salts (14 pp.), Stability of Valency States (7 pp.), Carbonyls and Complexes (18 pp.) and Practical Applications (12 pp.). The result is well balanced and enough references are given to enable the reader to follow up selected topics. The author should, however, have always given the source of numerical data. The weakness of the final bibliography indicates the size of the gap that this book helps to fill.

This monograph is expensive by comparison with one of 180 pages recently published at the same price on a closely related topic.

Gas Chromatography

GAS CHROMATOGRAPHY. By *E. Bayer*. Elsevier, Amsterdam, 1961. Pp. xii + 238. 25s.

The first thing to be said about the latest addition to the Elsevier Monograph series (excellent printing and typography; stiff paper cover) is that everybody concerned with gas chromatography will want to have a copy handy. Since this includes almost all research chemists concerned with organic compounds, the book should sell very well. Having said this it is fair to point out the book's limitations.

The monograph is a second edition of the German work and has been much improved. The German work appeared before the advent of capillary columns and super-sensitive detectors. Descriptions of the new developments have been skilfully grafted on. The weakest part of the book remains the theoretical section. The author is best at compressing a mass of experimental facts (drawn from over 400 references) into a small compass. Most chemists will be intrigued by the last fact in the main text which describes how the whirling dance of the stimulated male silk moth has been used to detect the emergence of the female sex lure from chromatographic columns in concentration as low as $10^{-11}\mu g/ml$.

NEW PATENTS

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

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

AMENDED SPECIFICATIONS

On Sale 7 June

Organo-metal and organo-metalloid compounds. Farbwerke Hoechst AG. **839 370**

ACCEPTANCES

Open to public inspection 14 June

Inert gas producing plants. Budworth Ltd., David. **870 500**

Process for linear polypropylene and copolymers of propylene with other olefins. Farbwerke Hoechst AG. **870 392**

Methods of hardening glycerides. Kaufmann, H. P. **870 393**

Chemically bonded basic refractory. Harbison-Walker Refractories Co. **870 115**

Acyl derivatives of 6-aminopenicillanic acids. Beecham Research Laboratories Ltd. **870 395**

Combined process for the production of water enriched with dueterium and the synthesis of ammonia. Uhde GmbH, Friedrich. **870 452**

Storage tank for liquefied gas. Garrett Corp. **870 269**

Manufacture of organic peroxides. Farbwerke Hoechst AG. **870 118**

Dichloro-dialkylamino-methanes. Ciba Ltd. **870 454**

Polyalkylene ether glycol diisocyanate cellular elastomers. General Tire & Rubber Co. **870 119**

2:2¹-Difluoracedianthrone. Ciba Ltd. **870 143**

Derivatives of ethylene-maleic anhydride copolymers. Monsanto Chemical Co. **870 398**

Olefin-sulphur dioxide copolymers and process for preparing them. Du Pont de Nemours & Co., E. I. **870 080**

Liquid-detergent compositions. Unilever Ltd. **870 081**

Polymerisation of vinylidene cyanide. Goodrich Co., B. F. **870 195**

Aliphatic glycidyl ethers and the preparation of sulphonates therefrom. Hedley & Co. Ltd., Thomas. **870 456**

Preparation of halogenated phenoxyalkyl substituted amines. Rohm & Haas Co. **870 399**

Preparation of polyoxyalkylene compounds. Shell Research Ltd. **870 457**

Process of trimerising isocyanates. United Rubber Co. **870 273**

Process for the preparation of trichloroisocyanuric acid. *Montecatini.* **870 274**

Process for the extraction of pyrethrins from pyrethrum flowers. Levy, L. W. **870 459**

Method of improving polyolefins, and compositions so improved. Farbwerke Hoechst AG. [Addition to 836 996.] **870 676**

Oil gasification plant. West Midlands Gas Board, and Diamond, B. Le G. **870 150**

Manufacture of borides. United States Borax & Chemical Corp. **870 083**

Process for the manufacture of pigmented artificial resin lacquers dispersible in aqueous media. Ciba Ltd. **870 460**

Solvents for the separation of diolefins from mixtures of hydrocarbons. Badische Anilin- & Soda-Fabrik AG. **870 380**

Process for the production of bodies of cross-linked polymeric material. Siemens-Schuckertwerke AG. **870 381**

Production of acetonitrile. Japan, State of. **870 462**

Purification of gaseous formaldehyde. Du Pont de Nemours & Co., E. I. **870 382**

Method of manufacturing boron nitride. United States Borax & Chemical Corp. **870 084**

Polyester resins. Imperial Chemical Industries Ltd. **870 278**

Process for cracking hydrocarbon materials. *Farbwerke Hoechst* AG. **870 087**

Preparation of polyester resins. Westinghouse Electric Corp. **870 088**

Silicon containing azoic dyestuffs and a process for their preparation. Union Carbide Corp. **870 467**

Colouring of aromatic polyester fibres or films. Badische Anilin- & Soda-Fabrik AG. **870 677**

Oxidation of hydrocarbon drying oils. Esso Research & Engineering Co. **870 092**

3-Carboxy-4-methyl-naphthalene derivatives and a process for preparing them. Farbwerke Hoechst AG. **870 384**

Pharmaceutical and veterinary compositions comprising derivatives of 2-hydroxy-3-naphthanilide. Imperial Chemical Industries Ltd. **870 469**

Salt purification, reclamation and treatment plan. Rosi, A. J. **870 617**

Linear copolyesters. General Electric Co. **870 095**

Process for the preparation of esters. General Electric Co. **870 096**

Diethinylquinols and a process for their manufacture. Farbwerke Hoechst AG. **870 097**

Process for preparing acid esters of polyphosphoric acids and their salts. Farbwerke Hoechst AG. **870 098**

Adhesive. Adhesive Tapes Ltd. **870 679**

Detergent compositions. *Shell* Research Ltd. **870 458**

Benzimidazoles. Ciba Ltd. **870 521**

Fermentation process for the production of D-arabitol. Distillers Co. Ltd. **870 622**

Benzimidazoles. Ciba Ltd. **870 385**

Benzothiadiazines and the production thereof. Olin Mathieson Chemical Corp. **870 575**

Methyl methacrylate-containing syrups and their preparations. Du Pont de Nemours & Co., E. I. **870 191**

6-Methyl-3-oxo-Δ^4 ^{6}-steroid compounds. British Drug Houses Ltd. **870 286**

Polymeric compositions. Imperial Chemical Industries Ltd. **870 287**

Substituted maleic anhydrides. Unilever Ltd. **870 681**

Furan derivatives and a process for their preparation. Boehme, W. R. **870 288**

Process for the preparation of di- and trihydroxy acetophenones. Boehme, W. R. **870 289**

Process for the preparation of alkyl phenols. Wingfoot Corp. [Addition to 758 474.] **870 192**

Azo dyestuffs containing thiocyanoalkyl groups. Farbenfabriken Bayer AG. **870 580**

Alkyl-hydrazine. Ciba Ltd. **870 581, 870 582**

Process for the production of solid boron hydride compounds. Studiengesellschaft Kohle. **870 099**

Substantially linear segmented polymer fibres. Du Pont de Nemours & Co., E. I. **870 292**

Peroxycarbonate derivatives and their use as polymerisation catalysts. Canadian Industries Ltd., and Imperial Chemical Industries Ltd. **870 584**

Useful polymeric materials. Imperial Chemical Industries Ltd. **870 646**

Preparation of polyvinyl alcohol. Air Reduction Co. Inc. **870 356**

Purification of phthalonitriles. Distillers Co. Ltd. [Addition to 803 172.] **870 647**

Polymer compositions and method for producing same. Houilleres du Basin du Nord et du Pas-de-Calais, and Ethylene-Plastique S.A. **870 650**

Glycyrrhetinic acid derivatives. Biorex Laboratories Ltd. [Addition to 843 135] **870 651**

Preparation of epoxyethers. Bataafse Petroleum Maatschappij N.V. **870 365**

Preparation of active oxide. Kali-Chemie AG. **870 172**

Organosilicon compounds. Imperial Chemical Industries Ltd. **870 102**

Thermoset resin laminates. Herberts, K. **870 303**

Epoxy modified water soluble alkyl resin. Rinshed-Mason Co. **870 412**

Preparation of C_{14} aldehyde. Pfizer & Co., Inc., Chas. **870 310**

Removal of hydrogen sulphide from industrial gases. Bischoff, H. **870 688**

Process for the manufacture of Grignard reagents. Imperial Chemical Industries Ltd. **870 415**

Steroid compounds and the preparation thereof. Pfizer & Co. Inc., Chas. **870 387, 870 388, 870 389, 870 390**

Production of mono-epoxides. Petrochemicals Ltd. **870 418**

Inhibited polymerisable compositions containing chloroprene. Distillers Co. Ltd. **870 600**

Iodine-containing aminobenzoic acid amides and a method of producing same. Osterreichische Stickstoffwerke AG. **870 321**

Vulcanised rubber compositions containing silica. Kali-Chemie AG. **870 173**

Organic phosphorus compounds. Union Carbide Corp. **870 425**

Steroids and the manufacture thereof. Upjohn Co. **870 123**

Organosiloxanes. Midland Silicones Ltd. **870 635**

Derivatives of 2,3-dimethoxy-5-methyl-benzohydroquinone-(1,4) and a process for the manufacture thereof. Hoffmann-La Roche & Co. AG, F. **870 638**

Recovery of polymethylene teraphthalate. Du Pont de Nemours & Co., E.I. **870 639**

Preparation of monomethylamine nitrate. Commercial Solvents Corp. **870 435**

Production of green trisazo dyestuffs. Badische Anilin- & Soda-Fabrik. [Addition to 785 101.] **870 698**

Coating of polystyrene. Plax Corp. **870 437**

Ketones and the manufacture of same. Hoffmann-La Roche & Co. AG, F. **870 699**

Process for the production of polyheterocyclic nitrogen-containing compounds. Berlin-Chemie Veb. **870 700**

Recovery of adipic acid from oxidation products of cyclohexane. Lanza Electric & Chemical Works Ltd. **870 105**

Cross-linking of polyvinyl alcohol. Goldschmidt AG, Th. **870 438**

Process for producing sodium zeolite A. Union Carbide Corp. **870 440**

Glycolic acid compounds and production thereof. Recherches et Techniques Appliquees. **870 441**

Process for preparing a polymer latex. Esso Research & Engineering Co. **870 478**

DIARY DATES

MONDAY 15 MAY

I.Fuel—Bournemouth: Conference on 'Waste heat recovery from industrial furnaces'.

WEDNESDAY 17 MAY

R.I.C., S.C.I.—Abingdon: Esso Research Laboratories, 5 p.m. 'Computors in chemical process development' by R. V. Thomas.

S.C.I.—Cardiff: Royal Hotel, 7 p.m. A.g.m.

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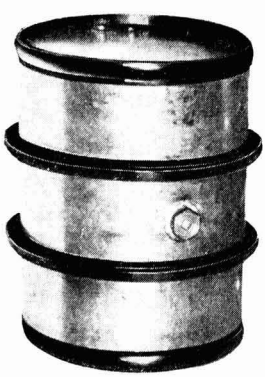

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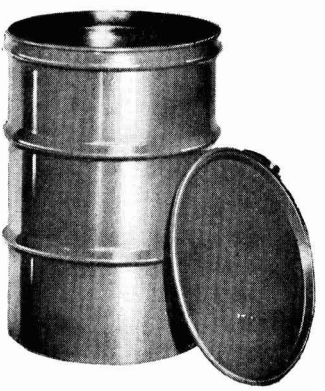

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