THE Chemical Age

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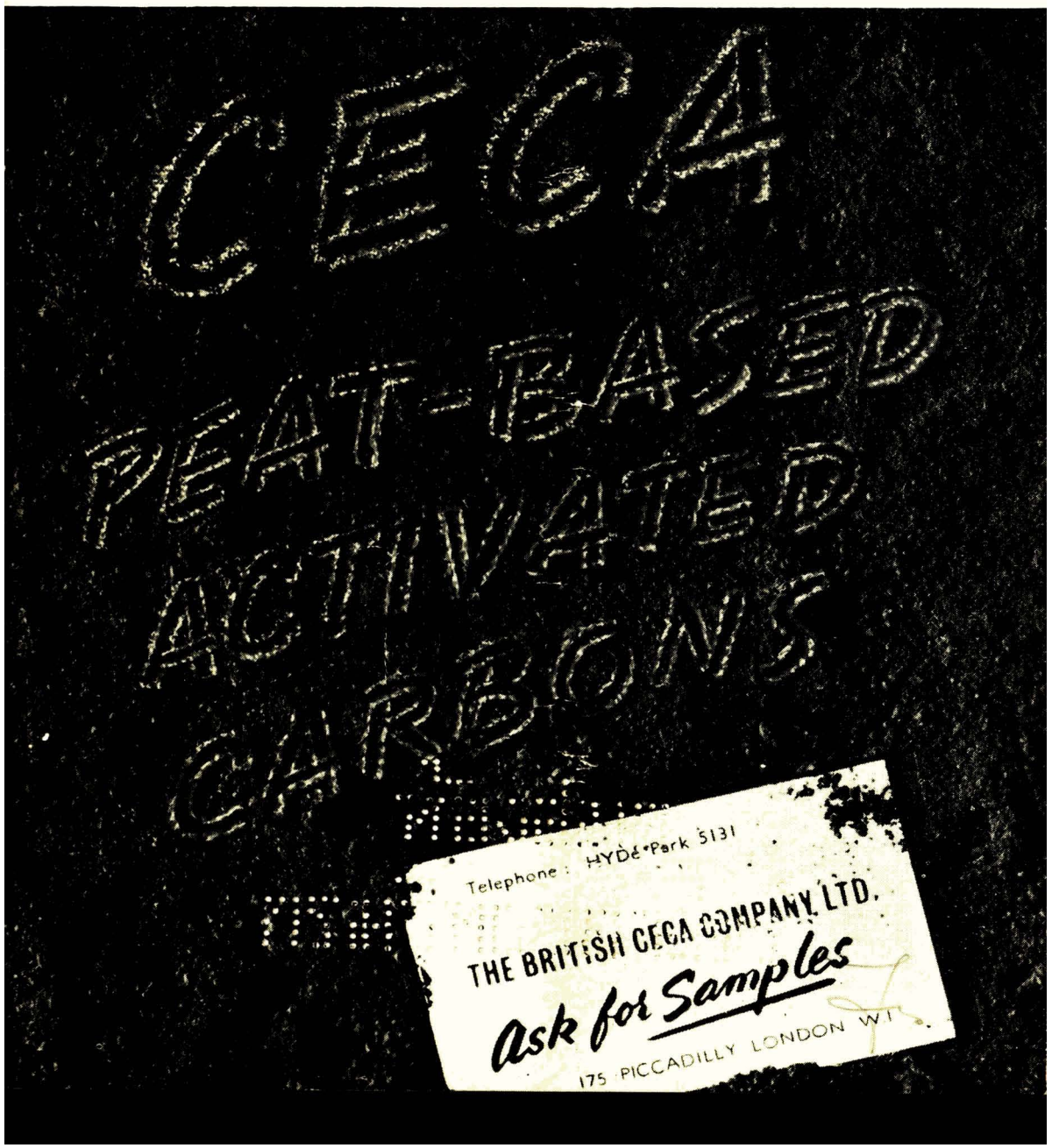
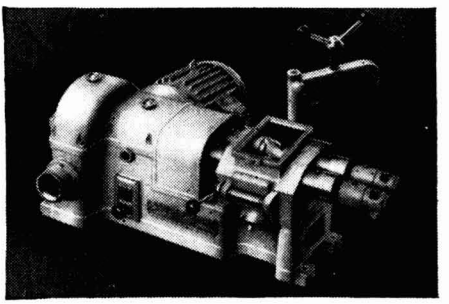


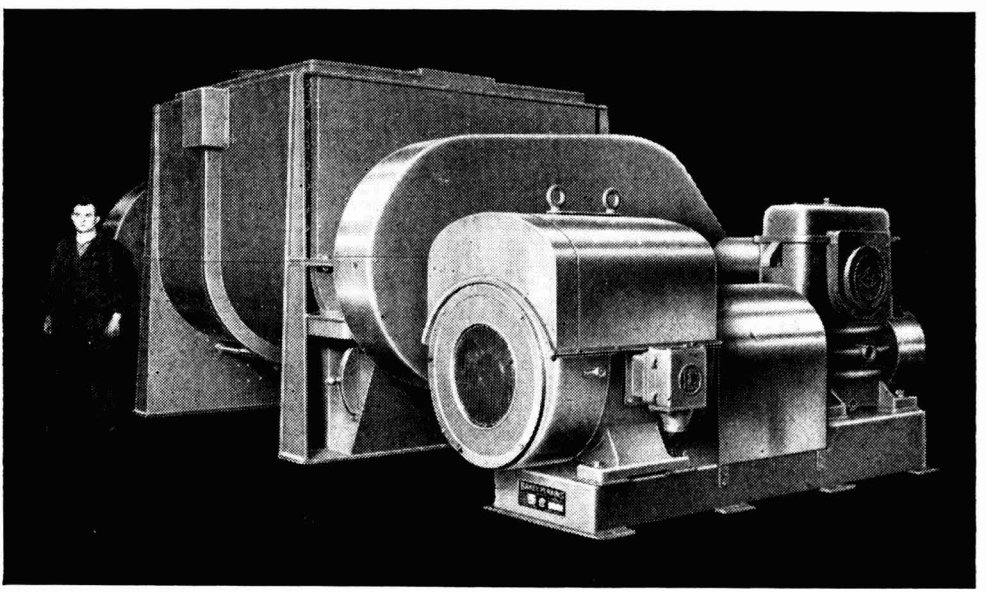
UNIVERSAL MIXING MACHINERY

These machines are produced in several standard types and classes to serve a wide variety of industrial purposes and they are capable of numerous adaptations to special requirements, capacities range from 1½ pints to 2,200 gallons per mix: troughs can be jacketed and blades cored for steam or brine circulation: many are supplied for mixing under vacuum and/or pressure.



Above is illustrated a simple Laboratory machine of 600 c.c. batch capacity and below — by way of contrast

a large and elaborate machine of over eleven hundred gallons capacity per mix



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Restraints & Restrictions

A SECTION at British Association meetings which receives small attention is that of economics. One subject of topical interest discussed by the Economics Section at Sheffield was 'The Control of Monopoly,' a subject which can equally be regarded as impersonal or highly personal. Monopoly, when it can be defined and proved—and monopoly-hunting seems even harder than witch-hunting in the middle ages—may be considered as the expression of group-power, or as the combined mental outlook of a few individuals who can settle certain aspects of many other people's economics simply by agreements reached round a small table.

Instinctively, no one at heart likes monopoly; even the minor monopolist probably objects to other monopolies when he encounters them as a private citizen.

Public opinion on the subject of monopolies is of vital concern to the chemical industry. Many of the new products of chemical industry, and especially the entirely new 'synthetics,' cannot begin to be manufactured without the initial protection of patent rights and without the economic advantages of large-scale production. Rarely now is it practicable for one man or one small factory to start making a new chemical product, for competition from several other equally small-scale and imitative producers can soon lead to a price-war and rock-bottom prices for consumers. That, of course, is the ideal inversion of monopoly. It cannot co-exist with the scale on which modern chemical processes must operate to be economic; nor, if it could co-exist by some marginal element of luck, would it be likely to foster further developments for the keenness of competition would leave no room for research investment.

In thus naturally requiring a background of conditions that must appear to many as being 'monopolistic,' the modern chemical industry is somewhat awkwardly placed. It is at least in easy danger of being misunderstood. Also decisions about monopolies or suspected monopolies in quite other trades or industries can affect the way in which the chemical industry is treated, both by public opinion and in the administration of the recent Restrictive Trade Practices Act.

In this light the Sheffield paper by Alex Hunter is of great interest. He draws an unusually clear distinction between the restraining practices of groups of industries or trading businesses, and what he calls 'oligopolistic' structures where an industry is dominated only by a few firms—more vaguely called 'big business' by the public. It is a distinction which the Monopolies Commission has recognised, but it is one that is seldom defined in newspaper articles or reports.

Trade associations' restrictive practices —exclusive selling to groups of distributors, exclusive buying from groups of manufacturers, disciplinary 'black lists,' special loyalty rebates, price-fixing on a basis of averaged costs within the total organisation and enforced price-maintenance—all these devices may be against the public interest. They rarely achieve complete control but they often go far enough to protect existing businesses from the competition of new ones or of new processes and new methods of distribution. Where competition should be

the mainspring of progress, there tends instead to be a state of stagnancy. That, briefly, is the case against systems of agreed restraints among groups of small and medium-sized firms in the same trade or industry.

If Mr. Hunter presented the case fairly harshly, he was not unrealistic. The total range of these restraints is probably not operated by any one organisation, but many—to some degree or another—operate a few of them. In so far as certain restraints prevent uneconomic price-cutting wars and assist in maintaining decent standards of employment and reward in trades and industries, they are not against the public interest. The difficulty is to determine the line between justified and unjustified restrictive practices.

This is the larger monopoly problem of our time, and it seems likely to be the one that will be most examined and tested by the 1956 Act. The required registration of agreements in itself may create 'an unfavourable climate of opinion,' so that some past agreements will quietly fade away like old soldiers. The Restrictive Practices Court is to operate on the presumption that all agreements are against the public interest, and its verdicts cannot be challenged by appeals elsewhere.

On the other hand, oligopolistic structures in industry are being much less stringently treated. Such enquiries as the Monopolies Commission has so far made have indicated approval more than disapproval, or at any rate, understanding. Big businesses which dominate the national manufacture of particular products compete intensively by technical advances, and they display a rate of progress much ahead of that found in small-scale industry. There is no stagnating outlook of mind. Research is self-financed on a large scale. Furthermore, only these measures enable certain kinds of industry to compete effectively with similar units in such countries as Germany and the United States. In many important ways, therefore, oligopolies are in the national interest for without them the nation's balance-sheet and rate of advancement would be greatly retarded.

This does not mean that restrictive practices can only be operated by a few very large firms who dominate this or that industry. As opposed to restraint agreements among many, there can be understandings made by a few. Mr. Hunter took the view that the Restrictive Practices Court is 'probably not appropriate for the judgment of oligopolies.' In such industries, restrictive practices are not crucial factors, though they might be considered undesirable.

What matters is whether such industries have a praiseworthy rate of development, what percentage of turnover is devoted to research and development, whether there are new directions of further amalgamation or subsidiary company ownership, and so on. The ideal system of control and scrutiny in the public interest is that laid down in the 1948 Act, with its power to instigate *ad hoc* investigation by the Monopolies Commission.

If this balanced course of action is followed by Governments, the chemical industry can have little to fear from charges of monopoly. It can always provide a reasonable answer in terms of rate of progress, devotion of resources to research, and in terms of internal competition with new products and processes.

The danger is that the public—and politicians who follow popular illusions rather than lead with realism—may not distinguish between these two very different types of apparent monopoly—the devised collective systems that must oppose public interest when they go too far, and the inevitable large-scale dominations that industries such as the chemical industry must create to enable many important materials to come into existence.

Titanium-based Ceramic

A CERAMIC, in which more than half the material used in its manufacture is titanium carbide (50 to 60 per cent) has been patented recently (British Patent 736,659, L. Nussbaum). Other materials also present are columbium (niobium) carbide (4 to 8 per cent) and tantalum carbide (0.4 to 1 per cent) which serve to strengthen the ceramic, and chromium and nickel, and in some cases, iron, which help to bind the compound together. The titanium-based ceramic has a transverse rupture strength of between 60 and 66 tons per sq. in.

NEWS BRIEFS

Air-lift to Lisbon

A high vacuum freeze drying apparatus manufactured by Edwards High Vacuum was recently flown from Blackbushe Airport, Hampshire, to Lisbon. The apparatus is for the production of a vaccine used in the treatment of Blue Tongue, a disease which is attacking Portuguese sheep. The vaccine is produced from chick embryo and is freeze dried for preservation.

Steel Structures Painting Bulletin

The Steel Structures Painting Bulletin, Vol. 2, No. 1, has been published by the Steel Structures Painting Council. This bulletin is an eight page technical publication issued quarterly and distributed free to those requesting it. The address of the Steel Structures Painting Council is 4400 Fifth Avenue, Pittsburgh 13, Pa., US.

OCCA Exhibition Stands

Stands have now been allocated for the 1957 Ninth Technical Exhibition of the Oil and Colour Chemists' Association which will be held in the Royal Horticultural Society's New Hall on 12, 13 and 14 March 1957. Eighty-eight companies and research associations have been allocated space at the exhibition.

AEC Contract Awarded

Beryllium Smelting Co. Ltd., London, announces that a contract, with a total value estimated at over $23,000,000 has been awarded to The Beryllium Corp. by the Atomic Energy Commission. Requiring the production of 500,000 lb. of nuclear grade pure beryllium metal, the new contract specifies delivery over a five year period. The corporation recently reported receipt of a contract from another source for beryllium copper master alloy in the amount of $13,000,000.

New Pakistan Plants

Under Pakistan's First Five-Year Plan, which has just been published, it is proposed that various new industrial plants should be set up. It has been suggested that two new sulphuric acid plants should be erected, one in East Pakistan and the other in West Pakistan, each having a capacity of 3,000 tons per annum. A Solvay process plant for the production of caustic soda and soda ash is proposed for West Pakistan. The plant would have an annual capacity of 17,000 tons caustic soda and 11,000 tons soda ash. An electrolytic plant, having capacity to produce 3,000 tons of caustic soda per annum, is planned for East Pakistan. A nitrogen fertiliser based on Sui gas is also proposed. Capacity would be 100,000 tons per annum. Power alcohol plants are also planned.

New Safety Goggle

A rubber two-piece safety goggle, the Neo-Plex No. 55, which incorporates a sweat-absorbent foam pad fitted to the inside of the frame, completely eliminating misting, has been produced by Safety Service Co., 86 Addison Gardens, London W14. The Neo-Plex Goggle is also fitted with a shatterproof lens. Cost of the goggle is 7s 6d each. Samples will be sent on request.

Strikes Over

The strike at the Anglo-Lautoro nitrate works in Chile has been settled, it was announced on 20 September. The loss of nitrate production is 250,000 metric tons worth £3.5 million. A settlement is also reported in the strike at the Cia Salitrera de Tarapacaa y Antofagasta nitrate plants.

Zirconium Test Plant

A test plant to produce zirconium is to be constructed by Kennecott Copper Corporation, near Cleveland, Ohio. Licensing arrangements have been made with Horizons Titanium Corporation, Princeton, N. Jersey, under which Kennecott has acquired licences for the electrolytic production of zirconium and its by-product, hafnium. Under the agreement the company also has the option to take up licences for the electrolytic production of titanium, thorium, niobium and tantalum.

Obituary

DR. FREDERICK SODDY, F.R.S., Emeritus Lee's Professor of Chemistry in the University of Oxford, died in hospital at Brighton last Saturday, 22 September, at the age of 79. In the early part of the century, Dr. Soddy worked first with Rutherford and then with Ramsay on radioactivity experiments. Elected an F.R.S. in 1910, he became professor of chemistry in Aberdeen University in 1914 and in 1919 was appointed Lee's Professor of Chemistry at Oxford. He was awarded the Nobel prize for chemistry in 1921. In 1913 he made his discovery of the elements with the same chemical qualities but different atomic weights, which he called 'isotopes'.

Acetates as Depilatories

New Zealand Work

METHODS of depilating sheep skins have been studied by Carrie *et al.* (*NZJ Sci. Tech.* B.38 : 19) for the purpose of testing the commercial possibilities of mucolyte enzyme depilation. Tests were carried out with diastase and pectinase. Diastase was found to be ineffective and although pectinase had some depilatory action at *p*H 4.0, its effect when used with acetate buffer was masked by that of the buffer itself. It was therefore decided to discontinue the enzyme experiments and to investigate the action of acetate as a depilatory for sheep skins.

Tests showed that the depilatory effect of acetic acid increased with rise in temperature, with increase in buffer concentration and with decrease of *p*H. High temperatures, high buffer concentrations and low *p*H values also caused damage to the pelt. At *p*H values above 5.0, bacterial depilation occurred accompanied by foul odours.

Marked Effect

The results of the tests showed that acetic acid and acetate buffers had a marked wool-loosening effect. The wool on skins soaked for 16 hours in M/20 acetate buffer at *p*H 4.0 and 35°C was loosened sufficiently for commercial 'pulling' although it was still held tightly in some isolated patches. Similar results were obtained by soaking sheep skins for a short period with M/1 acetic acid, wringing them free from excess acid, and incubating them for 16 hours at 32°C. Acids other than acetic, as well as ammonia and ammonia plus lime, were also tried, but were found to be less effective than acetic acid.

Wool and pelts treated with acetic acid were both initially in very good condition. Examination of a pelt after two months showed that degradation of the sweat glands had occurred but was confined to those areas where the wool had pulled freely. Some degradation of the glands is necessary for the successful degreasing of the pelts during the tanning process. It is stated that the degree of degradation found after acetic acid treatment and storage would be sufficient for this purpose. Chemical analysis of a stored pelt indicated a considerable degree of protein breakdown and it appears that residual acetic acid had caused a certain amount of degradation of collagen.

The authors conclude that acetic acid as a depilatory for sheep skins appears to offer greater prospects of success than do mucolytic enzymes, other acids, or ammonia. Difficulties still to be overcome are the 'patchiness' of the depilation and the effect of residual acetic acid on the pelt and the wool during storage.

High Sasol Output Expected

ALTHOUGH Sasol officials, after numerous setbacks in the past, are making no optimistic forecasts of future petrol production from the oil-from-coal plant, the South African Treasury has indicated that it is expecting heavy production from the plant in the financial year which ends on 31 March 1957.

Since comparatively limited gallonage has flowed from Sasolburg in the first four months of the new financial year, it is obvious that much is expected in the period from October onwards, according to estimates published in a recent *Government Gazette*. This shows that against excise collections last year on motor fuel of £4,172,363, the Treasury anticipates getting £5,675,000 this year—an increase of about 40 per cent. As the Durban refinery has been operating reasonably near its expected flow, this increase can only come from Sasolburg, writes our South African correspondent.

Texas Takes Over

THE TEXAS Co. has acquired more than 95 per cent of the outstanding capital stock of the Trinidad Oil Co. Ltd. This is a sufficient amount to complete acquisition of the Trinidad Co.

Trinidad Oil Co. Ltd. has substantial holdings of acreage in Trinidad, and produces crude oil at the rate of 25,000 barrels a day. It owns and operates a 80,000-barrel-a-day refinery, and has port facilities at Pointe-a-Pierre. Through subsidiaries and affiliates, it markets in a number of the Caribbean islands, and operates a tanker fleet.

Through a 50 per cent interest in Regent Oil Co. Ltd., Trinidad markets petroleum products extensively in the UK. It also owns approximately 90 per cent of Regent Refining Co. Ltd., of Canada, which has marketing operations in Canada and a refinery at Port Credit, near Toronto.

NOTE & COMMENT

A SIGNIFICANT contribution to the subject vaguely called 'technical writing' has been made in *Industrial and Engineering Chemistry* (1956, 48, 7, 47A) by Mr. H. C. McDaniel of the Westinghouse organisation. Most criticisms of scientists' ability to write clearly, especially for readers of lower technical grading, have seemed to assume that this is a failing which each individual scientist must cure. Mr. McDaniel takes the view that much of the writing must be regarded as a separate task calling for different skill, that chemical engineering is one specialism and reducing its results to terms that are widely understandable is another. 'Large organisations often employ technical writing specialists. The engineer must not be satisfied simply to co-operate with them—he must realise that these specialists are as necessary to complement his work as he is theirs..... In the smaller-sized organisations, the engineer must perform both roles.....in this area, the problem is greatest but least realised.' It is perhaps easier to put forward this view in the US than in Europe; the number of very big organisations there is greater, and this alone must foster the development of 'technical writing' as a specialised and adequately rewarded skill.

In 10 years' time, Mr. McDaniel predicts, there will be a need in the US for four times as many technical writing specialists as there are today, and that this requirement will at least double in the following decade. The more complex production techniques and processes become, the more need there will be for the verbal *entrepreneur*. His argument seems both practical and logical. His own organisation employs an English professor for teaching technical writing each summer to engineers.

Mr. McDaniel's recipe for good technical writing of this kind contains imagination as a major constituent. An approach that encourages enthusiasm must be visualised— ways of treating the facts that add reader-interest must be seen, 'the scientific equivalent of the newsman's nose for news'. This is true enough, provided that technical writing, in cultivating these desirable qualities, does not become a form of 'salesmanship,' making the *pros* of a project more attractive than the *cons*. It has never been an easy task to preserve objectivity whilst seeking wide readability; indeed, such skill is exceedingly rare. That is one of the development problems which technical writing as a profession in its own right must overcome.

Foreign Investment

PUBLISHED in the August issue of *Survey of Current Business* is the annual review of the US Department of Commerce of international investment. This review indicates that Canada is still the country which attracts most American investors. American holdings, mainly in manufacturing and in the petroleum industry, rose by nearly $600 million in 1955. Another $300 million was invested by US investors in Latin America, again mostly in manufacturing concerns. A similar amount was invested in manufacturing plants and petroleum refineries and distribution facilities in Western Europe.

American private investors earned a record $3.1 billion from their 1955 overseas ventures, a rise of 20 per cent over the previous year. Of these earnings, $1.2 million came from the petroleum industry, reflecting a 15 per cent increase in the production of crude oil by American-controlled oil companies overseas. Germany is another country which is investing in overseas projects.

The Germans also have been very active in South America, and particularly in Brazil, where they are building what will be the largest chemical manufacturing centre in that continent. It is obvious that the Germans are not thinking only of the internal market as an outlet for future production. For instance, Brazil, under a new agreement with Bolivia, will supply steel products, chemical products, tyres and other manufactures. Brazil is already exporting products which a short

while ago it was importing. It is, of course, very well placed to become a supplier to its neighbours.

The US, too, has recently agreed to finance Brazilian development, which will help Brazil considerably—and also the US suppliers. At the same time, it is to be hoped that these developments could provide openings for UK enterprises.

Coal-tar Dyes

COAL-TAR DYES, Orange 1 and 2 and Red 32, were prohibited as colouring agents for food and internal drugs as from 15 February this year by the US Health, Education and Welfare Secretary, Mr. M. B. Folsom. Orange growers appealed to the US Circuit Court of Appeals, New Orleans, and the Colour Industry Committee, representing all the major US colour manufacturers, appealed to the New York Court. The CI Committee asked the court to interpret the word 'harmless' as used in the Food, Drug and Cosmetic Act, as applied to coal-tar colours, to mean 'harmless under normal conditions of use.' No tolerances were set for use of the colours, since the secretary's findings were that no tolerances could be determined.

The court rejected the appeals. It stated that it was not necessary to prove that the colours were injurious to health but merely that addition of the colours 'might render the article of food injurious.' Although it failed to decide the tolerance authority question, the court indicated a belief that it might be impossible to establish coal-tar colour tolerances from a practical standpoint.

The colours in question are used on a wide variety of products and consumed by everyone over long periods. It would, of course, be difficult for the Health, Education and Welfare Department to establish the cumulative effect on humans over a 20- to 30-year period of use.

Marine Oil Project

A project to drill oil beneath the bed of the South China Sea off the coast of Brunei is being undertaken by the Shell Company. Three marine platforms have been erected off Seria and eight more will be put up by the end of the year.

Superphosphate Project

THE new sulphuric acid and superphosphate project of African Explosives & Chemical Industries Ltd. which is being established near Salisbury, Southern Rhodesia, is expected to be in production early in 1958 (see THE CHEMICAL AGE, 10 December 1955, p. 1279, 16 June 1956, p. 1322). This plant has been designed to manufacture both single and triple superphosphate. Its capacity will be large enough to meet the total superphosphate requirements of the Federation, all of which have at present to be imported. Of the two basic raw materials for superphosphate, pyrites will be obtained locally while phosphate rock will be imported. The company, however, has acquired a local apatite deposit at Dorowa and will be carry ing out investigational work to determine the economic feasibility of upgrading this material for superphosphate manufacture. This, however, will entail considerable experimental work and for the present, therefore, production plans will be based on the use of imported phosphate rock. African Explosives & Chemical Industries are also establishing a new fertiliser mixing and granulation plant at Rodia which is expected to be ready in the latter part of 1957. Nitrogen and potash ingredients will continue to be imported.

Special Glassware Service

A SCIENTIFIC GLASSWARE DEPARTMENT has now been established by Howard Lloyd & Co. Ltd., Batley, Yorks, research chemists and pharmaceutical manufacturers. Mr. C. Clegg will direct the new department. He has been producing and developing laboratory and industrial 'bespoke' glassware for 20 years. Mr. Clegg is well known for making the 'hydrogen-in-steel' apparatus, which is widely used in the steel industry (hydrogen causes brittleness in steel and increases the possibility of cracking), and the triple coil glass condenser.

In addition to providing Howard Lloyd & Co. Ltd. with special glassware for the company's research projects, the department will supply, by private contract, equipment to outside organisations' specifications.

MR. FRANK DAWSON CHAMBERS, of Brookhill, Eastwood, Notts, manufacturing chemist, who died on 6 July 1955, left £35,991 5s 7d gross, £35,370 7s 1d net value (duty paid £6,040).

Outlook for Celanese

US Company's President Foresees Increased Sales

CELANESE CORPORATION of America foresees an annual sales level well in excess of $300,000,000 by 1960, Mr. Harold Blancke, president, told members of the New York Society of Security Analysts Inc., recently.

The outlook is reflected in the corporation's capital expansion programme, which contemplates expenditures of $100,000,000 during the next five years to expand and diversify operations. It is estimated that this investment would generate additional annual sales of $125,000,000.

Expansion Capital

As now planned, expansion capital will be invested principally for facilities of the company's chemical and plastics divisions, Mr. Blancke said. In the case of the textile division, which currently accounts for the largest part of the Celanese sales dollar, efforts will be principally concerned with stimulating sales and markets to bring existing facilities up to 100 per cent capacity operations.

Included in future textile division operations, he noted, is the conversion of some facilities to meet the expanding demand for Arnel, the company's new tri-acetate fibre.

Since its introduction to the trade two years ago, Mr. Blancke said, Arnel has achieved gratifying market acceptance, being now employed in more than 20 fabric constructions and used by more than 300 garment manufacturers.

Other recent developments cited as indicative of acetate's significant present position and future potential were: Adoption of Fortisan-36, high-strength saponified acetate, for various industrial uses; recent emergence of new markets for acetate such as blankets, carpets, mattress battings, upholstery and cigarette filter tow; and the strong trend to non-woven fabrics, in which acetate is readily adaptable, for apparel, home furnishings and other end-uses.

In addition to progress by Celanese textiles, prospects appear bright for continuing growth in the chemical, plastics and foreign divisions of the company, the president reported. Among highlights of division operations he cited were the following:

Chemicals.—From originally a supplier of chemicals for other divisions of the company, the Celanese chemical division has broadened its market base to develop external markets and achieve greater autonomy. Less than 25 per cent of the division's 1956 sales will be internal and the proportion of external sales is expected to increase.

The division is now marketing over 40 chemicals and about 40 per cent of current sales comes from products introduced since 1949. A new plant in Point Pleasant, West Virginia, which started production in April, is making fire-resistant hydraulic fluids and has processing equipment for production of chemicals for plastics, textiles, automotive specialities and diverse industrial applications. Research and development are being aimed at products closer to the consumer.

Plastics.—This year's sales are currently running about 10 per cent above the level of 1955, which was a record sales year for the Celanese plastics division. One important product contributing to higher volume is Forticel, a cellulose propionate moulding material introduced in 1955, which has taken a big share of the moulded pen and pencil business and looks promising for telephone sets and numerous other applications. Good acceptance also has been achieved by polyvinyl acetate emulsions, used in making water-base latex paints for interior and exterior surfaces, to an extent that plans are being considered to expand p.v.a. production to meet demand.

Acetate Sheeting

Increased demand for acetate sheeting prompted expansion of sheet-casting facilities in the Belvidere, New Jersey, plant to nearly double production capacity. By early 1957, a new plant in Houston, Texas, will start producing Fortiflex, a polyolefine with unusual rigidity, heat resistance, chemical inertness and other property advantages over conventional polythenes. Sizeable markets for the resin are foreseen in such end-uses as bottles and containers, piping, housewares, electrical appliances, packaging and industrial products.

Foreign Operations.—Celanese Mexicana SA has grown from a one-plant venture in

Outlook for Celanese

1946 to a diversified five-plant operation with assets of 525 million pesos ($42,000,000). The first Mexican-made nylon has just come into production in the Ocotlan plant. Other products made by Celanese Mexicana include acetate and rayon filament yarn and staple fibre, rayon tyre cord and tyre cord fabric, purified cellulose from cotton linters, cellophane, polyvinyl acetate emulsions and fabricated polyester products. The company also carries on product and market development work through pilot plant facilities.

Celanese Colombiana SA likewise has achieved commercial success, having quadrupled production since 1951, and now produces acetate yarns and staple fibre, fabricates polyester resin products and supplies polyvinyl acetate emulsions to the paint industry. Celanese Venezolana SA, has not yet matched progress of the Mexican and Colombian companies, since it is operating in a hard currency country where sizeable textile imports have caused severe market fluctuations.

Canadian Chemical and Cellulose Co. Ltd. has excellent growth prospects. The mill at Prince Rupert, BC, originally a producer only of high alpha cellulose for processing into cellulose acetate, has been redesigned so it can also produce paper pulp and dissolving pulps for rayon manufacture. Mill capacity is expected to be expanded to nearly 500 tons of pulp per day. Canadian Chemical and Cellulose, which also produces and sells chemicals and acetate filament and staple fibre, recently reported $19,636,660 in sales for the first half of 1956. This compares with sales of $18,172,529 during the comparable six months last year.

Fabric Which Can Breathe

A P.V.C.-COATED fabric which can 'breathe' is being manufactured by the leathercloth division of Imperial Chemical Industries. The new product, Vynair, is the first of its kind to be produced in Britain. Available in modern designs, it is claimed to be suitable for the covering of loose foam-rubber cushions of three-piece-suites, cushioned chairs or contemporary stools.

Vynair possesses qualities of Vynide, ICI's p.v.c.-coated fabric, and in addition offers unique 'breathable' properties which it is said permit instant regain of shape without the use of eyelets in the material.

Oil-in-Water Emulsions

Pharmaceutical Conference

'RHEOLOGY of Oil-in-Water Emulsions: (1) The effect of concentration of constituents on emulsion consistency', was the subject of a paper by Mr. Arnold Axon, of the Wellcome Chemicals Works, Dartford, Kent, read at the British Pharmaceutical conference on 4 September. In an earlier paper the author stressed that semi-solid preparations show different kinds of anomalous viscous behaviour and that to distinguish between them a complete consistency curve must be determined. Emulsions containing bentonite when autoclaved exhibited uniform plastic flow. This finding has provided a basis for the comparison of oil-in-water emulsions.

The author's present paper records the preparation of oil-in-water emulsions of liquid paraffin, cetyl alcohol, sodium lauryl sulphate and bentonite and describes the effect on the consistency of changes in the concentration of each constituent of the emulsion. The work is part of a study which aims to show in quantitative units the significance of such expressive terms as 'body', 'podgy', 'sloppy', and 'stiff'. A variable speed rotational viscometer was used to determine consistency.

The autoclaved emulsions containing from 1 to 3 per cent bentonite exhibited thixotropic plastic flow over a wide range of concentration of each constituent. Autoclaved emulsions were found to give values for plastic viscosity and yield value which conform to a definite pattern. All the unautoclaved emulsions exhibited thixotropic shear-rate thinning.

Blue-print Protective Fluid

A plastic fluid, BPF, which forms a water-white transparent film and protects the surfaces of blue-prints, work cards, process sheets, maps and other documents receiving considerable handling, is now available from Corrosion Ltd. The film is stated to bond with the paper surface and reinforce it. It is also resistant to water, oils, lubricating fluids, finger marks, dirt and grease. The BPF coating retains its clarity indefinitely and does not crack, peel or strip off surfaces to which it is applied. For coding purposes BPF is available in six transparent colours—pink, green, yellow, blue, violet and buff. The sprayed BPF film dries in one minute.

Gibberellins for Growth

Research Work Outlined

AN ACCOUNT of the gibberellins, which have recently been reported as growth promoting substances (THE CHEMICAL AGE, 8 September), appears in *Chemical & Engineering News*, Vol. 34, No. 38, 17 September, p. 4496. Gibberellins are substances produced by *Gibberella fujihuroi*, an organism which causes elongation of rice shoots, known as 'Bakanae' disease or 'foolish seedling' disease. Three chemically different compounds have so far been isolated as a result of Japanese, British and American researches: Gibberellin A, (also known as 'A') $C_{19}H_{24}O_6$; Gibberellin A_2, $C_{19}H_{26}O_6$; and gibberellin A_3 (also known as gibberellin 'X' and Gibberellic acid) $C_{19}H_{22}O_6$.

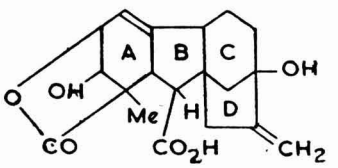
Japanese scientists, T. Yabuta and Y. Sumiki and co-workers gave the name gibberellin 'A' to a compound discovered by them in attempts to find out more about the 'Bakanae' rice disease (THE CHEMICAL AGE, 8 September). The chemical isolated was a colourless, crystalline, optically active acid, with a marked growth promoting property (1 p.p.m. stimulated growth of rice, wheat, barley and tobacco).

Fermentation Process

In 1951, F. H. Stodola, Northern Utilization Research Branch, US, developed a fermentation process for production of gibberellins. A nutrient medium containing dextrose, potassium phosphate, magnesium sulphate and ammonium chloride, was innoculated with the fungus *Fusanium moniliforine*. After three days' fermentation, the liquor was separated on a charcoal chromatographic column using acetone or ethanol as solvent. Two gibberellins were obtained and later identified as the 'A' form and a compound which Stodola called the 'X' form. Some 12 grammes of crystals were obtained from 160 gallons of culture liquor.

Empirical identification showed 'A' to be $C_{19}H_{24}O_6$ with one double bond; the 'X' to have the formula $C_{19}H_{22}O_6$ with two double bonds (*cf.* Japanese 'A' $C_{22}H_{26}O_7$). In Britain, P. J. Curtis and B. E. Cross (**1**) (Imperial Chemical Industries Ltd., Welwyn, Herts) investigating gibberellins, identified gibberellic acid. Further investigation proved that the acid was identical with gibberellin 'X.'

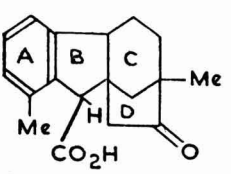
A tentative structural formula which has been proposed for gibberellic acid is:—



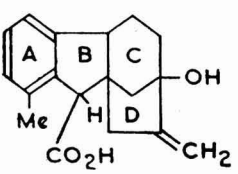
(I)

but there is some doubt as to the points of attachment of the lactone group to the ring.

In a recent communication (**2**) B. E. Cross *et al.* gave a preliminary account of their progress in determining the structure of the acid. Investigations by these workers show that gibberellic acid is a tetracyclic dihydroxylactonic acid (**3**). They state that one of the hydroxy groups is secondary since methyl-tetrahydrogibberellate is oxidised to a ketone, $C_{20}H_{26}O_6$ with chromic oxide-pyridine; the other they consider to be tertiary as they have failed to prepare a ditosylate. The position of the carboxyl group is the same as in gibberic, and therefore



(2)
GIBBERIC ACID



(3) *Allo* GIBBERIC ACID

*allo*gibberic, acid, since methyl gibberellate can be converted to methyl gibberate. Ozonolysis of the methyl ester of gibberellic acid shows that the acid contains a terminal methylene group. Having regard to these findings, Cross *et al.* suggest that conversion to *allo*gibberic acid involves only aromatisation of ring A; the latter, it is stated, must accommodate the 5-ring lactone, the second hydroxy group and a double bond. Another

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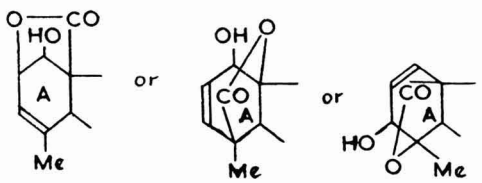
Gibberellins for Growth

structure proposed for gibberellic acid by Cross *et al.* is (4)—although structure (5) and (6) for ring A are not excluded.



(4) (5) (6)

As there are eight asymetric carbon atoms. some investigators consider that synthesis of gibberellic acid is doubtful. Some 250 optical isomers exist. However, in the US Eli Lilly & Co. Inc. and Merck Inc. are using fermentation processes. Extension of the length of fermentation from three to 18 days gives an increased yield.

Growth Studies

Geraniums, sunflowers and roses treated with gibberellic acid grow one-half to three times taller than comparable untreated plants. Heights of crop plants such as peppers and corn have, in many instances, been doubled or tripled after application of the acid. Young forest trees, e.g. willow, oak, maple, tulip, poplar, have all shown increased growth after treatment.

Other investigations, still in preliminary stages, show that the weights of fresh soya bean and snap bean and the solid matter in them increased 30 to 40 per cent after gibberellic acid spray treatment. Investigations have until recently been considerably handicapped by lack of adequate supplies of gibberellins. However, Eli Lilly & Co. Inc. and Merck Inc. are now offering free limited quantities to agricultural research stations etc. Should these investigations confirm the earlier findings, it should not prove difficult for the pilot plants used by the above mentioned companies to be scaled up and development work should provide higher yields of gibberellic acid.

REFERENCES

(1) Curtis, P. J., & Cross, B. E., *Chem. & Ind.*, 1954, 1066.
(2) Cross, B. E., *et al.*, *Chem. & Ind.*, 1955, 954.
(3) Cross B. E., *J. Chem. Soc.*, 1954, 4670.

Birlec Training Centre

AN apprentice training centre, specially built at a capital cost of some £25,000, was opened at Erdington, Birmingham, on 29 August by Birlec Ltd., manufacturers of air conditioning and air and process gas drying plant.

Four full time instructors have been appointed, two of whom have previously held lecturing appointments in the Birmingham College of Technology and the National Foundry College, Wolverhampton. It is anticipated that the scheme will cost about £20,000 a year to run.

For the first year of their training, apprentices will spend their whole time at the centre. Thereafter, they will return to the centre on a part time basis, working chiefly in the factory. Training at the centre is not intended as a substitute for technical college study, but has been planned as an extensive supplementary course.

Chemical Exports for August

EXPORTS of chemicals from Great Britain in August showed little change from the July figure (£19,989,019 as against £19,972,653). The figure for August 1955 was larger at £22,578,889.

Largest importer was Australia (£1,267,833) with India second (£1,197,524). No other importers bought more than £1 million worth of British chemicals.

The following table gives the breakdown for exports:—

Basic chemical elements & compounds ..	£4,804,892
Coal tar products	£420,666
Synthetic dyestuffs	£757,039
Paints, pigments & tannins	£1,957,951
Medicinal & pharmaceutical products ..	£2,915,625
Essential oils, perfumes, soaps, polishes etc.	£2,265,545
Fertilisers	£63,137
Plastics	£1,874,022

Cockroach Repellent

An insect repellent known as MGK Repellent II has been developed by Phillips Petroleum Co. of Oklahoma, US, to counteract the menace of cockroaches. When used with pyrethrum insecticide the repellent disperses the insects and ensures a high percentage kill near the treated area, it is claimed. Laboratory tests have shown the mixtures to be effective for up to 14 weeks; in the field the minimum period has been from four to five weeks. UK sales of the repellent (2,3,4,5-*bis*-(Δ2-butylene) tetrahydrofurfural) are in the hands of Joseph Weil & Son Ltd., London EC2.

From all Quarters

Israeli Chemicals

Superphosphate installations at Fertilizers & Chemicals Ltd. are stated to be producing 100,000 tons of this fertiliser a year, twice as much as the planned production. This is sufficient to supply the needs of the country and in addition 10 to 15 thousand tons will be available for export. Electrochemical Industries (Frutarom) Ltd., are now manufacturing hydrochloric acid. The plant is working on a three-shift schedule, at a production rate of 1,000 tons of acid a year. This quantity at present exceeds the country's requirements, but it is anticipated that the tendency to use hydrochloric acid in the galvanising industry, instead of sulphuric acid which requires expensive heating apparatus, will lead to an increase in demand.

Rich Ilmenite Sands

Deposits of radioactive sands near Fort Johnston, Nyasaland, are now being investigated. The sands are stated to contain 59 per cent ilmenite and magnetite and smaller quantities of other minerals including monazite, which would yield thorium.

Butyl Tyres

Esso Research & Engineering Co., the research section of Standard Oil Co., US, is reported to have produced new all-synthetic car tyres. The tyres are made of a perfected butyl latex which permits the bonding of butyl rubber with tyre cord, using existing plant equipment. Car tyres at present consist of a synthetic rubber, GR-S, plus a lesser amount of natural rubber. Inner tubes today are practically all made of butyl rubber, because of its excellent air-retaining properties. Plans for test-marketing some all-butyl tyres in six months' time are now being made.

New Zealand Oil Search

New Zealand Minister of Mines, Mr. Sullivan, has recently announced that a new £500,000 oil search is to be undertaken on the east coast of the North Island, New Zealand, by Todd Brothers, of Wellington, and the British Petroleum group.

US Isotope Laboratory 1st Decade

Oak Ridge National Laboratory, which Union Carbide Nuclear Company, a division of Union Carbide & Carbon Corporation, operates for the US Atomic Energy Commission, completed in August its first decade of radioisotope production and distribution to users in industry, medicine, and agriculture. Over 1,100 radioisotope shipments are now made each month to 2,700 users throughout the US and 57 countries.

Freeport to Mine Offshore Sulphur

The first completely offshore sulphur mining operation will be undertaken by Freeport Sulphur Co. at a deposit discovered in the Gulf of Mexico by Humble Oil & Refining Co. The deposit, located off Louisiana in 45 ft. of water six miles from the nearest land, represents a 'major new source of sulphur,' according to a joint statement by the two companies. Under a contract signed by the companies, Freeport will design, install and operate a mining plant to produce sulphur by the Frasch hot water process. Construction is required to begin by the end of 1958 and is expected to take two years to complete.

US Phosphate Rock

Mine production of phosphate rock ore in the US in 1955 decreased 13 per cent to 39.7 million long tons, according to reports by producers to the Bureau of Mines, US Department of the Interior. Total marketable output declined 11 per cent. The apparent consumption of phosphate rock rose two per cent above the 1954 figure.

Gatooma Nickel Deposits

The Southern Rhodesia Government was waiting just as anxiously as Gatooma for the final word about the Leslie nickel claims, said the Prime Minister, Mr. R. S. Garfield-Todd, when he spoke at Gatooma's golden jubilee celebrations on 12 September. The deposits, which were discovered earlier this year, are still being investigated. Preliminary indications were that they may be the largest nickel deposits in the world.

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Next Week's Events

TUESDAY 2 OCTOBER

Incorporated Plant Engineers

London: Royal Society of Arts, John Adam Street, Adelphi, Strand WC2, 7 p.m. 'The Treatment and Disposal of Industrial Effluent' by J. Lakin.

Institute of Metals

Oxford: Cadena Cafe, Cornmarket Street, 7 p.m. 'Molybdenum' by D. O. Pickman.

WEDNESDAY 3 OCTOBER

Society for Analytical Chemistry

London: Meeting Room of the Chemical Society, Burlington House W1, 7 p.m. 'Chromatography: The Determination of Vitamin D and Related Compounds. Part I: Introduction and Preparation of Compounds in the Irradiation Series. Part II: Analysis of Irradiation Products' by W. H. C. Shaw, J. P. Jefferies and T. E. Holt; 'Some Examples of the Use of Paper Chromatography in Toxicological Analysis' by A. S. Curry.

Institute of Metal Finishing

Glasgow: Institution of Engineers & Shipbuilders in Scotland, 39 Elmbank Crescent, 7.30 p.m. Chairman's Address by W. Watson.

Institute of Welding

Manchester: Reynolds Hall, College of Technology, 7.15 p.m. 'Welding in Atomic Energy Projects' by I. H. Hogg.

THURSDAY 4 OCTOBER

SCI (Bristol Section & Food Group)

Bristol: University Chemical Department, Woodland Road, 7 p.m. 'The Nature of Meat' by E. H. Callow.

Institute of Metals

London: 4 Grosvenor Gardens SW1, 6.30 p.m. 'The Bonding of Metals and Alloys to Glass and Ceramics' by H. Rawson.

Institute of Metal Finishing

Manchester: Engineers' Club, Albert Square, 7.30 p.m. 'The Evaluation of a Variety of Organic Finishes on Electro-Zinc Coatings' by P. Costelloe and E. Page. Meeting preceded by works visit to John Summers & Sons Ltd., Shotton.

Institute of Packaging

London: Management House, 8 Hill Street W1, 6.30 p.m. Pharmaceuticals Panel of speakers on tins, glass tubes, collapsible tubes, plastic moulding and 'strip packs.' Chairman: A. F. Much.

Flame Retardant

USE OF antimony oxide in flame-retardant compositions is becoming progressively widespread, according to a booklet *Timonox as a Flame-retardant in Polymers & Paint*, published recently by Associated Lead Manufacturers Ltd., Ibex House, Minories, London EC3. The booklet reviews applications other than in the textile field, with particular reference to the use of Timonox as a flame-retardant in polymers such as p.v.c. Antimony oxide alone does not bring about flame-retardant properties to a marked extent unless the material to which it is added includes a source of available chlorine to enable the powerful flame-retardant antimony oxide to be formed.

As the booklet points out, many plastics materials already contain available chlorine, and it suffices to add antimony oxide alone to the composition. When a flammable material containing no chloride is to be made flame-resistant, the desired property can be achieved by the addition of both antimony oxide and chlorine-containing material such as chlorinated paraffins to the compositions, in many cases the latter acting as secondary plasticisers.

FRIDAY 5 OCTOBER

CS, SCI & RIC

Manchester: Chemistry Lecture Theatre, The University, 6.30 p.m. 'Corrosion Fatigue' by U. R. Evans.

SCI (Fine Chemicals & Microbiology Groups)

London: London School of Hygiene & Tropical Medicine, Keppel Street WC1, 7 p.m. 'Some Uses of Isotopes in Biochemistry' by A. Neuberger.

Society for Analytical Chemistry

Cambridge: University Chemical Laboratory, Pembroke Street, 6.30 p.m. 'Sub-Micro Methods in Inorganic and Organic Analysis': 'Introduction' by R. Belcher; 'General Review of Sub-Micro Methods' by T. S. West; 'The Determination of Alkoxyl' by M. K. Bhatty; 'The Determination of Nitrogen' by M. Williams; 'The Determination of Iodine' by A. R. Shah. Preceded at 2 p.m. by a visit to the research station of Fisons Pest Control Ltd., Chesterford Park.

SCI (London Section)

London: 14-16 Belgrave Square SW1, 6.30 p.m. Chairman's address: 'Application of Chemical Analysis to Medical Diagnosis and Treatment' by Sir Charles Dodds.

PEOPLE in the NEWS

● DR. PHILIP HOWARD SYKES, M.Sc., Ph.D., F.R.I.C., a director of the British Oxygen Co., has been appointed chairman of the company's new subsidiary, British Oxygen Research & Development Ltd. DR. NORMAN BOOTH, B.Sc., Ph.D., F.R.I.C., general manager, research and development, British Oxygen Co., has been appointed managing director of the new company, and DR. LEONARD CHARLES BANNISTER, M.Sc., Ph.D., F.R.I.C., F.I.M., assistant general manager, research and development, British Oxygen Co., has been appointed a director of the company.

● The Superphosphate Manufacturers' Association has announced the following elections of officers for 1956-57:—*chairman*: MR. T. WILLIAMS (Eaglescliffe Chemical Co.) and *vice-chairman*, MR. H. G. ROPE (Fisons Ltd.).

● At the Bradford Technical College on 20 September, MR. J. H. HEPWORTH, of Shell Chemical Co. Ltd., presented a cheque for £250 for the textile department on behalf of his company to ALDERMAN REVIS BARBER, chairman of Bradford Education Committee (see THE CHEMICAL AGE, 8 September, p. 453). Among those present at the ceremony were DR. F. HAPPEY (head of the textile department), MR. R. G. OVERSBY (deputy head), MR. A. SPALDING (Bradford director of education), MR. N. WAGGETT (Shell technical representative and also an old boy of the college), and MR. H. ASQUITH (chief clerk).

● MR. G. P. DAVIDSON has been appointed chief of Head Wrightson & Co.'s nuclear power plant activities with the consent of The Distillers Co. Ltd.

● At the annual shareholders' meeting of Dow Chemical of Canada Ltd. held in Sarnia, the board of directors was increased to 11 members from nine. Two executives of the Sarnia operating staff were elected to fill the new positions MR. PAUL D. SCOTT, one of the new directors, is works manager at Sarnia and MR. JOHN L. SMART, the other, is assistant works manager. Both have been with Dow since the company was organised and both are chemical engineering graduates of the University of Toronto. Other directors include MR. N. R. CRAWFORD, president, Toronto, and MR. LEROY D. SMITHERS, executive vice-president, and MR. BERNARD A HOWARD, treasurer.

● A delegation of 12 Soviet steel experts led by MR. A. G. SHEREMETIEV, the Minister of Ferrous Metallurgy, arrived in the United Kingdom on Tuesday, 25 September, for a fortnight's tour of British steel plants. In the course of their tour the Soviet delegation will visit nine companies. In addition the delegation will visit the BISRA Laboratories.

● The British Rayon Research Association has appointed MR. L. A. WISEMAN (40) as deputy director from 1 December. He is at present working at the Atomic Weapons Research Establishment at Aldermaston.

● DR. SYLVAN I. COHEN has joined Olin Mathieson Chemical Corporation as an agricultural research specialist in the research and development department of the insecticides division at Port Jefferson, New York. He was formerly vice-president for research of Gallowhur Chemical Corporation, Ossining, New York. Dr. Cohen obtained his Ph.D. degree in plant pathology at Washington State College, Pullman, in 1942. Following World War II he was assistant research professor at the Rhode Island Experiment Station for two years.

● MR. MASON M. RANDLE has been appointed quality control manager for the Western Brass Mills Division, Olin Mathieson Chemical Corporation. Mr. Randle succeeds MR. HERBERT A. BALL, who has been transferred to New Haven to become special test superintendent of the recently created nuclear fuel division. The quality control manager's duties are being expanded to include customer relations.

Mr. M. M. Randle

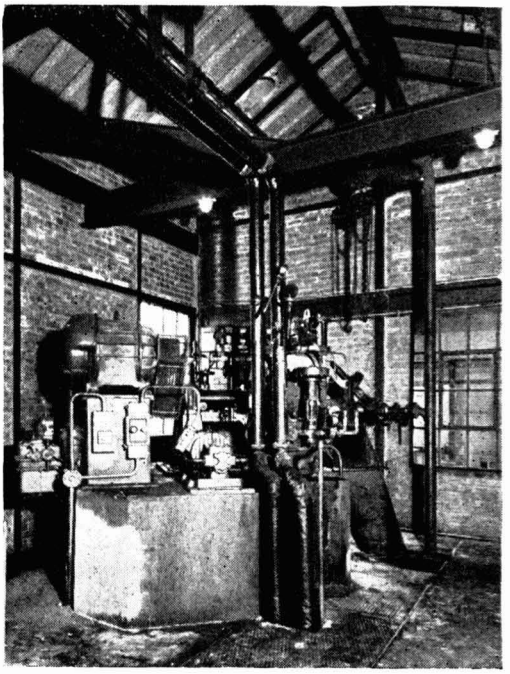
High M.Pt Naphthalene

Proabd's New Process

A NEW process for the production of high melting point naphthalene from crude naphthalene oil, a product of primary distillation of crude tar, has been installed by Proabd (England) Ltd., chemical engineers, in the Cadishead, near Manchester, works of Lancashire Tar Distillers Ltd. Proabd announces that it has also undertaken to install a large plant for the South Eastern Gas Board at its Ordnance Wharf, Greenwich, works, and a plant to produce over 30 tons per day of pure naphthalene for Dorman Long (Chemicals) Ltd. at its Port Clarence, Middlesbrough, works.

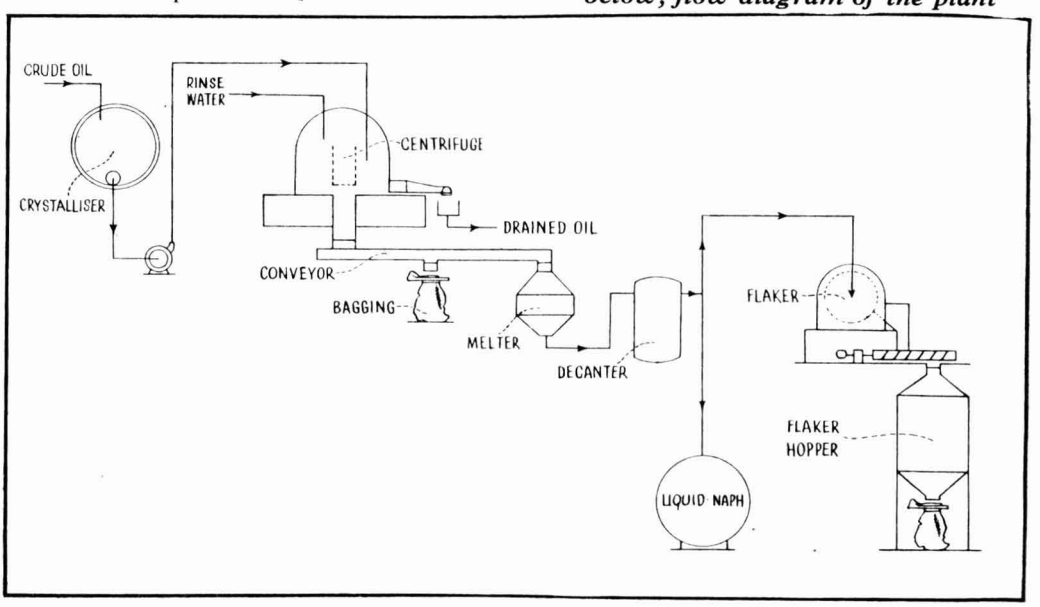
The process consists of the crystallisation of the naphthalene oil in water-cooled, stirred crystallising vessels, and subsequent centrifuging of the resultant slurry. A Sharples centrifuge is being used.

The centrifuge cake is rinsed with warm water and, after a drying spin, is discharged. At this stage, the naphthalene has been purified to a crystallising point above 78° C, but contains up to seven per cent water. This crystalline product can either be bagged and sold direct, or melted and dehydrated in a specially designed decanter which can function at the very small density difference available between the water and the liquid naphthalene. The dehydrated liquid naphthalene coming from the decanter contains less than 0.01 per cent H_2O.



The hot liquid naphthalene is in a suitable form to be transported direct to the makers of phthalic anhydride, but, if a solid product is preferred, this can be produced on a drum flaking machine.

Above, Sharples centrifuge in the Lancashire Tar Distillers' Cadishead works; below, flow diagram of the plant



Publications & Announcements

A REVISED BRITISH STANDARD on Ubbelohde apparatus for flow and drop points (BS 894:1956) has now been published. Important changes from BS 894: 1940 are 1, The metal cup, introduced in 1947 as an alternative to the original glass cup, is now the only type specified, because of the difficulty of manufacturing the glass cup to the precise tolerances on dimensions which are essential to secure reproducible results and interchangeability of the parts. 2, Spring clips are provided on the metal case to hold the cup, thus avoiding the very close tolerances on case and cup previously specified to ensure interchangeability. 3, Omitted from the specification are the methods of use as with different materials the methods need to be varied and followed precisely to ensure reproducible results. Methods specified by the British Pharmacopoeia Commission (for hydnocarpus oil, soft paraffin and wool fat), the Institute of Petroleum (for grease) and the BSI Committee concerned with analysis of oil and fats (for soft fats and hard fats) are reproduced in an Appendix. Components and method of assembly of the apparatus are specified and illustrated.

Copies of this British Standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W1, price 3s 6d.

* * *

SOME of the observations of early workers, such as Lord Lister, William Roberts and John Tyndall, pioneers in the science of mycology, have been assembled in a booklet entitled *A Decade of Penicillin* just issued by Glaxo Laboratories Ltd. Sir Alexander Fleming's investigations are described and also those of Sir Howard Florey and Ernest Chain who having extracted and concentrated penicillin, subjected it to chemical trial. Only a decade has passed since penicillin was made freely available to the medical profession in Britain. Glaxo Laboratories Ltd. have been providing the drug for this length of time and also information about it. A chart included in this booklet shows the development of Glaxo penicillin products from 1946 to the present day.

SPRING strips of tempered steel or other elastic materials have many uses in the design of all types of measuring instruments. These uses include flexible couplings and pivots, the magnification of small movements, and means of producing parallel movement. By using suitable spring strip arrangements in mechanisms, freedom from friction, play and wear of the moving parts is ensured and no lubrication is required. Instrument design can often be simplified by using spring strips. *Notes on Applied Science No. 15—Application of Spring Strips to Instrument Design*, published by HMSO for DSIR (price 2s), gives designers a knowledge of the subject which will enable them to make use of spring strips in solving certain problems in instrument design.

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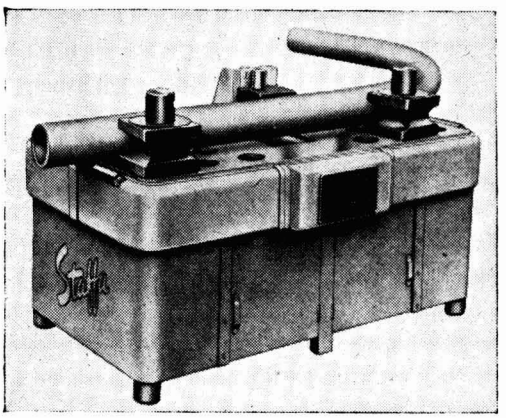
TO COMMEMORATE the completion of fifty year of productive life of the Zinc Corporation Ltd., the Consolidated Zinc Corporation Ltd. has issued a very fine illustrated booklet entitled *The First Fifty Years*. The Zinc Corporation Ltd. is the oldest and largest company in the Consolidated Zinc Corporation Ltd.'s group of mining and industrial interests. It is the foremost producing company of the Broken Hill field, New South Wales, Australia. It was to treat zinciferous residues that the Zinc Corporation was formed in 1905. The company's operations in the first two or three years, however, were disappointing but obstinate optimism carried the Corporation through to better times. In 1910, when it became evident that raw material would soon be exhausted, the Zinc Corporation speeded up exploration and development of leases it had acquired in the Broken Hill South Blocks where one of the greatest concentrations of minerals was discovered. The Consolidated Zinc Corporation Ltd. now has widespread interest in mining, smelting, acid, fertilisers and chemical and metal manufacturing industries in both Australia and the UK. Treatment processes for the recovery of zinc are discussed in the booklet and forty-four years of zinc mining. Further chapters are devoted to safety, engineering, the mine office and a description of the original and present-day community of Broken Hill.

Hydraulic Bending Machine

A FEATURE of the Soton motorised hydraulic horizontal bending machine which is marketed by Drummond-Asquith (Sales) Ltd., Birmingham and London, is the housing of all hydraulic, mechanical and electrical equipment within the framework. Thus, the operator has a clear view of the work on the table-like surface.

Incorporated in the machine is a mild steel cylinder operating a mild steel ram mounted on a substantial carriage and securely fixed to the forming head. The hydraulic pump is driven by a 4 h.p. electric motor and on the right hand side at the rear of the bender is a control panel.

Built-in safety features prevent the maximum working pressure from being exceeded. Steel doors are provided at the rear of the unit for easy access to the motor, pump and oil tank.



Motorised hydraulic bending machine

Russia's Oil & Gas

SOVIET MINISTER of the Oil Industry, Mr. M. Yevseyenko, in a recent article in *Pravda* states that ascertained resources of oil in the Soviet Union are now more than five times as great as 10 years ago. The Ural-Volga region at present produces 62.1 per cent of the USSR's total oil output.

Large quantities of natural gas are already being utilised in industry at Stavropol and Shebelinsk, in Ukraine. An exploratory borehole in the lower Ob region resulted in a gas gusher giving 45 million cu. ft. of gas per 24 hours. Instead of the scheduled output of 40,000 million cu. metres (about 12 billion cu. ft.) of natural gas for 1960, output aimed at is 45,000 million cu. metres.

Flexible Bellows

THE Engineering Division of Crane Packing Ltd. has developed a new and patented process for manufacturing p.t.f.e. bellows.

Bellows of this new type are suitable for such components as flexible connectors for pipes, sleeves and shaft glands which operate in contact with corrosive chemicals, solvents and lubricants. Their high insulation resistance makes them suitable for insertion in pipe lines where it is necessary to break the electrical continuity, or to prevent electrolysis between dissimilar metals on either side of a joint.

The bellows are at present offered in a range of bore sizes from ½ in. to 6 in. and in corresponding nominal free lengths from 1¼ in. to 3 in. with wall thicknesses ranging from 0.020 in. to 0.040 in. Corresponding extensions are from 0.6 in. to 1.6 in.

Initial tests have shown that these bellows will withstand at least 1,000,000 oscillations between the minimum and maximum working lengths at normal temperatures, and at pressures around 30 p.s.i.

Crane Packing has produced two information bulletins on the material: No. 3 *Basic Processing and Properties*, and No. 5, *Applications*, which are available to interested engineers.

Communications about the use of p.t.f.e. in general and p.t.f.e. bellows in particular should be addressed to the p.t.f.e. Engineering Division, Crane Packing Ltd., Slough.

Chemical Protection Against Radiation

Encouraging results have been obtained in recent experiments with animals on chemical protection against radiation (*Brit. Med. J.*, 1956, *ii*, 647). Several sulphydnyl compounds injected immediately before irradiation were found to protect 20 to 90 per cent of animals against LD100 dose of X-rays; cysteine protected mice and rats; glutathione, mice, rats and dogs; and dimercaptol (BAL) was found to protect rats. Cysteinamine is also effective. It is believed that the amines act by anoxia secondary to disturbances of circulation.

Autumn Handicap

The Autumn golf meeting of the London Section of the Royal Institute of Chemistry will be held on 11 October at Wimbledon Park Golf Club, London SW19. Cost will be 18s 6d and members interested should contact Mr. J. M. J. Wadia, Monsanto Chemicals Ltd., 10-18 Victoria Street SW1.

British Chemical Prices

(These prices are checked with the manufacturers, but it must be pointed out that in many cases there are variations according to quantity, quality, place of delivery, etc.)

LONDON Steady conditions prevail on most sections of the market. Home demand is about average for the period and well spread over the whole range of the industrial chemicals. Buying for shipment has been reasonably good and a fair volume of enquiry is in circulation. The undertone of the market remains firm with prices moving within narrow limits. On the coal-tar products market there has been little change in conditions or prices.

MANCHESTER Quotations on the Manchester chemical market during the past week have, in general, maintained a steady to firm undertone, the chief exception being a cut in the price of sulphate of copper of 42s 6d per ton in sympathy with the trend in the metal. There has been a reasonably steady call for contract deliveries of the alkalis and other heavy chemicals, with a fair number of fresh enquiries from users and shippers. Activity in fertilisers is confined to a few sections, including basic slag and the compounds. There is a steady movement of supplies of the light and heavy tar products.

GLASGOW The Scottish market opened on rather a quieter note during the earlier part of the week, but did show signs of improvement towards the latter end. The emphasis has been mostly on deliveries for immediate requirement with, however, contract deliveries continuing satisfactorily. On the whole prices have remained firm. There is still a good volume of enquiries being received for export, with a fair amount of business booked.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 10 tons, £91 ; 80% pure, 10 tons, £97 ; commercial glacial, 10 tons, £99 ; delivered buyers' premises in returnable barrels (technical acid barrels free) ; in glass carboys, £8 ; demijohns, £12 extra.

Acetic Anhydride.—Ton lots d/d, £132 per ton.

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

Aluminium Sulphate.—Ex works, £15 10s per ton d/d. MANCHESTER : £15 15s to £18 10s.

Ammonia, Anhydrous.—1s 9d to 2s 3d per lb.

Ammonium Chloride.—Per ton lot, in non-returnable packaging, £29 2s 6d.

Ammonium Nitrate.—D/d, £31 per ton (in 4-ton lots).

Ammonium Persulphate. — MANCHESTER : £6 2s 6d per cwt., in 1-cwt. lots, delivered. £112 10s per ton, in minimum 1-ton lots, delivered.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £106 and £97 10s per ton.

Antimony Sulphide.—Crimson, 4s 5d to 4s 10½d ; golden, 2s 8½d to 4s 1½d ; all per lb., delivered UK in minimum 1-ton lots.

Arsenic.—Per ton, £45 to £50 ex store.

Barium Carbonate.—Precip., d/d ; 4-ton lots, £40 10s per ton, bag packing.

Barium Chloride.—£49 per ton in 2-ton lots.

Barium Sulphate (Dry Blanc Fixe).—Precip., 2-ton lots, £35 per ton d/d.

Bleaching Powder.—£28 12 6d per ton in returnable casks, carriage paid station, in 4-ton lots.

Borax.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, anhydrous, £62 10s ; granular, £42 ; crystal, £44 10s ; powder, £45 10s ; extra fine powder, £46 10s ; BP, granular, £51 ; crystal, £53 10s ; powder, £54 10s ; extra fine powder, £55 10s (from 1 October).

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Boric Acid.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, granular, £71 ; crystal, £79 ; powder, £76 10s ; extra fine powder, £78 10s ; BP granular, £84 ; crystal, £91 ; powder, £88 10s ; extra fine powder, £90 10s from 1 October.

Calcium Chloride.—Per ton lots, in non-returnable packaging : solid and flake, £16.

Chlorine, Liquid.— £38 5s per ton, in returnable 16-17-cwt. drums, delivered address in 3-drum lots.

Chromic Acid.—2s 0⅝d per lb., less 2½%, d/d UK, in 1-ton lots.

Chromium Sulphate, Basic.—Crystals, 8⅛d per lb. delivered (£75 16s 8d per ton).

Citric Acid.—1-cwt. lots, £10 5s cwt.

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

Copper Carbonate.—3s 3d per lb.

Copper Sulphate.—£96 10s per ton f.o.b., less 2% in 2-cwt. bags.

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

Formaldehyde.—£37 5s per ton in casks, d/d.

Formic Acid.—85%, £86 10s in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 SG, £12 9s 0d per cwt. Refined pale straw industrial, 5s per cwt. less than chemically pure.

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

Hydrofluoric Acid.—59/60%, about 1s 6d per lb.

Hydrogen Peroxide.—27.5% wt., £128 10s per ton. 35% wt., £158 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed BP, 16s 2d per lb., in 28-lb. lots.

Iodoform.—£1 5s 5d per lb., in 28-lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight, 14d per lb. ; dark tech., 44 per cent by weight, 9d per lb., ex-works ; chemical quality, 44 per cent by weight, 12¼d per lb., ex-works ; 1-ton lots, usual container terms.

Lead Acetate.—White : About £150 per ton.

Lead Nitrate.—About £135 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red, £142 15s ; orange lead, £154 15s. Ground in oil : red, £160 15s ; orange, £172 15s.

Lead, White.—Basis prices : Dry English in 5-cwt. casks £147 15s per ton. Ground in oil : English, 1-cwt. lots 194s per cwt.

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

Litharge.—£144 15s per ton, in 5-ton lots.

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

Magnesium Carbonate.—Light, commercial, d/d, 2-ton lots, £84 10s per ton, under 2 tons, £92 per ton.

Magnesium Chloride.—Solid (ex-wharf), £16 10s per ton.

Magnesium Oxide.—Light, commercial, d/d, under 1-ton lots, £245 per ton.

Magnesium Sulphate.—Crystals, £16 per ton.

Mercuric Chloride.—Technical powder, £1 2s 9d per lb., in 1-ton lots ; smaller quantities dearer.

Mercury Sulphide, Red.—£1 9s 3d per lb., for 5-cwt. lots.

Nickel Sulphate.—D/d, buyers UK £170 per ton. Nominal.

Nitric Acid.—80° Tw., £35 per ton.

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, about £131 per ton, carriage paid.

Phosphoric Acid.—Technical (SG 1.700) ton lots, carriage paid, £100 per ton ; BP (SG 1.750), ton lots, carriage paid, 1s 3½d per lb.

Potash, Caustic.—Solid, £93 10s per ton for 1-ton lots ; liquid, £34 15s.

Potassium Carbonate. — Calcined, 96/98%, about £74 10s per ton for 1-ton lots, ex-store.

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

Potassium Dichromate.—Crystals and granular, 1s 1½d per lb., in 5-cwt. to 1-ton lots, d/d UK.

Potassium Iodide.—BP, 12s 6d per lb. in 28-lb. lots ; 12s in cwt. lots.

Potassium Nitrate.—In 4-ton lots, in non-returnable packaging, paid address, £63 10s per ton.

Potassium Permanganate.—BP, 1-cwt. lots, 1s 9d per lb. ; 3-cwt. lots, 1s 8½d per lb. ; 5-cwt. lots, 1s 8d per lb. ; 1-ton lots, 1s 7¾d per lb. ; 5-ton lots, 1s 7¼d per lb. ; Tech., 5-cwt. packed in 1-cwt. drums, £8 14s 6d per cwt. ; packed in 1 drum, £8 9s. 6d per cwt.

Salammoniac.—Per ton lot, in non-returnable packaging, £45 10s.

Salicylic Acid. — MANCHESTER : Technical 2s 8½d per lb. d/d.

Soda Ash.—58% ex-depot or d/d, London station, about £16 8s per ton, 1-ton lots.

Soda, Caustic.—Solid 76/77% ; spot, £32 6s 6d per ton d/d (4 ton lots).

Sodium Acetate.—Commercial crystals, £91 per ton d/d.

Sodium Bicarbonate.—Per ton lot, in non-returnable packaging, £17.

Sodium Bisulphite. — Powder, 60/62%, £42 15s d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—Per ton lot, in non-returnable packaging, paid address, £57.

Sodium Chlorate.—About £80 per ton in 1-cwt. drums, carriage paid station, in 4-ton lots.

Sodium Cyanide.—96/98%, £113 5s per ton lot in 1-cwt. drums.

Sodium Dichromate.—Crystals, cake and powder, 11¼d per lb. Net d/d UK, anhydrous, 1s 1d per lb. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride.—Delivered, 1-ton lots and over, £5 per cwt. ; 1-cwt. lots, £5 10s per cwt.

Sodium Hyposulphite.—Pea crystals £35 15s a ton ; commercial, 1-ton lots, £32 10s per ton, carriage paid.

Sodium Iodide.—BP, 15s 11d per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, paper sacks, £133 per ton.

Sodium Metasilicate.—£25 per ton, d/d UK in ton lots, loaned bags.

Sodium Nitrate.—Chilean refined granulated over 98% 6-ton lots, d/d station, £28 10s per ton.

Sodium Nitrite.—£32 per ton (4-ton lots).

Sodium Percarbonate.—12½% available oxygen, £8 6s 9d per cwt. in 1-cwt. kegs.

Sodium Phosphate.—Per ton d/d for ton lots : di-sodium, crystalline, £40 10s, anhydrous, £88 ; tri-sodium, crystalline, £39 10s, anhydrous, £86.

Sodium Silicate.—75-84° Tw. Lancashire and Cheshire, 4-ton lots, d/d station in loaned drums, £10 15s per ton ; Dorset, Somerset and Devon, £3 17s 6d per ton extra ; Scotland and S. Wales, £3 per ton extra. Elsewhere in England, excluding Cornwall, and Wales, £1 12s 6d per ton extra.

Sodium Sulphate (Desiccated Glauber's Salt).—d/d in bags ton, £18.

Sodium Sulphate (Glauber's Salt).—£9 5s to £10 5s per ton d/d.

Sodium Sulphate (Salt Cake).—Unground, £6 per ton d/d station in bulk. MANCHESTER : £7 per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot, £33 2s 6d per ton, d/d, in drums in 1-ton lots ; broken, £34 2s 6d per ton, d/d, in drums in 1-ton lots.

Sodium Sulphite.—Anhydrous, £66 5s per ton ; commercial, £25 5s to £27 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £20 to £22, according to fineness.

Sulphuric Acid.—Net, naked at works, 168° Tw. according to quality, per ton, £10 7s 6d to £12 ; 140° Tw., arsenic free, per ton, £8 12s 6d ; 140° Tw., arsenious, per ton, £8 4s 6d.

Tartaric Acid.—Per cwt. : 10 cwt. or more £13 10s, one cwt. £13 15s.

Titanium Oxide.—Standard grade comm., with rutile structure, £172 per ton ; standard grade comm., with anatase structure, £154 0s per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d, white seal, £115 ; green seal, £113 ; red seal, 2-ton lots, £110 per ton.

Solvents & Plasticisers

Acetone.—Small lots : In 5-gal. cans : 5-gal., £125, 10-gal. and upward, £115, cans included. In 40/45 gal. returnable drums, spot : Less than 1 ton, £90 ; 1 to less than 5 tons, £87 ; 5 to less than 10 tons, £86 ; 10 tons and upward, £85. In tank wagons, spot : 1 to less than 5 tons (min. 400 gal.), £85 ; 5 to less than 10 tons (1,500 gal.), £84 ; 10 tons and upward (2,500 gal.), £83 ; contract rebate, £2. All per ton d/d.

Butyl Acetate BSS.—£165 per ton, in 10-ton lots.

***n*-Butyl alcohol, BSS.**—10 tons, in drums, £152 per ton d/d.

***sec*-Butyl Alcohol.**—5 gal. drums £159 ; 40 gal. drums : less than 1 ton £124 per ton ; 1 to 10 tons £123 per ton ; 10 tons and over £119 per ton ; 100 tons and over £120 per ton.

***tert*-Butyl Alcohol.**—5-gal. drums £195 10s per ton ; 40/45 gal. drums : less than 1 ton £175 10s per ton ; 1 to 5 tons £174 10s per ton ; 5 to 10 tons, £173 10s ; 10 tons and over £172 10s.

Diacetone Alcohol.—Small lots : 5 gal. drums, £177 per ton ; 10 gal. drums, £167 per ton. In 40/45 gal. drums ; less than 1 ton, £142 per ton ; 1 to 9 tons, £141 per ton ; 10 to 50 tons, £140 per ton ; 50 to 100 tons, £139 per ton ; 100 tons and over, £138 per ton.

Dibutyl Phthalate.—In drums, 10 tons, 2s per lb. d/d ; 45-gal. drums, 2s 1½d per lb. d/d.

Diethyl Phthalate.—In drums, 10 tons, 1s 11½d per lb. d/d ; 45 gal. drums, 2s 1d per lb. d/d.

Dimethyl Phthalate.—In drums, 10 tons, 1s 9¼d per lb. d/d ; 45 gal. drums, 1s 10¾d per lb. d/d.

Dioctyl Phthalate.—In drums, 10 tons, 2s 8d per lb. d/d ; 45 gal. drums, 2s 9½d per lb. d/d.

Ether BSS.—In 1 ton lots, 1s 11d per lb. ; drums extra.

Ethyl Acetate.—10 tons lots, d/d, £135 per ton.

Ethyl Alcohol (PBS 66 o.p.).—Over 300,000 p. gal., 2s 11¼d ; 2,500-10,000 p. gal., 3s 1¾d per p. gal., d/d in tankers. D/d in 40/45-gal. drums, 1d p.p.g. extra. Absolute alcohol (75.2 o.p.) 5d p.p.g. extra.

Methanol.—Pure synthetic, d/d, £43 15s per ton.

Methylated Spirit.—Industrial 66° o.p. : 500 gal. and over in tankers, 5s 4d per gal. d/d ; 100-499 gal. in drums, 5s 8½d per gal. d/d. Pyridinised 64 o.p. : 500 gal. and over in tankers, 5s 6d per gal. d/d ; 100-499 gal. in drums, 5s 10½d per gal. d/d.

Methyl Ethyl Ketone.—10-ton lots, £140 per ton d/d.

Methyl *iso*Butyl Ketone.—10 tons and over, £159 per ton.

***iso*Propyl Acetate.**—In drums, 10 tons, £130 per ton d/d ; 45 gal. drums, £136 per ton d/d.

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

Rubber Chemicals

Carbon Disulphide.—£61 to £67 per ton, according to quality.

Carbon Black.—8d to 1s per lb., according to packing.

Carbon Tetrachloride.—Ton lots, £79 10s per ton.

India-Rubber Substitutes.—White, 1s 7¾d to 1s 11½d per lb. ; dark, 1s 4d to 1s 6¾d per lb. delivered free to customers' works.

Lithopone.—30%, about £55 per ton.

Mineral Black.—£7 10s to £10 per ton.

Sulphur Chloride.—British, about £50 per ton.

Vegetable Lamp Black.—£64 8s per ton in 2-ton lots.

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

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals. delivered in bulk, 90's, 5s ; pure, 5s 4d.

Carbolic Acid.—Crystals, minimum price 1s 4d per lb. delivered in bulk, ½d per lb. extra in 40/50 gal. returnable drums. Crude, 60's, 8s per gal. Manchester : Crystals, 1s 4d to 1s 7d per lb., d/d crude, 8s naked, at works.

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

Cresylic Acid.—Pale 99/100%, 6s 4d per gal. ; 99.5/100%, 6s 6d per gal. D/d UK in bulk : Pale ADF from 7s 3d per imperial gallon f.o.b. UK, 95 cents per US gallon, c.i.f. NY.

Naphtha.—Solvent, 90/160°, 5s per gal ; heavy, 90/190°, 3s 11d per gal. for bulk 1000-gal. lots, d/d. Drums extra ; higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in buyers' bags, £18 6s 0d to £29 19s 6d per ton nominal, according to m.p. ; hot pressed, £41 19s 0d per ton in bulk ex-works ; refined crystals, £61 10s 0d per ton d/d min. 4-ton lots.

Pitch.—Medium, soft, home trade, £9 per ton f.o.r. suppliers' works ; export trade about £10 10s per ton f.o.b. suppliers' port.

Pyridine.—90/160, 20/- to £1 2s 6d per gal.

Toluole.—Pure, 5s 9d ; 90's 5s 0d per gal. d/d. 1000 gal. lots in bulk. MANCHESTER : Pure, 5s 9d per gal. naked.

Xylole.—5s 11½d to 6s 3½d per gal., according to grade, in 1,000 gal. lots d/d London area in bulk.

Intermediates & Dyes (Prices Nominal)

***m*-Cresol 98/100%.**—4s 9d per lb. d/d.

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

***p*-Cresol 34/35° C.**—4s 9d per lb. d/d.

Dichloraniline.—4s 6d per lb.

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

Dinitrotoluene.— SP 15° C., 2s 1½d per lb. ; SP 26° C., 1s 5d per lb. ; SP 33° C., 1s 2½d per lb. ; SP 66/68° C., 1s 11d per lb. Drums extra.

***p*-Nitraniline.**—5s 1d per lb.

Nitrobenzene.—Spot, 10d per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—2s 5½d per lb.

***o*-Toluidine.**—1s 11d per lb., in 8/10-cwt. drums, drums extra.

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

Dimethylaniline.—3s 5d per lb., drums extra, carriage paid.

....an amusing appearance

"Fluor acid air is procured by dissolving the earthy substance called fluor in vitriolic acid.

This kind of air extinguishes a candle and, like vitriolic air, one measure of it saturates two of alkaline air. It is peculiar to this kind of air to dissolve glass when it is hot.

It seems to consist of a peculiar acid vapour, united to the strong substance of the fluor; for water being admitted to it absorbs the acid vapour, and the stony substance is deposited. By this means it exhibits an amusing appearance, whether water be admitted to a glass jar previously filled with that air, or the bubbles of air be admitted, as they are formed, to a quantity of water resting on mercury."

So, in 1797, Joseph Priestley described his early observations on hydrofluoric acid to students at the New College in Hackney, and recorded them under the title of *Heads of Lectures on a Course of Experimental Philosophy*. Today, using fluor acid air dissolved in aqua destillata, and costly vessels of silver and platinum, B.D.H. chemists make vast quantities of a great variety of fluorides of high purity, free from all stony substances, for which the B.D.H. sales departments will happily quote for deliveries by the pound, the cwt. or the ton.

Such fluorides are used industrially for all sorts of purposes from increasing the light transmitting properties of lenses to aiding the production of atomic energy.

B.D.H.

LABORATORY CHEMICALS

THE BRITISH DRUG HOUSES LTD. B.D.H. LABORATORY CHEMICALS GROUP POOLE DORSET

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

B. & B. PLASTICS LTD., London EC.—28 August, debentures, to Barclays Bank Ltd. securing all moneys due or to become due to the bank; general charge.

LEYLAND PAINT & VARNISH CO. LTD.—24 August, £300,000 first debenture stock secured a Trust Deed dated 23 August 1956; charged on properties specified in schedule to deed and a general charge. *Nil. 1 May 1956.

Increase of Capital

JOHNSONS OF HENDON (HOLDINGS) LTD. (17,581), manufacturing chemists etc., Renters Avenue, London NW4, increased by £100,000 in 5s 'B' ordinary shares, beyond the registered capital of £200,000.

Changes of Name

C. NISBET (COMPOUNDS) LTD., industrial cleansing compounds etc., Phoenix Works, Bailey Street, Salford 6, changed to Pamolene (England) Ltd., on 11 July 1956.

NAP-RENU & ALLIED PRODUCTS LTD., laundry and dry cleaning machinery, chemicals etc., Stratton House, Piccadilly, London W1, changed to Renovise Services (London) Ltd., on 18 July 1956.

Company News

Albright & Wilson Ltd.

Unaudited results of the Albright & Wilson group of companies for the half year to 30 June, are given below. The acquisition of Marchon Products Ltd. late in 1955 makes comparison with the similar period of last year difficult. Accordingly two sets of 1955 figures are given, one including and the other excluding Marchon results. Solway Chemicals, the main subsidiary of Marchon, only commenced operation in the second half of 1955:—

	£,000s.		
	1956	1955	1955 *incl. Marchon*
Trading profit	2,292	1,577	1,781
Deduct: Depreciation	919	669	750
Profit Before Taxation	1,373	908	1,031
Deduct: Taxation	817	520	590
(including distributed profits tax)	(128)	(60)	(60)
Group Net Profit	556	388	441
Attributable to minority shareholders in subsidiary companies (loss in 1955)	17	38	38
Attributable to stockholders of Albright & Wilson Ltd.	539	426	479

The satisfactory results for the first quarter of this year which the chairman mentioned

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Company News

from page 590

in the last annual report have been maintained during the second quarter.

The directors have declared an interim dividend on the ordinary stock of 5 per cent in respect of 1956 to be paid on 29 September.

British Tar Products Ltd.

At the 36th ordinary general meeting of British Tar Products Ltd. on 29 August, the chairman, Mr. F. Woolley-Hart stated that while to some extent the company's fortunes were linked with those of the fine chemical business, it only supplied the raw materials from which fine chemical and dye-stuff manufacturers start. Traditional raw materials of the tar industry, he pointed out, were being lost, but the company was extending its activities in directions outside of tar distillation and it was continuing to search for further profitable activities. By virtue of the policy of ploughing back profits, the company was in a position to meet any long term development plan. The accounts showed that there was little variation from the previous year in the profit and loss account, the balance after taxation being £30,322 (against £30,963). The directors recommended a final dividend of 20 per cent less tax, making 25 per cent less tax for the year.

Brotherton & Co. Ltd.

Trading profits of Brotherton & Co. Ltd., for the first six months of this year are considerably below those for the corresponding period in 1955, according to Mr. B. L. Ratcliffe, chairman. The previous 5 per cent ordinary interim dividend is being repeated, but holders are informed that little prospect is seen of maintaining the 1955 total rate of 17½ per cent. Narrowing profit margins are said to be due to the company's reluctance to increase selling prices in spite of rising costs.

Gas Purification & Chemical Co. Ltd.

The 82nd annual general meeting of the Gas Purification & Chemical Co. Ltd. was held in London on 18 September. Net profit of the Group for the year before taxation amounted to £464,270, compared with £296,256 for the previous 15 months' period. These earnings are the equivalent of 88.8 per cent on the share capital in issue at the end of the year The final dividend proposed will bring the total distribution up to 40 per cent per annum as against the equivalent of 22 per cent in the previous year.

Murex Ltd.

At the 37th annual general meeting of Murex Ltd., Sir Arthur Smout said that supplies of wolfram were freely available and price fluctuations were more moderate. The demand for molybdenum for the manufacture of special alloy steels was again at a high level, although usage of molybdenum where strength and rigidity at high temperatures were essential was small. The company was actively interested in the less common metals (zirconium, niobium, tantalum, berylium and others) as it is considered that there will be a growing demand for them in nuclear power applications and in the electronics field. Small scale plants for the production of tantalum in all its forms, zirconium sponge and ingot, and niobium metal have been in operation for some time. Sir Arthur reported that there had been some demand from chemcal engineers for tantalum in the form of rod, sheet and fabricated parts, as the metal is highly resistant to the corrosive action of acids and other 'virulent' chemicals. The demand for zirconium and niobium will probably increase because of their use in nuclear reactors. Murex Ltd. are expanding the capacity of their existing plants for zirconium and tantalum/niobium. Designs for new large plants are being drawn up to enable the company to build at short notice.

SIR MILES THOMAS, chairman of Monsanto Chemicals Ltd., sailed on the *Queen Elizabeth* for the United States on Thursday 20 September, accompanied by Lady Thomas. While in the US he will visit the headquarters of Monsanto Chemical Co. at St. Louis, as well as visiting plants in Texas and Alabama. He is also going to Canada to see plants of Monsanto (Canada) Ltd. at Montreal and Toronto.

Victoria Instruments Join Pullin Group

Victoria Instruments Ltd., a new member of the Pullin Group, has taken over the control of Victoria Instruments, formerly operated by VIC (Bournemouth) Ltd. The business will continue with the same staff and at the same address as hitherto and production has not been interrupted. The present Victoria range of panel-mounting and portable instruments and shunts will continue to be manufactured there.

CLASSIFIED ADVERTISEMENTS

PUBLIC NOTICE

CONSOLIDATED ZINC CORPORATION LIMITED announce the award of a Fellowship for post-graduate research at University College—University of London—on "The Application of Nuclear Magnetic Resonance Techniques to the Study of the Structure of Fluorine Compounds" under the direction of Prof. R. S. Nyholm and Dr. R. J. Gillespie.

SITUATIONS VACANT

A fully qualified **CHEMIST** or **CHEMICAL ENGINEER** is required by a small but progressive manufacturing concern in the North West for work in connection with the development of new and existing products.

A realistic salary will be paid to a man with the necessary qualifications and experience, and who must also have personality and initiative.

Applications for interviews should be addressed to **BOX NO. C.A. 3501, THE CHEMICAL AGE, 154 FLEET STREET, LONDON, E.C.4.**

CHEMIST required to undertake control duties relating to the basic manufacture of steroid products within a Company engaged in the production of pharmaceuticals. Applicants should hold an appropriate qualification (B.Sc. or A.R.I.C.), together with some knowledge of steroids, and considerable experience in chromatographic techniques. The appointment will be well-paid, and offers a real opportunity for advancement in an expanding organization. A non-contributory pension scheme is in operation and excellent working conditions exist in the manufacturing unit which is situated in a pleasant area. Applications with brief resume of career to date, should be addressed to:—

BOX NO. C.A. 3500, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.

METALLURGIST/CHEMIST required for control of incoming material supplies by large manufacturing unit in light electro-mechanical industry in the West Riding of Yorkshire. Experience in the analysis of metallic hardness testing and plating essential. Please apply, stating age, experience and present salary, to **BOX No. C.A. 3502, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

Atomic Energy Research Establishment
HARWELL
has a vacancy for a
POLYMER CHEMIST

to work on the physical properties of irradiated polymers. Previous experience of this type of work necessary.

SALARY:—The post will be graded, according to age, qualifications and experience as:—

Senior Scientific Officer (£1,155—£1,355) or
Scientific Officer (£615—£1,065)
(Minimum qualification for these grades is a 2nd Class Honours degree in Chemistry, Physics or Biology, or equivalent).
Or: Senior Experimental Officer (£1,295—£1,550) or
Experimental Officer (minimum age 26) (£940—£1,155)
(Minimum qualification—Higher School Certificate in Science subjects or equivalent).

Send **POST CARD** for further details and application form, which must be returned by 11th October, 1956 to Establishment Officer, A.E.R.E. Harwell, Didcot, Berks., quoting reference 639/38.

A **LABORATORY ASSISTANT** is required by **PETFOODS LTD.**, formerly Chappie Ltd., for their Development Division to assist the Physical Chemist in conducting experiments and in carrying out pilot plant tests. The work offers excellent opportunity for the gaining of experience in physical testing and pilot plant operations within the food industry. Applicants (male) should have completed National Service and not be over 25 years of age, and have passed General Certificate of Education (including physics and mathematics and preferably chemistry). Previous laboratory experience would be an advantage. The company will be prepared to assist in further education. The salary will be commensurate with education and qualifications, and the company operates a very generous social security plan.—Applications should be made to the Personnel Officer, **PETFOODS LIMITED, MELTON MOWBRAY, LEICESTERSHIRE.**

PFIZER LTD.

CHEMICAL ENGINEERS and **INDUSTRIAL CHEMISTS** are required for several vacancies which are now arising in the basic manufacturing unit of a Company engaged in the production of antibiotics and pharmaceuticals. Initially, those appointed would be concerned with the operation of established processes, but a planned and rapid expansion of the Company will soon give rise to exceptional opportunities in new and interesting fields.

A non-contributory pension scheme, canteen and social and athletic club are operated, the Company's plants being pleasantly situated on the South-East coast.

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