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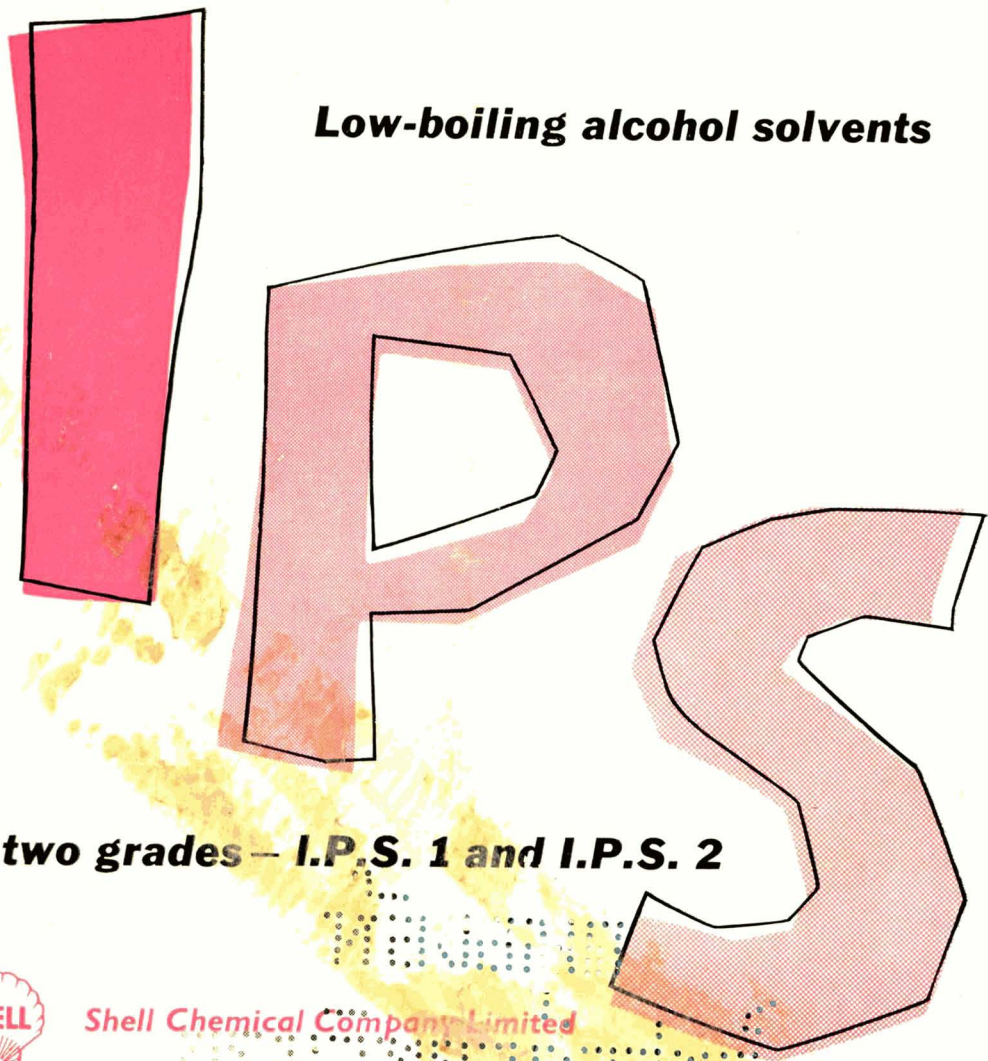
THE Chemical Age

VOL. LXXIV

17 MARCH 1956

No. 1914

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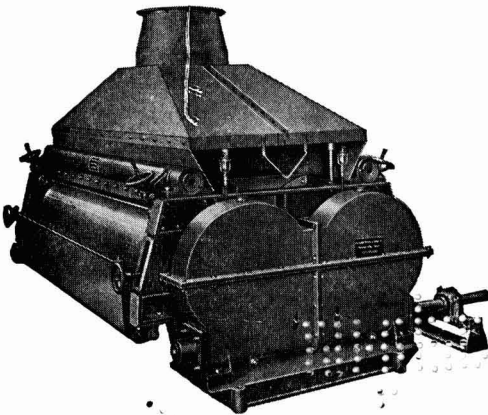


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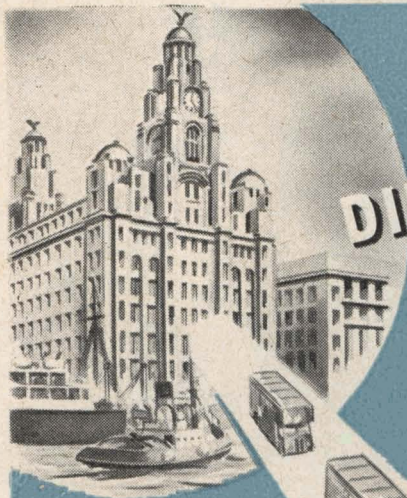
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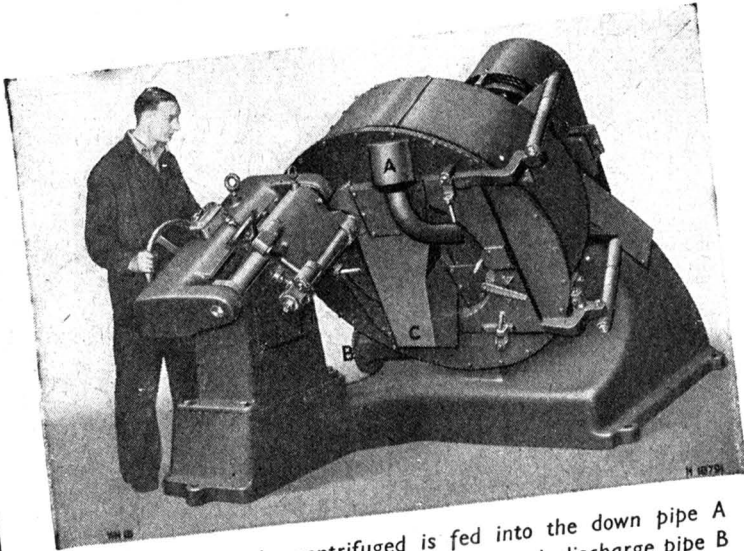


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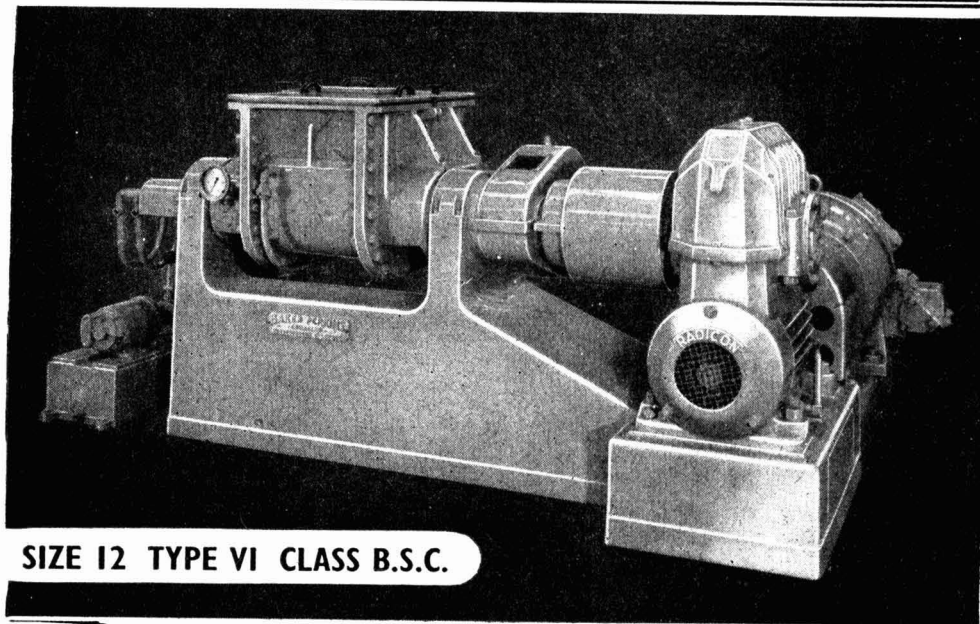


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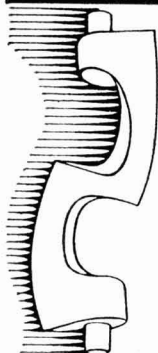
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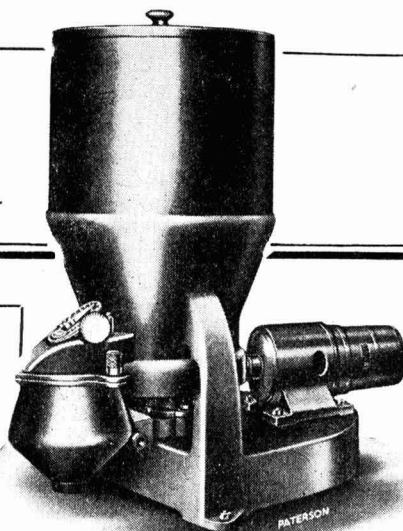
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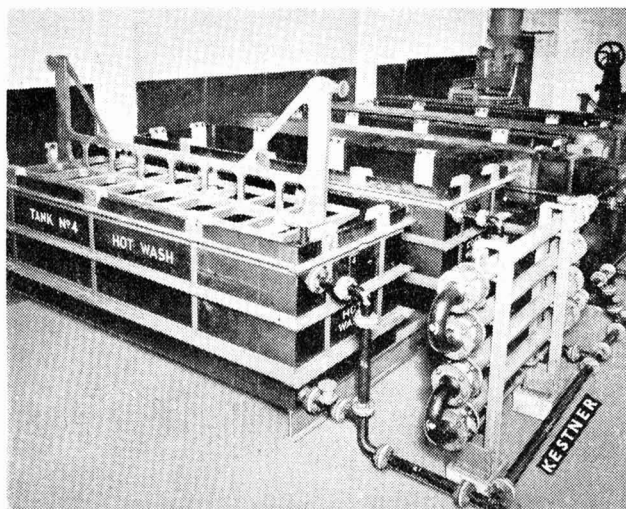
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The Atom, 1956

NORMALLY comment upon new books is reserved for the appropriate section of book reviews, but occasionally a book is of such outstanding merit that it is entitled to longer appraisal. One such occasion has occurred this month with the issue of 'Atoms and the Universe' conjointly written by G. O. Jones, J. Rotblat, and G. J. Whitlow (March 1956, Eyre & Spottiswoode, London, pp. 254, 31 plates, 25s.). Here is the book which has been so long awaited by scientists outside the world of nuclear physics and by intelligent, science-conscious laymen, described without exaggeration on the wrapper as 'the first attempt to present in a simple way in one volume the fascinating results of research by classical physicists, nuclear physicists and astrophysicists, both into the structure of matter and of the universe.' The text amply justifies this claim. Indeed, if science were not so mobile a subject this book might establish itself as one of the classics of scientific exposition, but there lies the tragedy of most great scientific writing—the subject matter dates however well it is handled.

The true value of this book cannot be assessed unless our general ignorance of modern nuclear physics is frankly admitted. The public at large no doubt assumes that all scientists know a good deal about atomic energy and atomic bombs, but these developments emerged under abnormally secretive conditions and the 'declassification' of informa-

tion has been slow and fragmentary. A gradual understanding of this revolution in physics has not been possible. Young scientists graduating in recent years have probably enjoyed an easier opportunity to acquire this understanding than scientists who graduated before 1939. The gap between pre-war and post-war atomic science is not only formidable but normal methods of bridging it have been politically restricted. The more difficult the subject, the harder the task of assimilation. Is it less than realistic to say that a majority of pre-war graduates in science (which comprises in the 1950s a majority of the country's working scientists) have made small progress in keeping up with nuclear physics, have in effect shrugged their shoulders and left its understanding to those whose actual work lies in that field? Inasmuch as this suggestion is true, a major duty of education and explanation has been accumulating throughout the past decade.

The technical suitability of the three authors for undertaking this duty cannot be questioned, but eminence in any specialized field is only one element of the recipe for success in popular presentation. Jones, Rotblat, and Whitlow have made a greater contribution to science than the contribution of knowledge. Their subject is complex, incomplete, still unfolding. Any attempt to present it so that many rather than a few people can understand it requires boldness and ingenuity in book-planning, notably in the selection of material and the order

in which it is treated. They have not been afraid to take short cuts or to reverse historical sequences; if they are open here and there to the charge of over-simplification, this must be dismissed as ultra-scientific criticism. Clarity has been achieved in a field where the majority have found clarity elusive hitherto. Another 'planning decision' which has contributed heavily to the book's achievement is the avoidance of extra-scientific controversy. The exploitation of atomic fission for bomb production is dealt with briefly, as only one facet of development in twentieth century atomic physics. Arguments of both ethical and practical kind about these weapons are eschewed.

If any single chapter will pull the average pre-war graduate in science up to date with a jerk, it is the first on 'Elementary Particles'. The final tabulation of twenty, including the mesons and the neutrino, will shake any complacency that has been content to think in terms of neutrons, protons, and electrons. Yet the question is asked, 'is this multiplicity of particles an expression of our total ignorance of the true nature of the ultimate structure of matter?' and contemporary atomic physics may well join the historical list of subjects in which a period of rising complexity was suddenly advanced by a single and simplifying idea. For chemists in particular, the sixth chapter, 'Matter and its Properties', will be quite separably useful, both a refresher course in the familiar and older aspects and a 'post-graduate' course for more recent concepts of the atomic and molecular patterns of various physical states. Perhaps more might have been said about valency in this part of the book.

The linking of radioactivity research and today's atomic fission is clearly shown—the three consecutive chapters, 'The Atom Breaks Up', 'Smashing the Atom', and 'Energy from the Atom', are superbly done in rather less than 24,000 words, a sheer triumph of exposition. A thoughtful rather than easy and rapid reading is required, but this is a requirement imposed by the subject, and not by any failings of the authors, who

have correctly assumed that they need not write for readers who want the well lubricated superficialities of potted science.

The later chapters in the book pass from the physical world and its particulate make-up to the physical universe. Here the topical challenge of atomic bombs and atomic energy reactors may be lacking, but the important though less well-known contributions of modern atomic science to advances in astronomical knowledge are discussed with considerable detail and speculation. A famous work of popular science published between the wars is inevitably recalled, 'The Mysterious Universe'; and the second half of this new book shows that it has now become appreciably less mysterious. Certainly to many chemists this will be uncharted scientific country.

A quotation from the authors' preface makes perhaps the most fitting final tribute to this major addition to scientific literature. The book began as a series of lectures organized extra-murally by the University of London and an urban education committee. Of the reception to these lectures this is said: 'This open-minded attitude towards scientific advance is one of the most encouraging signs in the world today. The intelligent layman who is not content merely to be the puppet of fortune wants to understand why science . . . now plays so large and exciting a part in human affairs.' It is this combination of response and responsibility in the thoughtful citizen that the book seeks to help and stimulate. We agree that it achieves this aim, but must add the point also suggested in Sir John Cockcroft's short prefatory note, that in the face of advances in atomic science since 1940 hardly a scientist working in any other field is much more than another intelligent layman or thoughtful citizen. It may be hoped that an American edition of this book is being projected, for it will give a much fuller impression of British science and its contributions than most of the writings of recent times on this subject. Indeed, this is a cultural and prestige 'export' that should receive most vigorous support from the British Council.

Notes & Comments

Duty & Disease

A MAJOR drug for tuberculosis relief would not in many opinions be the most suitable chemical for an imports-versus-home-product dispute. However, some of the manufacturers of *p*-aminosalicylic acid (PAS) in the US laid a plea before the US Tariff Commission for import duty concessions, made a few years ago, to be rescinded. Use of the escape clause safeguarding domestic industry was urged. Originally duty on PAS imports into the US was 45 per cent *ad valorem* plus 7 cents per pound; the GATT agreement brought this down to 25 per cent *ad valorem* and 3½ cents per pound. It was said that within two years five domestic makers of PAS were forced out of business. Competitive pricing became so low that PAS manufacture ceased to be profitable. Between 1951 and 1952 imports rose 2½ times. Between 1949 and 1951 the price fell from \$15 to \$4.45 per pound, and later to below \$4.00.

Facts Overlooked

IT seems worth pointing out one or two facts that seem to have escaped attention. The price of PAS began to fall sharply before the 1950 Torquay conference. The history of PAS as a commercial substance is following the usual course of newly introduced drugs—costly to begin with (\$100 per pound in 1947 as a clinical research product), then rapidly cheapening as demand and use widens. A second fact is that foreign PAS still carries a 25 per cent duty even if the 3½ cents per pound addition is regarded as negligible. If non-US-made PAS can carry this duty rate plus costs of transport from Europe and drive highly prosperous chemical firms out of the PAS business altogether, something was surely wrong with former production costs or former profit margins. More harm is done to Anglo-US relationships by not saying these things than by bluntly stating them. A third fact is that the use of PAS is a European discovery (Sweden), a result of European

research; it seems to be a relevant fact for no domestic producer in America can claim to have spent a fortune in initial development. A fourth fact is that medical treatment in the United States is frequently described as expensive. This may or may not be true, but the impression can be gathered from various home comments in America. Does the United States population suffer if a vital drug for the treatment of tuberculosis is made cheaper because European manufacturing costs are much lower?

Costly Study Called For

AT the hearing a spokesman for one of the disturbed US producers said that a return to the pre-Torquay rates of duty would place his company's product on about an equal competitive basis with the imported product. This would surely mean, in view of the strong 'buy American' pressure in most US markets, that most buyers would choose US-made PAS and stop considering foreign PAS. Leaving aside the question of TB patients' pockets, it would be far sounder for US producers to re-investigate their costs, or send over a team of experts to find out why some producers in Europe can sell PAS more cheaply.

What Language ?

A LETTER in *Nature* (1956, 177, 343) from a Swedish botanist has general implications for all branches of science. The letter gives the results of an ingenious 'survey'. Botanical journals of Britain, France, Germany, Scandinavia, Switzerland, the US, and the USSR were studied, and the language-origins of reference lists to papers in these journals were collated. The number of papers studied and the number of papers referred to in them were both quite sizeable for a narrow-field personal survey of this kind. British papers made reference to 78 per cent of papers in English, 15 per cent

in German, 3 per cent in French; American papers made reference to 84 per cent in English, 11 per cent in German, and 4 per cent in French. French papers referred to 42 per cent in English, 14 per cent in German, 42 per cent in French—a far broader indication of international outlook, even after making allowance for the fact that British and American scientists are fortunate in that a majority of papers are issued in their own language. German papers showed a stronger home-interest again, with 69 per cent of references to German papers, 22 per cent to English, 7 per cent to French; this is perhaps a surprising result in view of the traditional German reputation for diligence and thoroughness. Russian papers again showed a home-language dominance, but with a score of 73 per cent of references to Russian papers, 16 per cent to English, 10 per cent to German, and 1 per cent to French papers, there is no basis for suggesting that Russian science is unduly insular. Russia certainly looks at Western papers far more than Western countries look at hers.

. . . Why English !

IT is very apparent from the figures (which are worth studying in more detail in the original communication) that for all countries the dominant scientific language, other than each country's own, is English. The once supported view that the French language is a useful general tongue for science is shattered by the figures; German emerges with a far better 'score'. The evidence points powerfully to English as the major language for scientific papers, and all papers which their authors believe to be important might well be published in two versions, in the home language and in an English translation. However, the conclusion we have drawn from this interesting Swedish comment is that a student of chemical journals might find it rewarding to make a similar survey of chemical papers, possibly sub-dividing the survey into branches, *e.g.*, inorganic, organic, physical, engineering. It might also be worth while to sub-classify references to English-written papers according to

country-origin, for this would reveal how much attention English-written papers from Indian and Japanese journals are attracting.

Polyvinylpyrrolidone

Semi-Commercial Production by BOC

PRODUCTION of polyvinylpyrrolidone on a semi-commercial scale has recently been commenced by British Oxygen Chemicals Ltd., and the material is available in two grades, as a 30 per cent aqueous solution and as a spray dried solid.

Polyvinylpyrrolidone is produced from acetylene via the intermediates butyne 1:4 diol, γ -butyrolactone, α -pyrrolidone and vinylpyrrolidone. Polyvinylpyrrolidone is completely soluble in water and in many organic solvents. The aqueous solutions range in colour from water white to yellowish brown depending on grade; they are normally neutral.

Technical Bulletin No. 9, which has just been issued by British Oxygen Chemicals, gives a brief account of some possible applications for this material. In the textile industry polyvinylpyrrolidone is used in conjunction with caustic soda and sodium hydrosulphite for stripping vat and sulphur dyeings and prints.

Another use is in the production of photographic emulsions where its uniformity of composition and freedom from photo-active impurities are advantageous. The polymer has been used for at least one commercial photolithographic process.

Cosmetics are another use for polyvinylpyrrolidone. It is used in the formulation of hair lacquers where its solubility in water simplifies subsequent removal from the hair.

Although polyvinylpyrrolidone has many applications in medicine, *e.g.* in the preparation of blood plasma extenders, British Oxygen emphasize that their material is a commercial grade and must not be used for medical purposes.

Paper & Board Production

Statistics of production of paper and board in 1955 have been published by the Board of Trade. The highest tonnage is for general printing and writing paper, 932,028 tons, with newsprint second, 619,463 tons. By far the largest proportion of board was for packaging; 736,588 tons out of a total of 908,196 tons.

OCCA Eighth Technical Exhibition

82 Firms & Organizations on Show this Year

A TOTAL of 82 firms and other organizations connected with the paint, varnish and printing ink industries will be on show at the Eighth Technical Exhibition of the Oil and Colour Chemists' Association which will be held in The Royal Horticultural Society's New Hall, Greycoat and Elverton Streets, London SW1, from 20 to 22 March.

The official opening will be preceded by the Exhibition Luncheon at 12.45 in the Criterion Restaurant on 20 March, and the opening ceremony will be performed by The Right Honourable Viscount Waverley, President of the Parliamentary and Scientific Committee. On that day the exhibition will remain open till 8.30 p.m. and on the following two days the hours of opening will be 11 a.m. till 7.30 p.m.

Prior to the exhibition all enquiries should be sent to R. H. Hamblin, General Secretary, OCCA, Memorial Hall, Farringdon Street, London EC4; telephone Central 2120. During the exhibition the telephone number of the Association's information centre will be Tate Gallery 0021.

Illustrations of the properties and applications of the Araldite range of epoxy resins will be the theme of the stand of Aero Research Ltd., Duxford, Cambridge (stand 76). Araldite 820 A-B is a two part formulation consisting of a resin and a hardener, and has been specially developed to form the base of cold curing finishes or of finishes that cure rapidly at elevated temperatures. It is claimed that coatings based on this formulation cure without blushing even at high relative humidity and are also free from such surface defects as cissing and pinholing, and the cured coatings do not become brittle on ageing. In addition two established resins, Araldite 961A and 985E, which are used extensively in the electrical, food processing, chemical engineering, textile and aircraft industries, will be on show.

Bakelite Resins

Progress made in the application of Bakelite resins in the impregnating surface coatings field will be demonstrated on the stand of Bakelite Ltd., 12-18 Grosvenor Gardens, London SW1 (stand 23). A new resin, Bakelite Resin R 10282, has been

developed. This resin is a heat-reactive, oil soluble phenolic resin and it is claimed that with blown linseed and other oils it will provide impregnants for electrical apparatus which have good insulation at elevated temperatures. Styrenated alkyd resins have good drying speeds, durability and water and chemical resistance but with some types difficulties have been met with in re-coating. Bakelite have produced a resin, SJ 18981, which is designed to minimize this trouble without sacrificing other desirable qualities.

Isophthalic Acid Alkyds

Although not yet in production, Beck, Koller & Co. (England) Ltd., Beckacite House, Speke, Liverpool 19 (stand 50), are introducing their range of Super Beckosols which are isophthalic acid alkyds. Decorative and industrial types will be shown and examples of their use in formulating finishes will be displayed. This company has also been investigating thixotropic alkyds with special reference to their use in paints. Some applications of Filabond polyester resins in surface coatings will also be exhibited.

In addition to their established Beetle range of plastics, British Industrial Plastics Ltd., 1 Argyll Street, London W1 (stand 70), are featuring their new urea resins BE 643 and BE 644 together with Me'amine Resin BE 645. BE 643 is a butylated resin based on isobutanol. BE 644 is a more highly butylated resin in which the fast curing properties of BE 660 have been retained. Modifications have, however, enabled films free from striations to be obtained. Panels showing the effect obtainable with cold cure finishes based on urea/alkyd blends are to be exhibited; one panel will show a lacquer based on BA 506/BE660 which, after addition of the accelerator, has an usable life of three to four weeks.

Three aspects of their recent development work will form the main feature of the ABRAC exhibit of A. Boake, Roberts & Co. Ltd., 100 Carpenters Road, London E15 (stand 3). New plasticizers for pva are now being developed in ABRAC laboratories. Considerable promise is claimed for these materials by the makers. Plastic waxes will

also be given prominence. Investigations are now being carried out on these compounds to determine their effect on the moisture-vapour permeability and low temperature flexibility of paint and plastics films. The third feature of the stand will be recent developments in epoxidized oils, together with samples of other relatively new plasticizers and stabilizers.

Fire Retardant Plasticizer

Trichlorethyl phosphate, a fire retardant chemical, will be one feature of the display of British Celanese Ltd., Celanese House, Hanover Square, London W1 (stand 5). This material is an excellent primary plasticizer for many plastics including cellulose acetate and pva and is a secondary plasticizer for many other plastics. It is therefore valuable in the production of fire-retardant plastics articles of many kinds. Its water white colour is an added advantage. Celacol, British Celanese's brand of water soluble methyl cellulose has many uses in the paint, textile, printing, pharmaceutical and paper industries.

British Industrial Solvents, Devonshire House, Mayfair Place, London W1 (stand 41) are suppliers in bulk of basic raw materials for the paint industry. As selling agents for British Petroleum Chemicals Ltd., they will have on display a number of chemicals produced at Grangemouth. These will include dicyclopentadiene which is becoming important for the manufacture of synthetic drying oils. From its own production at Hull BIS will show *isophorone* which has applications in the paint, printing ink and other trades as a high boiling point solvent.

Plasticized and unplasticized polyvinyl acetate emulsions for the manufacture of flat, semi-gloss and gloss paints will be featured by British Oxygen Chemicals Ltd., Vigo Lane, Chester-le-Street, Co Durham (stand 21). Examples of paints formulated from them will also be shown. Paints having good tinting properties will be demonstrated by exhibits illustrating fading resistance and deep shades. Samples will show paints with a high pH stability and excellent scrubability. In addition, panels coated with gloss, eggshell and matt paints will be displayed. These will include finishes obtained using paints with excellent covering power formulated at minimum low material cost. Melamine is another product of British Oxygen Chemicals and examples of the use of

melamine resins in surface coatings will be featured on the stand.

Investigations into the use of di- and tri-pentaerythritols for the esterification of various resins will be featured by Leon Frenkel Ltd., Pomeroy House, 28a Basinghall Street, London EC2 (stand 74). Exhibits will include clear films of alkyd and other resins made from di- and tri-pentaerythritol with comparative films made from mono-pentaerythritol. Information on performance and other properties will be available.

The range of Manox products for the paint and allied industries will be shown by Hardman & Holden Ltd., Manox House, Manchester 10 (stand 13). Manox Gold, made under licence from the Interchemical Corporation of New York, is a transparent pigment which is readily soluble in hydrocarbons and is light fast and of good durability. Transparent blue and green pigments having similar properties to Manox Gold have been developed by Hardman & Holden and these will be on show.

The application of paper partition chromatography to the quality control of intermediates for lakes and pigments will be the technical theme of the stand of Hickson & Welch Ltd., Castleford, Yorkshire (stand 25). The apparatus used will be demonstrated and the interpretation of results indicated with special reference to Tobias acid (β -naphthylamine-1-sulphonic acid). This company manufactures a wide range of diazo components including *m*-nitro-*p*-toluidine, 2:4 dinitro-aniline, C acid and B acid.

Cyclic Ketone Resin

Howards of Ilford Ltd., Ilford, Essex (stand 61), will have as their principal exhibit the cyclic ketone synthetic resin MS 2. This resin is well-known in the production of high quality finishes and is of value in nitrocellulose formulations, particularly in half-hour synthetics. In oil varnishes and enamels MS 2 is claimed to impart better alkali and detergent resistance; gloss and colour retention are also improved.

The Dystuffs, Nobel and Billingham Divisions of Imperial Chemical Industries will be represented at this exhibition (stand 49). The Dyestuffs Division exhibit will deal with recent developments in the field of coloured pigments and synthetic resins. The effect of variations in the composition

of wall paints on their rheological and other properties will be illustrated. A new silicone masonry waterproofing resin will be shown by the Nobel Division, together with heat resistant resins and an improved grade of pentaerythritol. The Billingham division produces many materials of interest to the paint, varnish and printing ink industries, including solvents, resin forming materials, plasticizer intermediates, antioxidants, fungicides and humectants.

Electric Surface Heating

Electric surface heating equipment designed to serve the paint and varnish industry will be shown by Isopad Ltd., 30/32 Rosemont Road, London NW3 (stand 67). Isomantles are now made in standard sizes up to 2,000 gallons capacity, and those designed for use with resins employ special constructional methods for flameproof areas. Stainless steel sheathed mineral insulated heating elements are used, together with intrinsically safe temperature controls.

The latest information on the use of sodium benzoate for the prevention of corrosion in tins will be made available by Monsanto Chemicals Ltd., Victoria Street, London SW1 (stand 37). Santobrite for the preservation of water paints and the production of mildew resistant finishes will also be shown. Included among the range of plasticizers and resins on show will be HB 40, a new non-toxic plasticizer, and Lustrex 710 and 770, which are new resins having a variety of uses and compatible through the pH range 1-12.

Very Short-Oil Alkyds

Very short-oil alkyds are being produced on a commercial scale by Scott Bader & Co. Ltd., Wollaston, Wellingborough, Northants (stand 11). This is claimed to have been made possible by the installation of a novel type of plant which gives a very high degree of processing control. These alkyds can be used alone or combined with urea-formaldehyde resins to give quick bake finishes.

The exhibit of the Shell Chemical Company Ltd., Norman House, 105/109 Strand, London WC2 (stand 19) will be devoted to a demonstration of the latest developments in the use of their Epikote range of epoxide resins in surface coatings. Suitable combinations of Shell chemical solvents for these resins in various types of formulation will

be given, as well as in conventional surface coating applications.

The latest developments in the range of Vinamul synthetic resin emulsions and Vinalak polymer solutions will be featured by Vinyl Products Ltd., Carshalton, Surrey (stand 35). The display will be divided into three main sections, the first of which will feature the methods used in the technical service laboratories for the routine evaluation of emulsion paints. The second section will be concerned with fundamental research into the film integration of emulsions, with special reference to plasticization and pigmentation. The third section will deal with latest products developed in the company's research laboratories and will include new types of vinyl acetate copolymer emulsions and polyvinyl butyral.

A.I.Ch.E. Meeting

Paper on Important Topics

AT THE national meeting of the American Institute of Chemical Engineers, held in Los Angeles from 26 to 29 February, many papers on important chemical topics were presented.

Mr. E. D. Ermenc of the Food Machinery and Chemical Corp. presented a progress report on a new process for making basic chemicals for nitrogen fertilizers. Modern farming miracles of increased production are being made possible by chemical fertilizers—substances that are being made by the chemical industry in millions of tons each year—he said.

Combustion is a fast chemical reaction that is the basis of heat, power, and explosions. Edward H. Seymour of Thermal Research and Engineering Corp. described a method for improving burning efficiency in industrial burners. More fuel can be burned with a more efficient release of energy than was previously thought possible.

The study and control of fast chemical reactions are important for theoretical studies and for practical applications that may ultimately affect an important part of the nation's economy. Fundamental scientific papers which rounded out the symposium were 'Heat Conductivity in Chemically Reacting Gases' by J. O. Hirschfelder and C. F. Curtiss, University of Wisconsin; and 'Relaxation Times for Fast Reactions from Phase Lag Measurements' by S. H. Bauer of Cornell University.

Chemical Engine

High Temperature & Pressure Reactions

A REVOLUTIONARY type of reactor for carrying out chemical reactions at extremely high temperatures and pressures was described by Dr. B. H. Sage and Mr. P. A. Longwell of California Institute of Technology in a symposium on study and control of fact reactions at the national meeting of the American Institute of Chemical Engineers held at Los Angeles, California, on 26 to 29 February.

Dr. Sage pointed out that the automobile engine was in reality a 'chemical engine' and that at the conditions which existed in the internal combustion machine, many unusual chemical products were formed from the reaction of air and gasoline. Many of these compounds, which were not formed when gasoline burned relatively slowly in atmospheric air, had been identified as smog producers.

Many Uses Promised

According to Dr. Sage, the chemical engine promised to find many uses in new ways to produce familiar chemicals. It was known to be under intensive investigation by the Russians. The French had also been studying its possibilities.

The equipment used at Cal Tech consists of a 'ballistic piston' which is in effect a free piston type engine which can be closely controlled for the scientific measurements required. The device is a heavy-walled cylinder with a free, weighted piston driven by high pressure air which is used to compress the gaseous reactants.

In operation, various mixtures of chemical gases are charged into the compression chamber for study. Compressed air is forced into the space above the piston. The piston is released and is driven downward by the combined force of gravity and the compressed air, squeezing the chemical gas charge into such a small space that its temperature rises to as high as 10,000°F and the pressure reaches 100,000 pounds per square inch or more. This occurs in the fantastically short period of about five ten-thousandths of a second.

In another five ten-thousandths of a second, the piston has rebounded, the pressure released, and the temperature dropped back to about room temperature. Accord-

ing to Dr. Sage, cooling rates as high as 1,000,000°F per second have been obtained. The result of this operation is that a chemical reaction which was partially completed at 10,000°F and 100,000 pounds per square inch pressure is 'frozen' at its peak and the products recovered for further study.

Light Oils Duty

SEEKING the repeal of the 2s 6d per gallon duty on light hydrocarbon oils used for manufacturing purposes, Mr. Norman J. Campbell, chairman of the Industrial Light Oils Committee, representing 15 trade associations, has asked the Chancellor of the Exchequer to receive a deputation from the Committee.

In a letter to the Chancellor, Mr. Campbell refers to the recent representations by the Federation of British Industries which drew attention to the burden of taxation when levied on industrial raw materials and particularly on light oils used in a wide variety of processes. Current alterations in duty in countries which are among Britain's keenest competitors strengthen the case for the remission of the duty in the UK, says the letter.

The case is also supported by the Federation of British Industries, the National Union of Manufacturers, the Association of British Chambers of commerce, the National Joint Industrial Council for the Paint, Varnish and Lacquer Industry, and the National Joint Industrial Council for the Rubber Industry.

Ceramic Materials

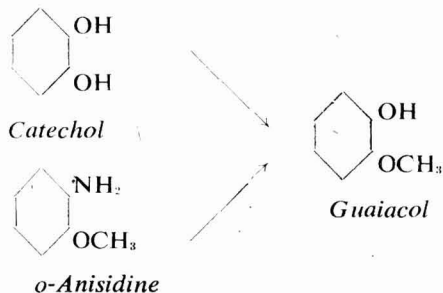
SPECIAL types of ceramic materials for application to ultrasonic techniques are being introduced by Technical Ceramics Ltd., Towcester, Northants. These ceramics have a number of uses, ranging from cartridge elements to ultrasonic cleaning equipment.

In addition to design and production of these materials, it is planned that Technical Ceramics will engage in the exploitation and development of new techniques in the ultrasonic field. Two leading US companies in this field, the Sonotone Corporation of Elmsford, NY, and Gulton Industries Inc., of Metuchen, NJ, are associated with Technical Ceramics.

A New Method for the Manufacture of Synthetic Guaiacol

by DR. M. A. PHILLIPS, F.R.I.C.

GUAIACOL, the monomethyl ether of catechol, can be synthesized either by methylation of catechol or from *o*-anisidine via the corresponding diazo compound:—



The first method requires critical conditions to ensure the maximum yield of monomethyl ether, and some dimethyl ether is always formed and some unchanged catechol is left. Separation from the dimethyl ether, taking advantage of the insolubility of this in caustic soda, is easy enough and catechol can be partly separated from the guaiacol since the former is very soluble, and the latter sparingly soluble, in cold water. The guaiacol is ultimately extracted from the aqueous

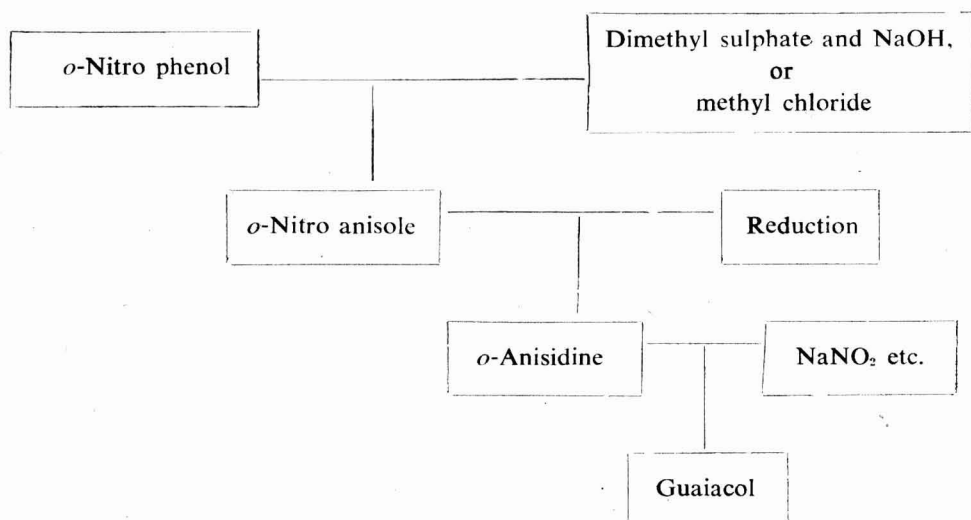
solution using organic solvents. Partial hydrolysis of the dimethyl ether is a paper possibility but in practice leads to difficulties and the same kind of mixture as monomethylation of catechol.

Hence, if *o*-anisidine is available, the diazo route has advantages since it leads to guaiacol only without contamination by the dimethyl ether.

o-Anisidine is made according to the flow sheet below; *o*-nitrophenol is methylated with dimethyl sulphate in caustic alkali solution or by methyl chloride under pressure; chemical or catalytic reduction then gives *o*-anisidine.

The usual and published method of diazotization involves preparation of the diazo solution which has to be stored in refrigerated vessels; the diazo solution is then dropped into a boiling solution of copper sulphate acidified with sulphuric acid and the guaiacol is steam distilled from the mixture. This is an expensive procedure and refrigeration requirements are high and costly, especially as regards plant, refrigeration machinery etc.

We have found that it is possible to avoid the use of refrigeration completely and to



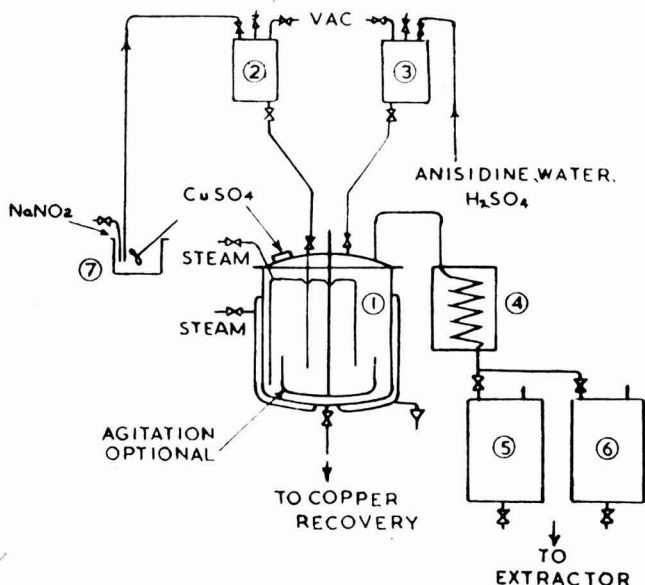
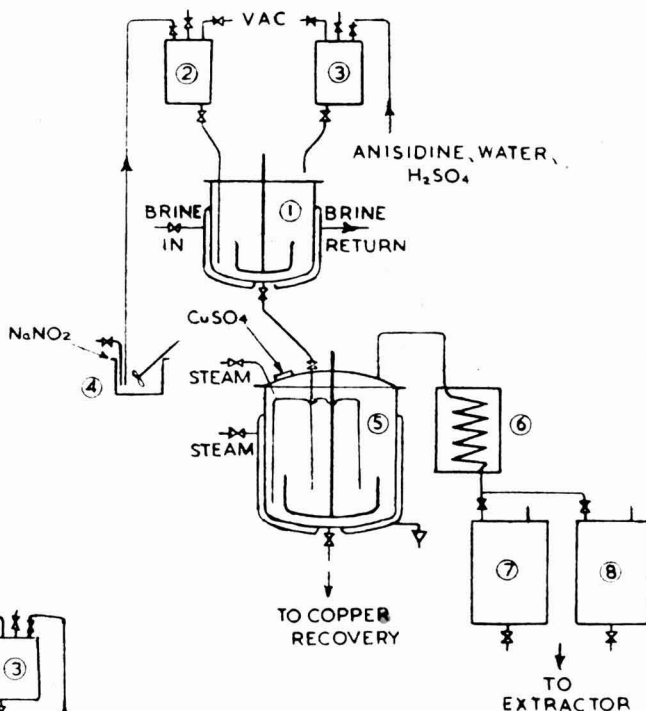
cheapen the cost of production very considerably by the following simple modifications:—

To a boiling solution of copper sulphate in dilute sulphuric acid, and containing in solution *o*-anisidine, is added a solution of sodium nitrite. Superheated steam is passed into the reaction mixture and distillation is arranged to be as rapid as possible and at about the same rate as the addition of

nitrite solution. Pure guaiacol is distilled off and the yield is about 80 per cent of that theoretically possible, based on the *o*-anisidine used. The first runs in guaiacol are separated first and the aqueous portion, mixed with the later steam distillate, is extracted with ether or benzene. In this manner, the yield can be augmented and 90 per cent of the weight of *o*-anisidine is obtained.

Cold diazotization method

1 Diazotization pan 250 gallons. 2 & 3 Feed tanks. 4 Nitrate dissolver. 5 Decomposition still (copper) 500 gallons. 6 Condenser. 7 & 8 Receivers



Hot diazotization method

1 Reactor 500 gallons. 2 & 3 Feed tanks. 4 Condenser. 5 & 6 Receiver. 7 Nitrate dissolver

Modern Analytical Techniques

Gas Chromatography & Ionophoresis Discussed at SAC Meeting

A MEETING of the Midlands Section of the Society for Analytical Chemistry was held on Wednesday, 11 January, in the Department of Chemistry, The University of Birmingham, Edgbaston. The following papers were read and discussed: 'Gas Chromatography' by Dr. J. C. Tatlow (University of Birmingham), and 'Ionophoresis' by Dr. A. B. Foster (University of Birmingham).

Gas-liquid partition chromatography was introduced by Martin and James (1) for the separation of fatty acids and amines, said Dr. Tatlow, and had been developed by these and other workers, notably Ray (2), for separations of all types of volatile organic compound.

The method in outline involved the separation of a volatile mixture by taking advantage of the differences in the distributions of its components between a moving gas phase and a stationary non-volatile liquid phase. Certain solids, such as kieselguhr, could absorb appreciable quantities of liquids and still retain their form, and this allowed the liquid phase to be carried on a finely-divided solid inert filler. A gas stream could be passed through such a mixture as though it were a dry solid. The distribution of the liquid over the enormous surface area of a powdered solid meant that equilibrium in the system was attained rapidly.

Construction of Apparatus

In practice, for analytical work, a glass column (usually about six feet in length and three mm. diameter) was packed with a mixture of kieselguhr and a suitable high-boiling liquid (a number of types were used, the commonest being dinonyl phthalate, liquid paraffin or silicone oils), care being taken to get a uniform packing with not too great a resistance to gas flow. The column was heated, either electrically or by a vapour jacket, and a steady stream of inert gas, generally nitrogen, passed through. The volatile mixture was injected into the gas stream, and moved down the column, separating into zones of pure components. These left the column as vapours in the gas stream.

Detection of the separated components was usually carried out by measurements of the differences in either thermal conductivity or vapour density between the nitrogen itself and the zones containing the different components. In each case the charges were measured electrically and the out-of-balance potentials developed were amplified and fed to a pen recorder.

Excellent Separations

Excellent separations of milligram quantities of many types of organic compound were given by the method, while a few micrograms of single substances could be determined in favourable circumstances. Each component gave a distinct peak on the recorder chart, the distance of the peak from the start line, i.e. the time for the compound to pass through the column, being a constant for that particular compound.

The size of the peak could be related to the amount of material present, and, if references peaks were obtained from authentic samples, the method could be used to identify and estimate volatile organic compounds quickly and with a reasonable degree of accuracy.

The use of larger-scale columns provided a preparative scale process for the fractionation of gram quantities of volatile compounds with remarkable efficiency (3). There seemed to be no reason why quantities of up to 10 g. of pure substances could not be prepared with the resources of a normal laboratory. For larger amounts, however, the equipment became rather bulky and inconvenient.

The time taken for analysis seldom exceeded a few hours and was often only a few minutes, depending on the difficulty of the separation. Martin (4) had expressed the opinion that the method was destined to replace analytical procedures at present involving fractional distillation at pressures exceeding a few mm. of mercury.

In introducing his paper, Dr. Foster pointed out that a study of the mobility of charged particles in free solution when an electric field was applied required the use of special apparatus to eliminate convection

effects and, in general, the method was restricted to substances of high molecular weight, e.g. proteins. The technique was known as boundary electrophoresis and the separation of the components of a mixture into discrete zones was not normally effected.

If the conducting solution was supported on a solid a quite different effect was obtained on electrophoresis. Convection effects were largely eliminated and separation of the components of a mixture into discrete zones was commonly achieved. Thus zone electrophoresis had been suggested as a generic name for the technique, which also was often referred to as ionophoresis.

Application Comparatively New

Historically, zone electrophoresis had been used in isolated instances as far back as 1886 but it was only during the past seven years that the method had come into prominence as an analytical technique.

Ionophoresis was applicable to a wide range of molecular sizes, e.g. from amino acids to proteins but it was, of course, restricted to those substances which had or could be given a formal electrical charge and which were soluble in the conducting solution. Aqueous solutions were normally employed but there was much scope for extension of the method to non-aqueous systems.

A variety of electrolyte supports had been used, including glass powder, sand, starch, string and even single cellulose fibres, but the most frequently used support was filter paper.

Each of the various types of apparatus now available for zone electrophoresis involved a strip of paper onto which the mixture to be separated was introduced within a small circular zone at an arbitrary point and the paper was impregnated with the conducting solution. The ends of the paper dipped into the electrode chambers. Since the moist paper strip was the resistance in an electrical circuit heat would be generated in the supported liquid and evaporation might occur with, ultimately, a breakdown of the circuit.

To overcome this a low voltage-current range could be used, in which case separations might occur slowly. In order to permit a rapid separation, the paper could be cooled and this was most conveniently done

by compressing the strip between two glass plates, the outer surfaces of which were cooled by metal plates. When separation was complete the paper strip was dried and the components of the mixture located by making use of some specific physical or chemical property. Square sheets of paper could be used so that ionophoresis could be effected, in successive operations, in two directions at right angles.

The use of ionophoresis and chromatography in conjunction provided a potent analytical weapon in many cases. Thus a complex mixture of amino acids from a protein hydrolysate could be resolved into groups of acidic, neutral and basic amino acids, which could be further examined by chromatography. Alternatively a mixture of sugars could be separated into pentose, hexose and oligosaccharide groups by chromatography and the composition of each group analysed further by ionophoresis. Neutral sugars could be given a negative charge by complex formation with borate ions in alkaline media. The theoretical bases for chromatographic and ionophoretic separations were quite different.

Perhaps one of the most spectacular uses of zone electrophoresis was that of the clinical examination of serum protein patterns. Information on certain pathological conditions could be obtained in many cases.

Use had been made of zone electrophoresis in the study of the structure of amylosaccharides, insulin and other biologically-active polypeptides, in the separation of enzymes, steroids (charge conferred by complex formation with detergents), alkaloids, and in the resolution of numerous mixtures of inorganic anions and cations including the rare earths.

Method of Choice

When a separation could be effected by both chromatography and ionophoresis it was often more expedient to use the latter method since many separations could be effected in a few minutes.

An apparatus had been devised for continuous paper electrophoresis in which a vertically arranged square sheet of paper was irrigated in chromatographic manner with the conducting solution and an electric field was applied across the paper from electrodes which extended down the length of the paper edges. A continuous stream

of a solution of the substances to be separated was introduced at a point along the top of the paper and as it progressed down the paper the components migrated to different distances in a horizontal direction. As the solution dripped from the lower edge of the paper it was collected in a series of tubes. The use of this technique permitted preparative separations to be effected.

Following the presentation of the two papers, some discussion of the techniques took place between members of the audience and Drs. Tatlow and Foster, after which the meeting adjourned to the laboratories to inspect some forms of the apparatus already described.

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Tracing Air Pollutants

THE method of using special smoke to trace paths of pollutants in the atmosphere was described by Dr. Frederick G. Sawyer and William H. Shallenberger in a paper given at the national meeting of the American Institute of Chemical Engineers in Los Angeles, 26 to 29 February.

Preventing excessive emissions of air pollutants from new industrial plants involved many factors, including economics, meteorology, agriculture, and community interests, according to Dr. Sawyer. The tracer expert said that after weather data was assembled, it was possible to locate plants by air pollution considerations.

The tracer material, finely divided zinc-cadmium, was fed into a stack which dispersed it into the air. Sampler devices located downwind sucked in the air bearing the tracer smoke, particles of which were identified by ultra-violet rays. By counting the number of particles collected per unit time, the concentration could be determined.

In concluding, Dr. Sawyer stated, 'The tracer technique is no panacea, but it is the best available means for determining air movements and effluent concentration downwind from an emission source. As such, it is a valuable tool in air pollution abatement programmes.'

Plastics Industry Output

Record Production in 1955

THE British plastics industry had a record production and export year in 1955, states the British Plastics Federation. Output reached about 320,000 tons, an increase of 46,000 tons over the 1954 total (274,000 tons), and more than double the production of five years ago (155,000 tons in 1950). Practically all branches of the plastics industry improved their production and the increase was particularly marked in thermoplastic materials. Various expansion plans will mean still higher production capacity in 1956.

Exports of plastics materials alone in 1955 amounted to nearly 85,000 tons, valued at nearly £23,000,000, a rise of more than 11,000 tons and, by value of £2,250,000 on 1954, the previous highest figures.

The tonnage exported is more than four times that for 1947 (21,000 tons) and approaching twenty times that for 1938 (4,300 tons).

The exported materials consist of resins, moulding powders, sheet, rod, tube, film and foil, but do not include finished components and parts, large numbers of which are used in domestic ware and parts for the electrical and motor industries.

Australia (with imports valued at over £3,000,000) remained the best market, and South Africa, Denmark, Sweden and the Netherlands (value over £1,000,000 in each case) were among the countries to whom exports showed rises.

Substantial increases were shown in exports to Italy (by £295,000 to a total of nearly £796,000); Finland (by £190,000 to £790,000); Switzerland (by £190,000 to £680,000); Austria (by £117,000 to £297,000); Eire (by £90,000 to £420,000); and Pakistan (by nearly £80,000 to nearly £240,000).

Industrial Diseases

The number of cases of industrial diseases reported in January 1956 has been published in the February issue of the *Ministry of Labour Gazette*. The figures are as follows: lead poisoning, four; epitheliomatous ulceration (skin cancer), six; chrome ulceration, eight. One death had been reported, for epitheliomatous ulceration,

Elastomer Process

Licensed to 7 European Companies

SEVEN major European companies have been licensed to use the Elastomer process for the production of vinyl foam, for which overseas markets are rapidly expanding.

The announcement was made recently by John E. Slaughter, Jr., vice president of The Girdler Company, Louisville, Kentucky, US, the exclusive licensor of the new process in all foreign countries except Canada. Girdler is a division of the National Cylinder Gas Company, Chicago, Illinois, US.

The Elastomer process was developed by the Elastomer Chemical Corporation, Newark, NJ. It uses an inert gas, rather than a chemical blowing agent, to make vinyl foam. The foamed vinyl has properties not possessed by other types of foamed products, and is claimed to be competitive in price.

The seven European licensees are:

(1) Les Etablissements Marechal of Paris, manufacturers of vinyl coated fabrics and unsupported vinyl films.

(2) Le Laboureur, Roubaix, Wattrelos (Nord), France. Le Laboureur is engaged in the manufacture of textiles, vinyl films and vinyl coated fabrics.

(3) Svenska Gummifabriks Aktiebolaget, Gislaved, Sweden. The company is owned by the Swedish Co-operative Wholesale Society and is a major tyre manufacturer in Sweden. The parent organization and its many subsidiaries make a variety of commodities, including margarine, lamp bulbs, fertilizers, paper and wall board, shoes, rubber products, cellophane films and cellulose sponges.

(4) Dunlop Rubber Company Ltd., London. A licence agreement with Dunlop was concluded in January, 1956. It has not yet been determined what type of vinyl foam plant will be erected, but it is expected to embrace both continuous slab production and moulded items. The responsibility for making vinyl foam by the Elastomer process has been assigned to the Dunlopillo division at Liverpool.

(5) Dunlopillo GMBH, Hanau Am Main, Germany. Dunlopillo is a division of Deutsche Dunlop Gummi Compagnie AG, which is affiliated with the Dunlop Rubber Company, Ltd., London. Dunlopillo GMBH

manufactures latex foam, polyurethane foam and various other products.

(6) British Geon Ltd., London, England. A licence agreement was concluded in January 1956.

(7) Elson & Robbins Ltd., Long Eaton, Nottingham, England, manufacturers of spring and upholstery products for bedding and automotive uses.

During 1956 The Girdler Company expects to grant Elastomer process licences to other European companies, and to companies in Mexico, South America, Australia and Japan.

Since vinyl foam will not support combustion, a growing number of designers are specifying it for transportation and public cushioning applications.

Major rubber companies in the United States, and a number of large vinyl processors, have acquired licences to produce vinyl foam by the Elastomer process.

Tall Oil Awards

THE tall oil division of the Pulp Chemicals Association have announced awards of \$500, \$350 and \$100 to Mr. Robert S. Aries and Mr. Melvin Wolkstein of the Polytechnic Institute of Brooklyn, Mr. Jacobus Rinse of Chemical Research Associates, and Mr. Paavo Kajanne of the Institute of Technology at Helsinki, Finland.

The winning papers were picked from among the papers submitted to the tall oil division in response to their awards contest which closed last October. The judges were three of the outstanding experts of the chemical process industry, Mr. Walter J. Murphy, editorial director of the American Chemical Society, Mr. Henry F. Payne of the University of Florida, and Mr. Francis Scofield of the National Paint, Varnish and Lacquer Association.

The premier award of \$500 went to Mr. Robert S. Aries and Mr. Melvin Wolkstein jointly for their studies on the esterification of tall oil with glycerol. Their findings on the best conditions for esterification, the effect of catalysts and the difference in the behaviour of the fatty and rosin acids of tall oil should prove of great help to manufacturers of this important ester.

Mr. Jacobus Rinse was awarded the second prize of \$350 for his paper on aluminium tritallate, a new tall oil derivative. The material is film forming and can be set by moisture.

Satisfactory Progress in West Germany

Bayer Building Titanium Dioxide Plant

LEADING German chemical manufacturers report satisfactory sales for the first two months of 1956. While outputs are still limited to some extent by shortage of reserve plant capacity, it is now expected that this difficulty will be gradually overcome in most basic products before the end of this year.

Badische Anilin- und Soda-Fabrik AG increased its turnover last year by 20 per cent to DM 1,260,000,000; exports rose by DM 88,000,000 to 36.6 per cent of total sales. Capital expenditure exceeded DM 260,000,000 of which DM 100,000,000 was met out of sums set aside for depreciation. The labour force increased by 11 per cent to 33,000. Increased labour productivity and full utilization of existing plant made up for rising wages and other costs, with the result that the slight decline in selling prices, especially in export markets, did not affect total profits.

BASF intends to carry on its expansion programme so as to keep production capacities abreast of the rising demand and provide industrial plant for the utilization of various new developments; details of these have not yet been released. The company's mining subsidiary, Gewerkschaft Auguste Victoria, is to sink a new shaft to raise coal output by 30 per cent and rationalize production. The polythene and ethyl benzol plant at Wesseling in which BASF has a share has reached the output target for the first stage of development.

New Plant

Farbenfabriken Bayer AG has started construction work on a new titanium dioxide plant at Uerdingen. Total capital expenditure is estimated at DM 100,000,000 but the first stage work which is to be completed by the end of 1957 will involve only part of this sum. It is expected that production from the new plant will not only meet all home requirements but supply substantial quantities for export.

Diolen, the German brand of ICI's Terylene, was shown at the Frankfurt Fair by Vereinigte Granzstoff-Fabriken AG, Wuppertal, which is now operating a pilot plant with a daily output of several hundred-

weight. Farbwerke Hoechst AG which has also acquired a licence from ICI has changed the name of its polyester fibre to Trevira and hopes to start commercial-scale production this summer. An annual figure of 600-700 tons has been mentioned in the German press as the likely initial output of the fibre which will at first be used largely in mixtures with wool and cotton.

Production of phenol by the cumol process operated by Phenol-Chemie GmbH, Gladbeck, is to be raised to 5,000 tons a year because of the continuing, and as yet not fully covered, consumption of phenol in West Germany.

Exports Cut

The production of coke-oven by-products rose by 11 to 16 per cent last year and included 1,806,000 tons of crude coal-tar, 506,100 tons of crude benzol, 486,000 tons of ammonium sulphate and 75,000 tons of naphthalene. Demand, however, increased so much more rapidly that exports of most coal derivatives had to be cut and imports raised. The Fischer-Tropsch plants which raised their output last year by 23 per cent to 45,100 tons of primary products intend to increase their production further in 1956 to meet the rising demand for aliphatic hydrocarbons. The hydrogenation plants which are now processing crude petroleum last year raised their intake by 25 per cent to 2,770,000 tons and supplied 40 per cent of the total petrol output in the Federal Republic.

West German production of nitrogenous fertilizers rose by 13.5 per cent to 790,000 tons (N) in 1955 as a result of extension and modernization of existing plants while that of phosphoric and potassic fertilizers increased by six to seven and four per cent only to 525,000 tons (P_2O_5) and 1,680,000 tons (K_2O) respectively. Nitrogenous fertilizer exports from the Federal Republic last year advanced by over 20 per cent. Increased sales and higher prices have so far made up for increasing fuel and labour costs but German manufacturers fear that the expansion of world nitrogen capacity will result in increased competition in the world mar-

ket even though total consumption may be expected to continue to expand.

Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, Frankfurt, has announced its intention to interest itself in the use of atomic energy. The company is producing sodium metal by an electrolytic process as well as a number of rarer metals such as zirconium and calcium which are of interest as ancillary materials for the production of uranium or the construction of atomic piles.

Degussa was the only German uranium producer before 1945, and though it was not then obtained in the degree of purity required now, the company regards its experience of some value. One of its subsidiaries is working with thorium, and Degussa itself has for some time been working in the high vacuum field and already supplied some installations for the production of uranium to other firms. It further claims to have developed some interesting processes in the sphere of nuclear physics. While all this specialized knowledge and experience should be of value for work in the sphere of nuclear physics, the company intends however to proceed very cautiously, especially as regards financial commitments.

New Harwell Outstation

Less Entrance Formalities

THE Atomic Energy Authority is acquiring two built up areas on Grove Airfield, near Wantage, as a site for a small outstation of the Atomic Energy Research Establishment, Harwell. These two areas are part of the airfield which the Air Ministry had decided to relinquish.

The new outstation is mainly to provide laboratories to allow the technological irradiation group to develop more rapidly. This group, a part of the Harwell isotope division, was formed in June 1955 in order to assist industry in making full use of the large amounts of radioactive material which will become available from the expanding atomic energy programme. The additional laboratories at Grove are seven miles from Harwell and less than two miles from Wantage.

In the choice of the new outstation preference was given to sites which had existing buildings so that the work of the new group could be advanced as rapidly as possible. The location of the technological

irradiation group at Grove, rather than inside the Harwell perimeter, will reduce the formalities for those who wish to use the irradiation facilities, and so make it easier for industry to co-operate to the full.

No radioactive waste will be discharged, as any small quantities of waste which may arise in the laboratories will be transferred to the main plant at Harwell for treatment and disposal. A similar system has been used by the radiochemical centre at Amersham, and has proved satisfactory.

Later it is proposed to transfer the isotope school from Harwell to the new site.

Science v Humanities

A DEBATE on the motion 'That Science Can provide as Good an Education as the Humanities' is being organized by the fine chemicals group of the Society of Chemical Industry, and will be held on Friday 20 April at 7 p.m. in the William Beveridge Hall, Senate House, University of London.

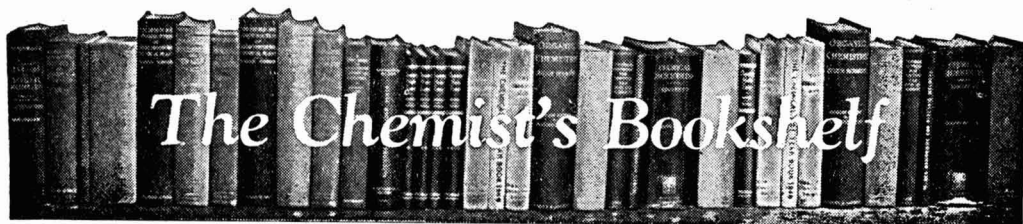
The principal speakers will be: for the motion: Dr. R. P. Linstead, C.B.E., F.R.S. (Rector of the Imperial College of Science and Technology) and Professor A. R. Ubbelohde, F.R.S. (Professor of Thermodynamics at the Imperial College of Science and Technology); against the motion: B. L. Hallward, M. A. (Vice-chancellor of Nottingham University) and H. D. P. Lee, M.A. (Headmaster of Winchester College).

The chair will be taken by Sir William Ogg (Director of Rothamsted Experimental Station and immediate Past-President of the Society of Chemical Industry). Admission will be by tickets which can be obtained from the honorary secretary, Dr. J. D. Kendall, Ilford Ltd., Ilford, Essex.

New Union Carbide Division

UNION Carbide Development Company has been formed as a new division of Union Carbide and Carbon Corporation. Long-term corporate planning and evaluation of new business opportunities will be important objectives of the new company. Operating divisions of the corporation will continue, as in the past, to carry on their own research and development activities.

Mr. Birny Mason, Jr., secretary of Union Carbide, has been appointed president of the new company; Mr. R. E. Cornwell, Mr. E. J. Fox, and Mr. J. J. Murphy have been named vice-presidents.



AN INDEX OF MINERAL SPECIES & VARIETIES ARRANGED CHEMICALLY. By M. H. Hey. British Museum, London. 2nd Edition. 1955. Pp. xxiv + 728. 60s.

Since the first edition of this compilation, issued some five years ago, considerable progress has been made in mineral chemistry and many new minerals have been described.

This chemically classified list provides a comprehensive reference to all known minerals of a given qualitative chemical composition and lists all recent work—up to March 1955—dealing with the individuality and chemical composition of these minerals. The alphabetical index following the chemical classification constitutes a very complete index of mineral names and synonyms. The chemical classification is based firstly on oxides, sulphides, silicates, phosphates, carbonates, arsenates, vanadates, molybdates etc.

Within these categories, the material is arranged by metals. Usually the metal selected is the noblest or rarest rather than that which is most abundant. Doubtful species, i.e. those having doubtful homogeneity or doubtful individuality have been treated in a conservative manner. Where there is reasonable doubt, the author has not rejected it, but has accounted it doubtful and listed the name in ordinary rather than prominent type.

The name and spelling to be adopted for a mineral often raised difficulties since the evolution of mineralogical nomenclature has been rather haphazard. It is essential that the nomenclature should be made as international as possible, but since no such agreement has yet been possible, the author has in general adopted the nomenclature used in the English-speaking world. Even with this decision much compromise has had to be made on spelling. In most cases the form

used by the original author has been used wherever possible. It is to be hoped that the production of this comprehensive work may itself crystallize opinion on these matters within the English-speaking lands, if not elsewhere.

An attempt has been made in this edition to offer guidance on the pronunciation of the various mineral names. This may well be a source of controversy but many users of the volume who are not so familiar with mineralogical terms will be grateful to the author for this feature of the work.

The book is well bound and fairly well laid out. It will prove an invaluable reference book to those dealing with minerals.—
T. S. WEST.

CATALYSIS. Volume 3. Hydrogenation & Dehydrogenation. Edited by P. H. Emmett. Reinhold Publishing Corporation, New York; Chapman & Hall Ltd., London, 1955. Pp. vii + 504. 100s.

The first two volumes in the series covered the basic concepts of homogeneous and heterogeneous catalysis and this volume deals with part of the field of catalytic hydrogenation and dehydrogenation. In the first chapter, B. M. W. Trapnell gives an account of the ortho-parahydrogen and ortho-paradeuterium conversions and also the exchange reaction between hydrogen and deuterium. The mechanism of these reactions is discussed and illustrations are given of some of the applications that have been made of these reactions in other catalytic studies.

The next two sections cover the hydrogenation of olefinic compounds. The first of these is an excellent review by Professor D. D. Eley of the fundamental aspects of this topic and the work that has been carried out on the reactions of ethylene with hydrogen and deuterium. Professor Eley's

review covers developments in this field up to the end of 1952 but does not include the results of more recent work.

The wider aspects of the hydrogenation of olefines are discussed by B. B. Corson who deals with the selective hydrogenation of olefines containing more than one unsaturated bond and also with the relative reactivity of double bonds in related hydrocarbon molecules, both in the aliphatic and the aromatic series. There follows a well-arranged chapter by G. C. Bond on the addition of hydrogen to carbon-carbon triple bonds. He gives a clear account of the relative extent of hydrogenation and polymerization observed with acetylene over different catalysts under varying conditions and also includes short sections on other acetylenic compounds.

A short chapter by H. A. Smith and W. C. Bedoit reviews the catalytic reduction of nitro-compounds. The different classes of nitro-compounds are discussed in separate sections; most of the work reported was carried out using nickel or platinum as catalysts.

The synthesis and decomposition of ammonia occupies a prominent position in the volume since two chapters, which together occupy one-third of the book, are devoted to this subject. The first of these by W. G. Frankenburg is a masterpiece. Admittedly, Frankenburg has a fascinating subject to review but the way in which the material is arranged and the excellent discussion of the various topics, relevant to an understanding of the catalytic synthesis of ammonia, render his chapter exceedingly interesting as a history of the development of modern thought and concepts about the phenomenon of catalysis.

The second chapter, entitled 'Research on Ammonia Synthesis since 1940', is written by a group of Dutch chemists. It gives a good account of the studies that have been carried out on the nature of the catalysts for this synthesis and also of the important developments in our understanding of the kinetics of the reactions which have originated from the work of Temkin *et al.*

In some ways this division of the material presented about ammonia into two chapters, one of which is comprehensive and the other mainly on developments since 1940, is rather unsatisfactory, as it involves some duplication of material. Frankenburg's chapter is not confined to discussion of papers which appeared before 1940 and a number of the

pre-1940 papers are mentioned again in the second chapter, e.g., the work of Kummer and Emmett using radioactive carbon monoxide on an iron catalyst is described on page 226 and again on page 314. Presumably the editor decided that the synthesis of ammonia was a subject of such importance that it merited treatment by more than one author even although this involved some overlap between the two chapters.

A section devoted to the synthesis of methanol is written by G. Natta who has made important contributions to this field and who is well qualified to review the subject. A section by R. O. Feuge gives an account of the hydrogenation of glyceride oils, another branch of hydrogenation of industrial importance. The final chapter by K. K. Kearby on catalytic rehydrogenation covers a field of growing importance, especially in the petroleum industry. Such reactions as the production of butadiene from butane and the production of styrene are discussed fully.

The volume has both an author index and a subject index. The illustrations are clear and numerous helpful tables are included. In many ways this is the best of the three volumes and it should prove of interest to chemists in universities and in industry. Taken as a whole it is a fine volume which ought to appear on the shelves of all types of chemical library.—C. KEMBALL.

PLASTICS PROGRESS 1955. Papers and Discussions at the British Plastics Convention 1955. Iliffe & Sons Ltd., London. Philosophical Library Inc., New York. Pp. vii + 432. 50s (by post 51s 8d).

This book is based on papers given at the British Plastics Convention held in June 1955 and organized by the journal *British Plastics*. The full texts of the papers are published here and in many cases the printed text is said to be substantially longer than the paper which was delivered at the convention. Authors have been allowed to make their points in greater detail than was possible on the platform.

There are 20 papers altogether, divided into nine sections: Polymer Structure and Properties, Expanded Plastics, Thermoplastics, Extrusion, Work Study and Productivity, Injection Moulding, Patents, Foundry Resins, and Glass Reinforced Plastics. In addition to the papers the original discussions are also reproduced word for word.

• HOME •

Silicone Company Formed

The Bradford Dyers' Association, Monsanto Chemicals and Union Chimique Belge, of Brussels, have formed a new company, Silicone Processes, which will manufacture a wide variety of textile and non-textile materials from silicones.

Incorrect Reference

It has been drawn to our notice that one of the references given in the article 'Vinyl Resin Emulsions & Their Monomers' by H. Warson, research manager of Vinyl Products Ltd., which appeared in our issue of 14 January (THE CHEMICAL AGE, 1956, 74, 157) was incorrectly printed. Reference 39 should have been: Shapiro, L., *Am. Dye-stuffs Rep.*, 1954, 43, 132.

RIC Hull Branch

Dr. D. W. Kent-Jones, president of the Royal Institute of Chemistry, speaking at the fourth annual dinner of the Hull and district branch on 9 March, congratulated the branch on its progress and its membership, which now numbered 200.

Stabilizing Bottle Prices

Glastics Ltd., of Barnet, Herts, glass container manufacturers, will maintain their bottle prices at the present level until at least the 31 August. By improvements in production technique, the company has succeeded in absorbing the increased production costs which gave rise to the five per cent increase which was applied in the autumn of last year by most glass container manufacturers.

Madder Root Duty

The Board of Trade are considering an application for a reduction in the import duty on madder root. Representations which interested parties may wish to make in connection with this application should be addressed in writing not later than 28 March, to the Board of Trade, Tariff Division, Horse Guards Avenue, London SW1.

Physical Society's Exhibition

The Physical Society's annual exhibition of scientific instruments and apparatus will be held at the Royal Horticultural Society's Old and New Halls, Westminster, London SW1, from 14 to 17 May. Sir John Cockcroft, K.C.B., K.B.E., F.R.S., will open the exhibition in the New Hall at 11 a.m. on 14 May.

Fibreglass Expansion

Additional factory premises in Birkenhead have been acquired by Fibreglass Ltd., a subsidiary of the St. Helens glass firm of Pilkington Brothers Ltd., for the production of fibreglass wool tissue.

Electron Emission from Metals

Professor Dr. Erich Schmid, of the University of Vienna, will deliver a lecture on 'Electron Emission from Metals', before the Institute of Metals on 13 April at 2.30 p.m. The meeting will be held in the Weir Hall of the Institution of Naval Architects, 10 Upper Be'grave Street, London SW1, and tickets will not be required.

Change of Address

Northey Rotary Compressors Ltd. announces that its telephone number has been changed from Parkstone 1500 to Parkstone 4900, and that its postal address has been revised to include the word Poole:—200/202 Alder Road, Parkstone, Poole, Dorset.

Increased Glass Exports

Exports of laboratory glassware manufactured by Quickfit & Quartz Ltd. rose by nearly 25 per cent in 1955 and went to 80 countries, several of them new markets. The principal countries were Australia, Holland, France, India, Belgium, Norway, South Africa, Sweden, Canada, New Zealand, Chile, Venezuela, Israel and Eire.

Woodcut of Dr Weizmann

A woodcut of Dr. Chaim Weizmann, a former lecturer at Manchester University, was presented by Mr. Jonas Bolchover, president of the Manchester Zionist Central Council, to Professor Geoffrey Gee, senior chemistry professor at the university, when an Israel Week exhibition opened there on 5 March. Dr. Weizmann, the first President of Israel (1949-52), was a lecturer in biochemistry at Manchester University from 1904 to 1917.

Tannins Symposium

The Society of Leather Trades' Chemists will hold a symposium on 'Vegetable Tannins' in the Chemistry School, Pembroke Street, Cambridge, on 12-13 April. Applications for registration should be made to G. H. W. Humphreys, Forestal Land, Timber & Railways Co. Ltd., Forestal Central Laboratories, Harpenden, Herts.

OVERSEAS

US Bromine Sales

US sales of bromine and bromine compounds in 1954 reached the record level of 220,449,988 lb. valued at \$41,312,669, according to the Bureau of Mines, US Department of the Interior.

Syrian Oil Refinery

The Syrian Government has accepted an offer from a Czechoslovakian firm to construct a refinery for crude oil in Syria, Damascus Radio reported recently.

US Fuller's Earth

US production of Fuller's earth decreased eight per cent in 1954 compared with 1953, according to reports of producers to the Bureau of Mines, US Department of the Interior.

£31,000 for Project Report

The Indian Atomic Energy Department has engaged Costain-John Brown to submit a project report on heavy water production and a proposed fertilizer factory. The company will be paid £31,000 for this report.

US Iodine Consumption

Consumption of crude iodine in the US increased to 1,347,308 lb. in 1954, compared with 1,170,422 in 1953, according to the Bureau of Mines, US Department of the Interior.

Shell Solvents Plant

Shell Oil of Canada is to build facilities at its Montreal East plant to manufacture methyl ethyl ketone and secondary butyl alcohol. Production of these two chemicals, which are now imported, will be under way by the end of the year.

Rubber & Ceramics Laboratory

A laboratory is to be set up at the Technion in Haifa, Israel, to provide research facilities for the rubber and ceramics industries, regulate the qualities of raw rubber imported, and create a pool of potential chemists and engineers for these two industries. Agreement on the project has been reached in principle between the Israeli Government, the US Operations Mission, the Technion and the Ceramics and Rubber Research Associations. Construction of the building will begin as soon as the necessary funds are available.

US Carbon Black

Production of carbon black in the US in January was three per cent higher than in December 1955, and 19 per cent higher than in January 1955, reports the US Bureau of Mines. Exports of carbon black last year were 13 per cent higher than in the previous year.

Nuclear Laboratory

Nuclear Development Corp. of America (NDA) has begun the construction of a radiochemical laboratory at its experimental station at Pawling, New York. Kreisler-Borg Construction Co., of White Plains, was granted the construction contract.

Contract for Kellogg International

The M. W. Kellogg Company's wholly-owned subsidiary, Kellogg International Corporation, has been awarded a contract by Raffinerie Be'ge de Petroles, Antwerp, for the design and construction of a combined catalytic desulphurizer and catalytic reforming unit. The units are expected to go on stream at the end of this year.

Indian Polythene Project

ICI's project for the manufacture of polythene in India has been approved by the Indian Government. The Alkali & Chemical Corp. of India Ltd., an ICI associate in which the Indian public has a substantial shareholding, will undertake the manufacture. The process to be used in India will be that developed by ICI in the manufacture of Alkathene. The project will involve an outlay of £2,500,000.

Norwegian Whale Oil

The Norwegian Whaling Association's sales organization has sold 45,000 tons of whale oil to the Norwegian processing concerns, De-No-Fa and Sandar Fatrikker, and most of the balance of this season's production, about 53,000 tons, to Unilevers, at a price of £85 a ton. Last year the average price obtained for Norwegian whale oil was £76 10s. During the Antarctic whaling season, which closed on 5 March, Norwegian expeditions produced about 130,000 tons of whale and sperm oil, compared with about 134,000 tons last season. Last year, however, the season lasted 15 days longer than this year.

PERSONAL

DR. F. H. BANFIELD, M.Sc., Ph.D., F.R.I.C., director of research, British Food Manufacturing Industries Research Association, has been appointed a member of the Committee of Management of the Low Temperature Research Station at Cambridge University. The appointment is until 31 December, 1959.

DR. E. J. BOURNE, Ph.D., D.Sc., A.R.I.C., who was formerly Reader in Organic Chemistry at the University of Birmingham, takes up his appointment as Head of the Chemistry Department, Royal Holloway College, University of London, Englefield Green, Surrey on 18 March.

In last week's issue we announced that DR. W. R. MOORE, senior lecturer in Physical Chemistry, Department of Chemistry and Dyeing, Bradford Technical College, was presenting a paper at the International Symposium on Macromolecular Chemistry to be held in Israel at Easter. Now it is learned that Dr. Moore has also been invited to present a paper on 'Cellulose Derivative-Solvent Interaction' at one of the Gordon Research Conferences to be held at New Hampton, New Hampshire, in July. Dr. Moore intends to spend a few days in the US at the time of the conferences and hopes to visit some of the polymer research laboratories in the vicinity.

DR. W. E. DE B. DIAMOND, Ph.D., M.A., F.R.I.C., has relinquished his position as director of the British Plastics Federation and his duties have been taken over temporarily by MR. C. J. G. STANLEY, who has for some time been the manager of the Federation, assisted by MR. BASIL C. ALDIS, who was assistant to the director.

DR. E. C. ROLLASON, aged 48, of Woodlands, Dunsdon Road, Woolton, Liverpool, has been appointed to the chair of industrial metallurgy at Birmingham University with effect from 1 September 1956. Dr. Rollason was appointed to the Henry Bell Wortley chair of metallurgy in the University of Liverpool in 1951. Educated at Dud'ey Grammar School, Dudley Technical College and Birmingham University, he took his B.Sc. in 1930 and M.Sc. in 1932.

A lecture on 'Chemical Engineering and Its Place in the University' was given by PROFESSOR K. G. DENBIGH at Queen's College, Dundee, on 8 March, under the auspices of the British Association (Dundee) Trust. Professor Denbigh is the newly-appointed first professor of chemical technology in the University of Edinburgh. He has had considerable experience of industrial chemistry (notably with Imperial Chemical Industries) and of university teaching.

COUNCILLOR HAROLD P. MINTON, who was, before his retirement an instruments department manager with ICI, has been named Mayor-elect of Widnes. With ICI he earned a reputation as an inventor and one of his devices is still known affectionately as the 'Mintonometer'.

Obituary

The death is announced of DR. ARTHUR F. CAMPBELL, M.Sc., D.Sc., of Lanark Lodge, Torquay, at the age of 71. Dr. Campbell, a Life Fellow of the Royal Society, a Fellow of the Royal Institution and The Chemical Society, and a member of the Institution of Chemical Engineers, was an expert philatelist. A graduate of Manchester University, he was at one time managing director of Hardman & Holdman Ltd., of Miles Platting, a director of the Lancashire Tar Distillers Ltd., and the Manchester Creosote Storage Co. Ltd. He was also a founder-director of Hubron Rubber Chemicals Ltd.

LORD TRENT, K.B.E., chairman and managing director of Boots Pure Drug Co. Ltd. until two years ago, died at his home in Jersey, Channel Islands, on 8 March, at the age of 67. He was the son of the founder of Boots, Sir Jesse Boot, the first Baron Trent, whom he succeeded in 1931. Lord Trent had been associated with the company for more than 45 years when he retired in 1954 because of ill-health. He was greatly concerned with the welfare of the company's employees and was said to have been one of the pioneers in the introduction

of the five-day week in industry, which was first introduced in Boots' Nottingham factory in 1934. On succeeding to the title, Lord Trent continued to support the educational facilities started at Nottingham University by his father. In 1949 he was installed as the university's first chancellor and received its first honorary degree, Doctor of Laws. He was chairman of the Council of Industrial Welfare Society from 1945 to 1951.

Automatic Degreasing

Controlled Electric Heating System

IN every section of industry in which metal components are manufactured the metal surfaces become contaminated with grease which must be removed before surface coatings can be satisfactorily applied. A convenient method of degreasing which has been employed for some considerable time is to use trichlorethylene vapour. This process has the advantage of being simple to control, the work is left in a dry condition and a minimum of space is required.

However, the usual degreasing equipment of the open-top manually operated type has two serious disadvantages:—

- (1) There is a loss of the toxic trichlorethylene solvent, as a result of draughts and convection, with consequent high operating costs, and a health hazard for the operator.
- (2) The efficiency of the process must depend entirely upon the conscientiousness of the operator. Thus there is always the possibility of under-treatment if the component to be degreased is not held in the solvent vapour for a sufficient time.

There has recently become available the Perlift, a machine which has been designed to overcome these disadvantages. It has a totally enclosed construction and an automatic time cycle, consisting of an evaporating tank, with a thermostatically controlled electric heating system, a vapour chamber and an electrically operated platform hoist. It is available in three standard sizes, with dimensions as follows:—

Platform Size	No. 1	No. 2	No. 3
Length	40 in.	60 in.	80 in.
Width	20 in.	25 in.	25 in.
Height	20 in.	27 in.	29 in.
Volume of solvent	3½ gal.	5½ gal.	6½ gal.

Non-Standard machines can also be built to order.

The operator has only to place the work on the platform and press the operating button. The sliding door of the machine is automatically closed, lowering the platform into the vapour chamber, where the component resting on it is degreased by the rising trichlorethylene vapour. When the vapour has risen above the level of the work, a temperature-controlled time mechanism causes the platform to rise through the drying zone into the unload position. At the same time, the sliding door opens and a bell signals the end of the sequence.

The degreasing and drying cycles are therefore quite clearly independent of the operator and are automatically governed by the quantity of work in the machine. No fumes can escape while the Perlift is in operation, as the sliding door is closed. When the door is opened a suction fan comes into operation which prevents the fumes from entering the room.

Perlift machines are manufactured in Switzerland by Technochemie SA, Zurich, and are imported by The Electro-Chemical Engineering Co. Ltd. of Weybridge who provide the technical staff to supervise installations and service the machines. A stock of essential spares is held in this country.

Hormones Aid Latex Yield

HORMONES could be used to raise the yield of latex by as much as 50 per cent, according to Dr. McGavack the technical director of the United States Rubber Co., owners of Malayan American Plantations.

As potential demand for rubber increased, the need to replant was more and more urgent and hormones offered an economical solution. They stepped up the yield of trees and made up for the loss of output due to replanting. Hormones produced more rubber by stimulating the formation of latex, and by enlarging pores they allowed a readier flow from a larger area of the tree.

It was estimated that natural rubber was irreplaceable for 30 per cent of world industry needs, and that synthetic rubber was essential for a further 25 per cent. For the remaining 45 per cent either natural or synthetic could be used, depending on price.

Publications & Announcements

SELECTIVE weed-killers are one of the subjects discussed in the 38th issue of *Wiggin Nickel Alloys*, published by Henry Wiggin & Co. Ltd., Wiggin Street, Birmingham 16. The first selective weed-killer to be used in this country was dinitro-*o*-cresol which was developed at the start of World War II. This was followed by two hormone type weed-killers, dichlorophenoxyacetic acid (2,4D) in the US and methylchlorophenoxyacetic acid (MCPA) in this country. Other selective weed-killers have been developed, which are more suitable for certain crops, but MCPA is the most widely used in this country. MCPA is manufactured under the trade name Phenoxyline Plus by Fisons Pest Control Ltd. The process involves two liquid phase chlorinations one of which is carried out in a mild steel vessel and the other in a Monel vessel using an organic solvent. In spite of the severely corrosive conditions encountered the Monel equipment is said to be giving satisfactory service.

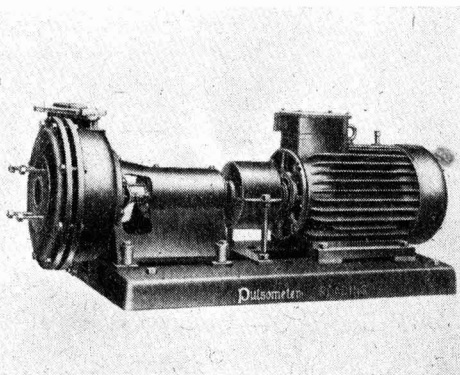
* * *

'ENGINEERING for the Process Industries' is the title of an excellently produced brochure published by W. J. Fraser & Co. Ltd., Harold Hill, Romford, Essex. In his foreword, printed in English, French and Spanish, the chairman says: 'We began as a family business. Now we can look back on four generations of steady growth—accelerated during recent years to meet very rapid advances in the application of chemical engineering itself. . . . This book is an attempt to show how our present organization works and how we handle our various contracts.' The brochure discusses the forms of contract that can be entered into between a chemical engineer and his client. The simplest arrangement is the fixed price contract in which the price is based on complete, detailed specifications. This is suitable for small plants but has serious difficulties for larger plants where much time and money has to be spent on working out designs. It may also happen that the client does not know his final requirements when the contract is made and may want to include the results of current research in the completed project. The contractor is obliged to include an appreciable sum to allow for such contingencies. Fraser operates a form of 'pay as you go' scheme in

which an approximate budget for the whole cost of the scheme is worked out from preliminary flow-sheets. If this budget is accepted, a fee, which is a small percentage of the budgeted cost is agreed for Fraser's services, and a method of payment is fixed for design and technical work, and all plant, equipment and construction costs are charged net and audited. Cost control is another feature of Fraser's system. A detailed itemized budget is prepared for the whole project and month by month proposed expenditure is checked against budgeted costs by an independent department.

* * *

A CENTRIFUGAL pump with non-corrodible contact surfaces of stoneware has been jointly produced by the Pulsometer Engineering Co. Ltd. of Reading and Doulton & Co. Ltd. of London. Known as the 'Pulsometer-Doulton' stoneware pump, it is marketed in three sizes, covering quantities from 1-450 gallons per minute and heads up to 140 ft. All interior parts are made in Doulton high quality acid-proof stoneware, no other material coming into contact with the liquid passing through the pump. The type of stoneware employed for the impeller of the pump is a special grade of 'Corundum' ware, with a low degree of porosity. This material is claimed to be harder than ordinary acid-proof stoneware and is said to have a high tensile strength and a smooth and uniform surface finish.



The 'Pulsometer-Doulton' Stoneware Pump

Law & Company News

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.)

D. W. PRICE & SON LTD., London, NW., glass manufacturers.—3 February, £12,000 mort. to London Assurance; charged on Braemar Works, Neasden Lane, London NW and a policy. *£11,854. 30 December, 1954.

NEW ZEALAND CEMENT CO. LTD., (incorporated in New Zealand).—2 February, £500,000 deb. stock with a premium of one per cent secured by a trust deed dated 26 January, 1956; charged on specified properties at Westport, South Island, New Zealand, benefit of an option agreement and a general charge.

Receivership

FRIGONIA LTD., chemical manufacturers etc., 16 Great Western Road, Paddington, London W9. Walter Love, 10 Sutherland Avenue, London W9, ceased to act as receiver on 9 February, 1956.

BALDWIN CHEMICAL SALES LTD., Star Street, Ware, Herts. Norman Stovold, of 21 Little Russell Street, WC1, ceased to act as receiver and/or manager on 16 February, 1956.

Satisfaction

BRITISH CELANESE LTD., London W.—Satisfaction, 27 January, of trust deed and supplemental deed respectively registered 2 October, 1943, and 8 November, 1944, to the extent of £5,714.

Increases of Capital

McKECHNIE BROTHERS LTD., 80 Hagley Road, Birmingham 16, increased by £1,500,000, in 200,000 ordinary and

1,300,000 'A' ordinary shares of £1, beyond the registered capital of £1,500,000.

PALLAS CHEMICALS LTD., 37 Lovaine Place, Newcastle-on-Tyne 1, increased by £19,500, in £1 ordinary shares, beyond the registered capital of £500.

GREEFF-CHEMICALS HOLDINGS LTD., Garrard House, 31-5 Gresham Street, London EC2, increased by £100,000, in 5s ordinary shares, beyond the registered capital of £525,000.

CLODOL INDUSTRIES LTD., manufacturers of chemicals and chemical products etc., 37 Lovaine Place, Newcastle-on-Tyne 1, increased by £19,500, in £1 ordinary shares, beyond the registered capital of £500.

GEIGY (HOLDINGS) LTD., 21 Spring Gardens, Manchester 2, increased by £130,000, in £1 ordinary shares, beyond the registered capital of £720,000.

JOHN MATHISON LTD. manufacturers of mechanical, thermal and thermo-chemical fuel saving devices, etc. Hutton Hall, Guistorough, Yorks, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £2,000.

ARC MANUFACTURING Co. LTD. electrical, mechanical, chemical engineers, manufacturers of electrodes, etc., Banner Lane, Tile Hill, Coventry, increased by £122,000, in £1 ordinary shares, beyond the registered capital of £78,000.

JOHN MARTIN OF LONDON LTD., manufacturers of soaps, general toilette preparations, etc. 14 Seething Lane, EC3, increased by £40,000 in £1 ordinary shares, beyond the registered capital of £70,000.

New Registrations

Harry Horner & Son Ltd.

Private company. (561,757). Capital £5,000 in £1 shares. To carry on the business of manufacturers of and dealers in powders, dyes, salves, balms, compounds, ointments, emollients, lotions, creams and beauty preparations of all kinds, perfumes, soaps and toilette requisites etc. Directors: Harry Horner, 21 Hurst Street, Bury, and Neville W. Horner, 99 Ingham Street, Bury. Registered office: Station Chambers, 36 Bolton Street, Bury, Lancashire.

Dabitoff Company (1956) Ltd.

Private company. (561,894). Capital £30,000 in £1 shares. To carry on the business of chemical manufacturers, druggists, drysalters, oil and colour men; manufacturers of and dealers in pharmaceutical and other preparations, cleaning materials etc. Subscribers: G. R. D. Lambert and K. M. Codd. Registered office: 4 Grafton Street, London W1.

Oralva Distributors Ltd.

Private company. (561,764). Capital £100. To carry on the business of manufacturing chemists and pharmaceutical chemists etc. Subscribers: Jean Herbert and T. A. Herbert, of 156 Strand, London WC2. Registered office: 175 Piccadilly, London.

Floralys Ltd.

Private company (51,929). To carry on the business of manufacturers of and dealers in cosmetics, creams, soaps, perfumes etc. Directors: Peter J. Goddard, Frederick R. Cullingford and Frederick W. Davis, all directors of Florogen Ltd. Reg. office: 132 Western Road, Mitcham, Surrey.

Chemical & Foundry Engineering Co. Ltd.

Private company (562,116). Registered 1 March. Capital £100 in £1 shares. Objects: To acquire the business of chemical and foundry engineer and metallurgist carried on by Harry Stevens at Winker Green Mill, Leeds 12 and Arch No. 3 Talavera Street, Leeds, as 'The Chemical & Foundry Engineering Co., etc. Directors: Harry Stevens and Mrs. Jessie Stevens, both of 118 New Ade Lane, Leeds 16. Reg. office: 3 Gelderd Road, Leeds 12.

Company News**Celanese Corp. of America**

Net income of Celanese Corp. of America in 1955, after provision for federal taxes and after including tax refunds of \$4,082,438, amounted to \$15,303,268, compared with \$6,590,268 in 1954. Sales of Celanese chemicals and plastics materials were a record for the year in which more than 40 chemicals were marketed. In the last quarter of 1955, the company began commercial scale production of Forticel, a cellulose propionate moulding material used in a variety of industrial and consumer items, and plans made for the construction of a new plant to manufacture rigid-type polythene resins by the newly-developed low pressure process.

International Nickel Co.

During 1955 the International Nickel Co. of Canada established records for net earnings, dividend payments, nickel exports, and ore mining operations. Net earnings of the company and its subsidiaries for the year ended 31 December 1955 totalled \$91,566,566 in terms of US currency which, after preferred dividends, was equivalent to \$6.14 per share of common stock. The increase of net earnings in 1955 was 40 per cent higher than in 1954. For the sixth successive year the company had operated at full capacity producing primary metals and in 1955 it delivered 290,463,000 pounds of nickel and 263,189,000 pounds of copper. In addition, the company made available 10,400,000 pounds of metallic nickel by converting sinter and concentrates supplied by other producers.

Wilton Expansion

DETAILS of new plants to be installed at its Wilton Works this year have been given by Imperial Chemical Industries Ltd. Approximately £50,000,000 has been spent on the plant to date.

Included among the new installations will be further plants for olefine production and butadiene extraction, the second *p*-xylyene and terylene units and a Butakon plant. The latter will use raw materials taken from the butadiene plant to produce a range of copolymers.

This expansion will necessitate an increase of about half in the steam raising and electricity generating capacity at Wilton. The increase will be obtained by installing a fourth boiler which, it is claimed, will be the largest on Tees-side.

Extensions involving 60,000 square feet are also being undertaken at the central workshops, while additional work on roads, railways, drains and distribution pipes is now in hand.

Aswan Fertilizer Plant

Egypt has accepted offers by West German and French firms to build a £20,000,000 fertilizer plant at Aswan, according to a recent announcement in Cairo. The Egyptian Production Council will contribute £2,000,000 towards the capital of the factory.

Next Week's Events

MONDAY 19 MARCH

British Ceramic Society

Stoke-on-Trent: North Staffordshire Technical College, 10.30 a.m. Symposium on refractories in the pottery industry.

SCI (Yorkshire)

Leeds: Chemical Lecture Theatre, The University, 7 p.m. Annual General Meeting.

SCI (London)

London: The Rooms of The Chemical Society, Burlington House, Piccadilly W1, 5.30 p.m. 'Toxic Chemicals in Foodstuffs' by Dr. E. J. Miller (Ministry of Agriculture, Fisheries and Food).

Institute of Metal Finishing

London: Northampton Polytechnic, St. John Street, EC1, 6.15 p.m. 'Some Problems in Bright Plating' by T. P. Hoar, M.A., Ph.D., B.Sc., F.R.I.C., F.I.M.

Sheffield: Grand Hotel, 6.30 p.m. 'The Physical Properties of Electrodeposits' by T. E. Such, B.Sc.

TUESDAY 20 MARCH

Textile Institute

Bradford: Midland Hotel, 7.15 p.m. Annual General Meeting of Yorkshire Section.

SCI (Birmingham)

Birmingham: Birmingham and Midland Institute, Paradise Street, 6.30 p.m. 'Quantitative Radio-paper Chromatographic Techniques in Biochemistry' by F. P. W. Winteringham.

WEDNESDAY 21 MARCH

Institution of Chemical Engineers

Birmingham: The University, Edgbaston. A symposium and exhibition, 'Modern Techniques in Chemical Plant Construction' (All day: eight papers to be presented).

Leeds: The University, 7 p.m. 'Some Aspects of Continuous Processes in Organic Synthesis' by J. W. Woolcock.

Royal Institute of Chemistry

London: The Senate House, University of London WC1, 5 p.m. A symposium on 'The Presentation of Science to The Public'. Principal speakers: Dr. Archie Clow, Mr. A. W. Haslett, and Mr. James McCloy. (In conjunction with The Institute of Biology and The Institute of Physics).

Chemical Society

Portsmouth: The College of Technology,

Anglesea Road, 7 p.m. 'Some Recent Developments in the Chemistry of Free Radicals' by Professor D. H. Hey, D.Sc., F.R.I.C., F.R.S.

SCI (Dublin)

Dublin: Trinity College, 7.45 p.m. Jubilee Memorial Lecture, 'Phosphates in Vital Processes' by Sir Alexander Todd.

THURSDAY 22 MARCH

Fertiliser Society

London: Lecture Hall of the Geological Society, Burlington House, Piccadilly W1, 2.30 p.m. 'Good Quality Granular Fertilizers. Some Research and Marketing Problems' by B. Raistrick, B.Sc., Ph.D., M.I.Chem.E., F.R.S.E.

Chemical Society

Bristol: Chemistry Department, The University, 7 p.m. 'Fluorescence Analysis in Ultra-violet Light' by J. A. Radley, M.Sc., F.R.I.C.

Liverpool: Chemical Lecture Theatre, The University, 5 p.m. 'The Fructose Group of Polysaccharides' by Professor E. L. Hirst, F.R.S.

Belfast: The Queen's University, 7.15 p.m. 'Some Themes in Chemotherapy' by Dr. L. P. Walls, M.A.

Society for Analytical Chemistry

Glasgow: Central Station Hotel, 7.15 p.m. Meeting on 'Flame Photometry in Analysis'.

FRIDAY 23 MARCH

SCI (South Wales)

Cardiff: University College, 7 p.m. Joint meeting with the Royal Institute of Chemistry. Domestic Evening.

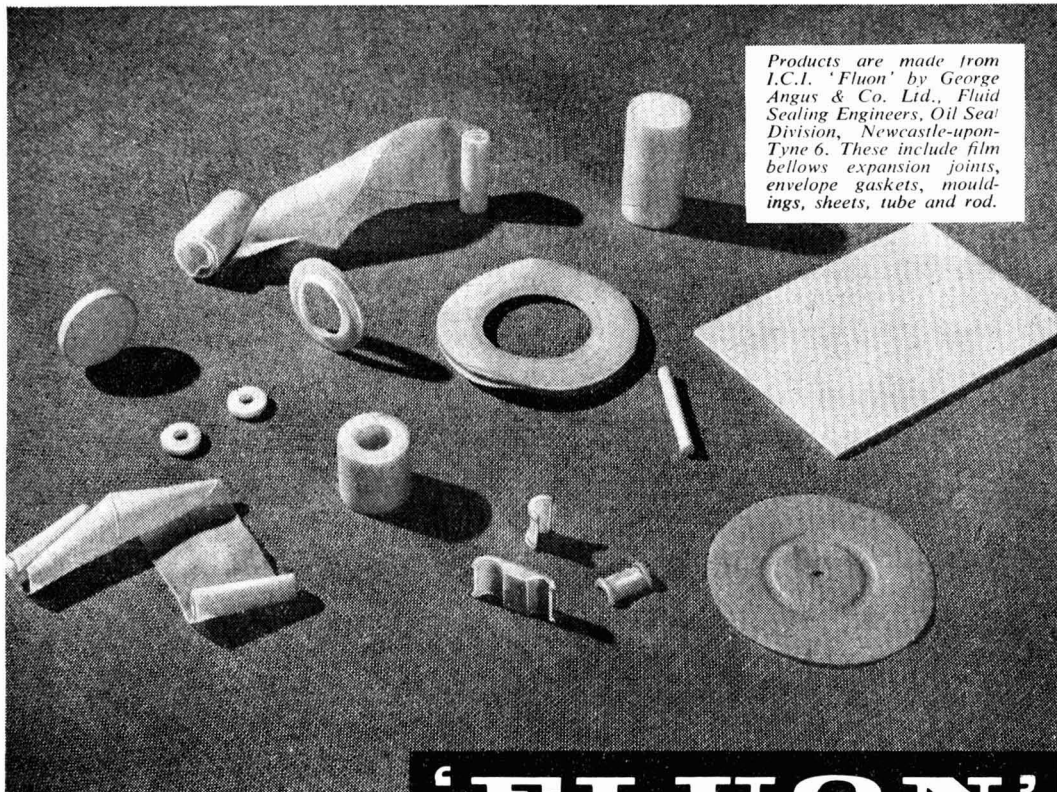
SATURDAY 24 MARCH

Society for Analytical Chemistry

Liverpool: City Laboratories, Mount Pleasant, 2 p.m. 'New Reagents and New Developments in the Fine Chemical Field' by W. C. Johnson, M.B.E., F.R.I.C. (chief chemist, Hopkins & Williams Ltd.).

Rayon Record

Rayon production rose to a record value of 972,800,000 lb. in 1955 it is reported by the American Rayon Institute. This was an increase of 15.6 per cent over the 1954 figure and 9.6 per cent over the 1953 figure, the previous record.



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Market Reports

LONDON.—An active demand has been reported from most sections of the market with the movement to the home consuming industries against contracts covering good volumes. Export trade remains at a high level, and a good flow of new inquiry has been reported. There has been a good seasonal demand for fertilizers. Among the industrial chemicals prices for the most part are unchanged and firm, the only noted exceptions being white lead and red lead, the current basis rates for which are £152 15s and £148 10s per ton respectively. Copper sulphate remains very firm with the strength in the price of the metal. The coal-tar products are unchanged.

MANCHESTER.—A strong price position pretty well throughout the range of heavy chemical products has again been reported on the Manchester market during the past week. The strength of the markets for the metals continues to be reflected in the price position of the non-ferrous metal compounds. Sulphate of copper has further stiffened by £4 5s to £125 per ton, less 2 per cent, f.o.b. Liverpool. The soda, potash and ammonia products are meeting with a steady demand, as are also a wide range of miscellaneous chemicals. Fertilizers and tar products are mostly moving steadily

GLASGOW.—Both in contract and spot during the past week orders have been well maintained, and business generally in the Scottish heavy chemical market has shown an upsurge. Little or no change in prices have to be reported, expect perhaps those pertaining to copper derivations, which have firmed. In regard to fertilizers the demand has been seasonably steady. The export market continues favourably.

Two British Standards

TWO publications just issued by the British Standards Institution concern white spirit and the methods of testing water used in industry. The British Standard for white spirit, BS 245, is a revised version of BS 245 'White Spirit' which was originally published in one volume with BS 244 and 290 'Turpentine'. The revised standard has been published in recognition of the superior quality of white spirit which is now available. It gives requirements for colour, distillation, aromatic content, residue evaporation, neutrality, freedom from objectionable sulphur compounds and flash point, together with appendices covering size of sample methods of test. It is priced at 6s.

The methods for testing water used in industry is described in BS 2690: 1956, which, although including some tests given in BS 1427, consists mainly of tests requiring laboratory facilities and chemical training on the part of the operator. The scope of the tests has been widened so that methods given are more generally applicable. Copies, price 17s 6d, are now obtainable from the British Standards Institution, Sales Branch, 2 Park Street, London W1.

L. H. Manderstam & Partners

In last week's issue we said that L. H. Manderstam & Partners: 'act as Crown Agents and are advisors to the Ceylon Government'. This of course would be impossible as the Crown Agents are a Government body and represent the interests of British overseas possessions. What we should have said is that L. H. Manderstam & Partners act as advisors to the Ceylon Government through the Crown Agents.

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THE Committee will, in July, allocate a limited number of Grants-in-Aid to young men and women employed in chemical works in or near London, who desire to extend their education for a career in chemical industry. Applicants must have General Certificate of Education at advanced level in Chemistry or Intermediate B.Sc. or their equivalent.

Applications should be made as soon as possible, whereupon forms will be issued requiring particulars of age, nature of employment and the manner in which the Grant would be used.

The application forms should be received, completed, before May 14th, 1956, by:—

THE CLERK OF THE SALTERS' COMPANY,
Salters' Institute of Industrial Chemistry,
36, Portland Place,
London, W.1.

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order, 1952

SENIOR SCIENTIFIC OFFICERS : SCIENTIFIC OFFICERS.

The Civil Service Commissioners invite applications for pensionable appointments. Applications may be accepted up to 31 December, 1956 (30 June, 1956, for posts in any branch of Chemistry or Biology), but early application is advised as an earlier closing date may be announced. Interview Boards will sit at frequent intervals. The Scientific posts cover a wide range of scientific research and development in most of the major fields of fundamental and applied science. In biological subjects the number of vacancies is small; individual vacancies exist for candidates who have special knowledge of, or who are interested in Palaeobotany, Malacology, Helminthology, Acarology, Foraminifera.

Candidates must have obtained a university degree with 1st or 2nd Class Honours in an appropriate scientific subject (including Engineering) or in Mathematics, or an equivalent qualification; or possess high professional attainments. Candidates for Senior Scientific Officer posts must in addition have had at least three years' post-graduate or other approved experience.

Candidates taking their degrees in 1956 may apply before the result of their degree examination is known.

AGE LIMITS.—Senior Scientific Officers, between 26 and 31, but specially suitable candidates under 26 may be admitted; for Scientific Officers, between 21 and 28 during 1956 (up to 31 for permanent members of the Experimental Officer Class). Salary—(London), Senior Scientific Officers: (men), £1,070-£1,245; (women), £951-£1,155. Scientific Officers: (men), £513-£925; (women), £513-£850. Women's scales being improved under equal pay scheme. Somewhat lower rates in the provinces.

Further particulars from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1, quoting No. S.53/56 for Senior Scientific Officers and S.52/56 for Scientific Officers.
8734/140/1/56/FW.

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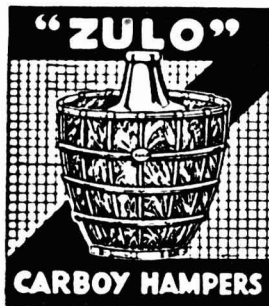
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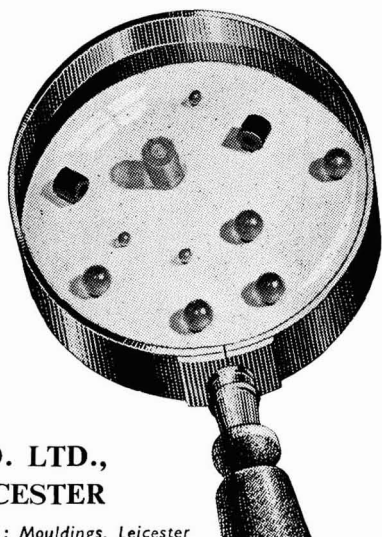
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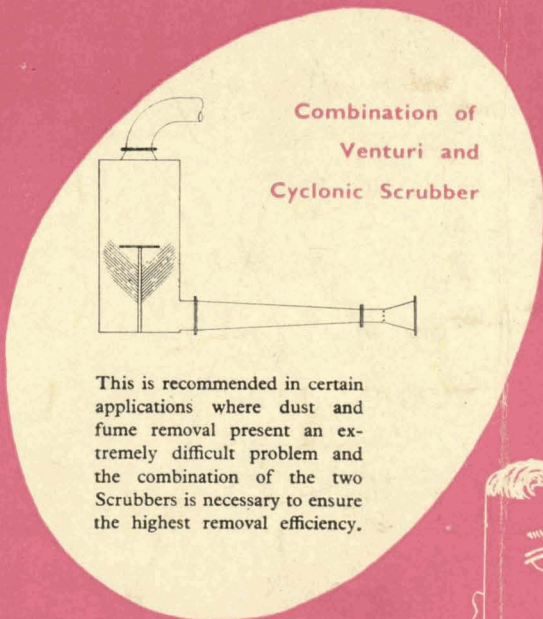
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