Chemical Age

OCCA EXHIBITION OPENED
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VOL. 77 No. 1966

16 March 1957

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The first figures refer to advertisement in **Chemical Age Year Book**, *the second to the current issue*

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One of the many valuable properties of 'Araldite' epoxy surface coatings is extraordinary adhesion to metals. Other characteristics of these versatile resins include toughness combined with flexibility, abrasion resistance combined with the capacity to withstand moisture and chemical attack. These are some of the properties that account for the widespread and increasing employment of 'Araldite' epoxy resins for coating wires and the insides of collapsible tubes, for protecting food processing machinery as well as chemical plant and metal components exposed to severe conditions of use.

May we invite you to write *now* for full descriptive literature?

'Araldite' epoxy resins have a remarkable range of characteristics and uses

They are used

- **for bonding metals, porcelain, glass, etc.**
- **for casting high grade solid electrical insulation.**
- **for impregnating, potting or sealing electrical windings and components.**
- **for producing glass fibre laminates.**
- **for producing patterns, models, jigs and tools.**
- **as fillers for sheet metal work.**
- **as protective coatings for metal, wood and ceramic surfaces.**

'Araldite' epoxy resins

'Araldite' is a registered trade name

Aero Research Limited *A Ciba Company. Duxford, Cambridge. Telephone: Sawston 2121*

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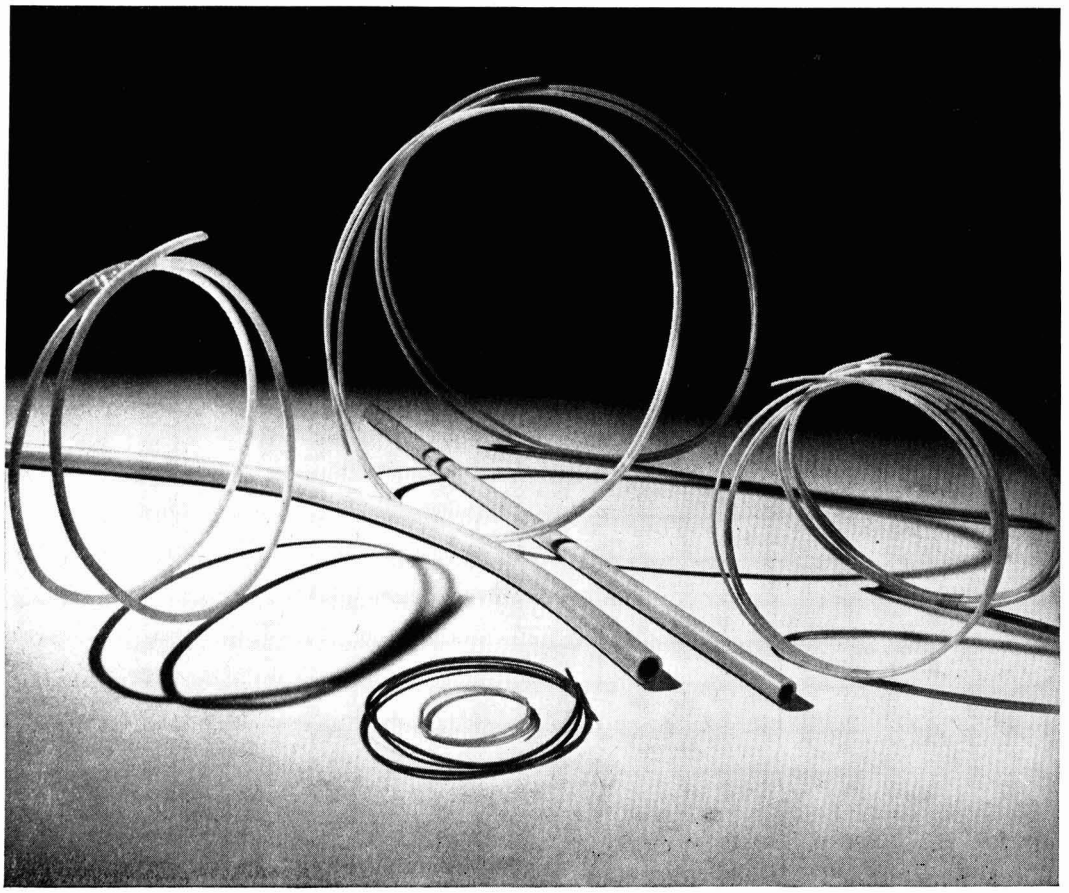

Tubing extruded from 'Fluon' p.t.f.e. by Crane Packing Ltd., Slough.

'Fluon' p.t.f.e. has no equal as a corrosion-resistant material for tubing

IS RESISTANCE to chemical corrosion one of your needs in tubing? Then use 'Fluon' polytetrafluoroethylene, the 'noble' plastic, unique among plastic materials. It is chemically inert and unaffected by *all* known corrosives except fluorine compounds and molten alkali metals. It is tough, flexible, resilient and may be extruded into continuous-length tubes, which can be used for lining high and low pressure hose to work at temperatures ranging from 250°C right down to −80°C.

'Fluon' is a plastic material with many uses. It can be used for making gaskets, packings, seals and couplings. It has remarkable electrical properties which make it invaluable as an insulator. Its co-efficient of friction is extremely low, so that it can be used for light duty bearings required to work without lubrication. It is also non-adhesive and non-wetting.

'FLUON'

'Fluon' is the registered trade mark for the polytetrafluoroethylene manufactured by I.C.I.

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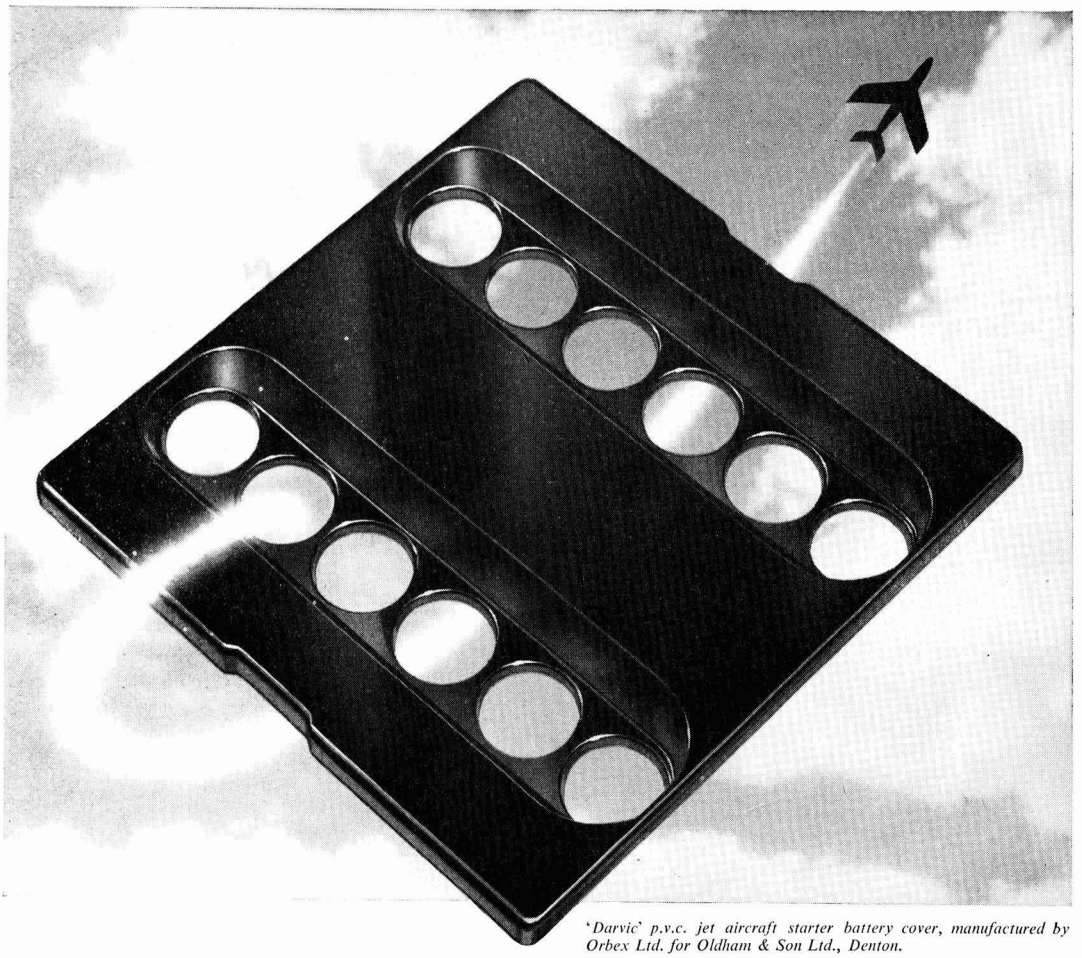

'Darvic' p.v.c. jet aircraft starter battery cover, manufactured by Orbex Ltd. for Oldham & Son Ltd., Denton.

Use 'Darvic' p.v.c. the plastic material that resists chemicals

'DARVIC' p.v.c. sheet, made by I.C.I., is the ideal material for all uses where outstanding resistance to corrosion is essential. 'Darvic' is resistant to most acids, alkalis, and gases.

'Darvic' is tough, light and long-lasting, and has considerable rigidity even in thin sheets. The forming of compound shapes in 'Darvic' presents no difficulties.

'DARVIC'

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

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

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VOL. 77 No. 1966
16 MARCH 1957

CHEMICAL AGE

BOUVERIE HOUSE · 154 FLEET STREET · LONDON · EC4

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IN THIS ISSUE

Annual subscription is 52s 6d ($7.40), single copies 1s 3d (by post 1s 6d).

WORLD'S FERTILISERS

FAO'S WORLD REPORT on fertilisers has been published almost simultaneously with the OEEC Report for Europe (see CHEMICAL AGE, 2 March, 367). However, to be discussing fertilisers again so soon is not inappropriate, for in much of the Western world March is the peak period of use, and possibly as much as a third of total annual consumption is now being drilled into, or spread upon, the soil.

This FAO Survey for 1956 (through HMSO, 92 pp., 5s) is able to present a broader picture of trends than the OEEC study. After all, it is outside Western Europe that the major opportunities for great expansion exist. Even in the US, fertiliser plantfood use per farm acre is a sixth of British use, a fifteenth of Dutch use! It is perhaps too easy to say that intensive fertiliser use has not yet begun outside Europe—excluding exceptional cases like Japan—for in many areas the soil's supply of water is a more frustrating limit to crop yields than the supply of nutrients. Holland probably provides the world's finest example of farming with a controlled water supply, and it is not completely accidental that she also uses fertilisers at rates reached by no other country.

World production is rising healthily. In 1955 there was a nine per cent increase over 1954; and for 1956, a further five per cent increase has been estimated. During the 1950s the annual rate of expansion up to now has been fairly steady at seven per cent. But 1956 production was about two and a quarter times that of the years immediately preceding World War II. These expansive trends have always been most marked for nitrogen. More countries are now making adequate returns of fertiliser statistics to FAO with the result that forecasting future demand can be a more reliable operation. It is confidently predicted that over the next few years world usage will rise by about six per cent per annum.

Despite the preceding comments, it is remarkable to find that European production rose by 20 per cent over the past three years, i.e. at almost the same seven-per-cent-annual rate for the world. This clearly indicates that it is easier to expand production where large-scale facilities already exist than to do so where facilities have to be initiated. In those parts of the world where fertilisers are still little used, is it scarcity and high cost of the fertilisers that keeps demand down to such poor levels? Or is it lack of demand that deters developments in local production? The statistics of the FAO Report give no answer to this problem.

It is in countries where the tempo of industrialisation is strongest that plans to expand fertiliser production seem the boldest, and this suggests the semi-paradox that industrialisation is the surest route to agricultural improvement. In Israel a national triple superphosphate factory is projected, and a new nitrogen plant at Haifa will produce 42,000 tons of nitrogen in 1957. New superphosphate factories at Madra, Hyderabad, and in West Bengal—total annual capacity, 60,000 tons—are planned for India, and nitrogen output at Travancore is to rise to 75,000 tons of ammonium sulphate and 30,000 tons of ammonium phosphate. A superphosphate factory is planned for Southern Rhodesia with a capacity equal to the present total needs of the Federation; a new phosphate rock refining factory in South

Africa has been opened and this is expected to lead to the production of 800,000 tons of superphosphate a year.

Neither Australia nor New Zealand are heavy nitrogen users, but in both cases their home production is inadequate. A new nitrogen plant in Tasmania will start producing in 1957. Two more new superphosphate factories are planned in New Zealand, where 100,000 tons of phosphate fertilisers still have to be imported every year.

A fair conclusion is that major opportunities for fertiliser export trade still exist on a large scale outside Europe; few of the major and more progressive food-producing countries are yet self-sufficient in fertilisers and less advanced food-producing countries still have grossly inadequate fertiliser industries. Will Europe's surplus production of superphosphate—equivalent to over 2,000,000 tons according to FAO estimates—compete for trade where an established market is already well supplied, or will it seek more distant markets where it is truly needed? It would be a better plan for an industrially-backward country to subsidise imports than to subsidise production facilities at home.

US EXPANSION LAGGING

IN proportion, the chemical industries of West Europe have grown faster than the chemical industry of the US during the last few years. Even French chemical companies have expanded more than their American equivalents during this period. It is significant that expansion in Europe has been aided by licencing agreements with US companies and by the setting up in Europe of US branch factories and manufacturing subsidiaries.

The average European chemical growth from 1953 until the Middle East crisis was 12 per cent per year compared to somewhat less than 10 per cent for the US, including tremendous growth in 1955 which compensated for the rather poor US showing in 1953 and 1954. The average net profits after taxes of the publicly owned chemical processing European companies are about six per cent of their sales, compared to about 9 per cent for US counterparts, according to Dr. Robert S. Aries, head of the New York consulting firm of R. S. Aries and Associates, who has recently returned from a two months survey trip.

Petrochemical growth is, obviously, the most impressive and American processes have been prominent in postwar development. Hundreds of agreements are in existence involving joint ventures, engineering and licencing with US firms. Products manufactured in West Europe and based on US licences are estimated to sell for one billion dollars annually and provide about thirty million dollars of annual income to US companies. Processes have also been purchased from West Europe by North American companies at an increasing rate since 1951, most of which have been based on inventions rather than complete know-how. Dr. Aries expects that in a decade the technical flow will be about equal in both directions.

RUBBER SYMPOSIUM

THE first ever international conference on synthetic rubber to be held in Britain opens in London on 26 March. The fixing of the conference is apt because some of the first British synthetic rubber plants are just coming into production, while others will be ready by 1958.

It will be recalled that last year ICI and Monsanto began production of butadiene copolymers, and Dunlop brought into operation at Fort Dunlop the first synthetic rubber plant. This year, British Geon Ltd. will start production of butadiene-acrylonitrile oil-resistant rubber at Barry, South Wales. Plans have recently been announced, too, by Du Pont (United Kingdom) Ltd. of their intention to build a plant in Northern Ireland to produce neoprene.

Main raw materials for general purpose synthetic rubber are also being produced in Britain. Butadiene is available from British Industrial Solvents Ltd., ICI are producing limited quantities at Wilton and Esso are building a plant at Fawley to supply the adjacent International Synthetic Rubber project: major suppliers of styrene monomer are Forth Chemicals Ltd., but another supplier will be Petrochemicals Ltd., at Partington.

Adequate supplies of synthetic rubber are of great strategic value to the UK as hitherto it has had to rely on natural rubber coming from the Far East. Now for the first time the British rubber manufacturers will be able to compete with their overseas rivals. While natural rubber has proved a very satisfactory general purpose material it does not possess the special properties of resistance to abrasion, heat, cold, ozone, chemicals and oils shown by special types of synthetic rubber.

A particular drawback of natural rubber has been its price instability and rubber manufacturers both in Britain and the US have found it difficult to remain competitive when using such a speculative material.

JAPANESE DEVELOPMENT

IN our 'Overseas News' last week (page 435) reference was made to a Japanese concern having acquired a licence in Japan to manufacture terephthalic acid, dimethyl terephthalate and other aromatic intermediates from petroleum based feedstocks. On page 469 of this issue there is a further note on Japanese petrochemical industry developments.

According to an estimate made by Baird Chemical Corporation of the US, Japan will have petrochemical sales worth $140 million with about $20 million for export by 1960. Dimethyl terephthalate alone will probably account for 20 per cent of the country's petrochemical output. Consumption of 'conventional chemical products' is expected to fall by $58 million a year, with, for example, polythene replacing p.v.c. in many markets. Phenol is to be made in large quantities. These developments will mean reductions of imports of benzene, ethylene oxide, ethylene glycol and many other chemicals.

Japanese production and consumption of vinyl chloride, polythene, urea formaldehyde, phenolic and polystyrene resins are scheduled to rise markedly. Excluding rayon and acetate, output of synthetic fibres will increase almost five times the present 63 million lb. a year level. Japan, has, of course, recently acquired patent right to Imperial Chemical Industries Ltd.'s polyester fibre manufacture (CHEMICAL AGE, 16 February, p. 282). Nylon, polyester and polyacrylontrile types will be the most important. Between 20 and 30 per cent of production is to be exported. Acetate output is expected to rise 5.5 per cent by 1960 over the current 725 million lb. a year level.

Ammonium sulphate output is to increase by 1 million tons by 1963 above the 1957 level of 2.3 million tons. Considerable plant expansion is also scheduled for urea, but other fertilisers will expand slowly, if at all. Japanese firms plan big increases in their capacity for heavy chemicals chlorine, caustic soda, sulphuric acid, and calcium carbide, exports of chlorine products are expected to increase greatly.

In its industrial plans, it will be noted that Japan is not concerned only with domestic needs in the chemical and synthetic fibre industries. She is building her plants with an eye to exportable surpluses. Japan is already making efforts to enter Russian, Chinese, African and South-East Asian markets. She has the available labour, she is rapidly acquiring chemical know-how and patent rights from the UK and US and will develop atomic power. The UK must therefore look to the markets which have been hers for many years and endeavour to strengthen these so they may withstand too fierce an encroachment by Japan.

OCCA TECHNICAL EXHIBITION OPENED BY UNILEVER CHAIRMAN

Not to Expand Any More, Says Mr. Newnham

NINTH TECHNICAL exhibition organised by the London section, Oil and Colour Chemists' Association, was opened on Tuesday this week by Lord Heyworth, chairman of Unilever Ltd. Lord Heyworth was also chief guest at a special lunch held earlier the same day by the section to mark the exhibition. The lunch was attended by about 350 members and guests, many from overseas. Mr. H. A. Newnham, chairman of the section, presided.

Among the guests at the lunch were the following representatives of scientific, research and other organisations: Sir Denis Truscott, president, Patra; D. L. Anand, president, Paint Research Association; W. M. Mackinley, president, National Paint Federation; C. D. O'Sullivan, president, Society of British Paint Manufacturers; G. D. Dane, president, Society of British Printing Ink Manufacturers; A. H. Whitaker, chairman, British Colour Makers' Assocation; J. Leonard, president, Society of Chemical Industry; W. C. Waghorne, president, British Plastics Federation; Dr. L. A. Jordan, director, Paint Research Association; Dr. G. L. Riddell, director, Patra.

Chairman's Welcome

In his address of welcome, Mr. Newnham referred to the contribution which Lord Heyworth's organisation made to the paint industry with regard to vegetable oils. He then welcomed the other guests, particularly stressing the valuable contribution made by the Paint Research Association. Mr. Newnham thanked the exhibitors for their past efforts and for the fine display put on this year. He remarked that when the first exhibition was held at Borough Polytechnic in 1949 there were 14 exhibitors. At today's Exhibition there were 88. He went on to say that size, however, was not important and it was not the intention of the exhibition to expand any further as it would mean exhibiting at Olympia which was not desired.

He warned that next year, the organisers would have to be selective regarding exhibitors. Replies to a questionaire indicated that exhibitors did not want the exhibition to be held at two-yearly intervals.

Finally Mr. Newnham thanked Mr. R. H. Hambling, OCCA general secretary, and his staff for the excellent organisation.

Responding for the guests, Lord Heyworth, said that just as a tree was known by its fruit, an industry was judged by its progress. He was therefore glad that in the oil and colour industry there was a planned technology. He felt that the gathering of personalities present and the exhibition were evidence that the tree was being well tended.

Undoubtedly the exhibition had a character all its own because of the scientific techniques, materials, equipment and research projects it displayed. The growth of the exhibition showed the need for understanding the technical requirements of the industry.

It was particularly necessary for young technicians to gain a view of new advances. Lord Heyworth stressed the need for closer co-operation between technical and business men. OCCA, he suggested, provided a meeting place for exchange of ideas.

The trend was for industry to spend more on research, and, therefore, scientists and industrialists must not work in separate compartments, only good could come from interchange of ideas.

Referring to the future need for selection of exhibitors, Lord Heyworth said that to have to discriminate would not be an enviable task. However, the challenge of competition in industry was its breath of life.

Many new developments on show at the exhibition were described in CHEMICAL AGE last week. Further details of developments are given below.

Durham Raw Materials Ltd., 1-4 Great Tower Street, London EC3, displayed a selection of the products manufactured by the Durham Chemical Group, for which they act as sole selling agents.

One section of the stand was devoted to the specialised zinc oxides produced by Durham Chemicals Ltd. for the paint industry, and to a demonstration of the gelling properties of the Durham range of aluminium soaps.

Another section exhibited the fungicidal qualities of Nuodex 321 Extra, in various formulations and under extreme conditions, and other products developed by Nuodex Ltd., including the lesser known metal naphthenates. Among the products on view were examples of a 'synres' non-yellowing resin after two years' interior exposure to diffused light.

A separate section demonstrated the properties of neoprene and Hypalon synthetic rubbers, manufactured by Du Pont and sold in the UK by Durham Raw Materials.

The Dyestuffs, Nobel, and Billingham divisions of **ICI Ltd.** exhibited on a combined stand. The new Daltolac alkyd resins and Suprasec polyisocyanate curing agents were the main features of the Dyestuffs division's exhibit. In the field of general surface coatings three new Paralac AH resins were featured. Two new pigments, Rubine Toner 2BOS and Pure Crimrose Chrome L6GS, were also exhibited.

On the Nobel division section of the stand, nitrocellulose SE, a new form of nitrocellulose with self-emulsifying and plasticising properties was shown. This provides a means of making clear, dyed or pigmented emulsions.

The Billingham division exhibit showed the application of phase equilibria and other physico-chemical principles to the study of resin/solvent systems and the changes that occur during their evaporation.

New products exhibited by **Styrene Co-polymers Ltd.,** 1 Roebuck Lane, Sale, Cheshire, were Scoflat 100/35, a high viscosity alkyd in odourless solvent; Scopon 1200M and Scopon 1200K, epoxy esters modified with vinyl toluene; Scopel 41N, a long oil low viscosity alkyd modified with vinyl toluene; and Scopel 76NX, a high viscosity styrenated alkyd. These products are not yet in bulk production.

Latest additions to the range of p.v.a. emulsions manufactured by **British Oxygen Chemicals Ltd.,** Vigo Lane. Chester-le-Street, Co. Durham, are the Vandike 2100 series emulsions. They were specially developed for the paint industry with the object of providing a versatile range of p.v.a. emulsions giving outstanding results in different types of paint formulation.

It is stated that paints made using a wide range of formulations can be stored even at 60°C without appreciably affecting their properties. Results obtained using both nonionic and anionic stabilisers are said to be excellent. Paints formulated to provide semi-gloss, eggshell and matt finishes have excellent scrubbability, the high scrub resistance being retained at pigment/binder ratios up to 3:1. It is also claimed that well bodied thixotropic paints can be formulated at solids contents as low as 50-54 per cent.

The Vandike 2100 series emulsions are white, uniform and of medium viscosity with an average particle size of less than 1 micron. The pH is 5-6 at 20°C and the specific gravity is about 1.1. Vandike 2100 is unplasticised and Vandike 2115 contains about 15 per cent of dibutyl phthalate on the total solids content. Vandike emulsions are also compatible with other accepted plasticisers such as dibutyl glycol phthalate.

Specifications are: Vandike 2100, total solids 55-57 per cent w/w; monomer, not more than 0.3 per cent w/w. Vandike 2115, total solids 59-61 per cent w/w; monomer, not more than 0.3 per cent w/w.

Examples of new formulations are given in BOC technical bulletin No. 14, issued this month.

UK Target for Nuclear Power Doubled

Details of the Government's new targets for its nuclear power programme were announced in the House of Commons last week. The target of 1,500-2,000 mW of nuclear capacity in the UK by 1965, has been raised to a range of 5,000-6,000 mW. This involves the supply of raw materials for nuclear generation, the acquisition of sites and the planning of transmission network on a scale sufficient to bring 6,000 mW of nuclear capacity into operation by the end of 1965.

The Electricity Board for Northern Ireland intend to bring a 150 mW nuclear station into commission by 1963 or 1964.

CONVEYOR BELT SYSTEM RECOMMENDED FOR SOIL ANALYSIS : OEEC REPORT

SOIL TESTING laboratories should be organised in such a way as to make a moving belt system possible. . . . Instruments should be reliable, robust, and of simple design. . . . Large dials for easy reading have an advantage. . . . Glass electrodes should be used in all laboratories for *p*H determinations. . . . For colorimeters and flame photometers, narrow wave band filters should be used.

These are some of the recommendations made by a 12-country conference and reported in the recent OEEC publication *The Organisation and Rationalisation of Soil Analysis* (from HMSO, 219 pp., 12s). It is stated that regional centres of which there may be several in any one country, already handle from 10,000 to 200,000 samples a year, according to size of region and the demand for advice from farmers.

The first apparatus needed is a drier. Opinions on suitable drying temperatures vary but most European centres observe a maximum drying temperature of 35°C. More research seems called for on the effects of drying temperatures upon plant-food solubilities. Soil grinding machines are next required. Many different kinds are at present used. A German machine (by Möhrling) is commended, but a new British machine being developed by the NAAS and the National Institute of Agricultural Engineering, with average output of 30 samples an hour, seems likely to take the lead.

Urgent Need

A balance of simple design and robust construction is urgently wanted for rapid routine weighings of 5 g. and 10 g. of soil. A balance to weigh fixed amounts, designed for another purpose, used at the Bristol centre (SW region of NAAS) is described as very suitable, though comparatively expensive. General OEEC agreement as to type of balance is urged, for its production could then be reduced in cost. Balances used at Swedish and Dutch centres are also mentioned as possible prototypes.

Most laboratories have developed automatic pipettes to deliver measured reagent quantities to a number of shaking bottles at one time. Shaking machines are of great importance, and many types are in use—end-over-end shakers, Arrhenius 'whirling' type, or back and forward horizontal movement shakers. The system used in UK and Ireland is said to be the best. This is of the latter type, the open mouths of the bottles being sealed during shaking by a sheet of rubber mat or sponge.

Several flame photometers are mentioned. The cheapest and simplest is one much used in the UK, produced by Evans Electroselenium Ltd. Zeiss, Lange, Schuhknecht, and Kipp photometers, used mainly for potash determinations, are also mentioned.

In Holland thermo-elements are used instead of photo-element cells for colorimetric analysis; this is due to wartime absence of the latter, and as thermo-elements proved so good they have continued to be used. In Ireland and some UK laboratories a simple colorimeter by Evans Electroselenium is used, but the Spekker adsorptiometer null deflection instrument is preferred at other UK centres. Colorimeters by Lange, Elko (Zeiss), and Eppendorf are favoured in Germany. At Munster, the biggest centre of the OEEC area, the cup-glass Lange instrument is much used.

Comment is made on the heavy usage of distilled water and its high cost at most centres. The use of demineralising plants with cation and anion exchange elements is recommended.

Finally, the general comment is made that 'in Denmark the greatest progress has been made in developing instruments specially designed for these analyses. They are almost foolproof. Galvanometer scales of some commercial instruments tend to be tiring to read when doing a large number of determinations. . . . Danish galvanometer dials beat all others in this respect as they have been specially designed for easy reading. . . .'

Comment Invited on Draft Standards

COMMENTS FROM industry are invited on the following draft British Standards. If received promptly they will be considered before publication. Copies are free to subscribing members; to non-members the price is 2s post free from the BSI, 2 Park Street, London W1.

Determination of tension set of soft vulcanised rubber (revision of parts 16 and 19, BS 903), CX 2030 and CX 2031; determination of specific gravity and density of petroleum and petroleum products, CX2032; and CX 2034; carbon tetrachloride, CX 2046; tritolyl phosphate (revision of BS 1999), CX 2047; analysis and testing of coal and coke (revision of BS 1016, parts 7, 6 and 11), CX 2147, CX 2296, CX 2413; determination of resin finish in textile materials treated with urea formaldehyde, CX 2260; determination of creep and stress relaxation of vulcanised rubber, CX 2357; determination of flash point of petroleum products by the Abel apparatus CX 2461.

Fluorocompounds Available

Associated Fumigators Ltd., 112 Victoria Dock Road, London E16, have prepared the following compounds in some quantity and small samples can be made available gratis to any bona fide worker for pharmacological and chemical research:

Code No.	Substance
AFL 1080	Sodium fluoroacetate
AFL 1081	Fluoroacetamide
AFL 1082	Fluoroacetanilide
AFL 1083	Fluoroacetic acid
AFL 1084	Fluoroacetyl chloride
AFL 1085	Calcium fluoroacetate
AFL 1086	Barium fluoroacetate
AFL 1087	Phenyl mercury fluoroacetate
AFL 1088	Phenyl mercury fluoroacetate/ammonium carbonate water soluble complex.

ABCM Forms Packaging Committee

THE Association of British Chemical Manufacturers has set up a Packaging Committee to watch the interests of the chemical industry. The committee will not provide a consultative service but will ensure that where packaging policy in general is concerned, the association is not at any disadvantage in relation to other industries.

Mr. G. H. Edwards, packaging adviser to Unilever, is chairman of the new committee.

The committee will co-operate with the British Standards Institution and with similar groups in other industries

Mr. G. H. Edwards, of Unilever Ltd., has been appointed chairman of the committee. Other members are: Mr. C. J. Johnson, North Thames Gas Board; Mr. A. F. Much, ICI Ltd.; Mr. A. Roche, Monsanto Chemicals Ltd.; Mr. E. O. Rounsefell, Laporte Chemicals Ltd.; Mr. L. W. Stubbs, Albright and Wilson Ltd.; Mr. F. W. Walmsley, British Industrial Solvents. The joint technical secretaries are Mr. C. Swinbank, ICI Ltd., and Miss E. R. Micklem, Unilever Ltd.

Marchon Exports 20 Times Higher than in 1950

EXPORTS of Marchon Products Ltd., a member of the Albright and Wilson group, in 1956 were 20 times greater than in 1950, stated Mr. Frank Schon, chairman, this week. The share of exports of the total sales increased steadily in the past seven years, rising from 14.3 per cent in 1950 to 52.7 per cent last year. During the same period, total turnover increased more than fivefold.

Mr. Schon believes this achievement in a highly competitive market was attained by frequent visits to most parts of the world by senior executives, by careful study of what the buyer wants and by prompt delivery of the right goods at the right price.

Discharge of Gas Liquor Into River Trent

What experiments have been made and with what results to break down the chemical compounds of gas liquor as a preliminary to its discharge into the river Trent, or to the absorption of gas liquor into the sewage plant for purification?

In reply to this question, asked last week in the House of Commons, Mr. H. Brooke, Minister of Housing, said the West Midlands Gas Board was pursuing an extensive research programme, which covered the treatment of gas liquor both before and after discharge.

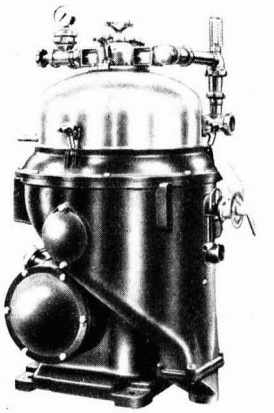
EQUIPMENT REVIEW

Chemical Plant : Laboratory Apparatus Safety and Anti-Corrosion Products

ALFA-LAVAL SELF-OPENING SEPARATOR

A NEW self-opening separator is being introduced by Alfa-Laval Co. Ltd., Great West Road, Brentford, Middlesex. Known as the type PX 209-00S, the machine, which is a special version of the company's self-opening separator, has a high efficiency, constant capacity disc type bowl for either liquid/solid or liquid/liquid/solid separation.

The bowl is fitted with a special hydraulic mechanism whereby solids may be ejected while the bowl is running at full speed. Stoppages for bowl cleaning are thereby eliminated and by using this machine processes can be put on a fully automatic basis. The bowl opening may be either controlled manually or by an automatic timing device.



Self-opening separator

This new separator is designed for the chemical, food and process industries and liquid contact parts are of stainless steel. The machine may be either gravity or pump fed. There is a special paring disc discharge whereby the clarified liquid is discharged in a non-aerated condition and under pressure. Consequently, the clarified liquid can be discharged to a height of 60 ft. without additional pumping.

EVOTECT PROTECTIVE PAINT

A NEW ANTI-BITUMINOUS paint, for protecting open-air iron and steelwork against weather corrosion, has been developed by Evode Ltd. of Stafford, and is now being marketed under the name Evotect.

For normal atmospheric conditions one coat of Evotect is sufficient. Covering capacity is approximately 60 to 70 sq. yards per gallon, depending upon conditions. The paint becomes surface dry in six to eight hours and hard dry by the following day.

A feature of the paint is that it may be applied direct to bitumen-painted surfaces, provided that the bitumen is at least 14 days old, without the use of sealer or special undercoat. Initial gloss and gloss retention of the paint are claimed to be superior to bitumen-based paints. Also it is available in 12 decorative colours as well as black and aluminium.

According to the manufacturers, Evotect painted surfaces may be subsequently over-painted with any normal decorative paint without the use of a sealer. If new plant or buildings are erected later, the whole may be unified in one colour scheme using conventional decorative paint, such as Evolene or Evolustre, including those originally painted with black bitumen.

HEAD WRIGHTSON DEVELOPMENTS

RECENT developments of Head Wrightson Processes Ltd., 24-26 Baltic Street, London EC1, include an advanced form of concrete cooling tower in which all the main units are constructed of factory precast concrete and special consideration has been given to an even structural load distribution throughout the ground area.

A low head cooling tower has also been designed which utilises extended packing and a special form of water distribution that ensures even distribution over the whole packing area.

Air cooled Fin-Fan heat exchangers are another development. The simple closed circuit principle of the air-cooled radiator has been applied to industrial problems by developing a robust high efficiency air cooled unit, incorporating spirally finned tubes and adjustable pitch propeller fans. Advantages claimed are low maintenance in labour and materials and low operating costs. A packaged version of the Fin-Fan has been designed and the standard range includes vertical and horizontal units mounted with direct power or belt driven fans.

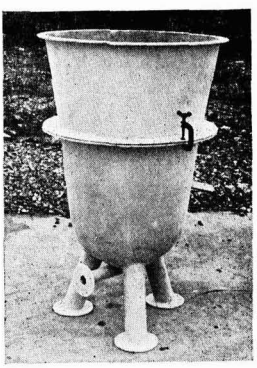
REMOTE READING GAUGE

THE R. and G. type B electrically operated remote reading contents gauge manufactured by Bayham Ltd., 12 Lower Grosvenor Place, London SW1, has now been followed by a companion instrument for use in explosive atmospheres where gases in the pentane and hydrogen classes may be present. This version has Ministry approval under Certificate No. I.S.3010, Issues 1 and 2, and complies with British Standard Specification BS 1259: 1945.

Termed the B/IS gauge, the new model is to indicate liquid levels in tanks, operating on an intrinsically safe electrical circuit. The gauge consists of three separate units: the tank unit, power unit and the receiver. Only the power unit must be kept out of the danger area.

RESILON VACUUM FILTER

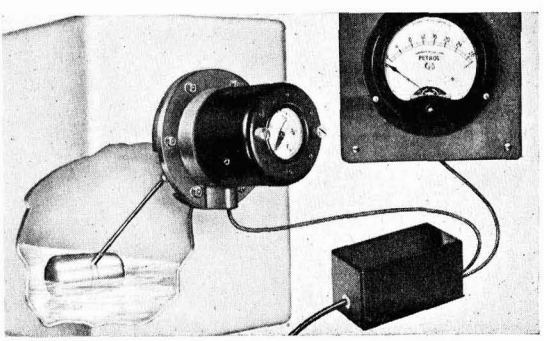
VACUUM filters made from Resilon, a synthetic resin bonded fibrous reinforced material, are now being marketed by Russell Construction Ltd., Russell House, Adam Street, Adelphi, London WC2. They are claimed to have such advantages as immunity from 'hair cracks' and



Resilon vacuum filter marketed by Russell Constructions Ltd.

their associated drawbacks, stability under sudden changes of temperature, lightness in weight, yet sufficient strength and resilience to withstand vigorous manhandling and a long working life.

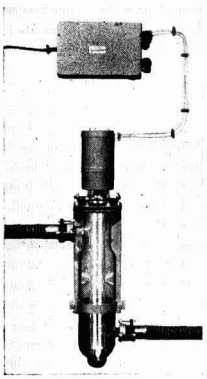
Resilon vacuum filters are constructed in five units: top section, bottom section, perforated plate, and two gaskets.



Bayham electrically operated remote reading gauge

NEW HANOVIA UNITS

NEW units announced by Hanovia Lamps, a division of Engelhard Industries Ltd., Slough, Bucks, include a dual-purpose water steriliser, a benzole meter, an ozone emitting UV discharge lamp in quartz, and Radisil radiant/infra-red industrial heaters, models 20 and 21.



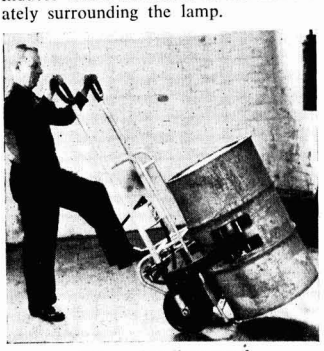
Hanovia water steriliser

The water steriliser comprises a special U-shaped low pressure mercury vapour discharge in clear quartz in a quartz protective cylinder and surrounded by a QVF industrial glass chamber through which water passes. A 100 m.a. step-up transformer operates the 44 watt lamp from a.c. mains supply. As a continual flow unit this steriliser was designed to treat 300-400 gallons of water an hour, depending upon the optical density of the water to short UV radiation.

Sealed to the circular flange the quartz lamp assembly can be quickly detached from the glass jacket and used separately as an immersion steriliser for small drinking or process water tanks of, for example, 50 gallons capacity.

Available for gas works and coke oven plants for the accurate, intermittent, or continual estimation of benzole in coal gas is a benzole meter. It is designed to take a recorder. Normal range for the meter is 0.1-6.0 g. of benzole per 100 litres of coal gas. Sensitivity can be doubled if required.

Describing the ozone emitting UV discharge lamps in quartz, the company states that an improved 52 in. U-shaped quartz lamp emits mainly in the UV at 2537 and 1850 AU. The latter wavelength induces ozone formation in air immediately surrounding the lamp.



Grippa handling truck

Such tubes have photochemical applications such as the synthesis of hydrazine from ammonia vapour, the oxidation of organic compounds, and are used to cause changes in the surface of certain plastics film.

Radisil radiant/infra-red industrial heaters, models 20 and 21, are the industrial versions of the successful domestic radiant/infra-red Radisils. They are designed for factory heating, and industrial drying or curing processes. Safety, economy, efficiency and versatility are the main features claimed for these heaters.

BCURA PORTABLE DEWPOINTMETER

THE DEWPOINTMETER, a portable instrument designed for the measurement of the dewpoint and corrosive potentialities of flue gases containing (sulphuric) acid vapour, has been developed by Victoria Instruments Ltd., Midland Terrace, Victoria Road, London NW10, in conjunction with the British Coal Utilisation Research Association.

The instrument consists of a detector element the surface temperature of which is controlled by a blast of compressed air and in which are flush mounted combined thermocouple electrodes. The detector is mounted on a probe for insertion in flue gases at a temperature not exceeding 700°F (over a temperature range from ambient to 700°F) and a sensitive microammeter detects and measures, by electrical conductivity, the acid condensed out at or below the dewpoint temperature of the gases under examination.

ONE-MAN HANDLING TRUCK

LATEST addition to the Sherpa range of one-man handling trucks manufactured by Salisbury Precision Engineering Ltd., 1 Buckingham Palace Mansions, London SW1, is the Grippa, which is capable of picking up loads of awkward shape and size. A safety valve prevents crushing of loads and the wheel principle facilitates easy manœuvrability over uneven ground.

Constructed of tubular steel, with arms of reinforced channel section, the Grippa can be fitted with a wide range of plates for different loads. The truck has a low delivery high pressure pump fitted with release and safety valves.

DIAPHRAGM TYPE GAUGE

DIAPHRAGM gauge (No. 70), manufactured by Bailey and Mackey Ltd., 7 Baltimore Road, Birmingham 22b, can be used to register pressure, vacuum, or pressure and vacuum combined. This gauge is claimed to be particularly suitable where there is a danger of mechanical vibration, and on chemical apparatus where special materials are required to resist chemical action. It is not recommended for a maximum calibration of more than 400-lb. per sq. inch.

The company's pressure switch (No. 108) is diaphragm operated and can be set in a few minutes to operate at any pressure within its range.

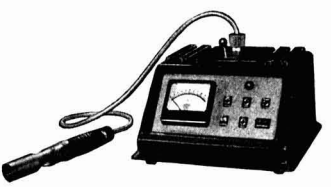
For chemical plant, the pressure chamber and diaphragm of the switch can be either made from a resistant metal or electroplated to withstand the effects of a corrosive medium. For some applications the pressure chamber can be lined with rubber, and the diaphragm protected by a rubber washer.

The switch is made in three pressure ranges: adjustable between 400 and 20 lb. p.s.i.; adjustable between 50 and 2 lb. p.s.i.; and adjustable between 15 lb. p.s.i. and 30 in. vacuum. It will take currents up to two amp. at 600 volts or five amp. at 250 volts a.c.

ELECTRIC ROTATION VISCOMETER

ROTOVISCO, an electric rotation-type viscometer designed to meet the need for a modern viscometer suitable for pure physical research as well as production control, has been produced by Gebruder Haake of Berlin and is available in this country from P. K. Dutt and Co. Ltd., 1 and 2 Alfred Place, London WC1. The instrument converts viscosity values into electric values, which are then indicated, recorded or controlled.

It has a five-speed change gear and two synchronous motors of different speed so that 10 different speeds can be selected.



Rotovisco viscometer

Two measuring heads are available for optional use, making the torque range amount to approximately 80:1.

Viscosity of material under test is obtained by multiplying the dial reading of the speed and calibration factors. No calibration curves are required.

On switching on different speeds, the proportionality or non-proportionality of the dial scale pointer deflection is an indication of whether the material under test is a Newtonian or non-Newtonian material. By operating a switch small pointer deflections can be magnified four times so that they can be accurately read.

ELECTRONIC READING MACHINE

AN ELECTRONIC device which 'reads' figures from a roll of paper and then types what it has read back on to the paper at very high speeds was demonstrated last week by Solartron Electronic Business Machines Ltd. No special type face is required and 120 characters can be read per second.

Developed to operate in conjunction with a computor the main purpose of the Solartron Electronic Reading Automaton was to reduce the number of operators or 'programmers' required for preparing material for processing.

The machine is the first of a series planned to read at speeds up to 500 characters per second. It is designed to handle many kinds of input material such at tally rolls from cash registers, microfilm records, cheques and invoices by

means of the 'eye', an all electronic scanning device. If necessary, the eye can skip the unnecessary part of a document and read only what is required without the document being moved about specially.

Information read is electrically conveyed to the actuating mechanism, for example, a card punch, punched or magnetic type, which is then operated at many times the speed possible by any human being. It is estimated that the Solartron ERA will punch cards at 144 times faster than human punches working at a rate of 300 cards per hour. Working eight hours a day, five days a week, capital investment cost of the machine can be written off in one year.

POLYTHENE COATED BAGS

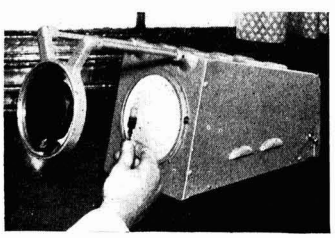
A RANGE of polythene coated paper bags is being introduced to the chemical industry by Robert Peters (Nottm) Ltd., Ethel Road, West Bridgford, Nottingham, under the trade name Telcothene.

At present, factilities are available for the production and delivery of bags of a maximum width of 10 in. and maximum length of 20 in. Various types of paper laminations are available, having slightly different characteristics: bleached Kraft, MG Kraft, vegetable parchment, and Glassine, all having a polythene face and printed when required.

Advantage of these bags is said to be their strength and rigidity.

AMPOULE INSPECTION VIEWER

DETECTION of minute particles of foreign matter in clear liquids in ampoules and other glass containers is claimed to be greatly simplified by the EDM 208 ampoule viewer marketed by Engineering Developments (England) Ltd., Mark Road, Hemel Hempstead, Herts.



Engineering Developments' EDM 208 ampoule viewer

The ampoule is held in a field of polarised light and viewed through a lens of 2X magnification, any foreign matter being shown up clearly and brightly against a dark background. One polarising filter is fitted behind a five in. diameter lens which is optically corrected for binocular viewing and has good depth of focus so that the ampoules do not require accurate positioning to be in focus.

The other polarising filter is mounted on the front of the instrument case and can be partially rotated to vary the degree of polarisation. Illumination is provided by a 100 watt pearl lamp, the casing being adequately ventilated.

Overall height is 10½ in., overall length 19½ in., and overall width 7 in.

POLYTHENE EVAPORATION BARRIER

INDUSTRY loses thousands of pounds through evaporation. In the US, the American Agile Corp., Maple Heights, Ohio, US, have designed an evaporation barrier which is stated to retard evaporation by as much as 75 per cent. The barrier is provided by tiny expanded star shaped polythene floats containing thousands of tiny air cells for buoyancy and light weight. The surface contours are designed to provide extensive interlocking and clustering at the surface of volatile solutions.

ELECTRONIC DIGITAL COMPUTER

A GENERAL purpose digital computer, Metrovick 950, has been developed by Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester 17, for use in solving a wide range of mathematical, engineering and scientific problems.

Basically a machine that will calculate at high speed, the Metrovick 950 consists of five main parts—input equipment, store, arithmetical circuits, output equipment, and control panel.

Information is fed into the machine by means of a photo-electric punched paper-tape reader. The output unit punches holes in paper tape under the control of the computer, and this information can subsequently be read or printed out on a teleprinter.

PNEUMATIC PUMP UNIT

NEUMO Mk. III, a pneumatically operated pump unit with no metal to metal sliding contact in the pump is manufactured by the S.E.D. Engineering Co. and marketed by Kingsbourne Products Ltd., 216 South Coast Road, Peacehaven, Sussex.

The standard Neumo motor employed has only two moving parts, both solid, which ensures a pump that can raise a system to a given pressure and then stall, only re-starting when pressure in the system drops.

The double acting plunger type pump with disc valves allows liquids to be raised to a considerable head. Standard pumps are of cast iron with alternatives available in the plunger and glands of leather, synthetics or p.t.f.e. Pumps can be made of special materials to order, and the manufacturers are attempting to cover the major portion of difficult liquids capable of being pumped, by marketing an inert pump entirely of p.t.f.e. The p.t.f.e. pumps are expected to be ready in May.

AUTOSONICS FOR AUTOMATIC TESTING

A RANGE of new automatic ultrasonic testing equipment, titled Autosonics, has been introduced by Kelvin and Hughes (Industrial) Ltd., 2 Caxton Street, London SW1. This is a new technique, combining the principles of electronics and mechanics, developed to scan automatically the material under inspection with a suitable probe that transmits sound into the material as a sequence of energy pulses, which in turn, are reflected from the opposite face and received by the probe. The sequence of events is displayed as a trace on a cathode ray tube and/or recorded electrically on paper.

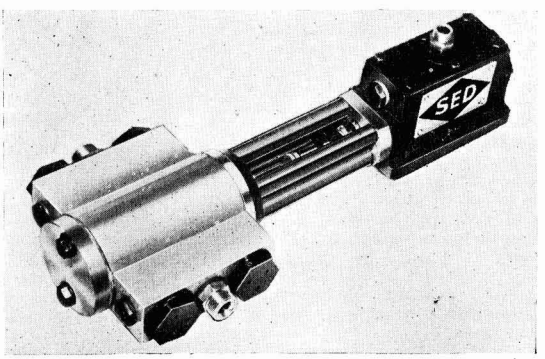
Autosonics is a development of the company's work in non-destructive testing. It overcomes the limitations of manual inspection, embodying a series of sensitive and stable electronic circuits which maintain constant vigilance, operating automatic alarms when defects are found. The technique facilitates the inspection of large volume production and enables predetermined material inspection standards to be integrated as part of a production line.

The technique comprises the following sections: flaw detector; automatic gain control; automatic flaw alarm and recorder; system fault alarm. Initial setting up procedure is said to be simple.

SOOT BLOWER PLANT

A NEW motorised rotary valve has been incorporated in the flue dust blower plant, designed by Heat Economy Ltd., 13 Kentish Town Road, London NW1, for flue dust removal from Lancashire boilers, with steam working pressure from 80 to 150 lb. p.s.i. With this valve, operation of the soot blower plant is stated to have been made foolproof.

The rotary piston is connected to a special geared motor by an intermittent motion gear. Due to this mechanism the port of the rotary piston is moved to position 1 supplying steam to blowers in the furnace flues. The piston stays in this position for one minute and is then moved automatically to the next position supplying the second blower groups with steam. Having blown all groups in succession, the rotary valve stops automatically in the closed position.



S.E.D. Neumo Mk. III pneumatic pump

CHEMICAL PIONEERS

4 Charles Tennant of St. Rollox

The fourth article in this series on the pioneers of the chemical industry deals with Charles Tennant of the St. Rollox Works. The author, Dr. D. W. F. Hardie, who is well known as a historian of the Industrial Revolution and of the chemical industry, describes Tennant as 'one of the great initiators of heavy chemical industry.'

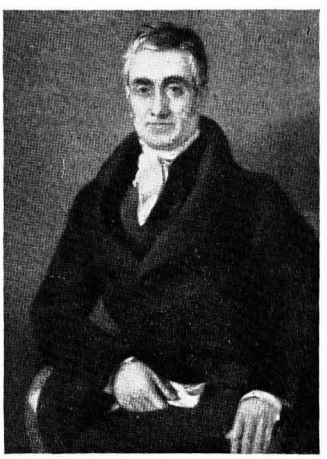
BORN IN AYRSHIRE in 1768, Charles Tennant was the fourth son of John Tennant by his second wife. John Tennant, who was the father of fifteen other children, was a small farmer—as his traceable ancestors had been at least as far back as 1635. In the year of Charles' birth, Tennant senior became factor to the Countess of Glencairn, a post which he held until his death in 1810. If not a man of substance, Charles Tennant's father appears to have been a man of note; Robert Burns, who knew the family well, described him as 'the most intelligent sensible farmer in the county.'

Charles Tennant received his education at the parish school, and, at the age of 16, became a weaver at Kilbarchan, weaving then being one of the best-paid trades in Scotland. From weaving he passed to bleaching, and subsequently with a partner, Cochrane, he established a bleachgreen at Darnley, near Paisley. Every morning, at the first light, young Tennant was walking with his watering-can along the turf lanes between the strips of bleaching linen. In a house overlooking the bleachgreen lived John Wilson, a local alum manufacturer, also an early riser. Impressed by the young man's diligence, Wilson invited him to his home, and in due course Tennant became his son-in-law.

The bleaching power of chlorine was first clearly recognised in 1785 by C. L. Berthollet. Not long after that date the inexorable miles of fabric poured forth by the textile machinery of the Industrial Revolution were taxing the capacity of bleachgreens to deal with them by the traditional procedure of many weeks exposure to wind and weather. Chlorine bleaching, because of its great rapidity, offered a prospect of relieving a bottleneck in textile manufacture and a serious threat to future expansion of the industry. In continental countries the new method of bleaching was practised soon after publication of Berthollet's work. Within two years, knowledge of the technique reached Scotland as a result of visits by Patrick Copland and James Watt to Geneva and Paris.

In England, during the period 1789-95, patents were taken out by De Boneuil, Taylor, Campbell and Bigg for various methods of preparing chlorine and applying it to the bleaching of linen, cotton and paper. There is evidence, too, that others, who did not seek protection of patents, were employing variants of the new art in the early 1790s. By 1796-7 chlorine bleaching, although far from universally practised, must have been a matter of common knowledge throughout the trade.

Although it will probably remain forever a matter of uncertainty, it seems that Charles Tennant, in 1796 or 1797, deciding to advance with the times, sought



Charles Tennant

advice from a chemist called Hugh Foy. In order to suppress the unpleasant character of the free gas, bleachers were adopting the continental practice of absorbing chlorine in potash solution to form what was known as *eau de Javelle*. Foy may have suggested to Tennant that, instead of absorbing the chlorine in potash solution, he should use a suspension of slaked lime for that purpose. Whatever the truth of the matter, in January 1798, Tennant patented a bleaching process using lime in that way.

In 1797 Tennant moved his bleaching operations to Glasgow, where, in partnership with James Knox, Alexander Dunlop, Dr. William Couper, and Charles Macintosh, he acquired for £5,000 the site on which the famous St. Rollox works were subsequently erected. Although Tennant himself had no chemical training or experience, it is to be noted that his father-in-law, John Wilson, and Couper and Macintosh had considerable knowledge of chemistry and its applications.

The procedure of absorbing chlorine in a suspension of slaked lime, while a certain step forward, did not entirely solve the problem of taming chlorine.

In 1798-9 Charles Macintosh (later to claim immortality as the inventor of the 'mackintosh') solved the problem by the expedient of absorbing the chlorine in almost dry slaked lime, producing a material to which Tennant gave the name 'bleaching powder.' To avoid interference with the wet process patent, which was in Tennant's name, Macintosh's invention, by agreement among the partners, was also patented as Tennant's. Although these facts have been published record for well over a century, many text-book and other writers continue to designate Tennant as the inventor of the chemical commodity, which, with alkali and sulphuric acid, formed one of the three key products of heavy chemical industry for over 100 years.

In 1800, each of the St. Rollox partners made a sealed tender for purchase of the works; Tennant, with the financial backing of his father-in-law, put in the highest bid and gained control. The other partners remained in the business, with the exception of Charles Macintosh.

During the immediately ensuing years Tennant and his associates found the exploitation of bleaching powder uphill work. In 1802, as the result of an infringement action, the patent was found invalid, in view of prior working of the process by others. Ten years later Tennant was attempting, unsuccessfully by political lobbying, to persuade the Government to purchase the invention outright. As late as 1820 bleaching powder output at St. Rollox was just beginning to exceed 300 tons a year. However, as the chemical phase of the Industrial Revolution gained momentum and manufacture at St. Rollox was diversified by production of sulphuric acid, LeBlanc soda, and soap, the fortunes of Tennant and his partners rapidly improved. Before 1803 the sulphuric acid for generating chlorine at St. Rollox was purchased from Prestonpans Vitriol Co. and from Norris and Sons, Halifax. In 1803-4 lead chambers of similar dimensions to those used by John Roebuck were installed and not long afterwards, larger ones, measuring 20 by 20 by 11 ft. In 1803, too, sodium sulphate from the on a small scale by the LeBlanc process.

Largest in the World

The associated firm of Tennant, Knox and Co. was formed in 1811 to act as a selling agency in London, and, in 1830, Tennant, Clow and Co. for a similar purpose in Liverpool. A sulphuric acid works was established in 1830 at Carnoustie in Angus, to supply acid to the linen bleachers of that county and of Fife. By 1835, St. Rollox was the largest chemical factory in the world; in plants covering 27,000 sq. yards, 600 tons a week of coal were consumed; the platinum in its vitriol rectifiers was valued at £7,000.

Charles Tennant died in October 1838. He was a man of liberal and energetic mind; neither scientist nor technologist, he takes his historical place as one of the great initiators of heavy chemical industry. He founded a dynasty which played a notable part in chemical enterprise up till the time of the great mergers which rationalised the industry to meet modern developments and competition from countries to which the Chemical Revolution had come later, but no less effectively, than to ours.

Overseas News

DESPITE COMPETITION BASF TURNOVER RISES TO ABOUT £127 MILLION

TOTAL turnover of BASF for 1956 amounted to DM 1,498 million (approximately £127 million). This figure includes the turnover of subsidiaries wholly owned by BASF and home associated companies whose products are marketed by BASF. The comparable figure for 1955 was DM 1,365 million so that there has been an increase of some 10 per cent in 1956. Of this turnover 65.4 per cent was from home sales and 34.6 per cent was from foreign sales.

Because of strong home and foreign competition revenues from many products were lower. Also, increase in quantity was greater than the increase in value in several fields. BASF had to make great efforts to meet increasing costs (wages, salaries, fuel, raw material and auxiliaries, materials for repairs, freight). It is expected, however, that the annual balance-sheet, which has not yet been declared, will again result in a satisfactory dividend for the year under review.

Investment in the Ludwigshafen Works in 1956 amounted to some DM 300 million. BASF is to begin an extensive new construction programme and complete work in hand in 1957 in order to keep pace with demand and achieve further reduction in costs. However, it is not anticipated that the amount of investment in the Ludwigshafen Works for 1957 will reach the figure of the previous year.

Turnover for January 1957 is above that of January 1956 and orders in hand are satisfactory.

Glycidyl Methacrylate Available in US

Experimental and pilot plant quantities of a light coloured, almost odourless monomer, glycidyl methacrylate, is being offered in the US by E. I. du Pont de Nemours and Co. Inc. Claimed to be a convenient way of introducing epoxide groups into vinyl polymers, or vinyl groups into condensation polymers, the monomer may be polymerised or copolymerised via the double bond. Further reaction may be achieved through the epoxide groups.

Brazil Regulates Development of Petrochemical Industry

To regulate development of the petrochemical industry in Brazil, the National Petroleum Council has issued Resolution 1-57. This defines the industry and lists the essential products, as well as providing that authorisation to install or expand plants must be given by the Council. Existing companies were called on to register within 90 days of the resolution being published.

To guarantee production of basic raw materials and essential products when private companies show no interest in such production, Petrobras is authorised to engage in industrial and commercial activities in the petrochemical field. This step may also be taken to avoid a monopoly on the part of the private interests and to encourage the adequate development of Brazil's petrochemical industry.

In the case of a shortage of the basic raw material, the foreign or partly foreign-owned companies may be given less favourable treatment than wholly Brazilian owned enterprises.

Sudan Export Enquiry

Osman Saleh and Sons, PO Box 633, Khartoum, seek UK agencies for chemicals and fats for the manufacture of laundry soap. Interested exporters should write direct to the firm.

New Dry Polyester Powder Expected in the US

It is understood that Durez of the US will offer a granular dry polyester moulding powder in the autumn of this year. This new product will, it is claimed, eliminate handling problems of present semi-solid and 'chunk' types of the resin. Light colours will be available to be competitive with melamine urea type and some phenolics.

Finland's 1957 Import Allocations

It was announced in Helsinki on 6 March that licence allocations for the first quarter of 1957 have now been made. About £10 million only has been allowed for distribution for purchasing from Western Europe. While Britain has no trade agreement with Finland, she heads the list with £2,663,000. Of this sum, £193,000 has been allocated for chemicals.

Reduction in Italian Copper Sulphate Price

The Interministerial Committee of Prices in Rome has decided to reduce the price of copper sulphate from 192,000 lire to 160,000 lire per metric ton, a reduction of 15.6 per cent. This price will remain in force until the end of March. The price for April has been fixed at 162,000 lire and the price for May at 164,000 lire.

Petrochemicals Industry in Japan

The first full-scale petroleum chemical plant in Japan has now been opened at Shimotsu, Wakayama, the Maruzen Oil Co. announce. Production is of the order of 80 tons of secondary-butanol which it is intended should be increased to 150 tons in March and to 300 tons monthly by May. This solvent is required for the Japanese paint industry, which is estimated to require 400 tons monthly.

Petroleum chemical production on a commercial scale by some ten Japanese companies has been authorised by the Japanese Ministry of Trade and Industry. It is expected the Nippon Petro-Chemical Co., will be producing acetone and *iso*-propyl alcohol by May, the Mitsubishi Oil Co., plans to start production of benzol, toluol and xylol in November. In this same month, the Sumitomo Chemical Industry should be producing polythene.

Canada's Chemical Industry Expands Rapidly

Chemical output in Canada has been stimulated by the construction of a natural gas pipeline which will soon connect western oilfields with eastern industry. Expansion of the plastics industry is creating larger markets for acetic anhydride, hydrochloric and sulphuric acid, ethanol, methanol, cresol, formaldehyde, glycerine, phenol phthalic anhydride, sodium hydroxide and urea. By 1975 plastics output is expected to grow from $100 milion a year to $400 million.

The Government is now studying the question of increasing tariff duties on sodium hydroxide and carbonate, dyes, pigments, paints, fertilisers, insecticides, glycerine and other chemicals.

Argentine Explosives Factory Not Yet Working to Capacity

Nitric acid and nitro-glycerine plants at the Naval Explosives Factory, Azul, Argentina, have recently been working at 80 per cent of capacity. The nitro-cellulose and dynamite plants, where the installations are not yet complete, have been working to 25 per cent of capacity. The factory is expected to reach full production this year.

Finnish/Czech Agreement

Under a new trade agreement, valid until 31 December 1957, Finland is to export magnesites and ilmenite concentrates and cellulose to Czechoslovakia. Czech exports to Finland will include certain chemicals.

FMC to Increase Solvents Production

A $ multimillion solvent expansion programme is being undertaken at Food Machinery and Chemical Corporation's largest chemical installation, the Westvaco Chlor-Alkali Division plant at South Charleston, West Va. Division president, Mr. Franklin Farley, has said that the expansion involves carbon disulphide and carbon tetrachloride, two major Chlor-Alkali products.

Engineering work on the solvent expansion programme has already begun. The present disulphide unit, built in 1954 and considered one of the most advanced

in the world, will be substantially expanded. The somewhat older carbon tetrachloride unit is to be completely overhauled to give more capacity and greater operating efficiency.

This solvent expansion programme is part of an overall plan to renovate and enlarge most of Westvaco's South Charleston facilities. Other phases of the programme include the entirely new ammonia plant completed in late 1955 and the rebuilding of the chlorine plant now in progress. Modernisation of the steam and power facilities, including installation of modern fly ash equipment, is also under way. The rehabilitation programme is scheduled for completion by early 1958.

Polyester Resin Plant in Ontario

Construction will start immediately on a new plant to produce polyester resin at the Naugatuck Chemicals plant in Elmira, Ontario. Target date for completion has been set for late 1957, and the new unit is expected to be in operation early in 1958.

Naugatuck Chemical, a division of Dominion Rubber Co. Ltd., began pilot plant production in 1952. The new plant will represent an additional investment of $500,000 and will be designed to produce a variety of basic polyester resins, formulations and pre-mix compounds of all types, as well as alkyds polyurethane production.

Peru Breaks Government Monopoly in Salt

Private firms in Peru may now exploit coastal salt deposits, provided the salt is to be used for a basic industry that is officially declared to be of national interest. This is the first time that any firm other than Estanco de la Sal, the Government agency operating a salt monopoly, has been allowed to utilise the salt deposits.

Egypt may buy Italian Pharmaceutical Products

An Egyptian mission entrusted with the task of purchasing 4,250,000 dollars worth of pharmaceutical products is expected in Italy. This mission is visiting also several other European countries, including Austria, Belgium, Germany, Netherlands, Spain and Switzerland.

Synthetic Rubber for Brazil

Talks on the setting up of a synthetic rubber plant near Cubatao, Brazil, between Sao Paulo and Santos are well advanced. The Government hopes the installation of such a factory will eventually avoid the need to import between 10,000 and 12,000 tons of rubber a year.

Terpene Hydroperoxides as Catalysts

Gordon S. Fisher and Leo A. Goldblatt of the US Department of Agriculture at Olustee, Fla., have been issued two broad patents on saturated terpene hydroperoxides and their use as polymerisation catalysts. US Patent 2,775,578 covers the use of saturated terpene peroxides, in particular p-menthane hydroperoxide and pinene hydroperoxide, in polymerisation processes. The second patent, US Patent 2,735,870, covers pinene hydroperoxide and methods for its production. Both patents are stated to be available for licensing on a royalty-free non-exclusive basis.

Canadian DuPont to Build Cellophane Cellulose Plant

DuPont of Canada plan a second plant for the production of cellophane cellulose. The existing plant, expanded nine times since 1945, has reached maximum production, but demand for the product is still growing. Initial services have been installed and work is well advanced.

NZ Customs Classifications

Among goods newly classified by the New Zealand Customs Department are the following: chemicals specially suited for use as catalysts in the manufacture of plastics materials; approved emulsifiers and wetting agents— myrex and polyoxy-ethylene thio ether; polyvinylpyrrolidone. In each case British Preferential and General tariff rates are set at 3 per cent.

Union Carbide's Expenditure on New Construction

Last year, Union Carbide and Carbon Corporation of the US spent $144 millions on new construction in the US, Canada and other countries. This year, the corporation expects that an even larger amount will be spent on the construction of new production facilities. In 1956, $55 million was invested in research and it is anticipated that this year at least an equal amount will be spent again.

US Price of Titanium Trichloride

A price of $10 per lb. for titanium trichloride has been established by Titanium Pigment Corporation, New York, US, as a result of larger pilot plant production. Until this announcement, the product, in laboratory quantities, has cost about $110 per lb. Titanium dichloride is being offered at the same new price as for the trichloride (see also CHEMICAL AGE, 9 February, p. 240).

European Chemical Engineering Congress in 1958

The 1958 European Congress of Chemical Engineering which will be held from 31 May to 8 June in Frankfurt in conjunction with the Achema Congress, will include the following meetings: 12th exhibition and congress of chemical engineering organised by Dechema; the second congress of the European Federation of Chemical Engineering, which will start in Brussels on 28 and 29 May and will be continued at Frankfurt from 31 May to 8 June; the second congress of the European Federation of Corrosion; special meeting and lectures of the Gesellschaft Deutscher Chemiker, and the annual meeting of Dechema Deutsche Gesellschaft für chemisches Apparatewesen.

An invitation brochure published in English, French, German, Italian and Spanish is obtainable from Dechema, Frankfurt am Main 7, Postfach.

Corrosion-resistant Chemical Equipment

A newly developed combination of furan resin and an inert ceramic, Chemplas 15, is being used by General Ceramics Corporation, Keasley, New Jersey, US, in the manufacture of all types of chemical equipment, tanks, trays, pipe and fittings, pumps, and a host of other applications.

It is claimed that the material is easily fabricated and can be used for many very complex shapes. The temperature limit on the material is relatively low compared to normal ceramic materials but it has excellent thermal shock resistance.

Spain's Chemical Production in 1956

Reviewing economic achievements during 1956, Spain's Minister of Industry has given the following provisional statistics relating to the country's production of certain chemicals and allied products.

	Production (1000 tons)	Percentage increase over 1955
Sulphur	50	33.0
Sulphuric acid ...	918	6.0
Caustic soda	116.5	16.5
Calcium carbide ...	56	18.5
Calcium superphosphate	1,575	8.5
Nitrogenous fertilisers	226.1	3.0
Petroleum products ...	3,890	13.0

Jordan's Phosphate Developments

Official permission has now been given to the Jordan Phosphate Co., a controlling interest in which is held by the local Government, to export 450,000 tons of phosphate during 1957. This, it is understood, will be supplied mainly to the Far East, with some going to Yugoslavia and Italy.

This year's projected output is stated to be justified by the present ore reserves which are believed to be of the order of several millions of tons.

It is considered by the company's London consultants, Mackay and Schnellman, that output could be markedly increased but for local transport difficulties. Very little processing, if any at all, is required to be carried out before shipment. Price is of the order of 88s per ton f.o.b. Aqaba.

Chemicals at Vienna Trade Fair

At the Vienna Trade Fair being held this week, chemicals and pharmaceutical products are being exhibited. In the Vienna Autumn Trade Fair, to be held from 8 to 15 September, there will be a section devoted to chemicals, dyestuffs and varnishes, plant protection chemicals and rodenticides. There will also be a special Inventor's Fair.

CORROSION PROBLEMS IN CHEMICAL FACTORIES—5

Effluent Drains

By

F. R. Himsworth, Ph.D., B.Sc.,

and

J. G. Hines, Ph.D., M.A.

A LARGE factory contains many miles of drains, in various sizes from 4 in. to 80 in. diameter. The effluents will vary from highly corrosive (for short times, if trouble occurs) to quite innocuous, for example, cooling and storm water. It may be possible to list the corrodents which may at any time exist in individual plant drains; the worst troubles occur where several such drains join up, since the list of corrodents becomes a large one and a very expensive construction might be called for. By careful design of the drainage system it will usually be possible to ensure that the main drains always have a large flow of storm or cooling water, so that even a high concentration of acid in a subsidiary drain causes only a very low concentration in the main drain.

The materials normally used for large drains are concrete and cast iron or steel. Even minute traces of acid are sufficient to attack these materials seriously over a period of many years, and some form of protection is required. Suspended solids may be present, requiring the addition of an abrasion-resistant lining at the invert. Brick lining, with a cement which will resist dilute acids and the other chemicals that may be present, is an economical solution. The lining may be all round the circumference, or may be only sufficient to exceed the normal flow level.

Earthenware Drains

For the smaller drains, say up to two to three ft. diameter, serving plants or small groups of plants, earthenware drains are generally used. The cement used to make the spigot and socket joint must be capable of resisting the chemical attack, and if an expensive cement must be used the joints may be very costly. The main disadvantage of earthenware drains is that they are brittle and inelastic, so that very slight ground movement is sufficient to loosen the joints or crack the pipes. If this happens, the leak rapidly becomes worse, since liquid escaping from the drain washes soil away, and this results in further settlement and cracking.

Drains are buried well out of sight, and the trouble may not be evident for many years. If the drain is surrounded by impervious clay, the clay itself may form an almost liquor-tight external lining, and this greatly delays the appearance of damage. The re-laying of a drain is, however, a slow and costly process, particularly on a congested site, and the loss of production during the repair may be serious. In addition, the drain may pass close to building foundations, and corrosive liquor escaping from it may damage these extensively before any evidence of leakage becomes apparent. It is therefore advisable to go to some trouble and expense in the first place to ensure that no leakage will occur, even in a very long period, say 25 years or more. If the drain is to serve several plants, the possibility of new plants producing different effluents should be borne in mind.

Acidic effluents, unless they are small in amounts and will be well diluted with water, should be neutralised at or near the plant from which they come. If this is done, only short lengths of comparatively small drain need be made acid-resistant; the large main drains, which in fully acid-resistant construction would be very expensive, can then be made of cheaper materials. It must be noted, however, that the salts produced by neutralising mineral acids may be aggressive towards concrete and steel, and some protection may still be required.

Large Scale Trials

In recent years trials on a large scale have been made using plastics pipes for effluent drains. The most suitable plastic is polythene, since it has very good all-round chemical resistance, and is flexible enough not to crack under the most severe ground movement. It is one of the few materials which can be relied upon not to corrode or crack when used as an effluent drain. It is, of course, a costly material compared with steel, cast iron, concrete or earthenware, though it may be noted that for large diameters, say 2 ft.

Fig. 1: Laying a nine in. diameter Alkathene drain pipe

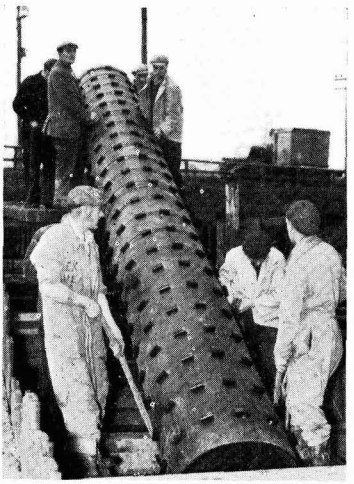


Fig. 2: Alkathene drain section, showing method of reinforcing

or over, it is actually cheaper than earthenware pipe. It is however very easy to install, particularly in small bores, and the final cost is much more favourable than might be thought.

For the smaller bores, up to 12 or 18 inches, it is possible to prefabricate long lengths, say 150 or 200 ft., by welding on the surface, either alongside the trench or, better, in a workshop. The material is so light that these long sections can be readily handled to site and placed in the trench. A 200 ft. length of 12 in. bore pipe, for example, would weigh about 800 lb., and could be handled by 15 to 20 men with ease. The usual practice is to prefabricate an entire section between manholes, so that no welding need be done in the trench. The flexibility of polythene is also useful. In transporting it to site, even in 12 in. or 18 in. diameter, it can be bent to negotiate corners. It can be laid even in a heavily timbered trench by 'snaking' it under the timbers and along the bottom of the trench. The rate of laying is very fast; a long section can be put in position in half-an-hour or less, and concreting and back-filling can be started immediately.

10-Minute Operation

Figure one shows a 150 ft. length of nine in. diameter pipe being fed into a heavily shuttered trench, 9 ft. deep. This operation took 10 minutes. Because of the lightness and flexibility of the material, nine in. pipe is easily placed in a curved trench.

With larger diameter pipes, say two to four ft., shorter lengths must be used, but even in the largest sizes prefabricated lengths of 24 ft. can be used. Large diameter pipe is made by centrifugal casting in 12 ft. lengths; two of these are usually welded together in the shop, and the remaining welding done in the trench. If the diameter is big enough, say three ft. or above, the site welding can be done from the inside, which is much more convenient than in the trench itself.

The flexibility of polythene introduces one difficulty. Large bore pipe collapses

under a very small external pressure, ground water pressure at moderate depths being sufficient. Polythene pipes are always encased in concrete, but the concrete is never sufficiently impervious to prevent the build-up of ground water pressure, and it is necessary to anchor the pipe into the concrete at quite close centres to prevent collapse. This has been achieved by welding short lengths of one in. bore polythene pipe at intervals round the circumference, and passing a steel rod through them. When the concrete is poured the pipe is thus thoroughly anchored, and if the rings are pitched sufficiently close collapse is prevented. This of course adds considerably to the cost, but at large diameters the cost is appreciably less than for earthenware, and the additional cost is not serious. Expanding wooden supports are placed inside the pipes to align the ends for welding. These are left in position while the concrete is being poured and until it sets.

Figure two shows a 22 ft. length of 30 in. diameter pipe, complete with the anchoring rings, about to be lowered into the trench. The steel rods are in the process of being fitted.

Polythene drains have been used successfully in sizes from six in. to 3 ft. 6 in. They are suitable for almost every corrosive condition likely to be met in a chemical effluent drain. They are not suitable for hot effluents (say a maximum of 40°C). If organic materials may be present, only the harder grades, Grade 2 Alkathene or harder, should be used. In fact for all chemical applications Grade 2 is preferred.

Conclusion: This paper is a very broad outline of current practice in corrosion prevention in chemical factories. It is not possible in a general paper to consider specific problems, and, as has been emphasised a detailed examination of the conditions is necessary before the test constructional materials can be recommended. We have therefore endeavoured to give guiding principles rather than attempt to list the chemicals to which various materials are resistant.

ECONOMICS OF USING TEFLON FIBRE AS VALVE PACKING MATERIAL

LARGEST single application of Teflon, tetrafluoroethylene, fibre to date is as a packing material for valves in the chemical industry, state E. I. du Pont Nemours and Co. An example is a valve used in a pipeline in one of the company's plants to transport hydrogen fluoride gas. With a packing of Teflon fibre, this valve was still operating successfully after three-and-a-half months when it was taken down for routine inspection. Best previous performance with a standard asbestos packing was three days.

Although valve packings of Teflon sell for more than 10 times the price of ordinary asbestos packing, the savings afforded in this instance more than justified the higher initial cost. The asbestos valves packing for instance, cost 30 cents against the Teflon fibre packing which cost $4.20. Operating cost of the asbestos packing is given as $1.20 a day compared with a daily operating cost of 12 cents in the case of Teflon. The annual saving is nearly $400 for this valve when installation and maintenance are included, but without considering other savings resulting from no loss of production time.

This is one of the uses to which the chemical industry is putting tetrafluorethylene fibre. The high selling price restricts its use to specialised applications, in which the corrosive or solvent action of the chemicals being handled precludes the use of less expensive materials. It is believed that the chemical industry itself will find increasing uses for tetrafluorethylene fibres.

As the molecular chain of Teflon consists only of carbon atoms and fluorine atoms it is peculiarly resistant to attack by chemicals. This inertness has been put to good use in the food and chemical industries, and fabrics of Teflon fibre are being used commercially to filter highly corrosive liquids and gases such as nitric acid, hydrogen peroxide, gaseous HCl, and others. Felts of this fibre are finding use in the filtration of liquid fuels and lubricants at fairly high temperatures.

The high temperature stability (melting point is over 600°F) of this fibre which is due to its carbon-fluorine chemical structure and the close packing of the molecules, is being used to advantage by industry in gas filters and in electrical insulation. Rapid advances in military aircraft and guided missiles are placing increasing demands on fibres, and tetrafluoroethylene promises to fulfil many of the high temperature requirements.

The low coefficient of friction of this synthetic fibre (.03) is also related to the basic chemical structure, i.e. closely packed molecules and high concentration of fluorine atoms in the molecule. The smooth surface of the fibre is believed to result from the fact that only the closely packed atoms are exposed, which present an unbroken surface.

The orientation of the molecules of this polymer during manufacture increases the tensile strength of the fibre and markedly increases its resistance to flow under high loads

The combination of its low friction with good resistance to flow, produces a product well suited for bearings, particularly bearings needing little or no lubrication. A development of a non-lubricated ball-socket suspension joint for motorcars was announced in May, 1956. In this case, the socket was lined with a fabric of Teflon fibre. Modifications of this principle are now being tested in supersonic jet aircraft where temperatures vary from well below zero to several hundred degrees, requiring uniform frictional characteristics.

Will

SIR LIONEL ERNEST HOWARD WHITBY, C.V.O., M.C., of The Masters Lodge, Downing College, Regius Professor of Physics at Cambridge and Master of Downing College, who died on 24 November left £22,303 net.

Thermoplastics Cable Is Subject of Plastics Institute Lecture

THERMOPLASTICS in the submarine-cable industry, is to be the subject of the eighth annual lecture of the Plastics Institute. The lecture will be given by Sir John Dean, B.Sc., A.R.I.C., F.I.R.I., chairman and chief executive of the Telegraph Construction and Maintenance Co. Ltd. Sir John is a vice-president of the Institute.

His talk will deal with the very great contribution thermoplastics have made to the development of submarine cables. Mention will be made of the use of gutta percha for the first submarine cable laid in 1850. This material held the field as an insulant for submarine telegraph cables for a full century.

Reference will then be made to Imperial Chemical Industries Ltd.'s discovery in 1933 of the thermoplastic polythene which enabled cables of much improved electrical characteristics to be produced, opened up a new field in the development of submarine telephony and led to the practical realisation of the first trans-Atlantic telephone cable. Because of the rigid specification for the Atlantic telephone cable completely new production plant had to be set up.

This lecture will be held in the Lecture Theatre of the Institution of Electrical Engineers, Savoy Place, London WC2 at 6.30 p.m. on Tuesday, 30 April 1957. Tickets are not required.

New Fluorinated Silicone Rubber to be Shown

A NEW fluorinated silicone rubber that is claimed to retain its elasticity over a temperature span ranging from less than −60°C to over 200°C and to display a remarkable resistance to attack by aircraft fuels, hydraulic fluids and petroleum based engine oils will be demonstrated by Midland Silicones Ltd. at a reception during the International Synthetic Rubber Symposium at Caxton Hall, Westminster, on 27 March.

The new rubber, Silastic LS-53, was developed by the company's US associates, Dow Corning Corporation, in conjunction with the materials laboratory of the Wright Air Development Centre. Combining the ease of fabrication of silicone rubbers with the solvent-resistance of fluorocarbon chemicals, LS-53 is regarded by the company as 'a major step towards achieving a low-swell, heat-stable rubber for use on jet planes—and ultimately in all those industries where rubber parts are exposed to oils; solvents and extreme temperatures.

Borax and Boric Acid Prices

Borax and Chemicals Ltd., Kings Bourne House, 229 High Holborn, London WC1, announce increases in the prices of their 'Three Elephant' brand borax and boric acid as from 1 April. Anhydrous borax, refined pentahydrate borax and boric acid will be increased by £3 10s a ton, and hydrous borax by £3 a ton.

Chemist's Bookshelf

DEVELOPMENTS IN CATALYSIS

ADVANCES IN CATALYSIS AND RELATED SUBJECTS. Volume 7. Edited by *W. G. Frankenburg, V. I. Komarewsky* and *E. K. Rideal*. Academic Press Inc., New York. Academic Books Ltd., London. 1955. Pp. xi + 362. 72s.

After the first few volumes of a series such as *Advances in Catalysis* have appeared, the publication has to survive a critical period. The initial need for clarification of the subject has been met, the obvious topics have been reviewed, the first list of suitable contributors has been exhausted and the initial impetus has died down. Continued success of the publication depends partly on the amount of new material being produced by original research and partly on the capacity of the editors to find new contributors of the correct calibre.

Both these criteria of success have been fulfilled in the case of *Advances in Catalysis*—the publication has survived the critical period and should continue to occupy the position that it has gained as one of the most important publications summarising progress in the field of catalysis.

Emission Microscopy

In this seventh volume there are a number of excellent and stimulating contributions by well-known people. The account of field emission microscopy by R. Gomer is timely, because there have been striking developments in this technique during the last three or four years.

The chapter by J. A. Becker on adsorption on metal surfaces includes further results from field emission microscopy and also treats other subjects such as the classical work on the investigation of the adsorption of caesium on tungsten using thermionic emission and the recent developments of the 'flash filament' technique with particular reference to the adsorption of nitrogen on tungsten. This chapter also reviews, in a critical manner, much of the earlier work on adsorption on metals in the light of present-day standards of surface cleanliness and in terms of the modern definition of a good vacuum (i.e. 10^{-10} mm. of Hg).

The chapters by K. Hauffe on the application of the theory of semiconductors to problems of heterogeneous catalysis and by R. Suhrmann on the electronic interaction between metallic catalysts and chemisorbed molecules are both important. Both authors have made valuable contributions to their fields and as most of their original work was published in German, these chapters giving an account of the subjects in English are particularly welcome.

Hauffe's chapter describes in some detail the effects which arise from the electrical properties of the boundary layer resulting from ionic adsorption on semiconductors and Suhrmann's chapter is mainly concerned with the effect of adsorbed molecules on the work function and the electrical resistance of metals.

Catalytic properties and chemisorption on zinc oxide and nickel oxide are discussed by G. Parravano and M. Boudart. Surface barrier effects in adsorption are described in a chapter by S. R. Morrison who deals almost solely with zinc oxide as an adsorbent. Although this chapter is somewhat more limited in scope than the others, it gives an interesting and consistent account of various phenomena involving zinc oxide.

A useful summary of the various complementary methods of assessing the influence of the electronic nature of substances on their catalytic activity is given by M. McC. Baker and G. I. Jenkins. There is also a short chapter by E. Cremer on the 'compensation effect', which is one of the names given to the linear relationship between the logarithm of the frequency factor and the energy of activation—a relationship which appears to occur surprisingly frequently in catalytic reactions.

The usual author and subject indexes are included and the volume is well illustrated both by figures and photographs. It can be recommended most strongly to all who wish to keep up with developments in the field of catalysis and adsorption. C. KEMBALL.

Crystal Structure of Calcium Silicates

CRYSTALLOGRAPHIC DATA FOR THE CALCIUM SILICATES. By *L. Heller* and *H. F. W. Taylor*. Her Majesty's Stationery Office, London. Pp. 79. 10s 6d.

This book is the outcome of work undertaken at Birkbeck College for the Building Research Board, on the hydration products of cement. It is a collection of crystallographic data for about 30 calcium silicates, anhydrous and hydrated. Compounds dealt with, many of which are known as minerals, are given ideal formulae although, as is explained, the natural minerals and the products in industrial processes may vary in composition.

Natural occurrence, density, optical properties, and the spacings as measured in X-ray powder photographs, are recorded. Different phases such as those of dicalcium silicate may not be distinguishable solely by optical means. A whole group of tobermorites, which include the complications of 'ill-crystallised mixed hydrates' and 'intergrowths containing wilkeite" illustrate other difficulties.

Work on such materials can only be useful if the substances are properly identified, and the present volume should be of great value in making this possible. In Appendix II an attempt is made to classify the structure of the hydrated calcium silicates according to the form of the idealised silicon-oxygen skeletons proposed for some of their structures. As might be expected the familiar chains, double chains, or layers of linked polyhedra appear, although these structural features are not as yet very clearly related to cementing action. H. M. POWELL.

Nuclear Science for Physicists

ANNUAL REVIEWS OF NUCLEAR SCIENCE Volume 6, 1956. Edited by *J. C. Beckerley* in association with *M. D. Kamen* and *L. I. Schiff*. Annual Reviews Inc. Pp. 453.

In the face of the tremendous bulk of current scientific publications, a reviewer need not be apologetic in commending a volume planned to give concise, authoritative articles on selected topics. The producers of such a series perform a valuable service. However, such books are not the light reading of the popular 'literary' digest. Indeed, they contain so much within such a small compass that they demand careful reading and defy brief review. Some 1,600 papers are reviewed within this volume.

The title 'Nuclear Science' is broadly interpreted. Six papers deal with topics of particular interest to the pure physicist. To these are devoted some 198 pages. Radiobiology claims 100 pages for its two articles. The review of recent advances in low level counting techniques was particularly interested in positive inferential evidence for the neutrino. However, some space was devoted to counting ^{14}C samples and many references were of more general interest. The applications of oxygen isotopes in chemical studies particularly concerned homogeneous solutions. Acidity in radiochemical separations is particularly pertinent to the processing technology. The section of 62 pages on nuclear radiation effects in solids, with its background discussion of general theory, might very usefully be published as a separate monograph.

Perhaps the easiest reading within this volume is the review of nuclear reactors for electric power generation. This is largely a condensation of the salient reactor features described at the Geneva Conference. Indeed, several of the articles draw on material that has only recently been declassified and are therefore able to bring many advances into perspective for the general reader.

The dust cover advertises that the 1957 volume 7 in this series will contain an article on instrumentation for high level radiochemical processes. But the series does not cover the vast field of nuclear engineering technology. However, it is necessarily to that field that the articles on nuclear radiation effects in solids and nuclear reactors for electric power must lead. In the latter paper the authors write of reactors:

'Material characteristics are often found to be controlling factors when attempting to convert a conceptually promising materials combination into an engineered reactor design.'

The stark fact is that, though much is possible, the challenge lies particularly with the metallurgists to develop materials which can make it profitable. Perhaps volume 8 will contain an article on the corrosion of constructional materials within nuclear reactors?

The series follows the useful and increasingly general practice of giving the date up to which the literature has been surveyed. It may be profitable to the publishers if they included an appendix listing the contents of previous volumes of the series. It would certainly be useful in helping the user find earlier articles of interest. However, I am sure volume 6 will provide incentive for him to look back through the series. J.S.M.B.

MODERN APPROACH TO pH

*p*H MEASUREMENTS. THEIR THEORY AND PRACTICE. By *Victor Gold*. Methuen and Co., London. 1956. Pp. 125. 10 diagrams. 9s 6d.

The modern approach to *p*H is one of the features of this little book. In fact, many reading it for the first time may be puzzled by such symbols as *p*cH, *p*wH, and *p*sH, particularly if they obtained their concept of *p*H from standard treatises dating from before 1950, for, as the author indicates in his foreword, only since that date has the chemist been able to bring some form of standardisation to the meaning of *p*H. A second impression gained from a perusal of this volume is that no space has been wasted. In its 125 pages a very large part of the physico-chemical interpretation of the subject has been covered.

An outline of the contents will indicate in some measure the subject matter covered. After a brief introduction to the terms 'acid' and 'base' and the logarithmic scale, a chapter is devoted to the theory of proton transfer equilibria. This includes only the more modern views. It develops the meaning of activity coefficients in a very lucid manner and the logical way in which the Debye and Hückel equations are applied will be appreciated. Following this, *p*H is defined in terms of e.m.f measurements on certain galvanic cells and factors governing the values of the e.m.f.'s of the cells are examined.

In subsequent chapters the modern interpretation of *p*H, the technique of *p*H determination by e.m.f. measurements, the role of *p*H in proton transfer equilibria, *p*H and reaction velocities, and the determination of *p*H by optical methods are discussed. The book ends with a praiseworthy attempt to present something of the very important subject of acid-base equilibria in solvents other than water.

This book is well up to the standard expected from a Methuen monograph. It is well written and edited. The only criticism that might be levelled is that the arrangement could be improved: seemingly related chapters are widely separated. Each chapter has its own bibliography and an index of symbols and tables of numerical data useful in practical *p*H determinations are included at the end of the book.

The presentation and modern treatment will make this book invaluable to those interested in the subject and the price, very low for these days of high costs, will bring it within the reach of all, including students.

Although the treatment of the subject is rigorous, there is evidence that the author has kept in mind the worker in biology, medicine, and agriculture whose physico-chemical training has perhaps not been so detailed. It is, therefore, strongly recommended. R. J. MAGEE.

Organic Chemistry Techniques

TECHNIQUE OF ORGANIC CHEMISTRY. Volume III. Part I, Separation and Purification. Edited by *Arnold Weissberger*. Second Edition. Interscience Publishers Inc., New York and London, 1956. Pp. ix + 873. $17.50.

It is a pleasure to welcome the arrival of fresh volumes in this valuable series. Volume III of the first edition has been revised and augmented and now appears in two parts: Part i to be discussed now, and part ii which will be entitled 'Laboratory Engineering,' and cover *inter alia*, selection of materials for equipment, heating, cooling, mixing and grinding.

The present work has six chapters. The first entitled 'Diffusion Methods' deals with thermal diffusion of liquids, barrier separations, dialysis and electrodialysis, and zone electrophoresis. The following chapter on extraction and countercurrent distribution is by L. C. Craig and D. Craig. Then follows 168 pages by R. S. Tipson on crystallisation and recrystallisation. Centrifuging and filtration are then discussed. The concluding chapter deals with the somewhat neglected subjects of solvent removal, evaporation and drying. Distillation is not covered by this book as it forms the subject of Volume IV; adsorption and chromotography are covered by Vol. V.

The book contains a wealth of information and references. It is, perhaps, doubtful if the average organic chemist often considers his techniques on the high level of this book. Nevertheless, this is an invaluable reference work, not only to the research organic chemist and biochemist, but also to chemical engineers and many industrial chemists.

Paper and printing conform to the high standard associated with the publishers. There are numerous excellent photographs of equipment, and a good index. There are also cumulative subject and author indexes. The main complaint might be that the binding is rather flimsy for a book of this size and price. This is a monumental and authoritative work, which will be welcomed by those who are already familiar with the series, and which should be perused also by those who are not. W.W.

Glassworking in the Laboratory

LABORATORY GLASSBLOWING. By *L. M. Parr* and *C. A. Hendley*. George Newnes Ltd., London. 1956. Pp. 160. 21s.

This is certainly the most comprehensive introductory manual on laboratory glassworking yet published and can be recommended both to the student and laboratory worker, who merely desire to carry out elementary glass manipulation and repairs, and to the technician who intends to make glassworking his career.

The first two chapters outline the various types of blowpipe in use and discuss the additional equipment normally used on the glassworking bench. The third chapter contains an account of the annealing of glass and has a list of all the commercially available glasses with the exception of the highly specialised types, together with their most important characteristics and physical properties. This chapter and the bibliography at the end lift the book out of the class of elementary primers and make it a valuable work of reference.

Successive chapters introduce the reader to the operations of glassworking starting with the simplest examples and extending finally to the complications of metal-to-glass seals, grinding of flanges and stopcocks and the graduation of blown glassware.

In only two details is the treatment other than excellent. Firstly not enough emphasis is laid on the correct use of the temperature difference between the various zones of the blowpipe flame. Secondly the restriction of platinum to glass seals to wire of 0.3 mm. diameter when borosilicate glass is used leads to difficulty when electrical connections must be made directly to the platinum wire. Much thicker wire may be sealed into capillary tubes in such devices as toluene thermoregulators and this avoids the continued fractures which occur at the point of entry of the wire.

J. R. MAJER.

INDUSTRIAL OPENINGS FOR GRADUATES

DIRECTORY OF OPPORTUNITIES FOR GRADUATES 1957. Cornmarket Press Ltd., London. 1957. Pp. 159. 7s. 6d.

Every graduate when he leaves college is faced with the problem: what will he do to earn a living? Very few people at college have much idea about industry. Some of the larger companies lecture and advise on opportunities in their own organisations and the Technical and Scientific Register and university appointment boards are of some help.

There still remains a gap in most young peoples' knowledge and this book is an attempt to fill the gap.

Nearly 200 organisations which recruit graduates on a large scale are described, including industrial companies, Government departments and research associations.

Copies of the book are being distributed free to all final year students at universities and colleges. J.P.J.J.

People in the NEWS

● MR. J. GRANGE MOORE, a production manager of ICI metals division since 1955, has been appointed works and personnel director of Wilton Council. He joined the research department, general chemicals division in 1933 later becoming acting research manager. From 1952-55 he was with the central work study department in London.

● MR. R. A. MILLER, sales director, Foundry Services Ltd., who recently completed a 30,000-mile world tour and has been twice to Japan in 12 months, is due to leave shortly on a 50,000-mile world tour, visiting, India, Kenya, Australia, New Zealand and Japan. The company announced last week that they have obtained a concession from the Japanese Government to build their own factory near Okayama, about 100 miles west of Osaka.

● MR. H. SMITH, joint managing director of the dyestuffs division, Imperial Chemical Industries Ltd. since 1955, has been appointed to a similar position with the general chemicals division. He joined ICI in 1929 after a distinguished academic career at the Imperial College (he gained B.Sc. (Hons), M.Sc. and D.I.C.) and become production director of the dyestuffs division in November 1952 and joint managing director in January 1955. DR. C. R. MAVIN, previously production director of the dyestuffs division succeeds Mr. Smith as joint managing director. He joined the division in 1933 having gained his M.Sc. and Ph.D. at Durham University. From 1942 until 1947 he was assistant works manager at Blackley and from 1947 to 1953 works manager at Dalton, Huddersfield. He became production director in 1955 and is succeeded in that post by MR. R. W. S. WRIGHT, previously production director of the pharmaceuticals division. Mr. Wright who gained B.Sc. with first class honours at Nottingham University joined the dyestuffs division in 1937, transferring to pharmaceuticals as production director in January 1955.

Dr. C. R. Mavin

Mr. H. Smith

● MR. E. C. JONES has joined the consumer sales department of Newton, Chambers and Co. Ltd.'s chemicals division as representative for the East Lancashire territory.

● DR. V. G. W. HARRISON has been appointed director of research of the Printing, Packaging and Allied Trades Research Association (Patra). He succeeds Dr. G. L. Riddell, who is leaving to join Albert E. Reed and Co. Ltd. For the past nine years, Dr. Harrison has been in charge of Patra's optics laboratory. He takes up his new appointment on 1 April. He has been closely associated with the development of the EEL spectrophotometer and opacimeter; the Patra-Hilger opacimeter was made to his specifications. He also carried out development work on Victor Letouzey's electronic colour measuring instrument, the Chromator. He gained his Ph.D. in 1936 having worked under Professor S. W. J. SMITH, F.R.S., for three years.

● MR. JOHN HAY WHITNEY, the new US Ambassador to Britain, has resigned as chairman of the board of Freeport Sulphur Co., New York. MR. LANGBOURNE M. WILLIAMS, president of Freeport, has been elected chairman to succeed him.

● SIR EDWIN PLOWDEN, chairman, UK Atomic Energy Authority, left Britain yesterday (Friday) for the Union of South Africa as guest of the South African Government. The purpose of his visit is to meet those concerned in South Africa with atomic energy development, and in particular with the mining of uranium. During his stay he hopes to visit some of the uranium mining installations.

● DR. ARTHUR M. SMITH, assistant to the vice-president, will be responsible for the direction of the anhydrous ammonia programme of the plant food division, Olin Mathieson Chemical Corporation, New York.

● MR. H. E. CHARLTON, the new chairman of the North-Western Banch, Institution of Chemical Engineers, served his apprenticeship with Western Electric Ltd. During that time he attended West Ham Technical College and Woolwich Polytechnic for evening and part time technical study.

Mr. H. E. Charlton

He started in the petroleum industry in 1928 with Moore and George, consultants, who were responsible for the erection of many European refineries. During the war he was a partner with Mr. Harold Moore in Harold Moore and Partners (Engineers) Ltd. Mr. Charlton was engineer in chief and consultant for Petrocarbon Ltd. when they were engaged in the building of Petrochemicals Ltd.

Later he extended the business and it now trades under the name of H. E. Charlton (Engineers) Ltd. and is concerned with the design and construction of chemical and petroleum plants.

● MR. VICTOR THOMAS, who for the past year has been general sales manager in charge of all home sales of Fielden Electronics Ltd., Wythenshawe, has now also accepted responsibility for export trade. Mr. Thomas, 36 years' old, has had 10 years' experience of selling in the electronic instruments field. Before joining Fieldens, he was with Electronic Instruments Ltd., Richmond. He was appointed sales promotion manager of Fielden Electronics 18 months ago. Mr. Thomas is planning an aggressive export drive and aims to set up servicing facilities in every country where Fieldens have agents.

Mr. V. Thomas

● MR. SAMUEL LENHER, a director of the du Pont Company, has been appointed to the board of trustees of the Wisconsin Alumni Research Foundation, US.

● MR. JOHN DEREK BERRESFORD, commercial manager of the Staveley Iron and Chemical Co. Ltd, near Chesterfield, has been appointed a director of the company. Aged 37, he is the younger son of the late H. H. BERRESFORD who at the time of his death in 1948 was managing director. After joining the staff in 1937, Mr. John Berresford worked in the invoice, costs, labour and welfare departments and in the foundries. He returned to Staveley's commercial department in 1946 after war service in the Middle East and was appointed assistant to the commercial manager. He took over that post at the beginning of 1955, Mr. Berresford was appointed a works director in 1950.

Mr. J. D. Berresford

● DR. KENNETH CARTER, formerly a director of development research of Smith Kline and French Laboratories in the UK, has been appointed scientific director to the Ames Company Inc., of Elkhart, Indiana, US.

● MR. H. W. GRAESSER-THOMAS, chairman, H. W. Graesser-Thomas Ltd., chemical manufacturers, London, and MR. C. E HIGHAM, managing director,

Arthur Waring and Co. Ltd., sizing and hair merchants, Warrington, sailed from Liverpool for New York in the Cunard liner *Britannic* on Friday 8 March. Mr. Graesser-Thomas is making his 97th Atlantic crossing.

● MR. C. E. KERVILLE, managing director of Nicholas Pty., the Australian associated company of Aspro-Nicholas, arrived in England this week for talks on further development of the group at Aspro headquarters at Slough. He was accompanied by MR. F. J. HOWELLS, finance director of Nicholas Pty. and a director of Monsanto Chemicals Australia.

● Hinchley medal for 1956 will be formally presented to MR. H. L. HOWARD at the Royal Society of Medicine (West Hall), 1 Wimpole Street, London W1, on 19 March at 7 p.m. Mr. Howard will then deliver the Hinchley Memorial Address which he has entitled 'Chemists and the Community.'

● LIEUT.-COLONEL W. T. RAIKES is relinquishing his position as managing director of the Fullers' Earth Union, as from 30 June after 33 years' service with the company. Lt.-Col. Raikes will continue as a non-executive director of the parent company, Laporte Industries, and the Fullers' Earth Union. Mr. J. L. Harvey, a director of both companies, has been elected vice-chairman of Fullers' Earth Union. MR. R. M. RAIKES, director of Fullers' Earth Union will become managing director from 1 July.

● MR. F. A. JACKMAN, B.Sc., A.R.I.C., who joined the company nearly 30 years ago, first working in the laboratories, has been appointed assistant managing director of Carless, Capel and Leonard Ltd., refiners of petroleum and coal tar naphthas, Hope Chemical Works, Hackney Wick, London E9. Well known in the coal tar trade, he has for many years been largely concerned with the buying of the company's crude products on that side. Mr. Jackman joined the board in January 1954.

Mr. F. A. Jackman

AERE Low Energy Reactor Starts Experimental Programme

'NERO,' the new experimental low energy reactor now operating at the Atomic Energy Research Establishment, Harwell, recently became critical for the first time. Its experimental programme is now beginning.

This reactor will be used to investigate the physics design problems associated with the more advanced types of graphite moderated power reactors now under study by the Authority. Maximum thermal neutron flux is about 10^8 neutrons/CM^2/second and the heat output is restricted to less than 100 watts.

Initially it will be used to check calculations on the effect of separating the fissile content of the fuel (U.235 or Pu 239) from the fertile content (U.238). Another application is to investigate problems associated with the design study of a sodium cooled graphite moderated reactor. That is why the name Nero is derived from the phrase 'Na experimental reactor.' The 'O' is added to indicate that it is a zero energy reactor.

'Nero' was designed and built by an AERE team in association with Saben Hart and Partners Ltd., London, Technical Design and Tool Co. Ltd., Reading (detail design work); March Ltd., Reading (steel work fabrication); ROF, Nottingham (roof trolleys); and H. M. Hobson Ltd., Wolverhampton (control mechanisms).

Modifications to Zephyr, the last reactor at Harwell, have produced a fast-slow reactor.

Graphite has been substituted for the uranium bars that originally formed the outer reflector. The thin inner reflector of uranium still surrounds the plutonium core.

In its new form the reactor diverged with a critical mass of plutonium very close to that in the uranium reflected system. Because the neutrons reflected back into the inner reflector have been slowed down, Zephyr now shows some of the characteristics of a thermal reactor. For instance experiments have shown that the chain reaction can now be controlled, as in a thermal reactor, by putting an absorber of low neutrons, such as cadmium, into the graphite.

The UK Atomic Energy Authority stated last week that it is too early to predict the applicability of this 'mixed' system to power breeder reactors such as that at present under construction at Dounreay.

Area Sales Office Opened

Samuel Denison and Son Ltd., makers of weighing and testing machines, Hunslet Foundry, Leeds 10, have opened area sales offices at King's House, 42 King Street West, Manchester 3 (telephone: Blackfriars 1986), and at West Bar Chambers, 38a Boar Lane, Leeds 1 (telephone: Leeds 2-8433). Mr. H. Hunt has been appointed area sales manager at the Manchester office and Mr. S. A. Morris has been appointed area sales manager at the Leeds office.

Chromatography Exhibition

Exhibiting at a display held in conjunction with a symposium on chromatography last week were Quickfit and Quartz Ltd., industrial glassware manufacturers. The symposium was held in the Chemistry Department of Kings College, Durham University on 8 and 9 March by the Royal Institute of Chemistry, Newcastle-upon-Tyne and North-East Coast Section.

ECGD Revise Cover for Export Credit Guarantees

IMPROVEMENTS in insurance cover for UK exporters are announced by the Export Credits Guarantee Department, 59-67 Gresham Street, London EC2. From 1 April, the form of cover against payment risks will be revised and will be available to exporters of goods sold on terms of payment up to two years' credit.

Principal changes are: ECGD pays 95 per cent, instead of 90 per cent, of all specified losses outside control of the buyer or seller once shipment has been made; claims arising out of blockage of exchange by buyer's government will be settled after four months (previously six); claims due to default on goods accepted will be paid after six months (previously 12); for the first time limited cover will be given on default by the buyer before acceptance of the goods.

Governors Appointed for Nuclear Research Institute

CHANCELLOR OF THE EXCHEQUER, Mr. Thorneycroft, stated in a Parliamentary written reply on Tuesday that the governing board of the National Institute for Research in Nuclear Science had been constituted by the Lord President of the Council and himself. It was:

Chairman: Lord Bridges.

Representing Universities: Sir Phillip Morris, Sir James Mountford, Professor N. F. Mott, Professor H. S. W. Massey, Professor J. Diamond, Professor R. G. Peierls, and Dr. D. H. Wilkinson.

Representing University Grant Committee: Sir George Thomson and Mr. J. C. Gridley.

Representing the Royal Society: Sir David Brunt.

Representing Atomic Energy Authority: Sir John Cockcroft, Sir Donald Perrott, and Dr. B. F. J. Schonland.

Representing DSIR: Dr. H. W. Melville and Professor P. M. S. Blackett.

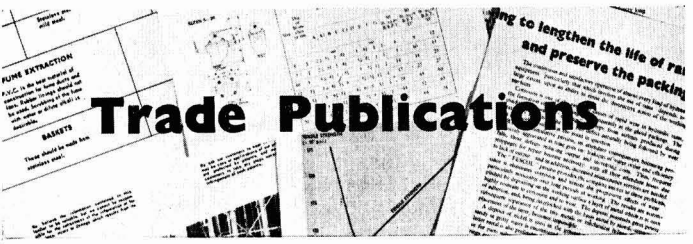
German Chemicals for UK

Negotiations between a UK and a German delegation have ended in Bonn, establishing quotas for 1957 to cover trade in each direction in those goods not yet liberalised. Quotas for which increases have been negotiated include UK exports of certain textiles and agricultural goods and German exports of certain chemicals, scientific and optical goods, and other goods. Chemicals for the UK comprise: dyestuff intermediates, anti-oxidants, plastics solutions and miscellaneous chemicals in small quantities.

Obituary

MR. H. W. P. MATTHEY, chairman, Johnson, Matthey and Co. Ltd, died on 6 March at the age of 80. He joined the company in 1894, became a director four years later, and chairman in 1928.

DR. ROBERT DURCOMBE ABELL, of Beck House, Esholt, Bradford, head of the chemistry department at Bradford Technical College from 1919 to 1939, died in hospital on 6 March aged 83.



Diaphragm Compressor for the Chemical Industry

Diaphragm compressors and pumps for pure, dangerous or corrosive gases and liquids, manufactured by Corblin, Paris, are the subject of a new booklet obtainable from the company's agents, C. T. (London) Ltd., 27 Ashley Place, Westminster, London SW1. Models described and illustrated are used for the compression of carbon dioxide, carbon dioxide recovery, the compression of rare gases in the atmosphere, such as argon, neon, krypton, and in the manufacture of nylon filaments. Highly corrosive gases—chlorine, bromine, fluorine, hydrogen chloride, hydrogen fluoride—can be handled in a V-shape compressor; parts in contact with the gases are made of alloys or plastics materials. A special compressor for use with hydrocarbon and other dangerous gases eliminates any risk of the formation of an explosive mixture with air; since there is no gland there can be no leakage of ethylene, carbon monoxide or acetylene.

BDH Biochemicals Booklets

Two booklets, on tetrazolium salt and dichlorophen, have been published by British Drug Houses, Poole, Dorset. Tetrazolium salt (2:3:5-triphenyl tetrazolium chloride, TTC) has many applications in biological investigations. Dichlorophen is a bactericide and fungicide and is used in veterinary medicine as a taenicide.

Silicone Compound

Properties and applications of Silicone Compound MS5, are described in a new publication issued by Midland Silicones, 19 Upper Brook Street, London W1. The compound, originally developed as a lubricant for silver plated switch contacts and instrument movements, has found many other uses due to its ability to retain excellent dielectric properties after long exposure to wet or humid conditions. It is claimed to have a high-degree of water-repellency, and to be resistant to chemical attack, salt spray and fungi.

Inhibition of Corrosion

A new brochure describing successful research and field work on combustion systems in which the tertiary heterocyclic amines have been used to render acid condensation innocuous by inhibition of the acid and not by neutralisation has been published by the Midland Tar Distillers Ltd., Oldbury. It is entitled *Teramins and the Inhibition of Corrosion.*

New Folder on Colloidal Graphite

A folder, 'Colloidal Graphite—What is it?,' has been issued by Acheson Colloids Ltd., 18 Pall Mall, London SW1. This illustrated folder is a brief, straightforward answer, devoid of technical jargon, to the question posed in the title. The text should be of value and interest to the general as well as the lubrication engineer. The nature of a colloid is defined, the advantages of graphite and colloidal graphite as a lubricant are discussed and supported by test data. Copies can be obtained from the company.

Inert Gas Generators

Holmes inert gas generators, both oil and gas fired, are described in publication No. 64, recently produced by W. C. Holmes and Co. Ltd., Turnbridge, Huddersfield. This equipment is claimed to effect the production of inert gas at a fraction of the cost of bottled gas or of solid CO_2. Among present uses of inert gas is the prevention of oxidation of synthetic resins, paints and varnishes. The blanketing of inflammable chemicals during processing or storage, and removal of sulphur dioxide.

Paint Standards

Available free from the British Standards Institution, 2 Park Street, London W1, is sectional list PD2709 covering BS for paints, varnishes, colours, solvents and allied products.

High Vacuum Engineering

Vacuum Technology is the title of a new brochure illustrating the products of the high vacuum engineering division of W. C. Heraeus GmbH, Hanau, West Germany. Products covered include high vacuum instruments, pumps, metallising and coating plants, high vacuum metallurgical plant, such as arc melting furnaces, and induction heated furnaces for sintering, heat treatment, melting and casting. Copies are available from the sole UK agents, Fleischmann (London) Ltd., 16 Northumberland Avenue, London WC2.

Airpel Filters

The new range of 'O-Line' Airpel filters introduced by Airpel Ltd., Lower Road, Chalfont St. Peter, Bucks, is described in the company's latest catalogue. New materials and modern techniques have resulted in the advanced design of this latest range, which includes modes produced in aluminium alloys for special work.

Spectronic Colorimeter

The new Spectronic 20 colorimeter produced by Bausch and Lomb Optical Co., Rochester 2, New York, is the subject of a brochure. The instrument is said to handle both colorimetry and spectrophotometry.

TRACE ELEMENTS IN PLANT NUTRITION

THIS YEAR the Fernhurst Lecture was delivered by Dr. T. Wallace, C.B.E., M.C., D.Sc., F.R.I.C., V.M.H., F.R.S., Professor of Horticultural Chemistry, University of Bristol, and director, Long Ashton Research Station, who dealt with 'Trace elements in plant nutrition; with special reference to crops.' The lecture was given at the Royal Society of Arts on 6 March.

Classification of plant elements was considered and historical aspects of trace elements research were reviewed. The function of trace elements in plant nutrition and their effects on crops is, the lecturer stated, very limited. However, there is much information available regarding the pathological effects that result in plants from deficiencies and excesses of trace elements and these were summarised by Professor Wallace. The occurrence of trace element problems in crops, soil factors affecting the supply of trace elements to plants, diagnosis of trace elements status in plants and correction of trace elements deficiencies and excesses were all considered.

At the conclusion of his lecture, Dr. Wallace referred to the expressed desire for routine preventive treatments, which he thought was most often shown by the wish to incorporate so-called 'shot-gun' mixtures of known essential trace elements into fertilisers. His lecture, however, had indicated the undesirability and wastefulness of such a procedure, and the need to adopt methods which treat only deficiencies and excesses after diagnosis.

Professor Wallace also considered that research was required on problems of multiple deficiencies and excesses of trace elements supplies to fertiliser and liming practices. High priorities for research were: the functions of trace elements in plant growth, particularly their roles in enzyme systems; the effects of trace elements on yields and quality of crops; and the examination of further elements to establish or otherwise their essentiality for plant growth. He suggested as a matter for co-operative research on a national or international scale, the study of distribution of trace element deficiencies and excesses and an assessment of their importance in crop production.

Commercial News

Reichhold Chemicals Cut Ordinary Payment by 2½ Per cent

FINAL ordinary dividend for 1956 of Reichhold Chemicals is 10 per cent plus cash bonus of 2½ per cent making 20 per cent (22½ per cent). Preliminary results show a net profit of £139,752 (£170,877). UK tax took £165,461 (£164,925). £75,000, £100,000 is allocated to general reserve and parent company's carry forward is £10,883 (£10,628). Annual meeting will be held at Winchester House, London EC, on 28 May.

F. W. Hampshire and Co.

Final ordinary of 10 per cent, making 16 2/3 per cent (same) is proposed for year ended 5 December by F. W. Hampshire and Co. Ltd., manufacturing chemists. Group trading profit was £105,220 (£117,864). Carry forward is £22,575 (£29,189).

Cambridge Instruments

1956 profit of the Cambridge Instrument Co., after depreciation etc., was £510,009 (£532,494). Tax takes £289,506 (£275,434). Final dividend of 4d (6d), making 3s 4d (3s 6d), tax free, has been declared on the ordinary £1 shares. Carry forward is £43,122 (£43,380).

Canadian Chemical & Cellulose

Net income of the Canadian Chemical and Cellulose Co. for 1956 was $41,369 (net loss of $1,542,612). Further improvement is expected this year.

Francis Morton and Co.

Francis Morton and Co. Ltd., engineers, Liverpool, have acquired the issued capital of Bates and Bates Ltd., welding specialists, Birmingham. Mr. C. R. Bates continues as managing director.

International Nickel

Net earnings of the International Nickel Co. of Canada Ltd. during 1956 were $96,296,000 ($91,566,000). Dividends declared total $56,140,000 ($56,602,000). In their report, the directors confirm their intention of putting new production facilities into operation as soon as possible and to continue an extensive exploration programme in order to do their 'full share in eliminating any shortage.'

Steetley Co. Ltd.

Group net profit for 1956 of the Steetley Co. Ltd., manufacturers of refractories, was £759,281 (£601,306). Dividend of 13 per cent (same, but on smaller capital) is declared on ordinary. The dolomite brick and magnesia divisions both contributed to the further improvement in earnings through higher production and sales. The company is now engaged on an expansion and modernisation programme.

The Texas Company

Consolidated net income of The Texas Co. in 1956 amounted to $302,262,620, or $5.51 a share, compared with $262,729,738, or $4.79 a share in 1955. The per share figures are adjusted for the two-for-one stock split in May 1956. Net income was the highest in the company's history. New levels were also achieved in producing, manufacturing, and marketing operations.

NEW COMPANIES

ARTHUR D. LITTLE LTD. Capital £50,000. Analytical and consulting chemists and chemical manufacturers. Directors: R. Stevens, L. W. Bass, F. N. Woodward. Secretary: R. H. G Duggan, 9 Linkfield Road, Musselburgh, East Lothian.

HEB PHARMACEUTICALS LTD. Capital £2,000. To acquire, use and exploit the registered trade mark 'HEB' in respect of pharmaceutical products, and to acquire the goodwill of the business of the manufacture and sale of pharmaceutical products bearing the prefix 'HEB' Directors: D. Pride, J. A. Cain, E. Pride and E. Pride. Reg. office: 482 Stretford Road, Stretford, Lancs.

IMMUVAC (ENGLAND) LTD. Capital £10,000. To buy, sell, manufacture, distil, rectify, manipulate and deal in vaccines, sera, pharmaceutical, chemical and industrial preparations etc. Subscribers: A. W. Uther, N. L. Manning, and F. H. Steere, all of 103 York Street, Sydney, NSW. Solicitors: Slaughter and May, 18 Austin Friars, London EC2.

RALPH LAWTON LTD. Capital £15,000. To produce and process ground quartz, sands and other minerals for the chemical, ceramic, abrasive and other industries. Directors: W. Ralph Lawton and D. B. Lawton. Reg. office: Sutton Street, Newcastle-under-Lyne, Staffs.

INCREASES OF CAPITAL

AKIS CHEMICAL CO. LTD., 82 Victoria Street, London SW1. Increased by £20,000 beyond the registered capital of £20,000.

CHEMSTRAND LTD., manufacturers of filamentous and fibrous materials produced from chemical substances etc., 8 Waterloo Place, London SW1. Increased by £799,900 beyond the registered capital of £100.

W. H. COOPER AND CO. (WEST END) LTD., manufacturing chemists etc., 104 Gt. Russell Street, London WC1. Increased by £4,900 beyond the registered capital of £3,100.

E.M. CHEMICALS LTD., Neasham Abbey, Neasham, Darlington, increased by £10,000 beyond the registered capital of £7,500.

GLAXO LABORATORIES LTD., 891-995 Greenford Road, Greenford, Middlesex, increased by £5,000,000 beyond the registered capital of £5,000,000.

MILES LABORATORIES LTD., 12 Whitehall, London SW1, increased by £10,000 beyond the registered capital of £60,000.

JOHN RONALDSON AND CO. LTD., manufacturers of and dealers in chemicals etc. 3-4 Crooked Lane, King William Street, London EC4, increased by £10,000 beyond the registered capital of £5,000.

C. TENNANT SONS AND CO. LTD., chemical manufacturers etc., 4 Copthall Avenue, London EC2. Increased by £10,000 beyond the registered capital of £560,000.

MORTGAGES & CHARGES

ALMA ENTERPRISES LTD., London EC, plastics products etc. 18 January, £700 mortgage, to Rasmussen Webb and Co. Ltd.; charged on 54a Clerkenwell Road, London EC.

DE-CORROSION SERVICES (NORWEST) LTD., Liverpool. 28 January, £2,000 debentures; general charge.

SATISFACTIONS

BOWATERS GLASS WORKS LTD., Stourbridge. Satisfaction 29 January of debenture registered 2 January 1933.

ENALON PLASTICS LTD. (formerly Engineering and Allied Manufacturing Co. Ltd.), London W. Satisfaction 28 January of debenture registered 15 September 1950.

REYNOLDS PAINT AND VARNISH CO. LTD., Liverpool. Satisfaction 29 January of mortgage registered 12 December 1947.

LONDON GAZETTE

Notice of Meetings

SUSSEX AND CO. LTD., reg. office, 69 Lewisham Way, London SE14, thermoplastic fabricators. Creditors, 19 March, 11.30 a.m.; contributories, 19 March, 12 noon, both at Room 401, 4th floor, Inveresk House, 346 Strand, London WC2.

Notice of Dividend

JOHNSON AGENCIES (PROPRIETORIES) LTD., reg. office, Old Forge, Albion Road, Horsham, manufacturing chemists and distributing agents. First and final dividend of 4s 3d per £, payable 22 March at 19 Eastcheap, London EC3.

New Glassworking Firm

Science in Glass Ltd. is the title of a new company recently formed to undertake simple or complex glass blowing in lead, soda, borosilicate and quartz glasses to the closest possible tolerances. Glass to metal seals (copper, iron, platinum, nickel, molybdenum, tungsten and covar) and glass to glass graded seals will be fabricated. The directors are A. W. McCann, E. S. D. Bainbridge, H. Bainbridge and A. E. Hughes. Registered office is at 3 High Street, Cheam, Surrey.

Carbon Black Drawback Reduced

Drawback allowable in respect of Customs duty paid on carbon black used in the manufacture of exported printers' inks was reduced from 8 March from 11s 6d to 10s 6d per cwt. This was effected by the Import Duties (Drawback) (No. 3) Order SI 1957/334.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents),' which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London, WC2, price 2s 6d including postage; annual subscription £6 6s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period. Dates on which these applications will be open to inspection are given in 'Official Journal (Patents)'.

AMENDED SPECIFICATIONS

Aqueous solutions containing lipoid-soluble vitamin. Wander, Dr. A., AG. **710 817**

Basic esters of phosphorus containing acids. Imperial Chemical Industries. **738 839**

ACCEPTANCES

Organo-silicon compounds. General Electric Co. **772 768**

Silicon carbide crystals. Philips Electrical Industries Ltd. **772 691**

Hydroxylamine salts. Badische Anilin- und Soda-Fabrik AG. **772 693**

Reaction products of glycidyl ethers. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **772 694**

Titanium tetrachloride. Horizons Titanium Corp. **772 695**

Upgrading naphtha. California Research Corp. **772 823**

Methods of making glass. AG der Gerresheimer Glashuttenwerke Vorm. F. Heye. **772 563**

Calcium carbide manufacture. Shaft furnace for use in such manufacture. Stamicarbon NV. **772 697**

Propargyl aldehyde. Badische Anilin- und Soda-Fabrik AG. **772 565**

Stable, injectable bismuth-containing pharmaceutical compositions and the compositions formed thereby. Fischl, S. **772 567**

Glass fibre filled alkyd resin composition. Allied Chemical and Dye Corp. **772 773**

Penicillin compounds. Ruskin, S. L. **772 573**

Separation of mixtures of pentaerythritol and dipentaerythritol. Celanese Corp of America. **772 574**

Treating hard water. Monsanto Chemical Co. **772 775**

Compounds comprising dihydro-1, 3-oxazine-2, 4 (3 H)-diones and salts thereof. American Cyanamid Co. **773 011**

Purification of dinitriles. Du Pont de Nemours, E. I., and Co. **773 014**

Di-hydrocabotin borates. Metal and Thermit Corp. **772 646**

Derivative of cortisone acetate. Labs. Francais de Chimiotherapie. **773 016**

Resinous compositions. American Cyanamid Co. **772 889**

Branched chain sulphenamides. Monsanto Chemical Co. **772 582**

Combustion-resistant neoprene foam rubber. Firestone Tire and Rubber Co. **772 704**

Manufacture of tubes and other profiled parts made of fused silica. Quartz and Silice. **772 826**

Alkoxypentenyl sulphonates. Rohm and Haas Co. **772 860**

2, 4, 5-Trichlorophenoxy acetic acid. Food Machinery and Chemical Corp. **772 966**

N-alkyl piperidine monocarboxylic acid amines. Aktiebolaget Bofors. **772 807**

Removal of hydrogen sulphide from gases. Bergwerksverband zur Verwertung von Schutzrechten der Kohlentechnik Ges. **772 905**

Thermal chlorination of hydrocarbons. Solvay and Cie. **772 910**

Chloral derivatives. American Home Products Corp. **772 808**

4-Substituted 1:2-diaryl-3:5-dioxo-pyrazolidines. Geigy, J. R., AG. **773 022**

Desulphurisation of gases. Ruhrchemie AG. **772 917**

Curing resins. Esso Research and Engineering Co. **772 977**

Soluble and fusible copolymers which can be converted into infusible and insoluble resins. Solvay et Cie. **772 978**

Pure adiponitrile. Du Pont de Nemours, E. I., and Co. **772 979**

Alpha, alpha-diphenyl-gamma-dialkyl-amino butyramides and quaternary salts thereof. Naamlooze Vennootschap Nederlandsche Combinatie Voor Chemische Industrie. **772 921**

Mucochloric acid. Quaker Oats Co. **772 778**

Tertiary-alkyl-phenols. Dow Chemical Co. **772 924**

Petrolatum cracking in liquid and vapour phase. Esso Research and Engineering Co. **773 025**

Steroids. Upjohn Co. **773 027**

Expanded elastomeric polyurethane polymers. United States Rubber Co. **772 925**

Triorganosilyl compounds. Midland Silicones Ltd. **772 986**

L-glutamine. International Minerals and Chemical Corp. **772 780**

Aryl-haloalkylamines and derivatives thereof. Ethyl Corp. **772 988**

N-alkyl - piperidyl-methylphenothiazines. Farbenfabriken Bayer AG. **773 037**

Stabilisation of polythene. Union Carbide and Carbon Corp. **772 938**

Unsaturated polyester resins. Chemische Werke Hüls AG. **773 056**

Separating finely ground stock from gaseous medium. Pfeiffer Barbarossawerke AG, Geb. **773 064**

Halomethylated aromatic compounds. Esso Research and Engineering Co. **772 828**

Basic N-diepoxides. Farbenfabriken Bayer AG. **772 830**

Apparatus for performing process of manufacturing gases containing hydrogen. Office National Industriel de l'Azote. [Divided out of 772 787.] **772 788**

Processes for making reproductions, especially printing plates, with the application of diazo compounds. Ozalid Co. Ltd. [Addition to 699 412.] **773 313** and **773 314**

Divided out of 773 313 **773 315**

Hydrazobenzenes. Farbwerke Hoechst AG. **773 143**

Manufacture of cerium mischmetal with low contents of iron, silicon, aluminium, copper, lead. Pokorny, E. A. **773 491**

Anti-diazotates. Farbwerke Hoechst AG. **773 365**

Method of and means for producing a liquid of definite temperature. Usines Lauffer Freres Soc. P.R.L. **773 328**

Lubricating composition. Blumenthal, V. [personal representative of Blumenthal, R. G. (deceased)]. **773 493**

Combined process for distilling and cracking petroleum oils. Esso Research and Engineering Co. [Addition to 719 003.] **773 524**

Condensation products of fluoro-ketones. National Research Development Corp. **773 402**

Fabrication of plastic substances. Perfolan Holding Trust. **773 146**

Ammonium sulphate. Koppers Co. Inc. **773 147**

Phenthiazine derivatives. Soc. des Usines Chimiques Rhone-Poulenc. **773 403**

Silicone water-repellent compositions. General Electric Co. **773 526**

Cophosphorylation products. National Research Development Corp. **773 495**

Treatment of polymeric materials. General Electric Co. **773 529**

Mixing machine. Thordahl, G. J. (trading as Thordahl, G. J., and Co.), and Podmore, A. **773 497**

Rigid polymerised halide composition. General Tire and Rubber Co. **773 530**

Apparatus for developing sensitised material by gases or vapours. Hall Harding Ltd. **773 198**

Testing air or other gases to determine the methane content thereof. Drager, O. H. **773 534**

Purification of organic compounds. Distillers Co. Ltd. **773 084**

Monovinyl ethers of dihydric alcohols. Deutsche Solvay-Werke Ges. **773 331**

Alkylation of aromatic compounds. Imperial Chemical Industries Ltd. **773 502**

Chlorides of metals. United Kingdom Atomic Energy Authority. **773 535**

Polymerisation of ethylene. Ziegler, K. **773 536**

Esters of N, N-bis (2-cyanoethyl) carboxamic acids. Union Carbide and Carbon Corp. **773 406**

Linear polyesters. British Celanese Ltd. [Addition to 707 913.] **773 538**

Steroid compounds. GNRD Patent Holdings Ltd. **773 150**

Filters. Trotman, W. E. K. **773 539**

Light sensitive cellulosic layers. Kodak Ltd. **773 202**

Fluidised fixed bed catalytic destructive hydrogenation of hydrocarbon oils. Gulf Research and Development Co. **773 333**

Electrolyte-stable dispersions. Boehme Fettchemie Ges. **773 508**

Polymerisable mixtures of carboxyl-containing copolymers with polymerisable oxirane triazines. American Cyanamid Co. **773 206**

Process and apparatus for catalytic reactions under high pressure. Gulf Oil Corporation. **773 210**

Anthraquinone dyestuffs. Farbenfabriken Bayer AG. **773 212**

Unsaturated polyesters and copolymers thereof. Soc. des Usines Chimiques Rhone-Poulenc. **773 408**

Amine condensation products. Ciba Ltd. **773 336**

Resol resins. Distillers Co. Ltd. **773 510** and **773 547**

Apparatus for carrying out chemical reactions. Esso Research and Engineering Co. **773 151**

Unsaturated cyclic hydrocarbons. British Oxygen Co. Ltd. **773 225**

Production of very finely divided solid substances with a low-bulk density. Badische Anilin- und Soda-Fabrik AG. **773 549**

Decanting liquids containing flocculated material. Soc. Francaise des Produits Gelsol. **773 552**

Guanidine compounds, preparation and use as analytical reagents. Farmaceutici Italia SA. **773 410**

Silicone rubbers. General Electric Co. **773 324**

Convertible organopolysiloxanes. General Electric Co. **773 325**

Bis-triazinylamino stilbene compounds and use as optical brightening agents. Geigy, J. R., AG. **773 152**

Process and apparatus for coking petroleum oils. Esso Research and Engineering Co. **773 153**

Finely divided cellulose derivatives. Hercules Powder Co. **773 519**

Therapeutic compositions having prolonged activity and compositions formed thereby. Laboratorios Industriales Farmaceuticos Ecuatorianoslife. **773 557**

C-nitrosodiarylamines. Compagnie Francaise des Matieres Colorantes. **773 236**

Softening of hard paraffin wax by cracking. Ruhrchemie AG. **773 237**

Anhydrous salts of mercaptobenzthiazole. Imperial Chemical Industries **773 413** **773 413**

Di-quaternary ammonium substituted alkanes. Irwin, Neisler and Co. **773 566**

Triazine derivatives. Merck and Co. Inc. **773 243**

Process for elimination of industrial odours. Rhodia Inc. **773 245**

Gas/oil separators. British Petroleum Co. Ltd. and Laird, A. **773 096**

Substituted synthetic linear polymers. International Polaroid Corp. **773 569**

Method of producing alkaryl sulphonates. Continental Oil Co. **773 423**

Composite ceramic-metal bodies. General Electric Co. **773 424**

Organic esters process. Parke, Davis and Co. **773 452**

Tetracycline. American Cyanamid Co. **773 453**

Perfluoro quaternary nitrogen compounds. Minnesota Mining and Manufacturing Co. **773 326**

Perfluoro amine compounds. Minnesota Mining and Manufacturing Co. **773 327**

Elastomers. International Latex Corp. **773 425**

Interpolymers. Monsanto Chemical Co. **773 426** and **773 427**

Ethers of polyglycols. Union Carbide and Carbon Corp. **773 455**

Halogenated octahydro-endo, endo-dimethanonaphthalenes and stabilisers therefor. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **773 431**

Secondary aliphatic amines. Armour and Co. **773 432**

Thyratron structure. Machlett Laboratories Inc. **773 253**

Dialkyl and trialkyl tin derivatives of thiomatic acid. Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny et Cirey. **773 434**

Polyhydric alcohols. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **773 436**

Organo-silicon compositions. Midland Silicones Ltd. **773 347**

Acetylene by incomplete combustion of hydrocarbons, Badische Anilin- und Soda-Fabrik AG. **773 437**

Urea formaldehyde condensates. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. **773 349**

Trichloromethane phosphonic acid monohydrate and anhydrous trichloromethane phosphonic acid and the resulting monohydrate and anhydrous acid. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **773 256**

Glass compositions. Zeiss-Stiftung, C. (trading as Jenaer Glaswerk Schott and Gen). **773 111**

5-Chloro- or bromo-2-methyl-3-(N-substituted-amino-methyl)-indoles. Farmaceutici Italia SA. **773 440**

Pyridine-(3)-sulphinic acid, sulphones related thereto, and salts thereof, a process for the manufacture of same. Hoffmann-La Roche, F., and Co. AG. **773 261**

Process for vat dyestuffs of the benzanthronimide green series. Farbenfabriken Bayer AG. **773 116**

Pyrrolidone. Rohm and Haas Co. **773 442**

Foamed polyester-polyisocyanate products. General Motors Corp. **773 265**

Dehydro-epiandrosterone acetate. Lepepit Soc. Per Azioni. **773 461**

Melamine. Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny and Cirey. **773 462**

Sulphonamide derivatives suitable for retarding excretion of drugs. Cassella Farbwerke Mainkur AG. **773 267**

Stabilisation of chlorinated hydrocarbons. Diamond Alkali Co. **773 447**

Preparation of cyclised rubber. Rubber Stichting. **773 352**

Desulphurisation of crude oil and crude oil fractions. Esso Research and Engineering Co. **773 173**

Lubricating greases. Shell Research Ltd. **773 118**

Morphine alkaloids. Merck and Co. Inc. **773 467**

3-Substituted 4-hydroxycoumarins. Geigy, J. R., AG. **773 468**

Conversion of hydrocarbon oils. Esso Research and Engineering Co. **773 121**

Resolution of D, L-pantolactone. Unjohn Co. **773 174**

Salts of organosilanols. Midland Silicones Ltd. **773 175**

3-(4'Chlorobenzhydryloxy) tropane. Schenley Laboratories Inc. **773 290**

2-Ayrl-3-amino-butan-2-ols. Ayerst, McKenna and Harrison Ltd. **773 292**

Hydroforming. Esso Research and Engineering Co. **773 476**

Chitosan derivatives. Hoffman-La Roche, F., and Co. AG. [Addition to 771 138.] **773 477**

FOR YOUR DIARY

TUESDAY 19 MARCH

Society for Visiting Scientists—London: 5 Old Burlington Street W1, 7.30 p.m. Discussion: 'The Widening Field of Application of Electronic Computors'.

WEDNESDAY 20 MARCH

RIC—London: Chelsea Polytechnic, Manresa Road SW3, 6.30 p.m. 'Organic Chemistry in the Photographic Industry' by D. J. Fry.

I.Chem.E.—Leeds: The University, 7 p.m. 'A Study of the Motion of the Solid Phase in Liquid Fluidised Beds' by N. L. Franklin and D. Handley.

THURSDAY 21 MARCH

RIC—Chatham: Medway College of Technology, Maidstone Road, 7.30 p.m. 'Petroleum Chemicals' by Dr. S. F. Birch.

SCI (Corrosion Group)—London: Institution of Civil Engineers, Great George Street SW1, 9.30 a.m. and 2.30 p.m. Symposium: 'The Corrosion of Metals in Buildings'.

CS—Bristol: Chemistry Department, University, 7 p.m. 'Terylene' by Dr. P. T. Barrett.

FRIDAY 22 MARCH

SAC—London: Chemistry Lecture Theatre, King's College, Strand WC2, 7 p.m. Joint meeting with Fine Chemicals Group of SCI. 'Organic Reagents in Inorganic Analysis: Some Recent Developments' by H. M. N. H. Irving.

Market Reports

GOOD CALL FOR ACETIC ACID AT NEW PRICES

LONDON Industrial chemicals market continues largely unchanged with the strength of home trade demand well maintained and a steady flow of export inquiry. Routine potash and soda products are moving well against contracts. Acetic acid is in steady demand at the higher rate recorded last week, and there has been a good call for tartaric acid, while sulphate of copper is in steady request for shipment. Demand for fertilisers has been more active. In most sections the price position is firm. Most coal-tar products are in good demand on home account with a steady export call for creosote oil and cresylic acid.

MANCHESTER Steady contract deliveries to textile and other leading industrial outlets in Lancashire and Yorkshire have been reported on the Manchester chemical market. A fair flow of additional inquiries from the home trade and from shippers is in hand. Prices are on a firm basis and a further strengthening of quotations in a number of directions during the coming months would occasion little surprise. Most classes of fertilisers are now meeting with good demand, and the leading tar products continue to find a ready outlet.

GLASGOW Compared with last week the Scottish market has shown a decided uplift, and covered most sections of industry, both in regard to spot and contract requirements. It is hoped that this trend will continue, and at the moment this is anticipated. On the fertiliser side a fairly active position can be reported, and the export market continues favourable with a varied range of enquiries being received.

Birlec get Air Conditioning Contract from Cyanamid

CONTRACT for the complete air conditioning installation in the new factory now being built at Gosport for the Lederle Laboratories Division of Cyanamid of Great Britain Ltd. for the preparation and packing of antibiotics has been awarded to the drier division of Birlec Ltd., Tyburn Road,Erdington, Birmingham 24.

Birlec have also received two orders for their Detroit furnaces, model IC. The first is from Rolls Royce Ltd., who require four furnaces for the melting of special alloy steels and the second from H. and F. Precise Castings Ltd., Derby, for the manufacture of turbine root blades for the Ministry of Supply.

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SALTERS' INSTITUTE OF INDUSTRIAL CHEMISTRY GRANTS-IN-AID

The Committee will, in July, allocate a limited number of Grants-in-Aid, for the purchase of books, for library subscriptions or other necessary purposes, 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, 1957, by:—

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

OFFICIAL APPOINTMENTS

DRAUGHTSMEN are required by the **NORTH THAMES GAS BOARD** at its **TAR AND AMMONIA PRODUCTS WORKS AT BECKTON, EAST HAM, E.6.**

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The Proprietor of **BRITISH PATENT NO.** 646916, entitled "Improvements in or relating to Sulphur", offers same for licence or otherwise to ensure practical working in Great Britain. Inquiries to **SINGER, STERN & CARLBERG, 14 E. JACKSON BLVD., CHICAGO 4, ILLINOIS, U.S.A.**

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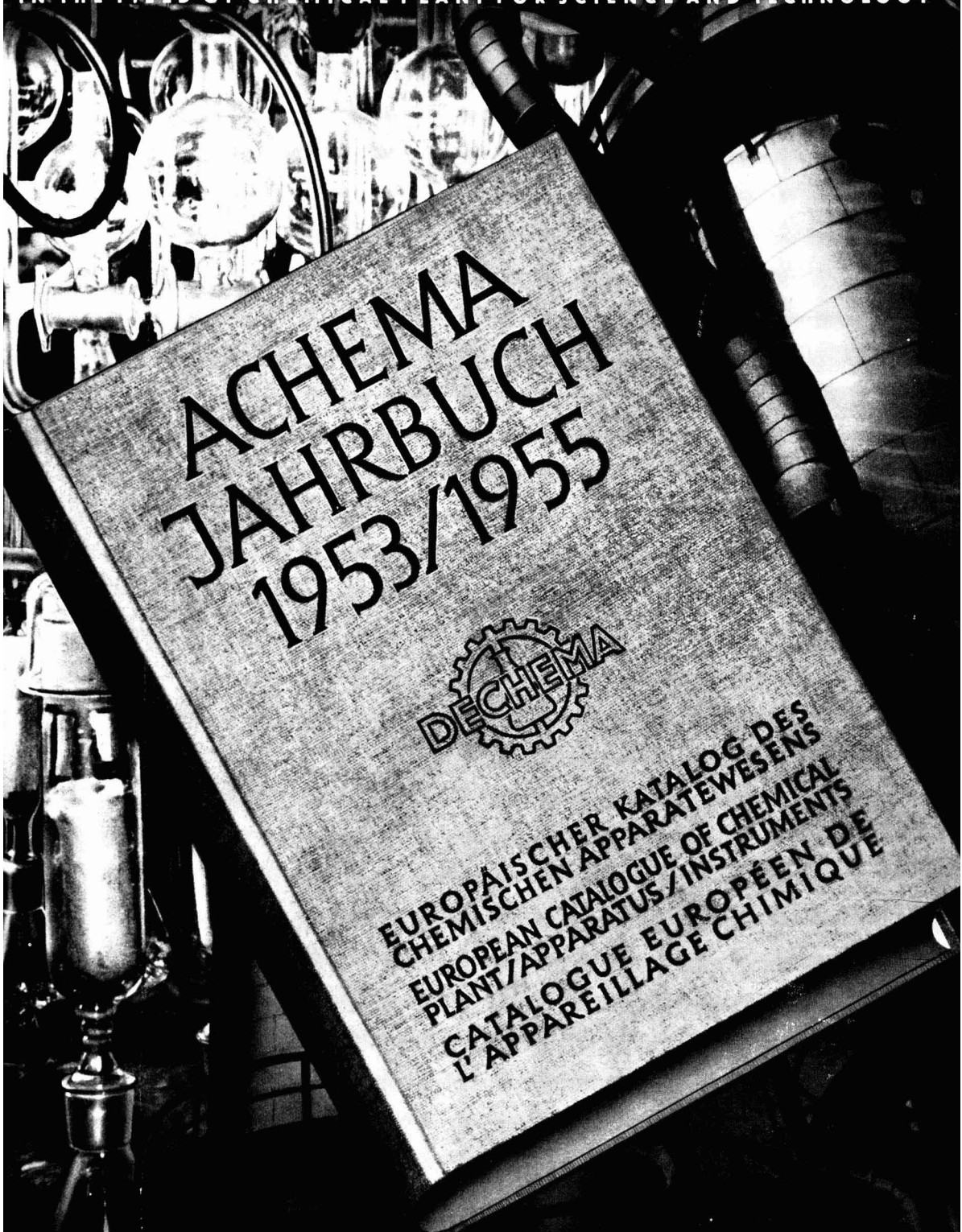

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