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VOL LXVIII

25 APRIL 1953

No 1763

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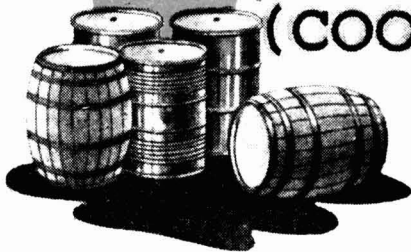
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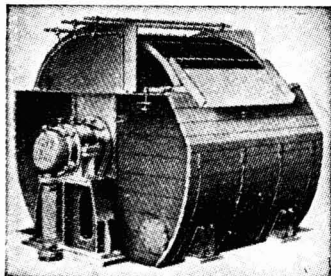
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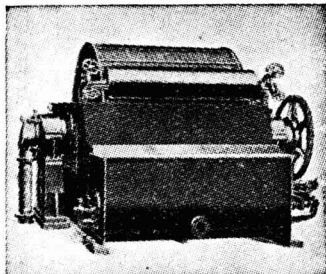


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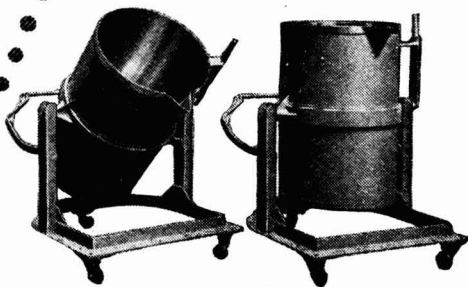


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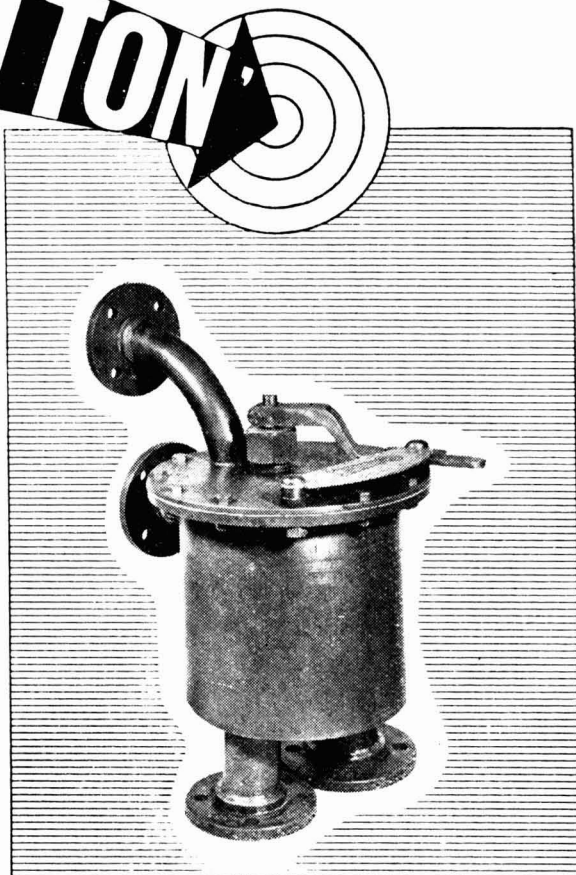
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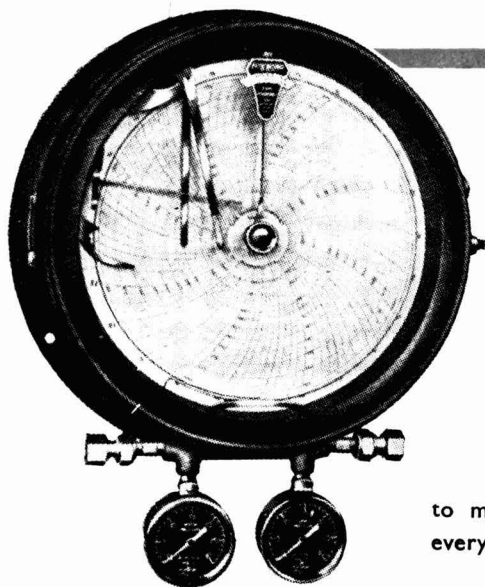
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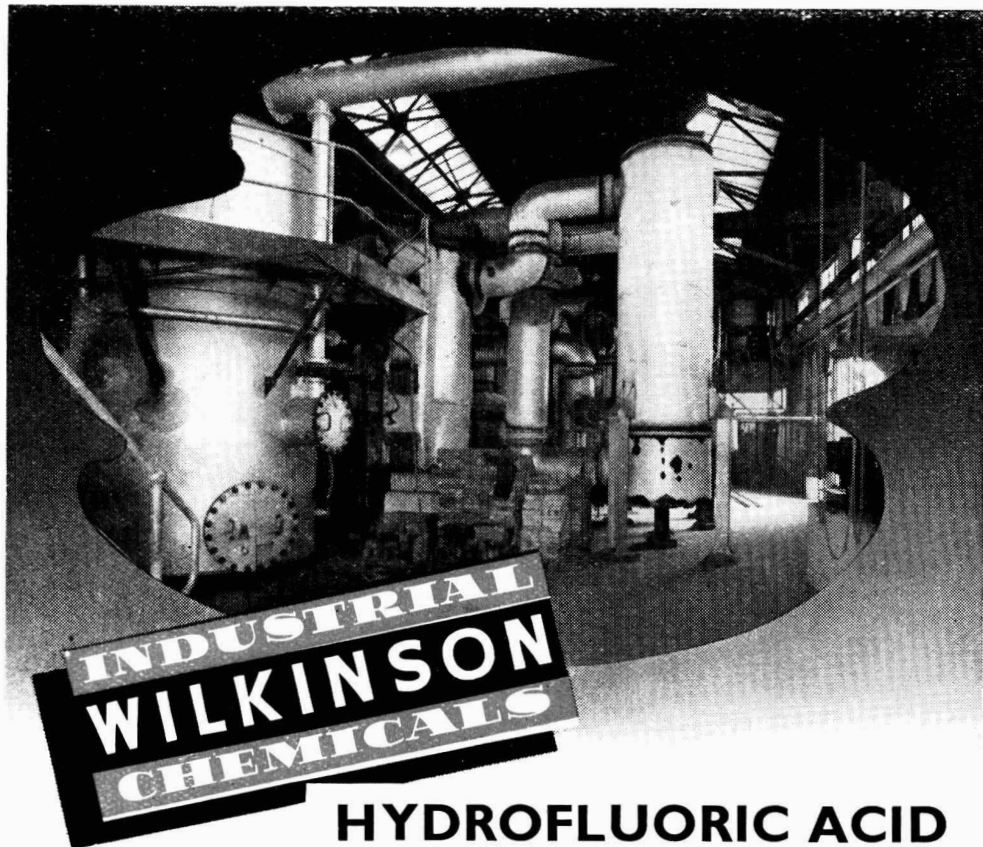
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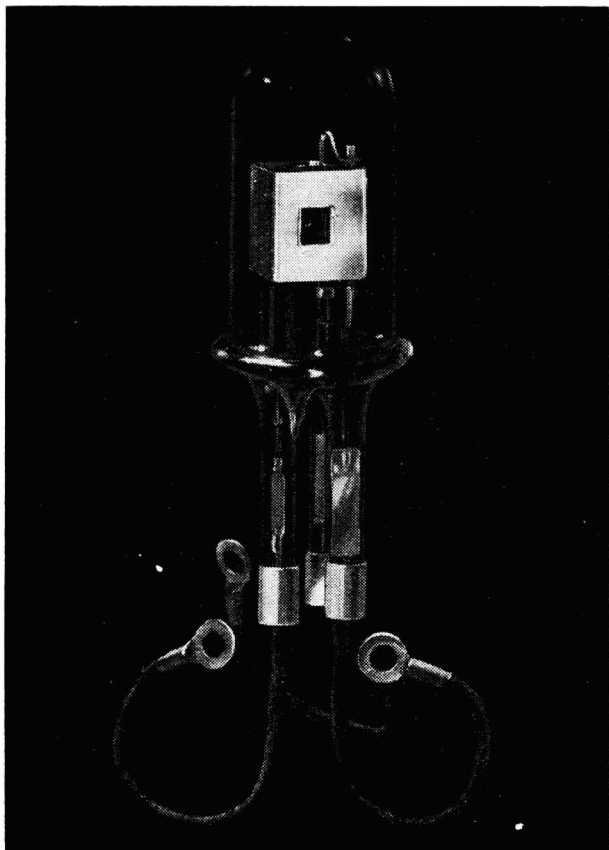
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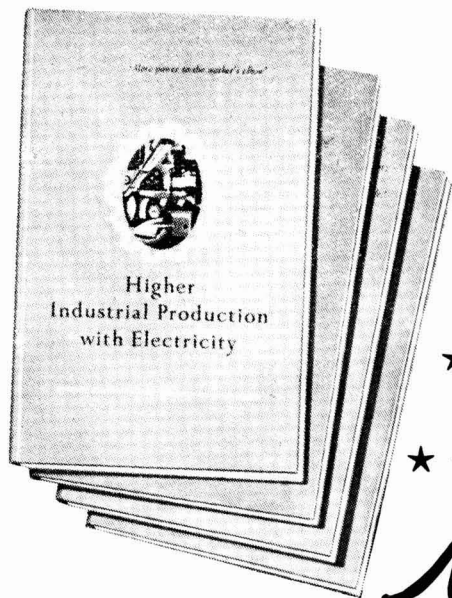
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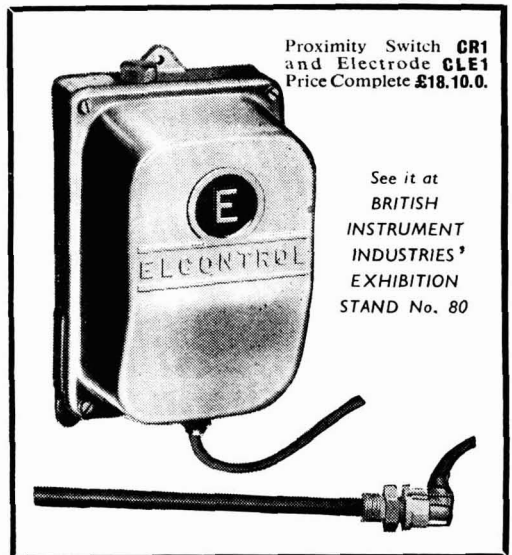
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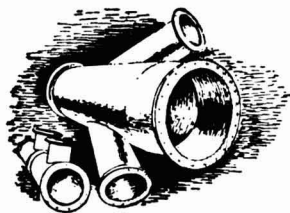


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Volume LXVIII

25 April 1953

Number 1763

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## Mr. Butler's Encore

JUDGING from immediate reactions, Mr. Butler's second budget is much more of a best-seller than his first. The analogy is not out of place for the Chancellor revealed a close and sympathetic knowledge of the author's trade in his budget speech. If the analogy has a weakness it lies in the fact that the first budget was not so obviously a best-seller. It had to be tested by time. There were many misgivings among the experts inside and outside the subjective arena of politics. Now it is clear that the 1952 budget succeeded beyond the most hopeful expectations, the due and proper applause has been cut short by the more clamorous reception of the encore. But all his concessions this year stand on the granite foundation of his takings last year, and this he would be the first to admit.

The budget has been criticised for not giving help to those who already pay little or no income tax. This type of criticism regards the budget as an instrument of welfare, an all-powerful economic dispensary, a leveller of rewards. Is it cynical or callous to suggest that relief cannot be appreciably given to people

whose incomes do not incur much tax, and that when relief can be given it must first assist those whose incomes still are severely taxed? To relieve taxes upon beer, tobacco, or even purchase tax upon clothing is to throw economic justice to the winds of personal habits. We have lived too long in a wishful new world. Purchase tax relief upon the more highly taxed goods is only stupidly and superficially seen as a preferential relief for the rich. These goods are manufactured by workers; the demand for them creates employment and lack of demand for them creates unemployment. The reduction of purchase tax upon cars, particularly upon the more costly cars, is an indirect relief for the men who make them. Industrial companies have received more help than the reduction in income tax rate; indeed, no class of taxpayers benefits more from Mr. Butler's second budget than industry. But only deep-seated malice or stark ignorance can represent this as preferential, sectional treatment. Taxation relief for industry is long overdue—not for the benefit of directors or shareholders but for the long-term salvation of industry itself. We

happen to be an industrial nation. If we cannot remain so effectively, we become an extinct nation.

For industry the end of the excess profits levy and the return of initial allowances are reliefs that transcend the reduction in rate of income tax. Here there would seem to be most welcome agreement between the parties for Mr. Gaitskell expressed opposition approval of these two measures on the first day of the budget debate. It is tedious now to repeat the arguments for the repeal of EPL and the revival of initial allowances, for they have been energetically pressed for many months wherever industry is intelligently discussed. The clasp of taxation has been holding our industry in a straight-jacket for years and the time is overdue for re-invigoration and expansion. Worse still, it is the most progressive and promising branches of industry that have suffered the most. Industry makes profits (or perishes) and it pays dividends (or also perishes); but it also employs directly or indirectly the whole working population and it provides—again directly or indirectly—all the necessities of living. Mr. Butler's second budget is not to be judged by the calculable savings in income tax that it brings to individuals. It will bring far greater and wider benefits in the unemployment it prevents, the increased efficiency in factories that it

promotes, and the expansion in our export trade that it may stimulate.

The budget is a challenge. The opposition would have coupled the EPL discard with ceiling limitations upon profit distribution. Mr. Butler has left it to industry to plough back the portion of earnings that he no longer demands. He backs freedom rather than edict and restriction, movement rather than rigidity. Nothing strangles the progress of new industries more than dividend limitations and in the long run the future of Britain rests more upon new ventures than upon the old. New ventures are not always successful for their first years and some fail dismally; how can capital—especially now that it is dearer—flow to the support of new risks with the rewards set to a ceiling for success yet with no floor for the losses in the event of failure? For the chemical industry the concessions on profits taxation are timely. To quote from a recent survey on international trade in chemicals (*Industrial Chemist*, 339, 160), 'Lasting progress in the export trade, however, demands a long-term policy of development and research at home. The solid backing of a strong and expanding home market will be needed in the future more than ever before for a healthy and progressive export trade.' For the first time since the war, a budget has attempted to create those conditions.

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## Notes & Comments

### *Detergent 'War'*

**T**HERE appears to be no limit to the lengths to which some present-day manufacturers will go to increase the sales of their products. Few people can have failed to notice in recent months the intense competition that has developed between makers of detergents and washing soaps. The tempo of the battle has now been increased by the adoption of methods used by American firms with the result that free samples, reductions in price on production of vouchers, and offers of motor-cars, motor-cycles, television sets, groceries and even 'dream' houses are being regarded as commonplace inducements to the bewildered housewife. Thousands of free gift vouchers are sent to housewives weekly. We cannot but regret the adoption by British manufacturers of these American methods of high-pressure salesmanship, with their resultant unwelcome addition to the already heavy load on the Post Office and waste of the public's time. Surely there must be a simpler, more logical and more 'British' solution to the problem.

### *New Oil and Fat Prices*

**T**HE soap industry will benefit most from the price cuts in certain fats and oils announced the other day by the Ministry of Food. The reductions, which have been widely welcomed, particularly as they were considerably overdue by the consuming trades and importers, bring values approximately in line with current world prices. In some quarters it is considered likely that the underlying motive of the price cuts is to speed the disposal of Ministry stocks as an initial step to further decontrol. By many traders it is considered probable that technical oils still under official control will be the first to be freed and then the edible oils. The high prices hitherto in vogue have made it difficult to dispose of stocks to the home trade, although sales abroad at competitive prices have been on a fairly extensive scale.

### *A New Systemic*

**T**HE ranks of the systemic insecticides are steadily increasing. The latest addition to the list of those available in this country is German. Its active ingredient is the diethoxyphosphoric acid ester of 2-ethyl mercaptoethanol and it is manufactured by Farbenfabriken Bayer. It is being developed as an insecticide for hops by Messrs. Plant Protection Ltd., who have arranged to buy supplies from Germany for distribution in Britain. Students of this branch of chemistry will not find this Anglo-German innovation unexpected, for it was in German pre-war and war-time research that the modern organophosphorus and systemic insecticides had their beginnings. In 1952 this new systemic was tested (as FR 162) in all the main hop-growing areas of England. Very low rates of application give both rapid and intensive control over the hop plant's major enemies—red spider and hop aphid. The material has both contact and systemic activity, but the rate of assimilation into the plant is very rapid; the initial contact toxicity is brief in duration, therefore, and is speedily followed by the systemic effects. This is a desirable balance for prolonged contact activity would lead to non-selective insecticidal results, reducing the populations of friendly insects as well as controlling the pests.

### *Rapid Absorption*

**I**NDEED, rapidity of absorption into the growing plant seems to be the main feature of the new product. With systemic materials in general, rates of absorption or of subsequent translocation within the plant have been slow enough to be affected by climatic conditions. This German substance so readily moves both into the plant and within it that the inhibiting effects of weather are more or less insignificant. According to strength of spray, a 100 per cent knock-down systemic effect is secured within 4 to 24 hours of application; the contact

effect is, of course, immediate. The effective life of an application is about two weeks. This period is shorter than that for most other systemics, some of which remain effective for four weeks. However, this is not a limitation to be regretted. Long maintenance of toxicity to sucking insects means that a systemic material is slow in breaking down within the plant to harmless substances. The

organo-phosphorus insecticides are so toxic that their use cannot be freed from residual hazards unless there is a definite and complete decomposition into non-toxic derivatives within a known and not overlong period of time. The diethoxy-phosphoric acid ester of 2-ethyl mercapto-ethanol (now sold as 'Systox') may well prove to be a major event in the history of systemic insecticide development.

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### *Activity of Insecticides*

**A**T a recent meeting of the Crop Protection Panel of the Agriculture Group of the Society of Chemical Industry three papers on the subject 'Physical Factors in Relation to Biological Activity of Insecticides' were read. Dr. R. A. E. Galley was in the chair.

Mr. C. T. Lewis discussed factors affecting the adhesion of dry particles of uniform size to active insects. Experiments with selected dyestuffs had shown that dry lipid-soluble particles adhered more readily to the cuticle of blowflies, and to leaf wax, than did lipid-insoluble particles possessing polar groups. Presumably the presence of polar groups lessened the attraction at the solid-solid interface due to Van der Waals forces. The phenomenon had an appreciable influence on the rate of accumulation of particles by flies exposed to deposits. Parallel experiments with insecticidal dusts had yet to be performed, but significant effects could reasonably be expected since contact insecticides were lipid-soluble and most diluent dusts were calcium or magnesium silicates. The effect of the 'cleaning' reactions of a treated fly on the retention and location of accumulated particles was described.

Dr. A. H. McIntosh dealt with the effect of certain conditions of test on the toxicity of a single insecticide. He referred to experiments in which insects were dipped in aqueous suspensions of DDT. The weight retained depended upon the particle size, being greater for needle-shaped crystals than for colloidal particles. Temperature had a notable effect on toxicity, and the temperature coefficient, usually negative, varied with particle size and with humidity. High humidities accentuated the difference between the temperature coefficients of large and small particles. The fact that poisons did not always have the same speed of action was an additional complication. The values

obtained in relative toxicity tests could vary with the time at which observations of kill were made. Dr. McIntosh also discussed the relation between the contact toxicity of insecticides and their fat-solubility.

Dr. Barlow gave some factors of importance in the control of adult mosquitoes by residual spraying of houses. Mosquitoes were sometimes stimulated to flight after a short time in contact with insecticidal surfaces and this fact increased the importance of physical factors affecting the availability of deposits. The best formulation for deposits on absorbent walls was a wettable powder; the dispersing medium was absorbed, leaving insecticide particles freely exposed. On all types of surface, toxicity was inversely related to particle size, because smaller particles were more easily picked up and retained by mosquitoes.

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### **Sulphur Committee Ending**

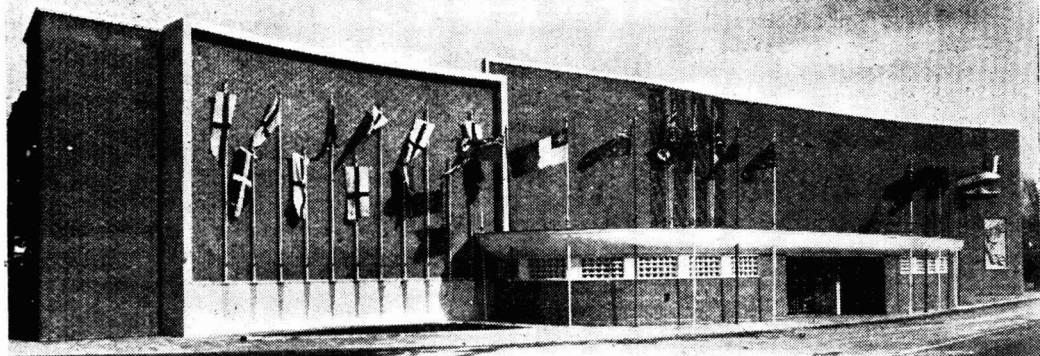
The International Materials Conference sulphur committee has announced that its member-governments have agreed to the dissolution of the committee on 30 April. This follows the committee's recent decision to discontinue international allocations of crude sulphur as from 1 March and reflects the continuing improvement in the supply and demand position of sulphur.

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### **Marketing of Fuel Oils**

The Vacuum Oil Co. Ltd. and Charrington Gardner Locket (London), Ltd. have announced a joint arrangement whereby Charrington's undertake the inland marketing of fuel oils now being produced at the Vacuum Oil Company's new refinery, Coryton, Essex. As a result of this arrangement a new road tanker fleet will soon be seen in service.

## B.I.F.—CASTLE BROMWICH



**M**ANY exhibits of interest to the chemical, chemical engineering and allied trades are included in the engineering and hardware section of the British Industries Fair which opens at Castle Bromwich, Birmingham, on Monday, and continues until 8 May.

Complete units for air, gas and liquid filtration at pressures up to 5,000 p.s.i., constructed from 'Celloton' and 'Porsilex' porous ceramic media, will be on show on the stand of **Aerox Ltd.** These media are also suitable for electrolysis, aeration and diffusion, and there will be practical demonstrations of this last application.

The stand of **Andrews Bros. (Bristol) Ltd.** will include display and photographs of fabricated stainless steel equipment suitable for dairies and chemical works.

The aim of the stand of **Bakelite Ltd.** will be to demonstrate the versatility of the plastics produced by the company. This is to be done by showing not only the range of materials supplied, but a wide selection of important industrial applications to which they are put.

Four giant test tubes in the centre of the stand will emphasise the scientific origin of the materials and displayed in and around them will be Bakelite phenolic and urea resins and moulding materials, laminated sheet, rod and tube, and the Vybak group of thermoplastic compounds for extrusion and injection moulding, and soft and rigid calendered sheet.

Problems of sealing or adhesion are considered by the **B. B. Chemical Co. Ltd.**, who are showing a complete range of their

'Bostik' products, designed to withstand stress and strain, water and oil, and extremes of climatic conditions.

For plastics manufacturers an interesting feature of the hydraulic presses displayed by **B.I.P. Engineering Ltd.** is the automatic control of the moulding cycle.

The stand of **Frederick Braby and Co., Ltd.** is constructed of 'Bar-Form' metal partitions, designed by the company. Free-standing exhibits will include steel drums for the chemical, oil and paint industries; perforated metals and cable trays; culverts; ice moulds; metal partitions; 'Bar-Form'; cisterns, cylinders and hot water tanks; export type barrow, with one dozen packed for export; steel shelving; office lockers; aluminium stacking drums of 3 gal. capacity; and a galvanised pressure vessel 8 ft. 7 in. high and 3 ft. 6 in. in diameter.

Technical advice on the properties and processing of Geon PVC in all its various forms will be available on the stand of the manufacturers, **British Geon Ltd.**

**British Industrial Plastics** will display a comprehensive range of 'Beetle' urea and melamine moulding powders and resins in use in the paint, paper and textile industries, and corebinding resins for bonding foundry sand cores.

A new fine grinder which can be completely and speedily dismantled, cleaned and re-assembled without the use of spanners, will be exhibited by **British Jeffrey-Diamond Ltd.**

This machine, the Intermediate Atomill, is the latest addition to the company's range

of fine grinders and has a product range from 50 to minus 300 B.S. mesh. It has special appeal to batch producers, particularly those in the chemical, colour and dyestuffs, cosmetics, food products and plastic industries, where it may be necessary to pass a variety of materials through the mill daily and where speed and spotless cleanliness are important factors.

A self-priming and flooded suction centrifugal pump for chemical and other corrosive duties will be shown by **British Labour Pump Co. Ltd.**, together with a vertical packingless pump.

A wide selection of resin adhesives and moulding materials will be exhibited by **British Resin Products Ltd.**, including 'Cellobond' urea and phenolic adhesives, 'Cellomold' cellulose acetate moulding materials, 'Distrene' polystyrene moulding materials, 'Epok' synthetic resins (for laminating, surface coatings, and foundry work) and 'Rockite' urea and phenolic moulding materials.

The novel stand used at Castle Bromwich last year by **British Ropes Ltd.**, testifying to the strength and quality of the company's steel wire ropes, is again being used this year. It will be suspended in mid-air, an office, a lounge and a small store being above the ground. A new product which will be on show is a braided wire rope sling, consisting of eight steel wire ropes braided together. Extremely flexible and resistant to kinking, these slings are particularly useful for lifting heavy and awkwardly shaped machines. Nylon cloth, adapted for industrial purposes, is also featured.

Many of the exhibits displayed by the **British Thomson-Houston Co. Ltd.** are to be shown at the British Industries Fair for the first time. They will include a new close-voltage regulation alternator; the new oil-switches on the Class QF ring-main switchgear unit; the high-speed electronic batch-counter; and the recently introduced BTH 16mm Type 401 projector. A special exhibit of stator and rotor units, now finding many new applications, includes a demonstration of high-speed units running at 60,000 r.p.m.

Complete plant and equipment units in stainless steel, mild steel, and aluminium, are among the productions of **W. P. Butterfield Ltd.**, who will display jacketed pans and milk, beer and petrol storage tanks, as well as some examples of their chemical plant fabrications.

**Carbox Ltd.** will have on show their carbon bricks, tiles and cement-jointing compounds (for chemical applications, including pickling tanks, digesters, etc.) and carbon refractories for blast furnaces.

The technology of glass has shown many advances in recent years, and some of the greatly increased number of uses to which it can nowadays be put will be demonstrated on the stand of **Chance Brothers Ltd.** Included among the exhibits are marine lighting equipment, electric generating plant and submersible electric pumps.

The protection of bright steel components and stock by the use of anti-rust oils is part of the display of the **Chemag Metal Colouring Co. Ltd.**, who also show their immersion black process and gun-black finish.

Laboratory mills, disintegrators, pulverisers and hammer mills are the products of **Christy and Norris Ltd.** These installations will handle a wide variety of materials, including limestone, cork, glue, plastics, chemicals, wood, etc.

The fruits of a year's steady development work in the design of electric storage battery equipment for industry are to be shown by the **D. P. Battery Co. Ltd.** The well-known D.P. 'Kathanode' range of traction cells, specifically designed for the propulsion of electric industrial trucks, road vehicles and locomotives, will again dominate the exhibits. All the examples to be shown are of the latest improved pattern. One of many recent developments has been the introduction of 'Porvic' ribbed separators, an advance of importance in the traction battery field.

For the fourth year in succession the **Royal Doulton Potteries** will display a wide selection of porous ceramics such as are being used today in almost every branch of industry for filtration, diffusion, electrolysis and other processes. New fields are being opened up with the introduction of Royal Doulton large size filter tubes into dust recovery equipment. Progress in this application during the past year has been considerable and has been augmented both by the successful production of filter tubes larger than any previously made in this country and by the introduction of a new grade of porous ceramic. Among the various exhibits is a chemical stoneware vacuum filter which has been sectioned for clarity.

A working model of factory swing doors

with rubber panels is to be shown by the **Dunlop Rubber Co. Ltd.**, with a truck passing through them. When the truck is driven straight at the doors they do not bang against the walls, but open easily, avoiding damage to the doors, the truck or to any fragile article passing through them.

The comprehensive range of exhibits shown by **Electromagnets Ltd.** will include a lifting magnet, swarf separator, high intensity chute type magnetic separator and various types of permanent magnetic separators. Of particular interest is a large high intensity overband type of magnetic separator, many of which are in use for the salvaging of tins and general ferrous scrap from household refuse, and removal of general tramp iron from products in process. Also to be shown is one of the 'Boxmag' high intensity conveyor head units built into a shortband conveyor.

The increasing degree of instrumentation in industrial processes is reflected in the range of indicating and control instruments on the stand of **Elliott Brothers (London) Ltd.** These include equipment for gas analysis, strain measuring instruments, speed indicators and recorders, and many forms of automatic control.

**Ether Ltd.** also will show a large selection of instruments: Ether-Wheelco electronic temperature controllers and combustion safeguards; surface contact and molten metal pyrometers; motor-operated and solenoid valves; pressure switches and temperature indicators.

The automatic control of liquid level may be achieved by the use of 'Level-Trol' controllers with pneumatic relay pilot units, made by the **Fisher Governor Co. Ltd.**, who also manufacture diaphragm motor valves and reducing regulators and relief valves.

A non-corrosive piston pump for handling all liquids used in food-processing, with a maximum capacity of 2,000 gph, at pressures up to 400 p.s.i., will be on show on the stand of **Food Machines (Slough) Ltd.**, together with examples of their complete oil refinery equipment, including roto-coolers.

Featured on the stand of **The Fullers' Earth Union Ltd.** will be activated earths and their applications. They will include 'Fulbond' for bonding foundry sands and 'Fulbent' for emulsifying and suspending many products, such as muds in well drilling and insecticides.

The protection of bright metal and valuable articles against rust, corrosion, abrasion and shock in transhipment, fabrication and store, is the theme of the exhibit of **Glostics Ltd.**, of hot and cold applied strippable plastic coatings.

The Lummus 'Multilok' heat exchanger fabricated under licence by **G. A. Harvey and Co. (London) Ltd.** will be featured on that company's stand and serve to indicate the type of work and class of finish produced from their factory at Greenwich.

During the past few years Harvey's have added considerably to their facilities for the fabrication of steel plate and they are now able to manufacture pressure vessels, autoclaves, fractionating and absorption towers in steel plate up to 3 in. in thickness and of any diameter and length, to Lloyds Class 1 rules, and insurance companies' and A.P.I.-A.S.M.E. codes.

The 'Atritor' unit pulveriser, for firing boilers and cement kilns, will grind, dry and deliver, in one operation, coal, chalk, limestone, clay, gypsum or other materials. It will be on show on the stand of **Herbert Alfred Ltd.**

**I.C.I. Plastics Division** will be displaying 'Mouldrite' thermosetting and thermoplastic moulding powders and showing, by means of end-products, how these powders are utilised in the engineering, electrical and motoring industries. Synthetic resins for use in foundries will be specially featured and 'Fluon' (polytetrafluoroethylene) which is now more readily available, will also be shown. A display of all the products made by the division is to be shown on the combined British Plastics Federation stand.

**I.C.I. Metals Division** will display copper, brass, cupro-nickel, phosphor-bronze and other non-ferrous alloys in plates, sheet, strip, tube, wire, rod and extrusions. Wrought aluminium alloys in similar forms will also be exhibited.

**Lockers Ltd.** will display perforated metal, woven wire and welded mesh screens for sieving, grading and filtering, from the coarsest mesh to sieving cloth with 40,000 holes per sq. in., and in all metals.

As in past years, a big attraction at the stand of **Londex Ltd.** will be the demonstration of electrical automatic control apparatus working in conditions similar to those in industry. No fewer than 14 exhibits are to be operating, some continuously, others by the touch of a switch. In keeping with

the Londex main line of production, a special feature will be made of their range of relays. The standard relays which are being used in increasing numbers by industry and in the Services are to be shown as working exhibits.

Distillation, evaporation and all plant for the chemical, brewing, dairy, food and paint industries, fabricated in stainless steel, nickel, inconel, monel, copper and aluminium is manufactured by the **London Aluminium Co. Ltd.**, who will have a comprehensive display.

Mouldings and other plastic products in a variety of materials for a wide range of industrial and domestic duties are to be displayed by **Lorival Plastics**. Attention is drawn on the stand to the production of Lorival calendered PVC sheeting in new qualities for individual applications. These special types were developed to meet specifications for packaging commodities of all kinds, for lining chemical tanks and drums, and for electrical insulation.

Handling of corrosive liquors is always a problem to the chemical engineer, and pumps, with their moving parts, are the most vulnerable parts of a plant. **Merrill Pumps Ltd.** will exhibit glandless self-priming tube diaphragm pumps for hydrochloric acid, hydrofluoric acid, phosphoric acid, sulphuric acid, acetic acid, pickling acids, battery acids, plating liquors, sodium hypochlorite, ammonia liquors and slurries.

An alloy steel continuous high vacuum fractionating column designed to handle a feed of one ton an hour of high boiling oil and to operate at  $1\frac{1}{2}$ -2 mm.Hg.abs. with reflux control, will be among the exhibits shown by **Metal Propellers Ltd.** Another exhibit of interest will be a 6 ft. 10 in. o/d alloy steel bubble tray, shown inside a specimen section of mild steel tower wall showing various stages in the lining of the wall with strips of B.S.S. EN56A alloy steel.

**Mono Pumps Ltd.** will have on show positive rotary pumps with high suction lifts, for handling hot or cold, free-flowing viscous, corrosive or abrasive fluids, or liquors containing small solids in suspension or solution, and **Morrison Automatic Pumps Ltd.** will demonstrate their portable, deep-well jet, and high pressure pumps.

In the refractory section of their stand the **Morgan Crucible Co. Ltd.** will display the wide diversity of shapes and materials now available from them. A feature is to

be made of two new refractories recently introduced, which may well change the whole conception of furnace efficiency and maintenance. These are the super-duty fire-brick—Morgan M.R.1—and the Morgan low storage insulating refractory—M.I.28. Prominence is also to be given to the most recent addition to the Morgan range of refractories—combustion tubes for the estimation of sulphur and carbon in steel. These tubes are suitable for use in temperatures up to 1,500° C. and provide ample margin of safety from fracture.

Besides their infra-red, gas-heated drying equipment for industrial finishing and rapid stoving, **Parkinson and Cowan (C.M.) Ltd.** will exhibit laboratory test-meters and pressure gauges.

Mixing equipment will be shown by **Pioneer Mixers Ltd.**, including an open tilting drum mixer, the 'Rolmixit' roller pan mill, a contra-flow tilting mixer and the 'Imp' tilting drum mixer.

**Prodorite Ltd.** a complete acid-proofing organisation for all industries, will demonstrate floor and wall finishes, tanks, cements, ducting and pipes for chemical works, breweries and dairies.

Permanent and electro magnetic separators are to be shown by **Rapid Magnetic Machines Ltd.** They will include the new 'Rapid' electro magnetic vibratory chute type separator, designed to treat fine powders and other commodities of a similar consistency that require mechanical motion to precipitate their flow. Among other exhibits are to be an electro magnetic ore separator capable of treating six minerals at one passing and the 'Rapid' Magna-sweep Major and Minor for collecting ferrous scrap from workshop floors.

Barrier creams for protecting the skin against all classes of irritant materials used in the chemical and other industries are to be displayed by **Rozalex Ltd.** Factory inspectors' reports year after year show that dermatitis easily heads the list of occupational diseases sapping the strength of the country's labour force.

Hammer mills for paints, drugs, fertilisers, plastics, etc., will be displayed by **Scottish Mechanical Light Industries Ltd.**, who will also display pneumatic conveyors and trunking.

Of interest to rayon and other synthetic fibre manufacturers will be the factory and

*(continued on page 628)*

# The Physical Society's Exhibition

## Wide Range of Instruments Shown

THE annual exhibition of scientific instruments and apparatus organised by the Physical Society was held at Imperial College from 13-17 April.

It was on the whole a smaller display than on previous occasions, being confined to the main building of the college, but there was the same enormous variety of design and invention. The exhibits ranged from the large linear accelerators of the Metropolitan Vickers Company, Ltd., to the tiny germanium crystal rectifiers of the General Electric Company, Ltd., with applications as diverse as the determination of the proteins in blood serum and the testing of the common lead pencil.

This year the show was less representative of the instruments industry and many of the stands were occupied by such bodies as University Departments, Government Research Establishments and the Science Museum, the last-mentioned having on show the original Milne-Shaw Seismograph. This is a tendency worthy of being encouraged; the visitor has the privilege of inspecting the instrument in its embryonic form before it is taken over by the manufacturers and streamlined into its production form.

Another feature to delight the less earnest visitor—that is, the visitor who can still remember the press button working models of the Science Museum—was the large number of demonstration exhibits. From these we may quote the display of phenomena con-

nected with arc discharge on the stand of the Siemens Research Laboratories, and the collection of computing equipment, including a Nim player of a different design from that which appeared at the Festival of Britain, contributed by the Mathematics Department of the Imperial College.

The most common instrument in the show was the strain gauge which is being developed by a number of companies; but there was also a great deal of interest in the possibilities of equipment for ultrasonics and there were several units of varying power upon the stands.

One of the more interesting exhibits had almost a historical significance. This was the display of instruments and equipment developed during the last war by the Cambridge Instrument Company, Ltd., and now released from secrecy by the various Service Departments and the Ministry of Supply. Among these was the Degaussing equipment used to combat the German magnetic mine, which was detonated by the distortion of the earth's magnetic field, caused by the presence of a ship. This distortion was measured by a submerged fluxmeter and neutralised by current carrying coils wound round the ship.

On the same stand was the Multi-Channel String Galvanometer with Time Marker and Automatic Developing Camera, used for localising enemy guns. The instrument gives a complete photographic ranging record in less than a minute from the firing of the



*General view of the exhibition*

gun, and such a unit was in use to localise the long range guns on the French coast firing to the English mainland.

There were equally interesting displays on many of the stands occupied by such bodies as the Department of Scientific and Industrial Research and the National Coal Board. The latter had produced a 16-page booklet describing some of the activities of its two research establishments.

Among the instruments on show was a moisture meter for measuring the moisture content of fine coal and a meter for the measurement of the oxidation of fine coal. In the production of smokeless fuel briquettes some of the coking properties must be reduced by oxidation and the control of this process is achieved by measuring the charge acquired by the coal particles. Raw coal acquires a positive charge while completely oxidised coal acquires a negative charge. Intermediate values represent intermediate degrees of oxidation and the instrument may be calibrated in terms of this variable for a given flow rate and particle size distribution.

Many of the operations of the laboratory worker have become mechanised in the past few years and electronic methods provide ever-increasing numbers of alternative techniques. As an example of this is the Thermobalance of Stanton Instruments, Limited. This incorporates a balance, an electric furnace and a recorder, and produces a continuous record of weight, temperature and time at temperatures up to 1,000°C. These facilities can provide both the analyst and the research worker automatically with data which would take considerable patience and time by any other method, without even the need of supervision. A further example of this mechanisation was the Automatic Titrimer exhibited by Electronic Instruments, Limited. This consists of a conventional pH meter with a glass and calomel electrode system coupled to a solenoid operated burette so that the burette is turned off as the end point is reached. A further refinement automatically reduces the rate of flow as the end point is approached.

The Exhibition handbook is as well produced as ever, and it is of considerable value that many of the companies have included a small heading describing their particular interests and activities.—J.R.M.

## BIF Castle Bromwich

*continued from page 626*

laboratory metering pumps and continuous fluid-flow mixers and disintegrators exhibited by **Slack and Parr Ltd.**

**Synthetic and Industrial Finishes Ltd.** will be demonstrating their 'Thermindex' paints, which are temperature sensitive compounds indicating by a sharp change of colour when the temperature of a surface has attained or exceeded a certain value.

A new range of plastic covered gloves for the chemical and industries will be on show on the stand of **Tedson, Thornley and Co.**

Exhibits of interest on the stand of **J. W. Towers and Co. Ltd.** will include the Towers Manipulator Box, which, although primarily developed for handling radioactive materials not emitting very penetrating radiations in a controlled atmosphere, has many applications in the more general fields of organic and inorganic chemistry. The Towers constant temperature bath for viscosity determinations has been designed to bring together the bath and controls into one unit, making it much more compact than formerly. Other instruments to be exhibited are Model 205 direct reading automatic balance, Model 45 analytical balance, Model 101 aperiodic analytical balance, general purpose water bath, precision heating block, magnetic stirrer, vibro shaker and Universal Electric Oven with circulating fan.

**Thompson Brothers (Bilston) Ltd.** will be exhibiting examples of their fusion-welded plant in stainless, stainless clad, and mild steel, for the chemical, beer, milk and food industries, including pressure vessels, galvanising plant, centrifugal machines, and petrol and oil tanks. The Bird continuous centrifugal filter, manufactured in Great Britain by Sir W. G. Armstrong Whitworth and Co. (Ironfounders) Ltd., will be on show on the stand of **Vickers Ltd.**

'Linatex' lined plant, including pumps, ball-mills, valves and hose, together with specially-fabricated components, will be the principal feature of the display of **Wilkinson Rubber Linatex Ltd.**

Straight-through diaphragm valves in cast iron, stainless steel, bronze, lead, glass, rubber, etc., all sizes up to 14 in., for gas, water, compressed air, acids, chemicals, beers, etc., are manufactured by **Wynn (Products) Ltd.**



# Export Market Difficulties

## BCPMA Report Outlines Past & Present Problems

**D**IFFICULTIES encountered in the export market by members of the British Chemical Plant Manufacturers' Association are referred to in the Association's annual report for the year ended 31 December, 1952.

The report, which was presented at the recent annual meeting of the Association, states that members found the export market during 1952 particularly difficult, and there was some falling off in the volume of orders received compared with 1951. The value of shipments was, however, only slightly below that achieved in the previous year.

The Association devoted particular attention to the problems of overseas trade, much of its work in this field being concerted with that of the British Engineers' Association and the Federation of British Industries, on whose respective Export and Overseas Trade Policy Committees it is represented by the director, Dr. E. H. T. Hoblyn.

Apart from the handicap imposed by raw material shortages and delays in the delivery of bought-out components (the report continues) the principal difficulties facing members are the limitations imposed by import licensing and exchange control, and the steady growth of foreign competition, notably from Western German exporters. There is widespread dissatisfaction with the facilities afforded by the Export Credits Guarantee Department, which do not enable members to match the specially advantageous terms of payment offered by many of their foreign competitors, and the Association would welcome a substantial improvement in these facilities.

### Foreign Competitors Aided

Foreign competitors are further assisted by the export incentive devices such as dollar retention and tax remission schemes made available by their governments. These incentives were fully discussed by the Council at a meeting with Sir Norman Kipping, director-general of FBI. The Association supports the Federation's view that the United Kingdom should press through appropriate international organisations for the complete abandonment of such incentives rather than invite further competition in their use by itself adopting them; like the Federa-

tion, it believes that increased production for export can best be stimulated by the removal of fundamental deterrents such as the heavy burden of corporate and personal taxation.

The Association has kept the Board of Trade informed of members' trading difficulties in specific markets, so that appropriate representations can be made by their negotiators in the various bilateral trade talks.

### Procedure Unsatisfactory

The procedure for consultation with industry prior to negotiations and for making the results known afterwards is far from satisfactory, says the report. It is under review by a small committee representative of Government and industry to which the Association has submitted its views through FBI. The Association has also urged the Board of Trade to give speedier notification of the periodical announcements made by the French authorities calling at short notice for the submission of import licence applications.

Elsewhere in the report it is stated that in common with other firms in engineering industry, members were faced at the start of the year with grave difficulties due to the critical shortage of ferrous and non-ferrous metals, difficulties which were aggravated by the claims of the defence programme. During the year there was, however, a gradual improvement in steel supplies, due to the increased production of steel-making materials, the expansion of steel-making capacity, and the purchase of raw steel from the U.S.A.; nevertheless, there remained a lack of balance between the various forms of finished steel. There was a similar improvement in supplies of non-ferrous metals other than nickel, and the situation was further eased by the Government's decision, announced towards the end of the year, to modify the defence programme by spreading it over a longer period, with a resultant easing of the burden on metal-using industries.

The shortage of raw materials and the delay in obtaining bought-out components have meant that members have not always been able to maintain promised delivery dates; the goodwill thus lost, for reasons out-

side their control, will not easily be regained.

Comment is made in the report on the conclusion reached by the DSIR Committee on Chemical Engineering Research that national requirements in chemical engineering research could only be met if existing facilities were supplemented by a central organisation specially adapted or created for the purpose.

This question, states the report, has been carefully examined by the research committee and the executive committee, who took the view that it would be premature to establish such an organisation until an attempt had first been made to find out what unpublished data existed and what research was currently being undertaken by chemical plant designers and chemical manufacturers regarding the problems listed in the report as requiring further investigation. This view was shared by the Association of British Chemical Manufacturers, with whom the question was discussed in detail, and the two associations decided to appoint an independent expert to make a preliminary survey of the chemical engineering needs of the chemical and chemical plant industries, based on the suggestions made by the organisations listed in Appendix 'A' of the DSIR report.

This task is being undertaken by Major F. H. Bramwell, lately chief engineer of the General Chemicals Division of Imperial Chemical Industries, Ltd. He will ascertain in confidence what unpublished information exists and what work is being done regarding the problems listed in Appendix 'B' and how far and on what conditions the firms concerned are prepared to make such information and the results of their research generally available. He will then report to the councils of both associations, making recommendations for further action. Before

any approach is made to BCPMA members, they will be notified by the Association.

Membership of the Association increased during 1952 from 182 to 192. Ten full members and three associate members were elected and three full members resigned. There are now 157 full members and 35 associate members.

At the meeting Mr. H. V. Yorke (Bennett, Sons & Shears, Ltd.) was re-elected chairman. Other officers are:—Vice-chairman, Mr. E. S. Franklin (Torrance & Sons, Ltd.), Mr. G. N. Hodson (Hatherware, Ltd.), and Mr. R. F. Stewart (Dorr-Oliver Company, Ltd.); hon. treasurer, Mr. P. W. Seligman (The A.P.V. Company, Ltd.).

Members of the council are as follows: Mr. W. R. Beswick (Ashmore, Benson, Pease & Company), Mr. B. L. Broadbent (Thomas Broadbent & Sons, Ltd.), Mr. H. W. Fender (Prodorite, Ltd.), Dr. G. E. Foxwell (Clayton, Son & Company, Ltd.), Mr. K. Fraser (W. J. Fraser & Company, Ltd.), Mr. N. C. Fraser (W. J. Fraser & Company, Ltd.), Major V. F. Gloag (Simon-Carves, Ltd.), Mr. A. G. Grant (Whessoe, Ltd.), Mr. J. C. Haithwaite (John Thompson [Dudley], Ltd.), Mr. W. J. Hooton (S. H. Johnson & Company, Ltd.), Mr. A. M. Hutcheson (Thompson Bros. [Bilston], Ltd.), Mr. I. M. O. Hutchison (Henry Balfour & Company, Ltd.), Dr. R. Lessing (The Hydro-nyl Syndicate, Ltd.), Mr. B. N. Reavell (Kestner Evaporator & Engineering Company, Ltd.), Mr. J. Arthur Reavell (Kestner Evaporator & Engineering Company, Ltd.), Mr. G. W. Riley (George Scott & Son [London], Ltd.), Mr. R. W. Rutherford (The Power-Gas Corporation, Ltd.), Dr. R. Seligman (The A.P.V. Company, Ltd.), Mr. E. Smyth (Peter Brotherhood, Ltd.), and Mr. J. W. Wright (Cannon [Holdings], Ltd.).

## The Annual Dinner . . .

THE annual dinner was held in Grosvenor House, Park Lane, London, W.1, on Wednesday evening, Mr. H. V. Yorke, chairman of the Association, presiding.

There were many distinguished guests present and their health was proposed by the chairman. The principal guest was Sir Haro'd Hartley. His fellows guests included Sir James Helmore (Permanent Secretary, Ministry of Supply), Mr. L. H. Robinson

(Deputy Secretary of the Ministry), Mr. J. B. L. Munro, Mr. S. C. Bishop and Mr. E. W. G. Haynes (Ministry of Supply); Mr. Rowland Owen (Controller-General, Export Credits Guarantee Department); Mr. D. L. Walker (general secretary, Federation of British Industries); Mr. David Walker (president, British Engineers' Association); Mr. L. P. O'Brien (vice-president, Association of British Chemical Manufacturers); Mr. John

Ryan (chairman of the Food Machinery Association); Mr. Stanley Robson (president of the Institution of Chemical Engineers); Mr. H. W. Cremer (president, Royal Institute of Chemistry); Mr. Francis J. Curtis (president of the Society of Chemical Industry), and Mr. J. Maynard Jenkins (of the Spencer Chemical Company, U.S.A.).

Sir Harold Hartley, K.C.V.O., C.B.E., M.C., D.C.L., F.R.S., who responded to the toast, spoke of the relations of the chemical plant manufacturing industry and chemical engineering. Judging from various reports he had read recently, it would appear that he and his chemical engineering friends had rather failed to put their case across, that they had been applying the wrong form of persuasion.

The art of chemical engineering, which he supposed all the members of the Association would admit was the basis of their industry, was also invading every other industry. If they needed evidence of that they need only refer to the Association's excellent directory, in which were set out in an imposing manner the merits of the products of their firms, each of which gave most impressive lists of the various industries in which their plants found a use. There were the fermentation industries; chemical engineering was revolutionising antibiotics; there were the imposing developments of the synthetic fibre industry and petrochemicals. And to mention an example nearer home, he said that Sir James Helmore, when the Ministry of Supply had to find a new Director-General of Ordnance Factories, had appointed a chemical engineer. There were very many examples of the importance of the industry to the future industrial development of this country.

#### Great Dollar Earners

As the chairman had said, the members of the Association were great dollar earners; Sir Harold wanted them to be also great dollar savers. They were making plant for the whole world; and to help them in that work he suggested they might change the name of the Association, which he felt was just a little misleading. It was still called the British Chemical Plant Manufacturers' Association, but it was really the British Chemical Engineering Plant Manufacturers' Association. There was a great difference between the terms 'chemical' and 'chemical engineering.'

He had read the interesting statements contained in the Association's report about the

way in which it co-operated with Government departments, with other associations, in matters of education, standardisation, and in the exhibition of plant at Olympia in September each year. But he had noted that it did not contain statistics, and he commented that in these days, when the importance of anything was reckoned by the number of noughts, that was an important omission.

#### Physics the Basis

Speaking of research, he said the basis of chemical engineering was classical physics. He urged that the chemical engineer should be in the engineering faculty and not the chemical faculty. With the lure of nuclear physics and electronics, classical physicists were a dying race; it was said to him very recently that classical physicists were out of business and that the chemical engineers had to do the research. That was a fact, and he could not help feeling that they could not afford not to do the research that was envisaged in the Cremer Report.

The Association, he continued, was co-operative, but he sometimes wondered whether there was not room for even a little more co-operation, because it had among its members the makers of those specialised plants which had a world-wide reputation. He knew the admiration which the Association's guests had for the skill and ability which its members displayed. But when he looked around and saw so many large plants in the world which were being designed and constructed abroad he just wondered whether, by pooling resources, the orders for more of those plants would not come to this country.

Asking forgiveness for his impertinent suggestions, Sir Harold said they came from his conviction of the enormous importance of the industry and of the great part it had to play in the future industrial development of this country.

Mr. G. N. Hobson (vice-chairman of the Association) proposed the health of the chairman.

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#### Long Service

More than 300 employees of the Metals Division of Imperial Chemical Industries, Limited, drawn from eleven factories in the Midlands and the North Country, were presented with long service awards at the Witton works last week.

## Chlorinated Hydrocarbons

AMONG recent U.S.A. reports which may be obtained from the DSIR Technical Information and Documents Unit, Cunard Building, 15 Regent Street, London, S.W.1, is one entitled 'A Method for the Continuous Determination of Some Chlorinated Hydrocarbons in Air by the Northrup Automatic Titrator.' This report describes a series of tests on the Northrup automatic titrator to determine its suitability for the continuous determination of some chlorinated hydrocarbons. Tetrachloroethane, trichloropropane, epichlorohydrin, tetrachloroethylene, carbon tetrachloride and chlorobenzene dispersed in air were sampled and heated over platinum at 900°C., the resulting hydrogen chloride being determined in the Northrup titrator. Results show that this apparatus is a suitable instrument for the determination of some chlorinated hydrocarbons in air.

## Oil & Fat Prices Reduced

THE following reductions have been made by the Ministry of Food in the prices of some unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during the four-week period ending 16 May.

Prices of all other unrefined oils and fats allocated to primary wholesalers and large trade users are unchanged. The entries in the Price List relating to South American non-edible imported tallows Nos. 1 and 2 have been deleted because supplies are no longer available.

<b>CRUDE OIL</b>					
Palm oil	.. .. .	from £106 10 0	to £71 10 0	per ton c.i.f., in casks,	to be returned.
		.. £106 0 0	.. £71 0 0	per ton c.i.f., in loan	drums.
		.. £105 0 0	.. £70 0 0	per ton c.i.f., in bulk.	
<b>IMPORTED TALLOW—NON-EDIBLE</b>					
<b>Australasian—</b>					
Prime mixed	.. .. .	.. £107 10 0	to £72 0 0	} per ton c.i.f. basis, casks or drums. If in barrels or tierces £1 15s. per ton extra.	
Good colour mixed	.. .. .	.. £105 0 0	.. £70 0 0		
Fair to good colour mixed	.. .. .	.. £102 10 0	.. £67 0 0		
Fair colour mixed	.. .. .	.. £100 0 0	.. £64 0 0		
Good gut	.. .. .	.. £95 0 0	.. £60 0 0		
Medium gut	.. .. .	.. £90 0 0	.. £57 0 0		
Low gut	.. .. .	.. £85 0 0	.. £54 0 0		
No colour	.. .. .	.. £85 0 0	.. £54 0 0		
<b>ACID OILS, ETC.</b>					
Cotton ex-washed oil	.. .. .	from £106 0 0	to £68 0 0	} per ton naked, ex-works.	
Groundnut	.. .. .	.. £108 0 0	.. £70 0 0		
Sesame/Benniseed	.. .. .	.. £106 0 0	.. £68 0 0		
Sunflower, soya, maize	.. .. .	.. £106 0 0	.. £68 0 0		
Whale oil/Herring/Seal	.. .. .	.. £50 0 0	.. £30 0 0		
Palm oil	.. .. .	.. £90 0 0	.. £60 0 0		
Mixed soft	.. .. .	.. £102 0 0	.. £64 0 0		
Ex-Hardened oils	.. .. .	.. £60 0 0	.. £40 0 0		
Mixed ex-Margarine and compound refineries	.. .. .	.. £60 0 0	.. £40 0 0		
Soapstock	.. .. .				
		Prices £1 per ton less than those of the equivalent acid oils on the basis of fatty matter.			

## Atom-Cooked Plastics

THE very interesting effects of 'cooking' plastics in the 'BEPO' pile at Harwell were demonstrated by the Ministry of Supply at the tenth Radio Components Show held at Grosvenor House, London, on 14-16 April. After irradiation for a few hours the plastics emerge as virtually new materials, due to progressive cross-linking of the chains; it is estimated that about 1 per cent of the C-atoms are cross-linked in one day's irradiation. Polythene, for example, is no longer soluble in hot toluene after 24 hours' treatment, and longer 'cooking' up to seven days results in an increase of flexibility; thereafter it decreases again.

Perspex, heated for one hour at 115° after 12 hours in the pile, gives a friable expanded material, but without much change in colour. It is hoped that it may prove possible to produce plastics with properties according to specification.

Other products of interest in the exhibition included ROG 1, a new refrigeration grade of 'Delaron' (T. De La Rue & Co.); a new heat resistant mica-containing moulded material made by Mycalex, Ltd., which will withstand continuous heat up to 500° and is considerably cheaper than the same company's 'Mycalex LDS'; a lightweight magnet in 'Gecalloy'—a composition of a pure iron micropowder—made by the Salford Electrical Instrument Co., Ltd.; and an improved electrolytic capacitor employing tantalum in a neutral electrolyte, made by the Telegraph Condenser Co., Ltd.

# Chemical Engineer's Metallurgical Needs

## *New Materials & Techniques Necessary*

UP till about 1925 the designer of chemical plant made use only of the range of constructional materials that had been developed for other purposes. In the last 25 years, however, the chemical engineer has made increasing demands on the metallurgist for new materials to meet his special requirements.

Some of these needs were surveyed by Sir Christopher Hinton, M.A., M.I.C.E., M.I.Mech.E., deputy controller of Atomic Energy (Production), Ministry of Supply, in a paper entitled 'The Present and Future Metallurgical Requirements of the Chemical Engineer,' delivered as the 43rd May Lecture at the annual general meeting of the Institute of Metals held in London on 23 March.

Two points made by Sir Christopher were the need for a better range of halide-resistant materials and that greater attention should be paid to methods of fabrication of new materials.

The following summary of the paper is reproduced by courtesy the Institute of Metals:—

Before surveying the materials of construction which the chemical-plant designer needs, or is likely to need, it is advisable to consider the tradition of design which forms the background against which he works.

### **Foundations of Heavy Chemicals**

Foundations of the modern heavy-chemical industry lie in the second half of the 18th century, when the manufacture of sulphuric acid, bleaching powder, and black ash began on an industrial scale. Throughout the Industrial Revolution there was a steady expansion. The manufacture of heavy alkalis was put on its present basis by the introduction of the ammonia soda process in 1873 and the invention of the electrolytic soda process in 1890; the contact process for the manufacture of sulphuric acid was made practicable in about 1870. Meanwhile, similar developments were taking place in the industries centred around coal tar.

By 1802 Boulton and Watt were lighting their factory at Birmingham by coal gas, and from the growth of the coal-distillation industry arose the developments of synthetic dyestuffs which continued throughout the

19th century, though the initiative was largely lost to Germany before the First World War.

That war called for an expansion of the chemical industry on a scale which was without precedent; later, it will be noted that the last war stimulated the beginnings of atomic energy in a similar way. There had been great developments in the explosives industry under Nobel, but in 1914 TNT had only just been approved as a high explosive, and the demand for it and for cordite led to a great programme of factory building which was carried out by the Government under Lord Moulton and Quinan.

### **Atmospheric Pollution Fixation**

At the end of the war Britain, having learned the seriousness of lacking supplies of ammonium nitrate and the danger of not having a well-developed coal-tar industry, started the fixation of atmospheric nitrogen and encouraged the growth of the dyestuffs industry. The formation of great combines of chemical manufacturers, which followed in the late 1920's, left the business organisation of the industry roughly in the form in which we know it today.

Until 1925 the chemical engineer had never demanded from the metallurgical industry the materials which he preferred or required for the manufacture of his plants; he had taken the materials which had been developed for other industries, and had devised processes which could be worked in vessels made of the available materials. The foundry industry had developed rapidly during the Napoleonic wars to supply the Navy and Army with guns and shot, and it had grown still further to meet the requirements of the engineering industry in the Industrial Revolution.

The steel industry had grown largely to meet the needs of transport—the railways and shipping companies, the lead industry largely to meet the needs of the building industry those of the domestic user, the builder, and the shipwright.

The chemical engineer seized on these and on ceramic materials, all of which had been intended for other industries, and used them skilfully to build his plants. He did little

to demand that materials should be invented to meet his requirements, and so his vessels were made of cast iron or mild steel, lined with blue brick if necessary; they were of timber lined with lead, or of copper. The chemical processes had to be so devised that they could be worked in these vessels.

The engineering and metallurgy of chemicals plants followed the growth of technique in the general engineering industry—it did not lead it.

### Turning Point in the 1920's

A turning point was marked by the late 1920's, and from then onwards chemical engineers began to demand the materials which they require for the construction of their plants. It is interesting to speculate on how the change came about; perhaps it was due to the general development and growth of the chemical industry which was then taking place in Great Britain, the construction of dyestuffs plants, plants for cellulose chemistry, and plants for high-pressure reactions; perhaps the formation of the large combines placed chemical firms in a stronger position to state their needs.

Possibly the new outlook did not arise entirely from changed conditions in this country; in the late 1920's the American oil industry was expanding rapidly, it was young and energetic, the efficiency of many of its processes could be improved by using higher pressures and temperatures, and it could afford to take risks. It did not hesitate to specify its metallurgical requirements and to demand improvements, and the line which it adopted may have influenced us here.

Perhaps all these factors and others acted together to bring about the change, but in the metallurgical industry the conditions were favourable. Most of the demands of the chemical industry are for materials which are corrosion- and erosion-resistant, and in 1913 Brearley had invented stainless steel. The original material, containing 12-14 per cent chromium and 0.3 per cent carbon, could be hardened by heat-treatment and was suitable for the cutlery industry; it was of little use to the chemical engineer, however, as the range of chemicals to which it was resistant was limited and it was not easily fabricated.

Development was retarded by the First World War, but in 1923 it was found that the corrosion-resistance could be increased by higher chromium contents, and in 1925

the 18 per cent chromium, 2 per cent nickel steel, now covered by British Standard S80, was evolved. This martensitic steel was still of only limited interest to the chemical engineer, but the later development of the austenitic, and to a lesser extent the ferritic stainless steels went far to meet his requirements.

Simultaneously with these advances in ferrous metallurgy there had been a corresponding widening in the range of non-ferrous alloys available for chemical plant construction. The manufacture of nickel had been put on an industrial basis at the beginning of the century, and at the end of the 1914-18 war it was important as an alloying material in ferrous metallurgy and as a plating material.

In the period now being considered its merits and the merits of non-ferrous nickel alloys as corrosion- and heat-resisting materials were realised. To complete the outline picture of the second quarter of the century, the progress which took place in the non-metallic protection of plant by rubber and glass covering, and in the use of plastics, must be borne in mind.

### Chemical Plant Design

The history of chemical-plant design thus divides itself into two periods; one starting in the 18th century and ending about 1925, in which there was a tremendous advance in the size and range of the industry, although the chemical engineer continued to make use of materials of construction which had been introduced for other industries; the other, covering the years since 1925, in which the chemical engineer has demanded materials to suit his specific requirements and has been given a very wide range of materials so developed.

What has he succeeded in doing with these new facilities?

It is doubtful whether the chemical engineer can claim correspondingly to have broadened the number of generic varieties of chemical products which are marketed, though, within a rather wider generic field, he can claim considerably to have increased the number of species. But he can certainly claim that he has made good use of the new materials to evolve more elegant and more economical plants.

Possibly the best single example of this is in the manufacture of nitric acid. In the first period it was made in large quantities from Chile nitrate in plants built mainly of

cast iron and acid-resisting brick; but in the second period the use of the cheaper ammonia-oxidation process was made possible only by developments in the austenitic stainless steels.

Sociological as well as technical effects must be appreciated. In the first period the typical chemical works was dark, dirty and unpleasant. Taking advantage of the greater freedom of design and plant reliability, the chemical factory of today is able to give working conditions as good as, or better than those in any other industry.

With this background it may be asked what further developments may reasonably be asked for by the chemical engineer. The answer is that not only must he have satisfactory materials but he must also have the techniques necessary for their use.

When faced with a new problem in chemical-plant design and construction it is comparatively easy to select a material which will reasonably meet the necessary requirements, but it is much more difficult to devise fabrication techniques for this material. This appears to be a common difficulty in the development of chemical-plant, and has certainly been met with in the history of stainless steel since the early days of its use in the chemical industry.

The difficulty is not confined to stainless steels and a number of cases can be thought of in which materials in billet or plate form exhibit valuable properties of corrosion resistance, but where the technique of fabrication still presents serious difficulties and limitations.

Methods of fabrication should keep pace with development in basic materials of construction. The difficulty is not an easy one to solve as collaborative effort is necessary. Some responsibility must rest with the user who must state more clearly not only the properties desired in his materials of construction, but also his requirements in respect of the sort of plant into which he expects to fabricate these materials. The main responsibility must inevitably fall on the metal manufacturer, who should develop a greater consciousness of the problems of fabrication.

#### **Field of Halide Attack**

In the field of halide attack the position is far less satisfactory than in that of oxidising attack. In the case of dry halides, mild steel can be satisfactorily used provided the temperature is not too high; even fluorine

can be handled in the dry state in mild-steel plant, provided the temperature is below 200°C. Above this temperature violent attack can take place. The temperature limitation can be raised by using nickel or Monel, but even these are not safe above 500°C.

Where hydroxyl ions are present, the problem becomes very much more difficult. In the case of hydrochloric acid and its corrosive compounds chemical engineers usually take refuge in the use of glass- or rubber-lined vessels. Glass-lined vessels have limitations in size and complexity, while rubber-lining cannot be employed at temperatures much above 90°C. if it is to give a reasonable life. The only metals which give good corrosion-resisting properties in this field are the nickel-molybdenum alloys in the Hastelloy group, but these are extremely difficult to fabricate.

#### **Bromine Less Satisfactory**

The position in regard to bromine is still less satisfactory, since rubber can be less readily utilised, but the greatest difficulty lies in dealing with the fluorine compounds. Here not only rubber-lining but also glass-lining and ceramics are normally excluded. Mild steel, nickel and nickel alloys, copper, and aluminium can be used with suitable temperature limitations and in 'dry' conditions, but these are very severe limitations to place on the plant designer. Thus the second reasonable request that the chemical engineer may make to the metallurgist is, for a better range of materials to resist halogen action, and within this field the need is stressed for materials to withstand fluorine attack.

This is of peculiar importance, as there is likely to be great growth in the status of fluorine chemistry in the next 10 years. The only substance that can at present be recommended for use under severe conditions of fluorine attack is graphite, and even with modern developments there are limitations to the plants and vessels which can be built of this material.

Chemical industry itself has not sufficiently realised its responsibility in regard to developments in this field; for the construction of chemical plants one needs not only metals or other materials of which to build plant vessels, but also such auxiliaries as jointing material, gland packing, and gland seals. The efforts made to produce such materials have not been sufficiently deter-

mined, and unless steps are taken to provide better materials for the construction of plants subject to fluorine corrosion, Britain may find that she is left behind in a new and important field of development.

Two other problems remain, those of high-temperature and high-pressure.

In the first of these must be included processes where the type of corrosion already referred to does not occur, but where the temperature is beyond that normal in chemical-plant practice and the creep of metals becomes a dominant design feature. In this field the requirements of the chemical engineer are likely to be covered by those of the gas-turbine industry provided he sees that a reasonable number of the heat-resisting alloys produced can be formed into the shapes in which he needs to use them.

### Corrosion Resistance

Before leaving orthodox chemical engineering there is one other problem to consider. A great deal of corrosion-resistant material is used for chemical-plant construction where conditions are not strictly corrosive. Stainless steel, nickel, and nickel alloys, are extensively used in plants for the food and pharmaceutical industries to ensure the biological cleanliness necessary there; in yet other processes the chemical industry is no longer content with the dark and dirty plants so common 20 years ago, and is rightly aiming at a far higher standard of amenity.

The plant designer has found it perhaps too easy to provide the higher standard demanded of him by using expensive corrosion-resisting alloys merely to secure cleanliness. This is a question to which the metallurgical industry might wisely give attention. Unless they are able to provide a cheaper means of providing materials which give cleanliness, there may be a swing towards the use of inexpensive plastic materials in these conditions. There is already some indication that this is taking place in the food industries.

With this question of cleanliness and ease of maintenance of plant should be associated the problem of building maintenance which is often so heavy in the chemical industry. In a great many cases the chemical engineer should eliminate this problem, as has been done in the oil industry, by centralising the controls and instruments and placing the plant in the open. But there are plants

where this is not possible and where corrosion of the building is severe.

Reinforced concrete construction is not a satisfactory solution, because of the fear that corrosive liquids may penetrate to the reinforcing rods and for other reasons. In these cases a structural steel which could be kept in good condition at reasonable cost would be very helpful.

The chemical plants in which the separation of the plutonium and fission products is carried out, after the uranium has been irradiated, are unconventional in that they are handling materials of such high radioactivity that the plants must be remotely controlled.

Basically, therefore, the problem of materials of construction is the same as for other chemical plants which are subject to oxidising corrosion, but the problem is made more difficult and interesting by the consideration that repairs cannot be carried out, and failure must therefore be avoided. Very careful consideration of methods of fabrication has therefore been necessary. The solution to many of the problems can be found with fairly conventional materials, providing use is made of the very finest techniques in design and fabrication.

Today the chemical engineer has at his disposal far more, far better, and far more expensive materials of construction than were available to him 25 years ago and he would be well advised to be more moderate in their use.

### Economical Solutions

In the old days research chemists in devising new processes paid very close attention to the metallurgical problems which would arise. Some of the solutions provided have great simplicity and cheapness; for instance, in the ammonia soda process, soda ash of high commercial purity can be produced in cast-iron and mild-steel plant, not because these materials are inherently resistant to the chemicals used, but because suitable chemical conditions have been devised for the formation of protective scales.

Chemists ought still to be alive to such possibilities and to avoid assuming that the metallurgist can and should solve for him the problems of plant materials to which his processes give rise. Chemical engineers should be discriminating in their choice of materials and avoid 'getting the stainless-steel habit.'



# Wool Textile Industry's Needs

## Professor J. B. Speakman's Comments in Brotherton Lecture

NEW chemical processing methods and new machines are needed by the wool textile industry if it is to continue to compete successfully with the growing synthetic textile industries.

This was the assertion made by Professor J. B. Speakman, Professor of Textile Industries at Leeds University, in the course of the Fourth Brotherton Memorial Lecture, which he gave last week to members of the Yorkshire Section of the SCI at Leeds University.

For three reasons, he said, the woollen industry is in a commercially vulnerable position.

First, the high price of wool invited competition from the new artificial fibres, such as nylon, in much the same way as the high price of silk had invited competition from artificial silk.

Second, the use of continuous chemical processing and a high temperature dyeing in the manufacture of synthetic fabrics was a distinct commercial advantage over the separate processes involved in the manufacture of woollen fabrics.

In the case of wool, they were in a dilemma. Continuous processing was bound to be attempted and would have to be attempted if the industry was to keep pace with the new synthetic fibres.

Thirdly, said Professor Speakman, the long succession of expensive mechanical processes necessary in the manufacture of worsted flannel to turn Tow into Top had at present to compete with synthetic fibres which could be produced in one mechanical operation.

### Research at Leeds University

Research was going on into both these problems at Leeds University. The investigation of methods of continuous processing of wool and high-temperature dyeing started last year, while a step towards new machines had been taken by the recent foundation of a Chair of Wool Textile Engineering at the University.

Speaking of the growing popularity of synthetic fibres such as nylon, Professor Speakman said that 25 years ago they were regarded as totally unsuitable as clothing. Their low affinity with water was held to

make them unsuitable for wearing next to the skin. Now they were being used as clothing fabrics with very great success.

The reason for this was what was once believed to be their great defect—their low affinity with water. This 'defect' enabled fabrics made of synthetic fibres to be washed and dried very quickly and to be worn without being ironed.

The president of the Society of Chemical Industry (Mr. Francis D. Curtis) presided. Mr. G. Brotherton-Ratliffe, a director of Brotherton & Company, Ltd., Leeds chemical dyestuffs manufacturers, proposed a vote of thanks to Professor Speakman.

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### 'Quickfit' Enlarges

EXTENSIONS totalling some 25,000 sq. ft. have now been completed at the Stone (Staffs.) factory of Quickfit & Quartz, Limited. These include a new shop devoted to production of 'Quickfit' industrial plant in glass, a new canteen and a kitchen. Other buildings in the vicinity of the factory have been acquired, including Stubbs Mill—a flour mill built in 1782—and a printing works, which have been converted for use as stores and offices respectively.

The occupation of the new building, the foundation stone of which was laid by Sir Graham Cunningham, chairman and managing director, in January, 1952, has made possible the re-organisation of other sections of the factory, resulting in considerably increased production of both the industrial plant products and 'Quickfit' interchangeable laboratory glassware.

The development and research department and the laboratories now occupy separate and more extensive premises. An independent unit has been established for production of special apparatus and equipment to customers' specifications, and will be engaged on unusual work which cannot be conveniently dealt with in routine production. The men engaged on this type of work will function as a team instead of being accommodated in different sections throughout the factory.

## Valve Lubrication

### Simplified & Improved Formulation

IT has been customary in chemical, petroleum and other plants handling a diversity of line fluids to use several different lubricants in their 'Audco' valves. This practice is now held to be out-of-date as a result of considerable research in the field of valve lubrication by Audley Engineering Company, Ltd., who have formulated a single lubricant which is claimed to be highly efficient on a wide range of services at high and low temperatures.

It is an elementary fact that the working life and efficiency of many mechanisms can be increased considerably by the use of a lubricant. Indiscriminate use of an unsuitable lubricant can, however, be most harmful, and a lubricant for any specific purpose must be carefully selected, bearing in mind its precise functions. The characteristics of lubricants vary considerably for various purposes, and a full treatise on the subject is not within the scope of this article, but generally speaking, a lubricant should reduce friction and wear between moving parts; not deteriorate rapidly due to wear, oxidation or temperature factors; and not break down under high loads or high rates of shear.

The problem of lubrication in relation to valves is more complex. The lubricant must possess the properties mentioned, plus resistance to the line fluid. Rapid advances in the chemical, petroleum and other industries have created many problems for the valve manufacturer, who has been called upon to produce valves which will work efficiently under many different and often arduous conditions. The problem is further complicated by the large number of line fluids at different temperatures on which the valve may be called upon to operate, necessitating in the past a considerable range of valve lubricants.

### Approaches Ideal

'Audco' Lubricant No. 631 is said to approach the ideal. It is soft at room temperature and the viscosity varies little over an extremely wide temperature range (0°F-620°). Thus a valve charged with Lubricant 631 which is normally operated at, say, 600°F., will turn readily even when cold. This softness when cold is something new in a high temperature solid lubricant. Furthermore, it does not readily carbonise at even higher temperatures than 620°F., eliminating

risk of the grooves becoming blocked with hard residue. Lubricant 631 will form a very thin film on bearing surfaces thus permitting close seating of the plug in the valve body. This thin film is extremely adhesive and will not break down under high pressures or temperatures. The value cannot be over-emphasised of this ability to form a thin adhesive film with the resultant fine adjustment of the valve and improved sealing against pressure and chemical attack.

Obvious advantages are to be gained from the use of a lubricant which can be confidently used in valves handling such diverse line fluids as sulphuric acid, brine, hydrocarbons, bitumen, diphenyls, etc.

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## Utilisation of Research

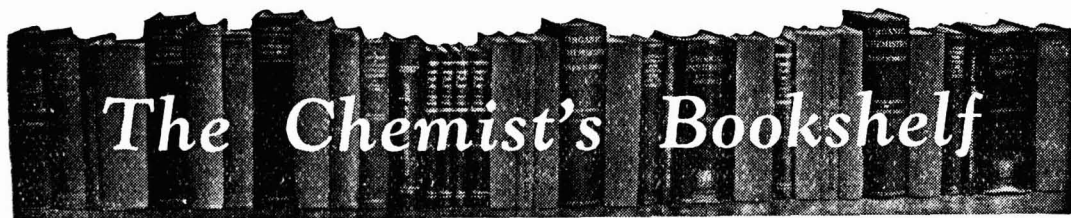
NEED for the Government to enable industry to obtain the essential finance and equipment if Britain is to carry out the essential research and development necessary to secure her future as an industrial nation was emphasised by Lord Baillieu, chairman of the Dunlop Rubber Co., Ltd., speaking at the opening session of a conference of industrial research directors and managers at Ashorne Hill, Warwickshire, on 17 April.

The conference, which had as its theme the commercial utilisation of research results, was the third in a series on industrial research organised by the Federation of British Industries.

In the years since the war, declared Lord Baillieu, the rising cost of research and development, the excessive tax burden borne by industry, a progressive increase in the cost of research and equipment and the growing capital cost of erecting new building and pilot plant, had all combined to operate directly against the prompt and effective commercial utilisation of research results.

The Budget proposals were a first but vitally important step in restoring freedom, initiative and incentive to industry.

Industry, on its part, must ensure that the cost of research, the selection of research projects, and the quality of research and development were kept under constant review. Policy decisions on programmes must preserve a proper balance between the long-term fundamental objectives, and the imperative needs of operating within financial resources and of concentrating on those projects which can be brought to completion in a reasonable time.



## The Chemist's Bookshelf

CHEMIE UND TECHNIK DER VITAMINE. By Dr. Hans Vogel, revised by Dr. Heinrich Knobloch. 3rd Edition, Volume II. Stuttgart: Ferdinand Enke Verlag. 1953. Pp. 160. DM. 26.00.

Volume I of this series, covering the fat-soluble vitamins, appeared in 1950, and has been reviewed in *THE CHEMICAL AGE* (1951, 64, 360). Volume II, dealing with the water-soluble vitamins, has been divided into six parts, because, as is stated in the foreword, the ground to be covered has expanded so enormously in recent years. The parts are expected to appear at intervals of about two months; it is hoped that this arrangement will allow the most recent researches to be included.

Part I, which has now appeared, is reviewed here. It covers vitamin B<sub>1</sub> and the first part of an account of vitamin B<sub>2</sub> (to be completed in Part II). The general arrangement is much the same as in Volume I. The first section (128 pp.) deals with the various aspects of vitamin B<sub>1</sub>, including history, occurrence, chemical constitution, synthesis, properties, enzymatic decomposition (thiaminase), cocarboxylase, oxidation and reduction products, analogues, detection and estimation (chemical and biological methods), thiochrome, vitamin B<sub>1</sub> deficiency and excess, pharmacology, biosynthesis, various important biological aspects and the connection between vitamin B<sub>1</sub> and the other water-soluble vitamins. A section on the technology of vitamin B<sub>1</sub> covers full experimental details of the chemical synthesis, and the vitaminisation of various foodstuffs. A complete list of international patents relating to vitamin B<sub>1</sub> is given, as in Volume I, together with well over a thousand references to the literature. The second section, dealing with vitamin B<sub>2</sub>, is arranged similarly, but a review of this part is best left until the appearance of Part II.

The book will serve as a most useful introduction to the chemistry, biochemistry and technology of the water-soluble vitamins.

and is an excellent guide to the literature. The style is readable, and errors remarkably few; one is found in the formula of the pseudo-base (p. 4), and it may be mentioned that no reference is given for the example of the synthesis of vitamin B<sub>1</sub> cited on p. 11.—  
A. R. PINDER.

SHEER MAGIC. The story of textile fibres. By J. Gordon Cook. Merrow Publishing Co., Ltd., Guildford. 1953. Pp. 79. 2s.

This is the fourth volume in the series 'Spotlight on Science,' written by Dr. Cook. This series of inexpensive books is intended to provide an easy-to-read, non-technical background to developments in modern science, and the volume under review certainly meets these requirements. It treats, in fact, quite thoroughly, the history, development, technology, chemistry and biology of the four main natural fibres—flax, cotton, wool and silk—together with interesting diversions to others such as sisal, ramie, and jute. The author has nowhere shirked a technical explanation, and has succeeded in making many complex subjects intelligible to the layman.

The part of the book which deals with man-made fibres takes up perhaps less space than the ordinary reader would desire. The chapter on rayon is satisfactory, but after this the book seems to draw too rapidly to a close. Eight pages on casein, Ardil, soya and other fibres, alginates, glass and asbestos, leave only eight more pages for all the synthetic fibres which are just appearing on the markets of the world, and about which prospective customers would surely like to know a little more. However, the information given is sound, if rather summary—'the primary raw materials for making nylon are coal, air and water' is a statement unworthy to appear in the same book as the author's earlier lucid explanations of the structure of the natural fibres—and this book is altogether a reliable survey, which should prove of considerable interest to the ordinary reader.—B.I.

# . HOME .

## Iron & Steel Output

Output of pig iron has again increased, according to the British Iron & Steel Federation. The current rate of 215,700 tons a week is the highest yet achieved, the previous best rate being 213,900 tons a week in January. Steel production continues at the new high level established early this year. The rate of 351,300 tons a week for March substantially exceeds the previous best rate for the month—329,800 tons a week in March, 1950.

## M.E.K. Prices Down

A further price reduction on one of their solvents—methyl ethyl ketone—effective on all deliveries after 1 April, has been made by Shell Chemicals, Ltd. The reduction is by £10 a ton, so that the new price per ton at the 10-ton rate is £141, equivalent to 10s. 1½d. a gallon.

## The Scientist & the Services

The Royal Society of Arts has announced that the Sir William Jackson Pope Memorial Lecture will be delivered at the Society's premises in John Adam Street, Adelphi, London, W.C.2, on 29 April at 2.30 p.m., by Dr. O. H. Wansbrough-Jones, chief scientist, Ministry of Supply, whose subject will be 'The Scientist's Place in the Services.'

## A Plastic World?

In its weekly series entitled 'Discovery,' the BBC Midland Home Service broadcast last week from the research and development laboratories of Bakelite Limited at Tysley and British Industrial Plastics at Oldbury. A variety of interesting developments in plastics were described and discussed during the programme, which was entitled: 'Discovery: A Plastic World?'

## Isopropyl Alcohol Reduced

Reduced prices for Shell Isopropyl Alcohol (standard grade) are announced by Shell Chemicals, Limited, with effect from Monday, 20 April. The new 10-ton rate is £80 10s. per ton, which is equal to approximately 5s. 7½d. per gallon at 20/20°C. The lowest price, for delivery 40/45-gallon drums, is now £80 per ton for 50 tons and over, whereas formerly it was 100 tons and over.

## Solvent Price Reductions

With effect from Monday 30 March, A. Boake, Roberts & Co., Ltd., have announced the following reduced prices:

	10 tons per ton	1 ton per ton	40-gallon drums per ton
Butyl acetate	£171	£173	£176
<i>iso</i> butyl acetate	£160	£162	£165
Ethyl acetate	£135	£137	£140
<i>iso</i> propyl acetate	£130	£132	£135

## Complexones in Analysis

The last meeting of the Midlands Society for Analytical Chemistry during the current session is to be held on Wednesday, 29 April, at 7 p.m. in the Lecture Theatre, Chemistry Department, Birmingham University, Edgbaston. The subject under discussion will be 'The Use of Complexones in Analysis' which will be introduced by Dr. T. S. West of the school of Analytical Chemistry in the University of Birmingham.

## BISOL Methyl Ethyl Ketone

British Industrial Solvents, a division of the Distillers Co. Ltd., have reduced the price of methyl ethyl ketone by £10 per ton. The reduction took effect immediately.

## Progress in Plastics

Mr. Henry Strauss, Parliamentary Secretary to the Board of Trade, speaking at a British Plastics Federation luncheon in London last week, said that in recent years few industries had grown so fast as the plastics industry, or had made a more useful contribution to the national interest. Production of plastic materials was six times greater in 1952 than in 1938 and during the same period the export of plastic materials rose from £400,000 to more than £13,000,000.

## Chemical Exports to China

Recently released statistics show that the total exports of chemicals, drugs, dyes and colours from this country to China during 1952 were valued at £2,770,697, compared with £343,829 in 1951 and £234,332 in 1950.

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# OVERSEAS

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## Model of Atomic Pile

Shown abroad for the first time, a three-ton model of one of Britain's two atomic piles is included in an industrial exhibition which opened in Milan on 12 April. The model is a nine foot construction of iron and steel and is included in a display by the Ministry of Supply.

## Uranium from Rum Jungle

The first shipment of uranium ore from Rum Jungle has been handed over to South Australian smelters for refining. Rum Jungle is the centre of Australia's most promising uranium field, which is stated to be now in full production.

## Canada's Need of Chemists

Unless more graduates go in for chemistry during the next four years a crippling blow may be dealt to Canada's expanding chemical industry, declared Dr. G. H. Guest, staff development consultant of Canadian Industries, Limited, at a recent discussion in Montreal. By 1956 the industry would be short of 1,300 men—600 chemical engineers and 700 chemists—at a crucial period in its development, said Dr. Guest. This deficit was based on a recent survey which showed the chemical industry needed 2,400 university-trained men (excluding research chemists), during the next four years, whereas only 1,100 were expected to enter the industry.

## U.S.A. Petrochemical Products

The petrochemical industry in the United States of America is stated to be unable at present to keep pace with the demand for petrochemical products. The value of the industry's output quadrupled between 1940 and 1950.

## New South Wales Uranium

A geological survey party led by a Government geologist has discovered radio-active minerals in the Broken Hill district of New South Wales. It is intended to make more intensive investigations.

## Plastics in Map Making

At the recent American Congress on Surveying and Mapping it was reported that maps are now being produced by a process of 'engraving' on an opaque coating or emulsion applied to a semi-rigid plastic sheeting, such as plexiglass.

## New Anti-Rickets Compound

The brucine salt of sulphonated cholesterol—known for convenience as '607'—has been shown to have considerable anti-rachitic potency, Professors L. Yoder and B. H. Thomas reported at a recent regional meeting of the American Chemical Society. Although not so potent as the irradiated vitamin-D, this derivative has the advantage of being soluble in both oils and water, and should prove of use in the study of the action of the vitamins in the treatment of rickets.

## U.S.A. Uses More Fertilisers

The use of commercial fertilisers for crops in the United States of America is stated to have increased about three-fold since 1935-39. It is estimated that U.S. farmers now spend about \$1,000,000,000 a year on fertilisers.

## India & Heavy Chemicals

India's new Five Year Plan makes provision for expansion of capacity in capital and producer goods industries such as iron and steel, heavy chemicals, aluminium, cement, fertilisers, etc. It also embraces the establishment of new plants for industries such as the manufacture of sulphur from gypsum, pulp for rayon and newsprint and the refining of ores or scrap for non-ferrous metals.

## Canadian Oil Project

Purchase of the former Canadian Oils properties at Petrolia by the S. Nord Chemical Company, Limited, a Canadian owned and financed company, is announced in a prospectus issued by Kippen & Company, Inc. An agreement has been arrived at with Nord & Co., Inc., of Keyport, N.J., to provide the Canadian concern with complete technical and engineering assistance so that production of benzene, toluene and xylene may be begun as soon as possible.

## New Chilean Copper Plant

A new plant to process the extraction of copper from sulphide ores and the sulphide content of mixed ores has been opened by the Chilean Exploration Company. The plant will produce 19,500 metric tons of blister copper monthly.

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# PERSONAL

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At the annual general meeting of the Association of British Pharmaceutical Industry held at the Cora Hotel, London, W.C.1, on 15 April, the following elections to Council were announced: MR. W. N. BOORNE, Evans Gadd & Co., Ltd.; MR. N. C. COLLINS, Burroughs Wellcome & Co.; MR. H. ROY COX, Arthur H. Cox & Co., Ltd.; MR. N. E. FORSTER, Hall Forster & Co., Ltd.; MR. A. FORSYTH, T. & H. Smith Ltd.; MR. C. M. HILL, The British Drug Houses Ltd.; MR. J. A. E. HOWARD, Howards & Son, Ltd.; MR. R. F. RANSOM, William Ransom & Son, Ltd.; and MR. W. A. STEWART, Pharmaceutical Specialists (May & Baker), Ltd.

The Treasury announced last week that it had nominated SIR HENRY TIZARD and MR. N. M. PEECH as its representatives on the board of Solway Chemicals Limited, the company building the £2,000,000 plant for producing sulphuric acid from British anhydrite. The plant, which is being erected at Whitehaven, is receiving £1,700,000 from the Treasury's Development Area Advisory Committee. This is the largest single loan to be granted to any one company.

The United Steel Companies Limited announces that W. DAVIES, M.Sc. (Sheffield), Ph.D. (London), A.M.I.M.M., head of the ore dressing laboratory at their Central Research and Development Department, has been selected to be one of the two official delegates to the OEEC Mission to visit continental countries in order to gather facts about research of low-grade ores and to consider measures which might be adopted to ensure closer co-operation between the organisations engaged in mineral dressing. The Mission started from London on the 20 April, 1953. Mr. Davies is a member of the Iron and Steel Institute, a Fellow of the Geological Society, a member of the Burden Committee, British Iron and Steel Research Association, and a member of the Melting Materials Panel of the British Steel Founders' Association. He is author of a number of books and many papers on mineral raw materials.

DR. HARRY L. FISHER, head of the new Department of Rubber Technology in the University of Southern California, has been chosen President-elect of the American Chemical Society, and will be head of the Society in 1954. Dr. Fisher, who was formerly special assistant to the Director of the Office of Synthetic Rubber, Washington, won the Charles Goodman medal in 1949 for outstanding achievement in the chemistry of rubber. In 1951 he was in charge of the arrangements for the 12th International Congress of Pure and Applied Chemistry.

COLONEL SIR RONALD E. L. WINGATE, Bt., has been appointed a director of the Imperial Continental Gas Association.

SIR HARRY PILKINGTON, chairman of Pilkington Brothers Ltd., has been elected president of the Federation of British Industries in succession to SIR ARCHIBALD FORBES. Sir Harry, who received his knighthood in the last New Year's Honours, was chairman of the FBI Fuel and Power Consumers' Policy Committee until recently. He was also appointed chairman of a Government committee set up to study the form to be taken by a greatly strengthened organisation for the promotion of fuel efficiency, as recommended by the FBI. Sir Harry is one of the Federation's representatives on the National Production Advisory Council on Industry.

MR. T. V. ARDEN, formerly of the Chemical Research Laboratory and now head of the Applied Ion Exchange Department of the Permutit Co., Ltd., is the recipient of the Sir George Beilby Memorial Award for 1952, in recognition of his experimental work on the hydro-metallurgy of uranium, with particular application to the separation of uranium from low-grade ores. Awards from the fund, which is administered by the Institute of Metals, the Royal Institute of Chemistry and the Society of Chemical Industry, are made to British investigators as a mark of appreciation for distinguished work, particularly in such fields as fuel economy, chemical engineering and metallurgy.

# Publications & Announcements

VIBRO ELECTRIC equipment is finding many new applications and being increasingly used in a large number of industries. A selection of its wide range of feeders, vibrators, sifters and vibratory screens is given in its latest illustrated booklet issued by Podmores (Engineers), Limited, of Shelton, Stoke-on-Trent. All the equipment described uses, in various ways, high frequency vibration generated by electro-magnetic units. A machine widely used in the manufacture of fine chemicals, pharmaceuticals, plastics, soaps and colours, and so on, is a portable electric sifter specially designed to provide a light portable unit capable of the rapid and efficient sifting of powders and slurries.

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A REVISED edition of the 'Chemical Products' booklet published by Kaylene, Limited, Waterloo Road, London, N.W.2, has just been issued. It contains several new items in the pharmaceutical and industrial fields, many of which are the result of the service offered by this firm whereby it undertakes the investigation and research of products which are difficult to obtain. An interesting feature is that chemicals are listed in English, French, German and Spanish and there is a useful alphabetical index.

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AN EVENT of importance to all concerned in the manufacture and application of colouring matters is the announcement by the Society of Dyers and Colourists and the American Association of Textile Chemists and Colorists, that the second edition of 'The Colour Index' is to be published in 1955. The work, which has been completely re-designed and brought up to date with the co-operation of all the dye manufacturers in Great Britain, America, Western Europe, India and Japan, will be in three main parts. Part I will be in three volumes each of approximately 1,000 pages. It will deal with all commercially homogeneous dyes and pigments in current use (approximately 5,000 dye entities and 25,000 commercial names) within groups relating to their main usage. Part II will consist of one volume of approximately 700 pages. It will contain data relating to chemical con-

stitution, method of preparation, patent and literature references relating to manufacture or constitution, solubilities, and reactions in substance for approximately 3,800 dyes and pigments. Part III (one volume of approximately 400 pages), will contain the general index. The commercial names index will include the names of dyes not in current use, and the names of dyes now disclosed by the manufacturers as standardised mixtures.

A special pre-publication price of £30 has been fixed for the complete work payable before 30 June, 1953, and there is also a scheme for three annual payments of £11. Price on publication in 1955 will not be less than £35. A descriptive leaflet and order form may be obtained on application to the Society of Dyers and Colourists, 19 Piccadilly, Bradford, Yorkshire.

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SOME 9,500,000 tons of coal are carbonised each year by the National Coal Board through its 51 high temperature coking plants. These supply some 42,500,000,000 cu. ft. of gas annually and produce 364,000 tons of crude tar, 24,500,000 gallons of crude benzole, 63,000 tons of sulphate of ammonia, together with some 24,000 tons of concentrated ammonia liquor a year of varying strengths. A booklet on coal by-products, their application and marketing was produced by the Board for distribution and display at the fifth Technical Trade Exhibition of the Oil and Colour Chemists' Association held in London on 30 and 31 March and 1 April.

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A LARGE range of laboratory ware in plastics has been developed by Rediweld, Limited, of Crawley, Sussex, and this is now presented for the first time in the form of an illustrated catalogue. Items range from polythene graduated measuring cylinders, funnels, beakers and Winchester carriers for acids and other dangerous liquids to PVC rigid test tube racks, tubing, laboratory drains, and protective clothing for chemical workers. The company has also issued a leaflet giving particulars of the Rediweld impulse heat sealing equipment used for the manufacture and sealing of various types of plastic bags.

## Simple Truck Loading

A NEW addition to the 'Telehoist' range of automatic truck loaders was demonstrated in London on 9 April. The operating principles are the same as for the 'Teleloader' introduced in February, 1952. Operation is by a hydraulic unit driven from the vehicle gearbox, and engaged and disengaged by a control lever in the cab. The loader operates at normal engine idling speeds. Raising and lowering of the loader and the speed at which it operates are controlled from ground-level, and it can be fitted to trucks with platform heights between 3 ft. 7 in. and 4 ft. 5 in.



The new features are a barrel or drum lifting frame, and a swung cradle for churns or open crates, both with a maximum capacity of 5 cwt. When the vehicle is on the road, the frame or cradle is normally removed and the hydraulic cylinder swung up and made fast below the body floor. The loader is manufactured by Telehoist, Limited, Cheltenham, Glos.

## Huge Extraction Tower

EARLY Sunday morning, the journey began of one of the heaviest loads ever to be carried on the roads in the London area. A propane extraction tower was carried through London to the Vacuum Oil Company's new refinery at Coryton in Essex from Greenwich, where it has been manufactured by G. A. Harvey & Company (London), Limited.

Its weight (102 tons), length (65 ft.) and diameter (12 ft. 6 in.) make it one of the

heaviest and most unmanageable road loads ever tackled by the Road Haulage Executive.

This tower constitutes the last remaining piece of equipment to complete one of the processing units of the refinery, and will be erected immediately on arrival.

## Next Week's Events

MONDAY 27 APRIL

### Institution of the Rubber Industry

Manchester: Engineers' Club, Albert Square, 6.15 p.m. Annual general meeting.

WEDNESDAY 29 APRIL

### Society of Chemical Industry

Hastings: White Rock Pavilion, 10 a.m. Joint meeting of the Food Group with the Royal Sanitary Institute. General discussion on 'New Developments in Food Infestation Control.' Opening address by Professor H. D. Kay, chairman of the Food Group, and the following papers: A. K. Makin (chief sanitary inspector, Yiewsley and West Drayton Urban District Council): 'The Problems of Port and Local Authorities'; G. V. B. Herford (director, Pest Infestation Research Laboratory, DSIR): 'Insect Infestation Control'; J. W. Evans (chief scientist, Infestation Control Division, Ministry of Agriculture and Fisheries): 'Rodent Infestation Control.'

THURSDAY 30 APRIL

### The Chemical Society

London: Burlington House, Piccadilly, W.1, 7.30 p.m. Professor H. S. Taylor: 'The Scientific Problems of Surface Catalysis.'

### Society of Chemical Industry

London: Royal Institution, Albemarle Street, W.1, 6 p.m. Third H. E. Armstrong Memorial Lecture. Dr. R. T. Colgate: 'Science, Food and the People.'

FRIDAY 1 MAY

### Society of Chemical Industry

Newton Abbot: Seale-Hayne Agricultural College, Two-day conference of the Food and Agriculture Groups and the South Western Section. Dr. W. Black, J. A. Radley and Dr. R. N. Salaman: 'Potatoes as a Crop and an Industrial Raw Material.'

### Society of Glass Technology

St. Helens: Gas showrooms, Radiant House, 6 p.m. Annual general meeting. Professor H. Moore: 'Modern View on Selenium Decolorising.'



# British Chemical Prices

LONDON.—A steady trade has been reported from most sections of the market, and the movement to the chief consuming industries against contracts has been on a good scale. Prices generally are steady, with no outstanding changes to record. The export demand continues to be of moderate dimensions and no improvement is expected until the existing stocks held by consumers are used up. In the coal tar products market prices are steady on a quiet demand.

MANCHESTER.—Fair trading activity in the alkalis and other heavy chemicals has been reported on the Manchester market during the past week, with the cotton, woollen and rayon textile trades maintaining a quietly steady demand. Contract deliveries to home

users are moving satisfactorily in most lines and a fair number of new inquiries have been in the market. On export account, also, additional business is on a fair scale. The call for the general run of fertiliser materials continues on steady lines, but in the tar products market business during the week has been patchy.

GLASGOW.—The trade generally during the past week has been exceptionally busy with a good demand for all classes of light and heavy chemicals and the volume of orders for forward delivery has been maintained. Inquiries for export are still coming in and there is little or no change in the position with regard to this market.

## General Chemicals

**Acetic Acid.**—Per ton : 80% technical, 1 ton, £88. 80% pure, 10 tons, £92 ; commercial glacial 10 tons, £94 ; delivered buyers' premises in returnable barrels ; in glass carboys, £7 ; demijohns, £11 extra.

**Acetic Anhydride.**—Ton lots d/d, £138 per ton.

**Acetone.**—Small lots : 5 gal. drums, £143 per ton ; 10 gal. drums, £125 per ton. In 40/50 gal. drums less than 1 ton, £105 per ton ; 1 to 9 tons, £104 per ton ; 10 to 49 tons, to £103 per ton ; 50 tons and over, £102 per ton.

**Alcohol BSS, Butyl.**—£161 per ton in 10-ton lots.

**Alcohol, Diacetone.**—Small lots : 5 gal. drums, £162 per ton ; 10 gal. drums, £172 per ton. In 40/45 gal. drums ; less than 1 ton, £142 per ton ; 1 to 9 tons, £141 per ton ; 10 to 50 tons, £140 per ton ; 50 to 100 tons, £139 per ton ; 100 tons and over, £138 per ton.

**Alcohol, Ethyl.**—300,000 gal. lots, d/d., 2s. 11d. per proof gallon ; 100,000 and less than 200,000 gal. lots, d/d, 3s. per proof gallon.

**Allyl Alcohol.**—Less than 40 gals., 3s. 10½d. per lb. ; 40 gal., 3s. 6½d. per lb. ; 2 to 5 40 gal. drums, 3s. 4½d. per lb. ; 1 ton and over, 3s. 2½d. per lb.

**Alum.**—Ground, £24 per ton, f.o.r. MANCHESTER : Ground, £25.

**Aluminium Sulphate.**—Ex works, £12 per ton d/d. MANCHESTER : £14 to £15.

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

**Ammonium Bicarbonate.**—2 cwt. non-returnable drums ; 1 ton lots £47 per ton.

**Ammonium Chloride.**—Grey galvanising, £31 5s. per ton, in casks, ex wharf. Fine white 98%, £25 to £27 per ton. See also Salammoniac.

**Ammonium Nitrate.**—D/d, £18 10s. to £20 10s. per ton.

**Ammonium Persulphate.**—MANCHESTER : £6 2s. 6d. per cwt. d/d.

**Ammonium Phosphate.**—Mono- and di-, ton lots, d/d, £93 and £91 10s. per ton.

**Antimony Sulphide.**—Golden, d/d in 5 cwt. lots as to grade, etc., 2s. 3¼d. to 3s. 1½d. per lb. Crimson, 3s. 4¼d. to 4s. 5¼d. per lb.

**Arsenic.**—Per ton, £59 5s. nominal, ex store.

**Barium Carbonate.**—Precip., d/d ; 2-ton lots, £35 5s. per ton, bag packing.

**Barium Chloride.**—£42 15s. per ton in 2-ton lots.

**Barium Sulphate (Dry Blanc Fixe).**—Precip., 4-ton lots, £38 per ton d/d ; 2-ton lots, £38 5s. per ton d/d.

**Bleaching Powder.**—£21 per ton in casks (1 ton lots).

- Borax.**—Per ton for ton lots, in free 140-lb. bags, carriage paid: Anhydrous, £59 10s.; in 1-cwt. bags; commercial, granular, £39 10s.; crystal, £42; powder, £43; extra fine powder, £44; B.P., granular, £48 10s.; crystal, £51; powder, £52; extra fine powder £53.
- Boric Acid.**—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granular, £68; crystal, £76; powder, £73 10s.; extra fine powder, £75 10s.; B.P., granular, £81; crystal, £88; powder, £85 10s.; extra fine powder, £87 10s.
- Butyl Acetate BSS.**—£173 per ton, in 20-ton lots.
- sec. - Butyl Alcohol.**—5 gal. drums £159; 40 gal. drums: less than 1 ton £124 per ton; 1 to 10 tons £123 per ton; 10 tons and over £122 per ton; 100 tons and over £120 per ton.
- tert. - Butyl Alcohol.**—5 gal. drums £195 10s. per ton; 40/45 gal. drums: less than 1 ton £175 10s. per ton; 1 to 5 tons £174 10s. per ton; 5 to 10 tons, £173 10s.; 10 tons and over £172 10s.
- Calcium Chloride.**—70/72% solid £12 10s. per ton.
- Chlorine, Liquid.**—£28 10s. per ton d/d in 16/17-cwt. drums (3-drum lots).
- Chromic Acid.**—2s. 0½d. to 2s. 0¾d. per lb., less 2½%, d/d U.K.
- Citric Acid.**—1 cwt. lots, 201s. cwt.; 5 cwt. lots, 196s. cwt.
- Cobalt Oxide.**—Black, delivered, 13s. per lb.
- Copper Carbonate.**—MANCHESTER: 2s. 7d. per lb.
- Copper Sulphate.**—£87 10s. per ton f.o.b., less 2%, in 2-cwt. bags.
- Cream of Tartar.**—100%, per cwt., about £10 2s.
- Ethyl Acetate.**—20 tons and upwards, d/d, £151 per ton.
- Formaldehyde.**—£35 10s. per ton in casks, according to quantity, d/d.
- Formic Acid.**—85%, £84 10s. in 4-ton lots, carriage paid.
- Glycerine.**—Chemically pure, double distilled 1.260 S.G. £14 19s. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.
- Hydrochloric Acid.**—Spot, 12s. to 16s. per carboy d/d, according to purity, strength and locality.
- Hydrofluoric Acid.**—59/60%, about 1s. to 1s. 2d. per lb.
- Hydrogen Peroxide.**—27.5% wt. £124 10s. per ton. 35% wt. £153 per ton d/d. Carboys extra and returnable.
- Iodine.**—Resublimed B.P., 19s. 10d. per lb. in 28 lb. lots.
- Iodoform.**—30s. per lb. in 28 lb. lots.
- Lactic Acid.**—Pale tech., 44 per cent by weight £122 per ton; dark tech., 44 per cent by weight £67 per ton ex works one ton lots; dark chemical quality 44 per cent by weight £102 per ton, ex works; Usual container terms.
- Lead Acetate.**—White: £137 10s. per ton.
- Lead Nitrate.**—£105 per ton.
- Lead, Red.**—Basis prices per ton. Genuine dry red lead, £113; orange lead, £123. Ground in oil: red, £140 10s.; orange, £152 10s.
- Lead, White.**—Basis prices: Dry English, in 5-cwt. casks, £129 per ton. Ground in oil: English, under 2 tons, £151 10s.
- Lime Acetate.**—Brown, ton lots, d/d, £30 to £34 per ton; grey, 80-82%, ton lots, d/d, £34 to £39 per ton.
- Litharge.**—£113 per ton, in 5-ton lots.
- Magnesite.**—Calcined, in bags, ex works, £22 to £24.
- Magnesium Carbonate.**—Light, commercial, d/d, £87 15s.; cwt. lots £97 10s. per ton d/d.
- Magnesium Chloride.**—Solid (ex wharf), £15 per ton.
- Magnesium Oxide.**—Light, commercial, d/d, £240; cwt. lots £250 per ton d/d.
- Magnesium Sulphate.**—£12 to £14 per ton.
- Mercuric Chloride.**—19s. 3d. per lb. in 28 lb. lots; smaller quantities dearer.
- Mercury Sulphide, Red.**—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.
- Methanol.**—Pure synthetic, d/d, £28 to £38 per ton.
- Methylated Spirit.**—Industrial 66° O.P. 100 gals., 5s. 4½d. per gal.; pyridinised 64° O.P. 100 gal., 5s. 6½d. per gal.

- Methyl Ethyl Ketone.**—5-gal. drums, £173 per ton ; in 40-45-gal. drums, less than 1 ton, £143 per ton ; 50 to 100 tons, £160 per ton ; 100 tons and over, £139 per ton.
- Methyl isoButyl Ketone.**—5 gal. drums, £203 per ton in 40-45 gal. drums, less than 1 ton, £173 per ton ; 1 to 10 tons, £172 per ton ; 10 to 50 tons, £171 per ton ; 50 to 100 tons, £170 per ton ; 100 tons and over, £169 per ton.
- Nickel Sulphate.**—D/d. buyers U.K. £140 10s. per ton. Nominal.
- Nitric Acid.**—£35 10s. to £40 10s. per ton, ex-works.
- Oxalic Acid.**—Home manufacture, £170 per ton ; in 5-cwt. casks, £139, carriage paid.
- Phosphoric Acid.**—Technical (S.G. 1.700) ton lots, carriage paid, £87 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.
- Potash, Caustic.**—Solid, £98 10s. per ton for 1-ton lots ; Liquid, £37 15s.
- Potassium Bichromate.**—Crystals and granular, 11½d. per lb. ; ground, 1s. ½d. per lb., standard quantities.
- Potassium Carbonate.**—Calcined, 96/98%, £96 per ton for 1-ton lots, ex store.
- Potassium Chloride.**—Industrial, 96%, 6-ton lots, £20 to £22 per ton.
- Potassium Iodide.**—B.P., 17s. 10d. per lb. in 28 lb. lots ; 17s. 4d. in cwt. lots.
- Potassium Nitrate.**—Small granular crystals, 81s. per cwt. ex store, according to quantity.
- Potassium Permanganate.**—B.P., 1s. 9½d. per lb. for 1-cwt. lots ; for 3 cwt. and upwards, 1s. 8½d. per lb. ; technical, £8 11s. 6d. per cwt. ; for 5 cwt. lots.
- isoPropyl Alcohol.**—Small lots : 5 gal. drums, £118 per ton ; 10-gal. drums, £108 per ton ; in 40-45 gal. drums ; less than 1 ton, £83 per ton ; 1 to 9 tons £81 per ton ; 10 to 50 tons, £80 10s. per ton ; 50 tons and over, £80 per ton.
- Salammoniac.**—Dog-tooth crystals, £72 10s. per ton ; medium, £67 10s. per ton ; fine white crystals, £21 10s. to £22 10s. per ton, in casks.
- Salicylic Acid.**—MANCHESTER : Technical 2s. 7d. per lb. d/d.
- Soda Ash.**—58% ex depôt or d/d, London station, £9 10s. to £14 10s. per ton.
- Soda, Caustic.**—Solid 76/77% ; spot, £25 to £27 per ton d/d, (4 ton lots).
- Sodium Acetate.**—£85 to £91 per ton d/d.
- Sodium Bicarbonate.**—Refined, spot, £13 10s. to £15 10s. per ton, in bags.
- Sodium Bichromate.**—Crystals, cake and powder, 9½d. per lb. ; anhydrous, 11½d. per lb., net, d/d U.K. in 7-8 cwt. casks.
- Sodium Bisulphite.**—Powder, 60/62%, £40 per ton d/d in 2-ton lots for home trade.
- Sodium Carbonate Monohydrate.**—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.
- Sodium Chlorate.**—£87 to £95 per ton.
- Sodium Cyanide.**—100% basis, 8d. to 9d. per lb.
- Sodium Fluoride.**—D/d, £4 10s. per cwt.
- Sodium Hyposulphite.**—Pea crystals £28 a ton ; commercial, 1-ton lots, £26 per ton carriage paid.
- Sodium Iodide.**—B.P., 19s. 4d. per lb. in 28 lb. lots.
- Sodium Metaphosphate (Calgon).**—Flaked, loose in metal drums, £123 ton.
- Sodium Metasilicate.**—£22 15s. per ton, d/d U.K. in ton lots.
- Sodium Nitrate.**—Chilean Industrial, 97-98%, 6-ton lots, d/d station, £30 5s. per ton.
- Sodium Nitrite.**—£32 per ton (4-ton lots).
- Sodium Percarbonate.**—12½% available oxygen, £8 2s. 10½d. per cwt. in 1-cwt. drums.
- Sodium Phosphate.**—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £78 10s. ; tri-sodium, crystalline £39 10s., anhydrous, £75 10s.
- Sodium Prussiate.**—10d. to 10½d. per lb. ex store.
- Sodium Silicate.**—£6 to £11 per ton.
- Sodium Sulphate (Glauber's Salt).**—£8 per ton d/d.
- Sodium Sulphate (Salt Cake).**—Unground, £6 per ton d/d station in bulk. MANCHESTER : £7 per ton d/d station.
- Sodium Sulphide.**—Solid, 60/62%, spot, £30 2s. 6d. per ton, d/d, in drums ; broken, £31 12s. 6d. per ton, d/d, in drums.
- Sodium Sulphite.**—Anhydrous, £59 per ton, pea crystals, £37 12s. 6d. per ton d/d station in kegs ; commercial, £23 7s. 6d. per ton d/d station in bags.
- Sulphur.**—Per ton for 4 tons or more, ground, £22 16s. 6d. to £25 6s. according to fineness.

**Tartaric Acid.**—Per cwt. : 10 cwt. or more, £10. 10s.

**Titanium Oxide.**—Standard grade comm., with rutile structure £143 per ton ; standard grade comm., £130 per ton.

**Zinc Oxide.**—Maximum price per ton for 2-ton lots, d/d : white seal, £107 10s. ; green seal, £106 10s. ; red seal, £105.

#### Rubber Chemicals

**Antimony Sulphide.**—Golden, 2s. 3½d. to 3s. 1½d. per lb. Crimson, 3s. 4½d. to 4s. 5½d. per lb.

**Carbon Bisulphide.**—£64 2s. per ton, according to quality.

**Carbon Black.**—6d. to 8d. per lb., according to packing.

**Carbon Tetrachloride.**—£74 10s. per ton.

**India-rubber Substitutes.**—White, 1s. 6¾d. to 1s. 10¼d. per lb. ; dark, 1s. 4¾d. to 1s. 8½d. per lb.

**Lithopone.**—30%, £50 per ton.

**Mineral Black.**—£7 10s. to £10 per ton.

**Mineral Rubber, 'Rupron.'**—£20 per ton.

**Sulphur Chloride.**—British, £55 per ton.

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

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

#### Nitrogen Fertilisers

**Ammonium Sulphate.**—Per ton in 6-ton lots, d/d farmer's nearest station, £16 18s.

**Compound Fertilisers.**—Per ton in 6 ton lots, d/d farmer's nearest station, I.C.I. Special No. 1 £27 9s.

**'Nitro-Chalk.'**—£12 9s. 6d. per ton in 6-ton lots, d/d farmer's nearest station.

**Sodium Nitrate.**—Chilean agricultural for 6-ton lots, d/d nearest station, £29 per ton.

#### Coal-Tar Products

**Benzole.**—Per gal, ex works : 90's, 3s. 8½d. ; pure, 3s. 11½d. ; nitration grade, 4s. 2½d.

**Carbolic Acid.**—Crystals, 1s. 6d. to 1s. 8d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 6d. to 1s. 8d. per lb., d/d crude, 8s. naked, at works.

**Creosote.**—Home trade, 1s. to 1s. 4d. per gal., according to quality, f.o.r. maker's works. MANCHESTER : 1s. to 1s. 8d. per gal.

**Cresylic Acid.**—Pale 99%, 5s. 8d. per gal. ; 99.5/100%, 5s. 10d. American, duty free, for export, 5s. to 5s. 8d. naked at works.

**Naphtha.**—Solvent, 90/160°, 4s. 10¼d. per gal. for 1000-gal. lots ; heavy, 90/190°, 4s. 3½d. per gal. for 1000-gal. lots, d/d. Drums extra : higher prices for smaller lots.

**Naphthalene.**—Crude, ton lots, in sellers' bags, £16 5s. to £26 10s. per ton, according to m.p. ; hot-pressed, £34 10s. per ton, in bulk ex-works ; purified crystals, about £60 per ton.

**Pitch.**—Medium, soft, home trade, 130s. per ton f.o.r. suppliers' works ; export trade, 200s. per ton f.o.b. suppliers' port. MANCHESTER : £8 f.o.r.

**Pyridine.**—90/160°, 42s. 6d. per gal. MANCHESTER : 42s. 6d. to 45s. per gal.

**Toluol.**—Nitration grade, 5s. 3d. per gal. MANCHESTER : Pure, 4s. 7½d. per gal. naked.

**Xylol.**—For 1000-gal. lots, 5s. 6d. per gal., according to grade, d/d.

#### Intermediate and Dyes (Prices Nominal)

*m*-Cresol 98/100%.—3s. 9d. per lb. d/d.

*o*-Cresol 30/31° C.—1s. 4d. per lb. d/d.

*p*-Cresol 34/35° C.—3s. 9d. per lb. d/d.

**Dichloraniline.**—2s. 8½d. per lb.

**Dinitrobenzene.**—88/89°C., 1s. 11d. per lb.

**Dinitrotoluene.**—S.P. 15° C., 1s. 11½d. per lb. ; S.P. 26° C., 1s. 3d. per lb. S.P. 33°C., 1s. 1½d. per lb. ; S.P. 66/68°C., 1s. 9d. per lb.

*p*-Nitraniline.—4s. 5½d. per lb.

**Nitrobenzene.**—Spot, 9¼d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

**Nitronaphthalene.**—2s. per lb.

*o*-Toluidine.—1s. 7d. per lb., in 8/10-cwt. drums, drums extra.

*p*-Toluidine.—5s. 6d. per lb., in casks.

*m*-Xylidine Acetate.—4s. 5d. per lb., 100%.

# Law & Company News

## Commercial Intelligence

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

### Mortgages & Charges

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

CHANCE BROS., LTD., Birmingham, glass manufacturers. 25/4/53. 4 March, charge to Burnley Building Society securing £1,089 and any other money, etc., charges on 69 St. Albans Road, Smethwick. Nil. 25 July, 1952.

INDUSTRIAL CHEMICALS LTD., London, W.C. 25/4/53 16 March, series of £5,000 debentures, present issue £2,250; general charge £11,250 debentures. 20 February, 1952.

MURGATROYD'S SALT & CHEMICAL Co., LTD., Sandbach. 25/4/53. 23 March. £75,000 prior lieu loan stock part of an amount already registered. £43,200,000. 24 December, 1952.

TINTOMETER LTD., Salisbury, manufacturers of instrument for colour measurement. 25/4/53. 19 March, debentures to Lloyds Bank Ltd., securing all moneys due or to become due to the Bank, general charge. £1,900. 25 March, 1952.

### Satisfactions

TINTOMETER LTD., Salisbury. 25/4/53. Satisfaction 19 March, of debenture registered 9 April, 1951.

UNIVERSE PETROLEUM Co., LTD., London, E.C. 25/4/53. Satisfaction 25 March, of charge registered 11 January, 1952.

## New Registrations

### W. C. Evans & Co. (Eccles) Ltd.

Private company. (518,504). Capital £20,000. Wholesale, retail and manufacturing chemists, druggists, etc. Directors: W. C. Evans, H. Evans D. A. Evans. Reg. office: Campdex Works, Chadwick Road, Eccles, Lancs.

### M. Hamburger & Sons Ltd.

Private company. (517,777.) Capital £100 in £1 shares. Gum and resin and general produce dealers, manufacturers and merchants. Subscribers (each with one share) are :—Louis E. P. Tyler and Robert J. Abbott, both of St. Swithins House, Walbrook, E.C.4, solicitors. The first directors are not named. Solicitors: Coward Chance & Co., St. Swithins House, Walbrook, E.C.4.

### Read Air Purification Co. Ltd.

Private company. (518,387.) Capital £3,000. Manufacture, installation and research into air-conditioning, oxidising, heating, refrigerating and ventilating systems and equipment by electrical, mechanical and chemical methods, etc. First directors to be appointed by subscribers. Reg. office: National House, 240/242 King Street, Hammersmith, W.6.

### Soluble Fibres Ltd.

Private company. (518,467.) Capital £100. Manufacturers of chemicals, gases, drugs, medicines, proprietary articles and all forms of chemical and medical products. Reg. office: 20 Essex Street, W.C.2.

### Whites (Ardwick) Ltd.

Private company. (518,341.) Capital £4,000. Consulting, analytical, manufacturing, pharmaceutical and general chemists. Directors: I. White and J. T. Wilkinson. Reg. office: 45 Ashton Old Road, Ardwick, Manchester.

### T. Wilson & Co. (Accrington) Ltd.

Private company (518,724). Capital £15,000. Manufacturers of and dealers in chemicals, pigments, resins, gums, colours, etc. Directors: Thomas Wilson and Mrs. Alice Wilson. Registered office: Union Bank Chambers, Blackburn Road, Accrington.

## Changes of Name

The following change of name has been announced:—TRIPOL LABORATORIES, LTD., to TRIPOL (WHOLESALE, EXPORT), LTD., on 18 March, 1953. VERNON & COMPANY, LTD., Penwortham Mills, Preston, to VERNON & COMPANY (SURGICAL DRESSINGS), LTD., on 14 March, 1953.

## Chemical & Allied Stocks & Shares

**S**TRENGTH of British Funds has been the main stock market sequel to the Budget. There was some profit taking following the £125,000,000 issue of 4½ per cent stock by British Electricity, but buyers continued to predominate, and War Loan 3½ per cent has reached its highest level since 1951. The City is talking of the possibility that a reduction in the bank rate is in prospect and that a big new British Government issue may be made later this year.

Industrial shares have also moved in favour of holders, though a good part of earlier gains was lost and caution has tended to prevail. This is because the prospect of peace in Korea has led to uncertainty as to the outlook if slowing down of rearmament were to result in a trade recession in the U.S. Nevertheless, numerous shares have moved higher compared with a month ago, though best levels have not been held. Many companies are now following a somewhat more liberal dividend policy, and the reduction in income tax, the restoration of the initial tax allowance in respect of new plant and equipment, and the coming end of E.P.L. on 1 January are all of course bull points for industrial shares.

### Failed to Hold Best Levels

Chemical and kindred shares have failed to hold best levels touched in the past few weeks. There appeared to be widespread disposition to await the forthcoming I.C.I. results, and because of the waiting attitude, I.C.I. ordinary units have eased to 44s. 6d., at the time of writing. Monsanto Chemical 5s. shares were 20s. 4½d., Fisons 34s. 9d., Laporte 5s. shares 10s. 3d., and in other directions, Albright & Wilson have eased to 16s. 4½d., since publication of the results. British Chrome & Chemicals 5s. shares were 16. 6d., while Reichhold Chemical 5s. shares changed hands around 7s. Borax Consolidated deferred units have been active around 34s. 9d. Coalite & Chemical 2s. units were dealt in around par, while elsewhere, Hardman & Holden 5s. shares were 19s. 4½d., W. J. Bush were 42s. 6d., and Burt Boulton & Haywood 27s., William Blythe 3s. shares were 9s. 7½d., while Amber Chemical 2s. shares were quoted at par. Cooper McDougall & Robertson eased to

33s. 6d., following the results, Pest Control 5s. shares were 5s. 6d., while elsewhere the 4s. units of the Distillers Co., were 17s. United Molasses, after rising, came back to 29s. Unilever were 48s., while among plastics, Xylonite were 23s., British Industrial Plastics 2s. shares 4s. 3d., and Bakelite 10s. shares 17s. 6d. xd. Kleemann 1s. shares changed hands around 8s. 9d. Yorkshire Dyeware & Chemical 5s. shares were 7s. 6d. Among paints, British Paints 4s. units were lowered to 12s. 3d., the reduced profits affecting sentiment more than the increased dividend, although the latter is nevertheless a conservative payment. Other paint shares were lower owing to reports of increasing competition in the industry. Lewis Berger 4s. units were 9s. 6d., and International Paint 12s. 6d.

Boots Drug 5s. shares have been relatively firm at 19s. 3d. Associated Cement showed activity around 110s., awaiting the dividend announcement, while British Plaster Board 5s. shares were 14s. 7½d. Staveley were 72s. 9d., and Powell Duffryn 29s. 4½d. Oils, like industrial shares, have not held best levels. Shell were 81s. 10½d., and Anglo-Iranian 113s. 9d.

### BISOL Price Changes

British Industrial Solvents have announced reductions in the prices of 'BISOL' acetaldehyde, paraldehyde and dimethyl acetal, applicable to all despatches made on or after 7 April last. The new prices per ton for 1-ton lots, carriage paid in packages returnable at sellers' expense, are as follows:

Acetaldehyde 100%	..	..	£142
40%	..	..	£151
Paraldehyde, stabilised	..	..	£155
technical	..	..	£128
Dimethyl acetal	..	..	£160

Forty-five gallon lots are £3 per ton extra in all cases; higher premiums are charged for 5- and 10-gallon lots; allowances are given for bulk tank wagon deliveries.

### Sodium Silicate Duty

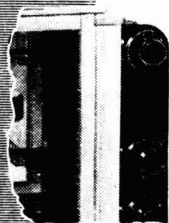
On the recommendations of the Tariff Commission, the Pakistan Government have decided to enhance the existing 30 per cent *ad valorem* Revenue Duty on sodium silicate to 60 per cent *ad valorem*.

# When you weigh it all up . . .



## Accuracy and Ease of Reading

Convenient positioning of reading scale and green filter make for reduced eyestrain. Other features contributing towards accuracy—stainless steel pans, compensated stirrups, stainless steel rider movements, agate arrestment bearings; weights Immaculate-5, corrosion resisting, non-magnetic, stainless steel, adjusted to the highest degree of accuracy.



## Reduced Weighing Time

We were the first in Britain to fit auto-loading attachments up to 200g. No box-to-pan manipulation. Totalling of weights immediate. A complete weighing carried out in less than half a minute with our Model BA6. Thus, one assistant is enabled to do the work of five.



## Greater Life

First in the world to fit Synthetic Sapphire (Corundum) planes. Each Stanton balance is the product of the care, skill and experience of British craftsmen using the finest materials and equipment available.



## Wide Range

There is a Stanton balance for every laboratory need from micro to heavy duty work. We have *informative literature* on all our models, and your request for more detailed information will be promptly met.

*Alternatively, all the leading laboratory furnishers are able to give you information concerning our products.*

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**BRITISH  
INSTRUMENT  
INDUSTRIES  
EXHIBITION**



**OLYMPIA LONDON  
JUN.30-JUL.11 '53**

**STAND NO 3 H**

... it pays to have **STANTON**  
in the balance room



**STANTON** PRECISION BALANCES

## Hazardous Substances

**W**IDER control of inflammable chemicals and other substances are contained in proposals being made to the Home Office by the Association of Municipal Corporations, which represents over 400 cities and towns.

After recalling that in 1951 the Home Office was in touch with the Association of British Chemical Manufacturers the association's memorandum states:—

'It is unsatisfactory that the Home Office should apparently wish to wait until they have obtained information of the circumstances and extent of fires which have broken out before they will control substances which are already known to be dangerous.

'Explosives officers in local government could readily produce a list of substances which are so dangerous that they ought to be controlled. This would include such substances as acetone, absolute alcohol, methyl alcohol, sulphuric ether, methylated ether, methylated spirit, and wood naphtha. Apparently carbon bisulphide is acknowledged as a dangerous substance by the conveyance regulations for it made in 1935; collodion should also be controlled.

'A list of dangerous substances ought to be prepared by the Home Office, and orders made under section 12 and/or 19 of the Petroleum (Consolidation) Act of 1928 to bring them under control. Not only should the storage and use of dangerous substances be controlled, but also their conveyance.'

The association suggests that it is doubtful if the regulations controlling the road transport of carbon bisulphide are being enforced by anyone, or observed by those to whom they relate. Local authorities apparently have no power at present to enforce them.

It also says that if the Home Office does not wish to appoint a panel of experts on dangerous substances, the AMC is prepared to do so, in order to prepare a list.

### Hess Products Fire

It has been learned that the fire which occurred recently at the Littleborough works of Hess Products Ltd., the makers of Distec fractionally distilled fatty acids, has not caused as much damage as was feared and that, in fact, they are already once more in full production.

### Sole Licence Rights

An agreement has been concluded by Mertz Patents, Limited, of Sutton Coldfield, under which the whole range of its solvent extraction plants, both batch and continuous, will in future be manufactured and sold throughout the world under sole licence by Rose, Downs & Thompson, Limited, of Hull. The full time services of Mr. Victor Mertz have been retained and he has joined the organisation at Hull to maintain his personal contact with the work.

### NORTON & RIDING (YORKSHIRE) LTD.

*Chemical Plumbers & Leadburners*

On Ministry of Supply List  
Contractors to N.C.B.

LEAD-LINED TANKS, COILS and VATS

SULPHURIC ACID PLANT

HOMOGENEOUS LEAD LINING

LEAD WORK FOR DYEWORKS and  
EXPLOSIVES

SATURATORS and BENZOLE WASHERS

*Reg. Office*  
66 Westfield Road,  
Heaton, BRADFORD.  
Tel. : 42765 & 44868

*Works*  
New Works Road  
Low Moor,  
BRADFORD

## COTTON BAGS

AND

LINERS for SACKS, BARRELS and BOXES

WALTER H. FELTHAM & SON., LTD.

Imperial Works, Tower Bridge Road,  
London, S.E.1

## JOHN KILNER & SONS (1927) LTD

ESTABLISHED 1867

Calder Vale Glass Works, Wakefield, Yorks.

PHONE : WAKEFIELD 2042 GRAMS : GLASS, WAKEFIELD

SPECIALISTS IN

**Carboys · Demijohns  
Winchesters**



**MEMO**



See Hattman  
about switching  
to Hysil

**'HYSIL'**



lab  
glass



Price

Competitive?

Quick deliveries?

Fewer breakages?  
(Sims says so)

Chance product  
(Confirmed by  
Sims)

Chance  
(Clinches it!)

# HYDROMETERS

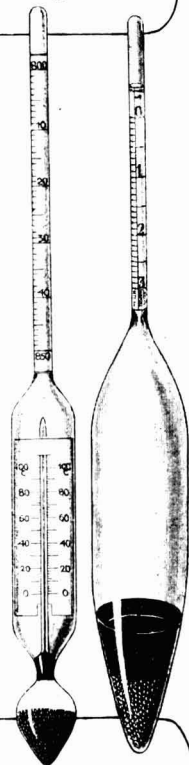
*of guaranteed accuracy*

● We manufacture every type of glass Hydrometer and every Towers' Hydrometer is of guaranteed accuracy.

Specialities — I.P., A.S.T.M., B.S.S. and Thermo Hydrometers.

Quick delivery.

New Catalogue sent on request.



# TOWERS

**J. W. TOWERS & CO., LTD.**

Head Office : VICTORIA HOUSE, WIDNES.  
Telephone : WIDNES 2201 (5 lines)  
Branches ; MANCHESTER—44 Chapel Street, Salford, 3.  
LIVERPOOL—134 Brownlow Hill.  
STOCKTON-ON-TEES—28 Bridge Road.

# CLASSIFIED ADVERTISEMENTS

## SITUATIONS VACANT

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

**SENIOR SCIENTIFIC OFFICERS; SCIENTIFIC OFFICERS; PATENT EXAMINER AND PATENT OFFICER CLASSES.** The Civil Service Commissioners invite applications for permanent and pensionable appointments to be filled by competitive interview during 1953. Interviews will continue throughout the year, but a closing date for the receipt of applications earlier than December, 1953, may eventually be announced. The Scientific posts are in various Government Departments and cover a wide range of Scientific research and development in most of the major fields of fundamental and applied science; in Biology the number of vacancies is small. The patent posts are in the Patent Office (Board of Trade), Admiralty and Ministry of Supply.

Candidates must have obtained a university degree with first or second class honours in an appropriate scientific subject (including engineering) or in Mathematics, or an equivalent qualification; or for Scientific posts, possess high professional attainments. Candidates for Senior Scientific Officer posts must in addition have had at least three years' post-graduate or other approved experience. Candidates for Scientific Officer and Patent posts taking their degrees in 1953 may be admitted to compete before the result of their degree examination is known.

**Age Limits:** Senior Scientific Officers, between 26 and 31; for Scientific Officers and Patent classes, between 21 and 28 during 1953 (up to 31 for permanent members of the Experimental Officer class competing as Scientific Officers). London Salary Scales: Senior Scientific Officers (men) £812-£1,022; (women) £681-£917; Scientific Officers (men) £440-£707; (women) £440-£576; Patent Examiner and Patent Officer Classes (men) £440-£655; (women) £440-£576. Somewhat lower rates in the provinces.

Further particulars from the **CIVIL SERVICE COMMISSION, SCIENTIFIC BRANCH, TRINIDAD HOUSE, OLD BURLINGTON STREET, LONDON, W.1**, quoting No. S.53/53 for Senior Scientific Officers and S.52/53, S.128/53 for the other posts.  
20094/150/LMS.

## FOR SALE

### PHONE 98 STAINES

**TWO** Gunmetal Duplex Fin-blade Jacketed Tilting Enclosed "MELVIN" MIXERS—29 in. by 27 in. by 24 in. deep. 30 ft. by 9 ft. R. S. TANK—12,000 gallons capacity.

New Stainless Steel 50-gal PANS. Ditto, 100-gall., with electric agitator.

S.S. Jacketed, Cylindrical Gas Heated Enclosed MIXER, 22 in. by 36 in. deep.

Stainless Steel "GARDNER" POWDER MIXER, 5 ft. by 19 in. by 20 in.

Twin "Z"-blade MIXERS—5 in. by 4 in. by 3 in., 6 in. by 11 in. by 11 in., 16 in. by 16 in. by 14 in., 20 in. by 20 in. by 18 in., 29 in. by 27 in. by 27 in. and 36 in. by 30 in. by 26 in. deep.

Four "U"-trough SIFTER/MIXERS and various Jacketed PANS AND MIXERS up to 1,200 gallons.

**PUMPS, HYDROS, STILLS, CONDENSERS, OVENS, AUTUOCLAVES, DRYERS, ETC.**

Send for lists.

**HARRY H. GARDAM & CO., LTD.**  
STAINES.

## FOR SALE

**CHARCOAL, ANIMAL AND VEGETABLE**, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD.**, "INVICTA" MILLS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL. JONES, BOCHURCH LONDON," TELEPHONE 3235 EAST

**DELAFILA, THE INERT FILLER.** Used in the manufacture of Fertilisers. Insecticides, Paints, Plastics and Insulating and Sealing Compounds. Prompt supplies in a wide range of fineness grades. **THE DELABOLE SLATE CO., LTD., DELABOLE, CORNWALL.**

**GRAVITY Roller Conveyor several lengths, Rolls.** 24 in. diam. by 16 in. 3 in. centres. Good condition. **THOMPSON & SON (MILLWALL), LIMITED, CUBA STREET MILLWALL E.14.** (Tel. East 1844.)

**NISSEN TYPE HUTS** or sale. All prices reduced. Prompt despatch of 16 ft., 24 ft., 30 ft. and 35 ft. wide huts. All completely reconditioned. Also **BLISTER HANGARS**, 89 ft. and 91 ft. wide. Various lengths. Huts comprise steel framework with corrugated iron, corrugated aluminium or corrugated asbestos sheeting. Full details from **J. THORN & SONS, LTD.**, Dept. 154, **BRAMPTON ROAD, BEXLEYHEATH, KENT.** (Tel.: Bexleyheath 305.)

**30 CWT. CHAIN BLOCKS**, 10 ft.-12 ft. lift. ex-Government surplus. £15 per set.

**5 CAST-IRON JACKETED PANS**, 36 in. diam. by 27 in. deep, 1½ in. bottom outlet. £20 each.

**1 MILD STEEL WELDED OPEN-TOP TANK**, 60 in. by 27 in. by 42 in. by 4 in. plate. £25.

**THOMPSON & SON (MILLWALL), LTD., CUBA STREET, MILLWALL, E.14.**  
TEL. EAST 1844.

### MORTON, SON AND WARD, LIMITED,

offer

#### MIXING EQUIPMENT

"**MORWARD**" "U"-SHAPED TROUGH MIXERS, up to 3 ton capacity, scroll or paddle type. Jacketed or unjacketed.

100g., 150g. and 200g. new **JACKETED PANS**, all welded, on three legs.

Several Second-hand **JACKETED PANS** in stock, 40g. to 200 g. capacity. With or without mixing gear.

#### HYDRO EXTRACTORS

Large selection available, 72 in., 60 in., 48 in. and 42 in. by **BROADBENT and WATSON LAIDLAW and MANLOVE ALLIOTT.**

All-electric 400/3/50, complete with starting equipment.

#### PUMPS

A selection of **MONO** and other **PUMPS** in stock, 2 in. to 6 in., new and second-hand.

#### EVAPORATING PANS

**ONE** New, 100g. Glass-lined, 70 lb. p.s.i. in jacket, and three second-hand 30g. by **PFAUDLER.**

#### LEAD-LINED VESSELS

Two 100g. and one 75g. Totally Enclosed, Cylindrical. As new.

#### INQUIRIES INVITED.

**MORTON, SON AND WARD, LIMITED,**  
WALK MILL,  
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Phone: Saddleworth 437.

## FOR SALE

- 3 JACKETED INCORPORATORS**, double 'Z' arms, double geared, power-driven tipping motion, with counterbalancing weights.
- 1—Baker Perkins **MIXER** as above, not steam jacketed, single geared, complete with 25 h.p. A.C. motor.
- 2—Baker Perkins and Werner Jacketed **MIXERS** screw tipping pattern, friction pulley drive, single geared, with double-fin type agitators.
- 4—Gardner **RAPID SIFTER MIXERS** and **MIXERS** only, various sizes, one with brass fitted interior and glass-lined end plates.
- 27—Various **POWDER DRESSING** or **SIFTING MACHINES**, totally enclosed, with barrels from 80 in. long by 22 in. diam. to 120 in. long by 30 in. diam., belt driven with collecting worm in hopper bottoms.
- 1—Simon Horizontal Tubular **DRIER**, 12 ft. long, 100 lb. steam pressure, size 3B, requiring 12 b.h.p.
- 4—Recessed Plate **FILTER PRESSES**, 30 in. square, 70 plates in each, centre fed.
- 5—Johnson **FILTER PRESSES**, 24 in. square, side feed and enclosed delivery, fitted 29 plates and 30 frames.
- 1—Johnson **FILTER PRESS**, 36 in. square, plate and frame type, double inlet and enclosed delivery ports.
- Johnson Oil **FILTER PRESS**, Premier type plates 2 ft. 8 in. by 2 ft. 8 in., of which there are 45, with angle lever closing gear.
- 1—Johnson **FILTER PRESS**, 42 C.I. plates, 32 in. square, centre feed.
- Steam-heated **FILTER PRESS**, Premier type, 32 in. square, with 30 recessed plates.
- Wood **FILTER PRESS**, fitted 69 ribbed plates, 2 ft. 8 in. square, with top centre feed and bottom enclosed delivery channel.
- 1—24 in. **HYDRO EXTRACTOR**, self balancing, swan-neck type, self emptying bottom.
- Heavy Cake **CRUSHING MILL**, 2-pair high, by Nicholson, for cake up to 3 in. thick, rolls 30 in. long, top with coarse teeth 9 in. diam., bottom with finer teeth 12 in. diam.
- 5 Sets **A.A. CRUSHING ROLLS** for linseed, cotton seed, etc., 48 in. long, belt driven, with feed hopper side frames, baseplate and striking gear.
- Beckett Copper-built **EVAPORATOR**, 4 ft. diam. by 4 ft. 6 in. high, steam-jacketed bottom, mounted on legs, with swan-neck vapour pipe and separate vertical belt-driven vacuum pump.
- Douglas **ROTARY PUMP** for oil, soap, etc., belt driven.
- 6 Various Horizontal Duplex **STEAM PUMPS**, Worthington and Tangye pattern, 1 in. to 2½ in. suction and delivery.
- "U"-shaped Horizontal **MIXER**, 8 ft. long, 3 ft. wide, 3 ft. 3 in. deep, belt and gear driven, end outlet, square horizontal centre shaft with cast radial type mixing arms, last used for linseed paste.
- 1—"U"-shaped **MIXER**, as above, but 7 ft. long.
- 4—5-roll **REFINERS**, fitted chilled iron, water-cooled rolls, 40 in. long, 16 in. diam., belt and gear driven, with clutch drive suitable for motor, by Baker Perkins, Ltd.
- No. 2HS Hammamac **HAMMER MILL**, No. 1 size, Standard Miracle Mill, No. 2 size Standard Miracle Mill and a No. 3 Super Miracle Mill, with fans, piping and cyclones.
- 7 ft. Torrance Positive-driven **EDGE RUNNER**, 2 Vertical Paint Pug Mills, 2-bar Disc Paint Grinding Mills, and 2 Horizontal 40-gallon capacity Cox Pug Mills for paint.
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- 2 Single effect **VERT. EVAPORATORS** by Worthington Simpson. Output of each 50-ton fresh water per 24 hrs. 12 Internal steam coils coupled to cast steam and drain headers. Test pressure; Steam and Drain headers 200 lb. sq. in., Body and Dome 60 lb. sq. in. Overall height 12 ft. Weight approx. 5½ tons.
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- JAR AND BOTTLE CAPPER** by Gravit. Cap. approx. 36 per min., with adjustment for various sizes. Motorised 220/240/1/50, through reduction gear. Unit mounted on C.I. stand with castor wheels.
- BOTTLE RINSING M/C.** by Thomas & Hill. Chain conveyor type, 12 ft. centres, double row bottle fixtures 132 head. Rotary jet rinsing. Cap. 150 doz. half or pint bottles per hr. Motorised 400/3/50.
- LABELLING M/C.** by Rawsons, for pint or 16 oz. size flat or square. Cap. 24-30 per min. Numbering device. Motorised 400/3/50. Unit mounted on rubber tyred wheels.
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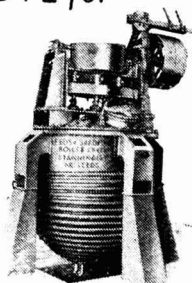
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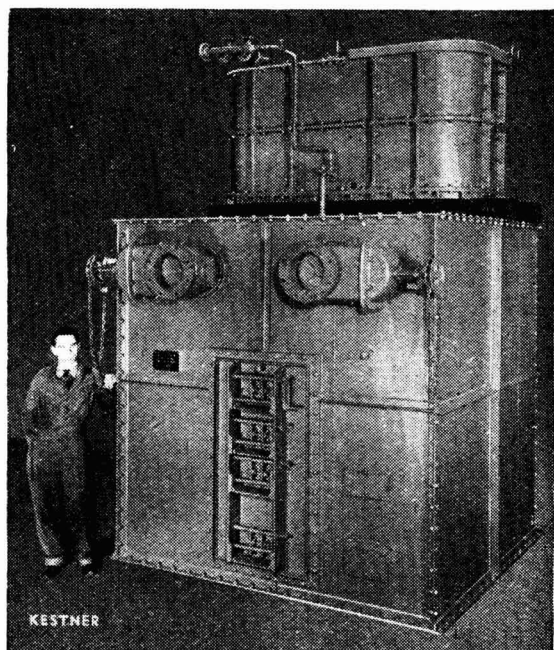
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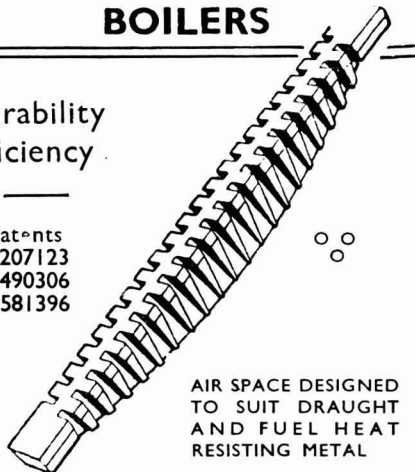
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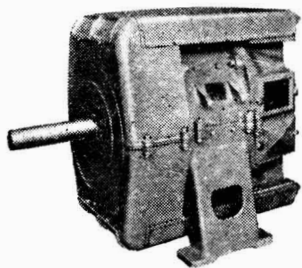


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