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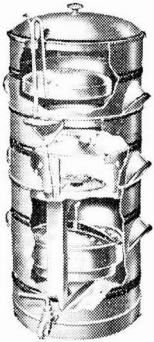
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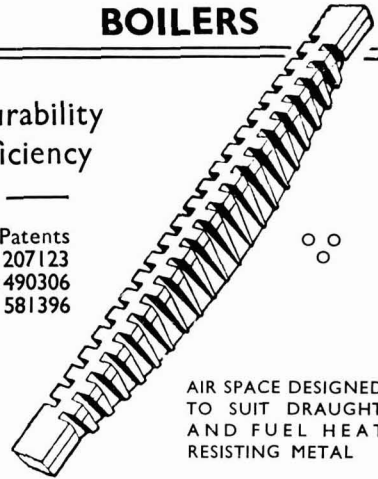
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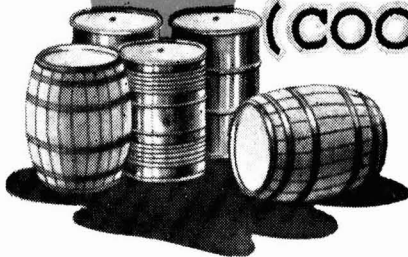


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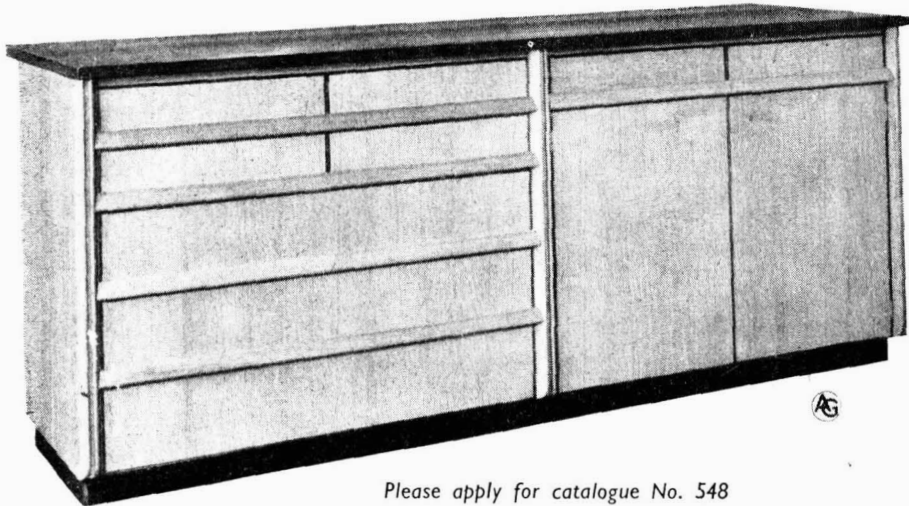
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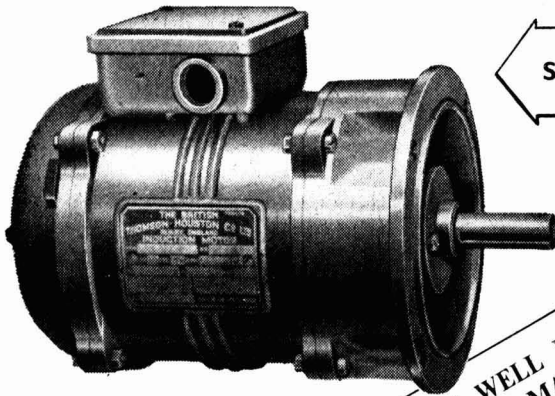


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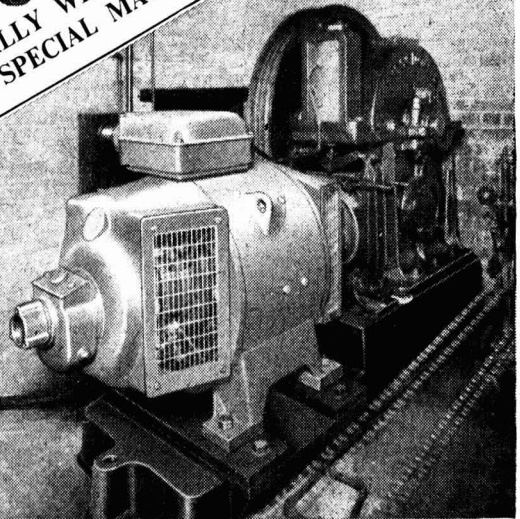
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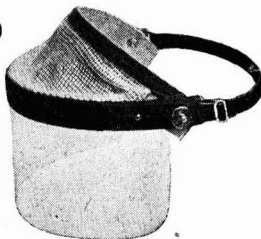
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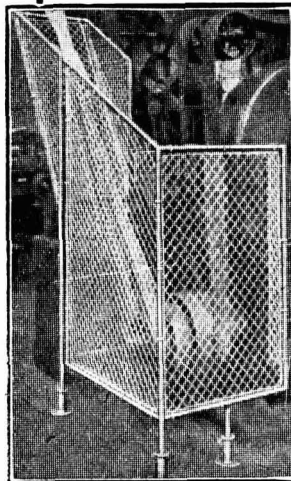
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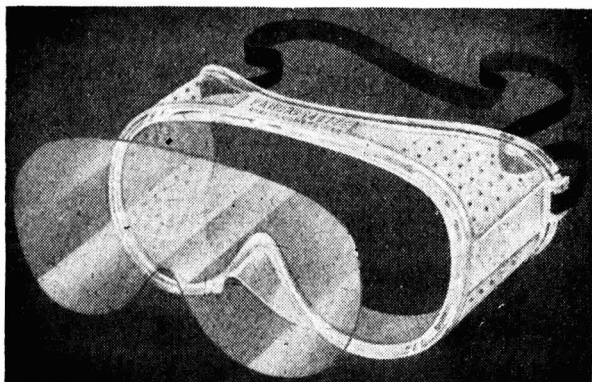
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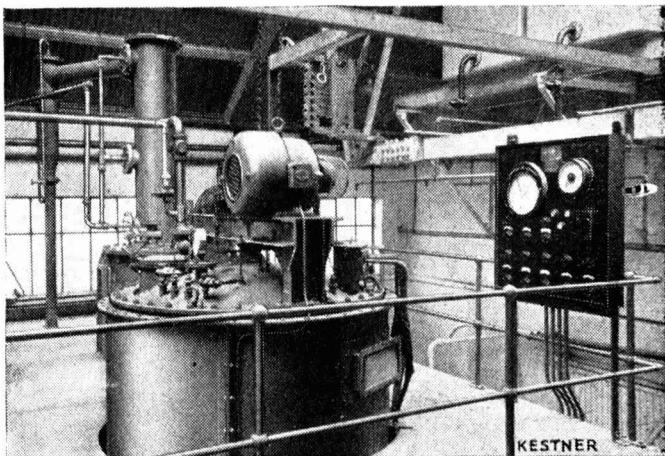
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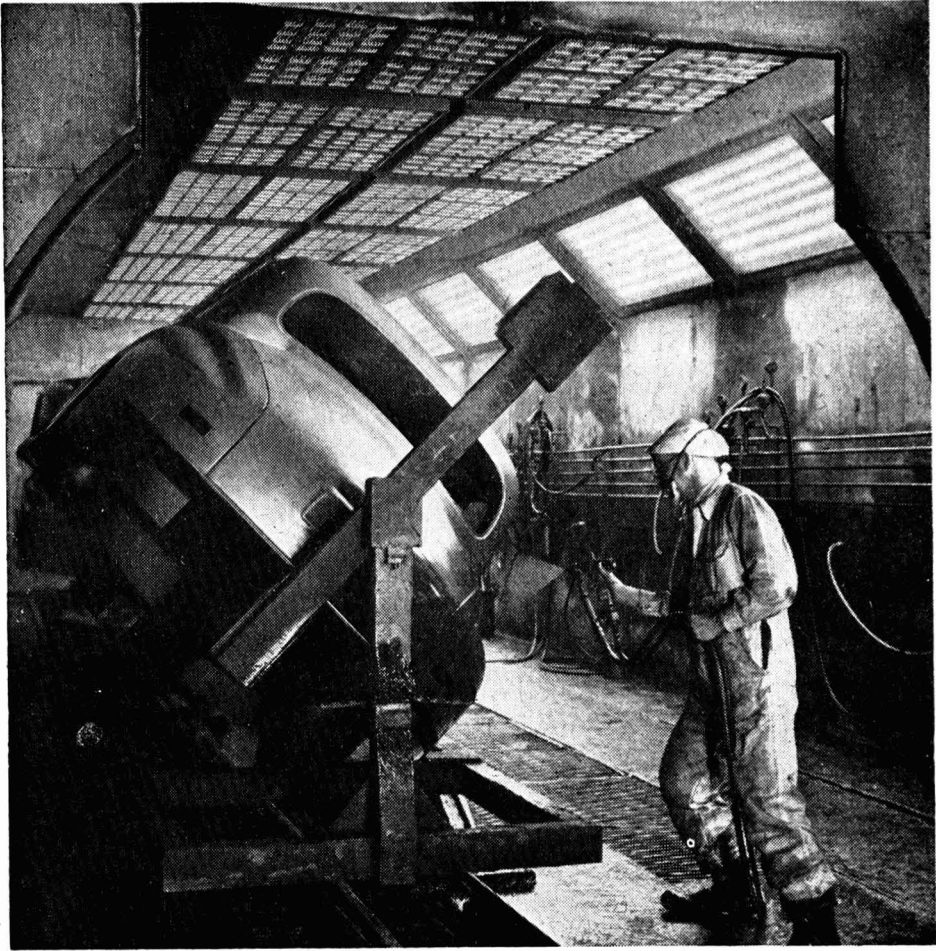
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Export Selling

TODAY the British exporter is faced with foreign competition to an extent unknown for the past 14 years. The buyer's market is well and truly back. A new FBI publication, 'Exports in a Buyer's Market,' not specially written but the report of the Export Sales Conference held at Buxton two months ago, presents the hard facts of Britain's economic future fairly and squarely. For exports without any doubt measure our future. Every other economic ingredient in our affairs is finally weighed in the export balance—the cost of transport, the cost of defence, the cost of health services and pensions, all these and more contribute to the price that must be asked for British goods. Foreign buyers, not we, decide whether to 'buy British goods,' and now once more they have the choice of other countries' products and prices.

The FBI conference was devoted to the practical theme of export technique, how to export. Sir William Rootes, chairman of the Dollar Exports Council, stated three fundamental conditions for success. First, significant increases in wage costs cannot be absorbed until the tempo of production had also been raised; this, he felt, might require greater mechanisation. Second, we must look ahead more in adapting products and their packaging to world requirements. Third, we must show more initiative in market research, advertising, customer relations, and salesmanship in general. Few of our British readers will dispute Sir William's view that these conditions, certainly the first two, will be much more readily established and held if we follow a more broadly based policy for science and research. There is . . . too great a gap between the general or real research carried out by the scientific bodies and

the practical application of research to the factory products. Let us have more scientists inside the works, where there is bound to be a real appreciation of the customers' requirements and problems . . . Through our research we must do everything to justify the great claim we have made for many years—that of being the first in the field with most new developments.'

One of the most vexed problems of British manufacturing practice and policy today, whether for the home market or for export trade, is the balance between mass-production of standardised goods and specialised production of what might be called 'made-to-measure' goods. There is undeniably a great deal of muddled thinking on this subject. The quality reputation of British goods, for so long our principal claim for recognition in world markets, was largely gained by specialised production methods. We too readily assume that standardisation and mass production bring quantity at the expense of quality, bring uniformity at the price of identity. With capital goods—and this would seem highly appropriate to chemical plant design and manufacture—the component parts and materials can be standardised and mass- or semi-mass-produced, although the final product is essentially a 'made-to-measure' article meeting the specific needs of the buyer. The work of the British Standards Institution, not only at home but through its contacts with the International Organisation for Standardisation and its consultations with other Commonwealth countries, has already made a notable contribution, and the FBI publication recommends exporters to take the fullest advantage of BSI help and information. We can, perhaps in the end better than any other manufactur-

ing nation, marry the benefits of mass and specialised production. Foreign observers usually give us greater credit for skill in compromise than we give ourselves, and they are probably right. We have an instinct for blending apparently contradictory facts and principles, and we should be capable of blending the lower costs of standardised production with the high quality of finally assembled specialised capital goods. For the plain fact is that we dare not produce for quality alone and at any cost as a sufficient number and variety of overseas buyers do not exist.

The form of price quotation in export markets is a major influence. Firm prices should be quoted to the greatest possible extent, and clauses providing for variations in raw materials and wages costs should be included only when absolutely unavoidable. Prices should not be on an 'ex works' basis, leaving it to the buyer to work out his final price with its added accumulation of transport and insurance charges. C.i.f. price quotations are much preferable to f.o.b. quotations. Whatever good reasons may seem to justify non-firm quotations or f.o.b. prices, it must never be forgotten that a foreign competitor may prefer to be slightly less cautious and secure the order at what is after all only the same basic price. Speed of firm quotation is another important factor. The exporter's representative in the foreign market should have 'the greatest possible degree of authority to quote the price at which an order will be accepted.' Here, too, over-caution must be discarded to meet competition. The home competitor for the order will be able to quote with maximum speed even if reference back to headquarters is required. The salesman representing another country may have authority on the spot. No order is more painfully lost than the order that could have been won at the most favourable price if the quotation had not been made too late. In our own internal trade we like to take our time, and we suspect the 'go-getter.' Buyers abroad do not necessarily share this outlook.

Technical and sales literature is an important ingredient of export sales promotion. The FBI commentary ob-

serves that 'it is disturbing that a very large amount of export material is still printed only in English. Correct and accurate translation is essential . . . The expense of translation may be a deterrent factor in some cases, but it is worth considering that sales potential is multiplied many times by the use of sales literature written in the local language.' The triteness of this point makes its lack of general acceptance seem all the more culpable.

'Considerable benefits are to be derived from equipping foreign universities with British text-books . . . Canada today is being brought up on American text-books, and this is apparent in many parts of South America as well. 'In some branches of technology, such as chemical engineering, the available British text-books are inadequate and in some cases out of date.' An answer to this, not given in the FBI booklet, is that writers of comprehensive technological text-books in this country are rarely rewarded for their time and effort at even the lowest labouring rate. The limited market and high costs of book production have slowly created a vicious circle within which there is little incentive for either publisher or author. One of the saddest declines in British quality is the decline of the authoritative British text-book or treatise. Another FBI comment is that 'in many important markets the circulation of British trade and technical journals is negligible.' But US and to some extent German trade journals 'appear to be widely read.' The enterprise of British publishers is not questioned. 'It is felt that this is not due to any inferiority of the British trade and technical Press, but that industry as a whole tends to be too conservative in publicising itself and its achievements through these media.' We must ourselves confirm the truth of this.

To see ourselves as others see us—that, perhaps, is the most concise summary of this expert advice on export selling. When we can see British products and salesmanship through the eyes of foreign buyers, we can make progress in changing parts of the view that are not attractive. From now onwards we must discard insularity and embrace adaptability.

Notes & Comments

Permanganate & Apples

APPLE scald is a disorder causing heavy losses in the cold storage of this fruit. A surface browning of the apple occurs and although this is not very deep it ruins market appearance and weakens the skin as a protection against fungi. Two new papers on this problem have just been published (*Agricultural & Food Chemistry*, 1953, 1, 1104, 1107), and it seems that a chemical method of reducing serious scald losses is likely to be more effective than any remedy previously considered or tried. A major cause of scald is skin penetration by esters or other volatile substances that are emitted by the apples themselves during storage. A study of these volatile substances showed that those which are particularly active in promoting scald could be converted into non-active substances by treatment with alkaline potassium permanganate solutions. Alkalies, acids, or oxidising agents, however strong, were ineffective by themselves. Air-scrubbing in a cold storage room with alkaline permanganate was pilot-scale tested, and good if not complete control over scald was achieved. Oddly, an aeration treatment (three days exposure to ordinary uncooled air before assessing the incidence of scald) increased the effectiveness of the alkaline permanganate treatment though it substantially raises scald incidence with other treatments or when there has been no anti-scald treatment.

Effective Yet Economical

THE alkaline permanganate air-scrubbing treatment left 78 per cent of a susceptible variety of apples marketable and free from scald damage after 95 days' cold storage. With activated carbon as the air-cleansing agent the comparable percentage was only 30, and without any treatment from 20 to 30 per cent of the fruit was marketable. It is therefore a cautious estimate to say that the new chemical method of control is promising. The solution used was a 10 per cent sodium hydroxide solution with

10 grams of potassium permanganate added per 100 ml. of solution; it was pump-circulated at one to one and a half gallons per minute, and the 25 gallons batch was replaced twice during the 95 days of storage. The cost of power was twice the cost of the chemicals. A storage room of 150-bushel capacity was kept air-scrubbed at a cost of \$10 for chemicals and \$21 for power, and damage to about 50 per cent of the stored fruit prevented.

The Father of Chemotherapy

THIS year brings the centenary of one of the most vivid characters of science, Paul Ehrlich, born in 1854. Few of the great German scientists have combined gaiety with solid, persistent research but Ehrlich in almost all things, was an odd man out. Was it only because his student days coincided with the great period of chemical dyes that he persisted in staining tissues with these 'new' substances, an unorthodox activity that did not improve his already poor reputation as a medical student? Nevertheless, when he heard Koch lecture and explain the cause of tuberculosis, he realised that he had actually seen the bacilli though he had assumed that they were crystals selectively coloured in one of his dye experiments. He was able to show Koch, then about ten years his senior, how to stain the bacilli. It might have been a less happy encounter for after flinging himself enthusiastically into tuberculosis research, Ehrlich picked up the disease himself. Fortunately Koch's own cure saved Ehrlich and he was able to return to the Berlin institute where Koch worked.

Never Lost Faith

EXCITABLE, undignified to the point of eccentricity, a prodigious cigar smoker and not much less prodigious a lover of beer, argumentative but never vainly obstinate, Paul Ehrlich must often have seemed a liability to his sponsor. A man of many ideas, it was

to be a long span of years before one of them was turned into reality and conquest. But Ehrlich never lost faith in the original idea of his student youth, that dyes or dye-like chemicals, since they could selectively stain different components in tissue, must be able to attack selectively unwanted invaders of the body. His conception of chemicals as 'magic bullets' for parasitic organisms of disease was long regarded as the dream of a crank. He was 58 before his faith was justified. A long and laborious task of trial-and-error tests with hundreds of modifications of organo-arsenic compounds ended with salvarsan or Compound 606. Ehrlich had found a magic bullet for one of the world's most horrible diseases and at the same time opened the doors of a new branch of medical chemistry.

Died Exhausted

THOUGH already suffering from diabetes, and probably also from the endless chain of cigars, he flung even more time and energy into the work of development than he had flung into research and discovery. It is probable that he took a more limited view of his success than we can now take today. There was a disappointing lack of consistency with salvarsan; though it cured thousands of cases, it occasionally killed. Ehrlich strove desperately to find the cause of these occasional failures, but it eluded him, as it eluded later workers. He died in 1915, a spent force, the exhausted father of modern chemotherapy.

Left a Legacy of Clues

A PART from the great highlight of his career, Ehrlich left a legacy of clues for the future. In his 'forties he had noted that the dye, methylene blue, exercised a mildly curative effect upon malaria. A decade and a half later a synthetic drug, with its molecular pattern derived from the methylene blue starting point, was produced; later still, this became known as Mepacrine. However, chemotherapeutic progress has out-dated Ehrlich's original contributions today. Better drugs conquer the same

diseases. But at least two generations were saved thousands of deaths and immeasurable suffering by Ehrlich's work. He must always be classed among the great names of nineteenth and twentieth century science.

India-USSR Agreement

Exchange of Products

A FIVE-YEAR Trade Agreement between India and the USSR was signed in New Delhi on 2 December. It provides for exchange of a large number of items and specifies the procedure for trade and shipping and for settlement of accounts.

At the same time as the signing of this agreement, the first of its kind, letters were exchanged on the establishment and status of Soviet trade representatives in India and on the extension of technical assistance by the Soviet Union to India both for installation and operation of Soviet equipment as well as for planning and execution of various projects in India.

Among goods agreed for export from India to the USSR during the first year of the agreement are shellac, black pepper and other spices, hides and skins, vegetable and essential oils, and a number of other goods. The list of goods agreed for export from the USSR to India includes crude petroleum and petroleum products, timber and paper, iron and steel manufactures, chemicals, dyestuffs, medicaments, as well as a wide range of industrial equipment.

The agreement provides for most favoured treatment in regard to shipping and a number of other facilities to each other. Under the agreement, all payments between India and the USSR will be made in rupees, and the Soviet Government will maintain accounts in exchange banks in India and also in the Reserve Bank of India for this purpose. Any balances in these rupee accounts will be convertible on demand into sterling at the usual bank selling rate for sterling as fixed from time to time by the Indian Exchange Banks Association.

The agreement came into force on 2 December and will remain valid for a period of five years. The agreement can be extended or renewed by negotiation between the parties to be commenced three months prior to its expiry.

Public Aid for Research

Projects Receiving Support from Development Corporation

THE National Research Development Corporation, whose main task during the first four years of its existence has been to administer and to secure the exploitation of public inventions (that is, those resulting from public research), has recently issued its annual report for the year ended 30 June last. Reference is made to the development projects with which the Corporation is at present concerned and some of these are mentioned below.

Inventions in the field of hydrocarbon synthesis at the Imperial College of Science & Technology have continued to receive the support of the corporation and developments have so far proceeded without setbacks. The project is, however, of a long-term nature and progress is not expected to be rapid in the early stages.

Results of the pilot scale production in East Africa of hecogenin from sisal juice have encouraged the corporation to make further contractual arrangements for increased supplies of the material. The process employed is still in the development stage. Purification of the crude concentrate shipped from Africa is being undertaken in the UK and pure hecogenin acetate is being made available in research quantities as a starting point for the synthesis of cortisone.

Ion-exchange Processes

Ion-exchange methods for chemical separation are now being used, not only in laboratories, but on the largest commercial scale. The utilisation of one such process for a natural-product extraction has been worked out by the Food Investigation Organisation of the Department of Scientific and Industrial Research and the rights assigned to the corporation. In collaboration with DSIR and two industrial firms, a pilot plant has been erected and has just begun to operate.

A number of resin based formulations containing insecticides have been proposed by a Colonial Office research unit and have been the subject of extended trials by the Agricultural Research Council. These formulations have been made the subject of patent applications in the UK and a wide range of overseas countries. Licence agree-

ments have been made by the corporation with several British paint manufacturers and commercially produced formulations are becoming available on an increasing scale. The corporation has also organised and made available to its licensees facilities for the standardisation and testing of these compositions and further investigations and development work are being supported by the corporation.

Inventions at the RAE

During the year there has been increased interest in a group of about 30 inventions in the plastic structures field originating in the Royal Aircraft Establishment, Farnborough, in respect of which the patent rights have been assigned to the corporation.

This increased interest has been due to a growing realisation of the importance of phenolic-impregnated asbestos felts as constructional materials, and of polyurethane and furane resins for foams and adhesives respectively. The British Plastics Federation has helped to make this work known to its member companies. A special study of the process of shock curing of plastic laminates evolved by the RAE has been carried through at the corporation's expense so that the results can be made available to industry.

Plans are in hand for the setting up by the corporation of a plastics structures demonstration laboratory through which the corporation will maintain liaison with industry and take off the shoulders of the RAE part of the increasing burden of industrial inquiries not specifically related to the aircraft industry.

Three licence agreements with industrial firms in respect of certain of these inventions were concluded during the year and negotiations for others are in hand.

A machine of novel design for the liquefaction of atmospheric gases on a scale considerably smaller than machines at present available, has been invented at Reading University, and the patent rights have been assigned to the corporation. The corporation has placed a development contract with Reading University for the construction of a prototype, which is now being built.

The report points out that the corporation's borrowing powers expire at the end of June next year and if it is to continue its normal activities thereafter further provision for borrowing, entailing legislation, will require to be effected before then.

The statutory functions of the corporation are as follows:—(i) To secure, where the public interest so requires, the development or exploitation of inventions resulting from public research, and of any other invention as to which it appears to the corporation that it is not being developed or exploited or sufficiently developed or exploited; (ii) to acquire, hold, dispose of and grant rights (whether gratuitously or for consideration) in connection with inventions resulting from public research and, where the public interest so requires, in connection with inventions resulting from other sources.

As a result of four years' working the corporation is a party to more than 250 licence agreements with industry in the UK or abroad, and to revenue sharing agreements entered into with universities, university research workers and industrial research associations. These involve administration of 2,224 patents and patent applications in the UK and overseas. This administration, together with the yearly accretions to the corporation's Portfolio of Patents, involves the corporation in a continuing commitment in respect of wasting assets with a maximum life of around 16 years.

Standard Pesticide Names

THE British Standards Institution has just issued Part 2 of BS. 1831 which consists of six common names for pure pest control chemicals well known in agriculture; Part 1 was published in 1952 and further lists will be published from time to time. Of these six names allethrin and methoxychlor are already accepted as coined common names by the United States Interdepartmental Committee on Pest Control. In both the UK and the USA the names have been preempted as far as possible for common use, by recording them with HM Patent Office and the US Patent Office, respectively.

The common name is assigned to the 100 per cent pure chemical and is correlated with the chemical name and the formula. Where more than one chemical name is known for that material, the first which is given is in accordance with the principle recommended

by the Chemical Society of London. The common names and chemical names are indexed for convenient reference and this index may afford guidance to those concerned with indexing and abstracting, as to the preferred alphabetical arrangement of these names. The numbering of the common names is a continuation of that adopted in Part 1.

Copies of this standard may be obtained from British Standards Institution Sales Branch, 2 Park Street, London, W.1, price 2s.

New Gas Analyser

Ingenious French Apparatus Described

A NOTICE from the Office National d'Etudes et de Recherches Aeronautiques, Chatillon-sous-Bagneux, France, describes a newly developed gas analysis apparatus. The instrument is based on the selective IR absorption of various gases, and is capable of analysing mixtures containing CO, CO₂, NH₃, HCN, SO₂ and the majority of hydrocarbons.

The principle of the apparatus is as follows. Two rays of IR light from the same source pass through two parallel tubes. One of these tubes contains air which does not absorb the IR (*sic*); and through the other passes a current of the gas mixture to be analysed. Some absorption of heat occurs in this second tube and the two beams then enter the two halves, separated by a thin membrane, of a chamber containing a pure sample of the gas to be determined in the mixture.

This gas absorbs the appropriate wavelengths of the incident beams, and since the beam from the first tube will be more intense than that from the second, one half of the receptor gas will be heated more than the other, and a variation in pressure will result in a deformation of the membrane.

The beams are regularly occulted by a revolving shutter, so that a periodic vibration is transmitted to the membrane, and by making this a part of a capacitive circuit, it is possible to construct a measuring instrument.

The sensitivity depends upon the length of the tube, the maximum corresponding to a concentration of about 0.01 per cent for a complete scale deflection. Thus concentrations of the order of a few ppm. may be determined. The instrument may be attached to a recorder, a controller or an alarm.

Every Chemical Need

Extensive Displays at US Industries' 24th Exposition

THE 24th Exposition of Chemical Industries in Philadelphia early last month drew an estimated attendance of 32,300 visitors from the entire United States and many countries of the free world. Spread over five level acres at the Commercial Museum and Convention Hall were 550 displays of chemical substances, chemical processing machinery, structural materials and research equipment such as have never before been assembled under a single roof.

More extensively than is usual with industrial expositions, the display was illuminated by moving displays giving pictorial, simulated or actual demonstrations of processing equipment at work. Most instructive were the numerous working models made entirely or partly of glass or transparent plastics.

Thus the visitor might see the operation of a two-stage steam jet vacuum pump at one stand, compare the performance of the dry and oil-bath filters at another, or observe the continuous performance of an automatic in-line filter. The latter unit operates on an automatic cycle in which it precoats, blows back, filters, cleans, shuts off, and then repeats.

Many Scale Models

Similarly illustrated by means of transparent models were a turbo-mixer, a liquid separator, a Dowtherm vaporiser in which both the combustion and the pattern of circulation could be studied, and at a fourth display the internal structure of a steam turbine. Another novel in-glass display demonstrated the operation in quarter-scale dimensions of a floor-mounted, direct-contact, counterflow barometric condenser—very compact by comparison with the conventional apparatus of its kind. By way of proving the facility for study and development of glass models, a glass manufacturing company displayed a transparent cascade cooler.

Graphic models of another kind were the scale models of actual processing plants, either projected or already built. These were more numerous than at any previous exposition.

One such model, exhibited by a firm of consultants which develops such miniature scaled structures for visualisation and checking purposes as construction plans are being developed, was that of a fractionation plant built several years ago. At another stand a model of a nitrophosphate process plant in France was shown. This illustrated the construction and layout for a new process for making fertiliser, using carbon dioxide to convert corrosive, unstable and hygroscopic calcium nitrate into calcium carbonate.

Model Oxygen Plant

New sources of supply for oxygen were forecast by still another exhibitor who specialises in the design and construction of complete chemical plants, from first plans to actual operation. On this exhibitor's stand a German-built model was shown of a plant of 190-tons-per-day capacity, producing oxygen of 95 per cent purity by separation from air, using the famous Linde-Fraenkl process.

Rapid strides have been made recently in applications of plastic products in chemical processing equipment. Taken at random from a score or more of exhibits in this field are the following: a steel company's display of semi-rigid butyrate plastic pipe and flexible polyethylene piping and joints; the same exhibitor's Dekoron-coated standard galvanised electric conduit tubing to which a corrosion-resistant polyethylene is applied by a patented extrusion process. At another display, new valves and fittings of Boltaron, an unplasticised polyvinyl chloride, which is also available in sheets, bar stock and in special fabrications. Van-Cor 2 is a compound of rigid unplasticised polyvinyl chloride modified to improve its impact resistance to approximately 30 times that of the unmodified compound, its manufacturer claims.

Alpha Forty-HI is another rigid polyvinyl chloride product offered as a thermoplastic piping that is outstanding for high impact strength, corrosion resistance, tensile strength, ageing characteristics, machining and forming and even welding characteristics. This material, offered as the 'stain-

less steel' of the plastic pipe industry, is five times lighter than steel pipe of the same size, and is reported to be able to withstand the roughest treatment because of its high impact strength.

Kel-F is one of the new rubber-like plastics that has made remarkable progress with converters and processors and is already used in such manufactured products as blown bottles, coil forms, diaphragms, gaskets, armoured hose, rod and tube both extruded and moulded, moulded sheet, 'spaghetti tubing,' tape and strip, and insulated wire. It is a polymer of trifluorochloro-ethylene having a unique balance of chemical, mechanical, and electrical properties, especially noteworthy for its high impact strength and resistance to thermal shock.

Assembled Using Common Tools

Rigidon plastic is a polyester resin reinforced with glass fibre, shaped or moulded to size, and offered in a standard line of duct sizes. Duct work can be sawed, drilled and assembled in the field by the use of common tools. A cementing system employing plastic resin and glass fibre is provided for installation work.

Vinocel is a vinyl plastic foam based on an entirely new principle in which foaming is accomplished simply by mechanically beating air into the Vinocel plastisol at atmospheric pressure and then moulding and curing. It is offered for most of the uses already employing foam rubber.

Many visitors were especially interested in improved structural materials and in fabrications especially developed for the processing of chemicals. An entirely new material for chemical processing is a metal ceramic. This material has the following characteristics: exceptionally strong, excellent resistance to temperatures in the range of 1,000°-1,370°, resistant to the effects of oxygen up to 1,200°, and to the effects of combustion gases up to 1,870°. It is also resistant to attack by molten steel and furnace slag. This material is made by sintering together selected steel alloy and ceramic materials.

The new requirements are met in many instances by cladding the strength material used for pressure vessels and processing equipment with other materials more resistant to corrosive and thermal influences. Lead cladding, under the names Ferrolum

and Cupralum, now available in many fabrications, is an instance in point. For many purposes steel clad with precious metals is used.

An alternative to cladding is the coating method for securing the necessary combination of chemical resistance with strength in processing equipment. Here, of course, the plastics are widely used, but several exhibitors at Philadelphia displayed glass-coated equipment to considerable advantage.

One exhibitor, long-experienced in the production of glass-lined chemical processing vessels, brought forward the first example of a glassed-steel tubular heat exchanger. Another heat exchanger at the exposition was constructed of a rigid, mouldable material made by mixing acid-digested asbestos with special synthetic resins.

Equipment on view ran the entire gamut of processing steps. A simple, rapid method of separating stubborn, unstable emulsions on a continuous basis, in equipment without moving parts, was based on the principle that when a liquid-liquid interface is supported across the capillaries of a properly-conditioned porous membrane, its resistance to rupture will increase to the extent that a practical separatory system is created. Employing this concept, a three-stage separatory system is employed, in which the emulsion is first passed through a coalescing membrane, which is water repellent, then permitted to settle out by gravity, and finally passed through separatory membranes, which are preferentially wetted by water, in opposite streams.

Drying Wet Gases by Screening

The method of drying wet gases by screening affords another example of special technique applied to meet the exacting demands of chemical processing. The application is in distillation equipment, liquid and gas separators, extractors, evaporators, dehydrators, scrubbers and gas absorbers. In such installations one exhibitor's separators are guaranteed to give a performance of not less than 99 per cent separation efficiency.

Still in the trend toward putting equipment on stream, was the announcement by a manufacturer of instruments and controls, 'fully automatic batch processing cuts costs.' The basis of this is the application of the automatic process method to batch operation, such as is unavoidable in some instances, often to the distress of manufac-

turers who long for, but cannot employ the continuous process method for technical reasons. This system can be adjusted to any process sequence up to 36 separate functions, controls multiple operations per function, and is accurately timed in seconds or hours.

Remarkable advances in process control were exhibited by a number of manufacturers in the field of production instruments, as distinguished from instruments for research and development work. Such instruments are remote reading, reduced to miniature size for installation in graphic panels or on control desks from which the operation of an entire plant may be monitored.

One of the most advanced displays illustrating this trend was one showing by photomural a refining plant, with flickering miniature lights to show the widely distributed location of instruments for sensing pressures, temperatures and other operating data. In step with the flickering lights, an automatic electric typewriter, operated by a digital recorder, was ticking off the complete log sheet of the entire plant.

Dual Purpose Party

ON Tuesday, 15 December, George Lewi & Partners held a cocktail party in their new offices at Hanover Court, Hanover Square, London, W.1. The party was a combination house-warming and Christmas party and was attended by a large number of associates and friends, including:—

Mr. John Brown (Brown & Forth Ltd.), Dr. W. Sachs (London & Scandinavian Metallurgical Co.), Dr. F. A. Freeth, O.B.E., F.R.S. (Sondes Place Research Institute), Mr. H. W. Vallendar (Association of British Chemical Manufacturers), Mr. Angus Morrison (Powell Duffryn Carbon Products Ltd.), Dr. E. H. T. Hoblyn (director, British Chemical Plant Manufacturers' Association), Mr. Gordon Inskoop (European editor, American Chemical Society), Dr. B. J. A. Bard (National Research Development Corporation), Mr. Dennis Parsons (ditto), Mr. J. H. Kelly (Prodorite Ltd.), Mr. Hans Stork (Federation of German Industry), Mr. R. Welham (British Moulded Plastics Ltd.), Mr. J. Collins (Montanto Chemicals Ltd.), Professor R. J. Sargent (University of Sheffield), Mr. G. A. Dummett (The A.P.V. Company, Ltd.), Mr.

K. B. Ross (Costain-John Brown Ltd.), Mr. L. A. Plummer (F. W. Berk & Co. Ltd.), Mr. S. Stager (E.I. Du Pont de Nemours & Co. Inc.), Major General G. E. Wildman-Lushington (Sulphur Exploration Syndicate), Mr. J. M. Lancaster (ditto), Mrs. M. E. Mackiewicz (ASLIB), Mr. P. Nash (Sondes Place Research Institute), Mr. F. J. Bellinger, M.P. (Member of Parliament for Nottingham), Dr. H. Schaefer (Bad Homburg) and Lord and Lady Nunburnholme.

The Rarer Base Metals

Lectures to be Given at Acton

A COURSE of 11 lectures on 'The Rarer Base Metals: Production and Modern Applications' will be held in the Department of Chemistry & Biology at Acton Technical College, High Street, Acton, W.3, during the forthcoming spring term.

Fuller details of the lectures, which will be given on Fridays, beginning at 7.30 p.m., are as follows:—

15 January: 'The Rarer Base Metals and the Periodic System,' by Dr. J. H. Skellon, T.D., M.Sc., Ph.D., F.R.I.C., head of the Chemistry Department, Acton Technical College.

22 January: 'Beryllium and its Applications,' by Dr. B. A. Scott, Ph.D., A.R.C.S., F.R.I.C., F.I.M., research chemist, the British Aluminium Co.

29 January: 'Gallium, Indium and Thallium,' by Mr. A. R. Powell, F.R.I.C., F.I.M., F.R.S., manager, research and development, Johnson, Matthey & Co.

5 and 12 February: 'Titanium and Zirconium,' by Mr. T. L. Brown, M.Eng., B.Eng.(Met), manager, tantalum and zirconium plants, Murex Ltd.

19 February: 'Germanium and Silicon and Their Uses as Semi-conductors,' by Mr. A. R. Powell.

26 February: 'Vanadium and its Application,' by Mr. P. S. Bryant, B.Sc., A.M.I.Chem.E., production manager, chemical group, Murex Ltd.

5 and 12 March: 'Niobium and Tantalum,' by Mr. T. L. Brown.

19 and 26 March: 'Molybdenum and Tungsten,' by Mr. P. S. Bryant.

The fee for the course is £1 10s. and as accommodation is limited, early application is advised.

Prices of Unrefined and Refined Oils

Minister of Food Announces Changes

CHANGES in the prices of both unrefined and refined oils allocated during the current allocation periods have been announced by the Minister of Food, Major the Rt. Hon. Gwilym Lloyd-George, as follows:—

| PRICES OF UNREFINED OILS TO PRIMARY WHOLESALE AND LARGE TRADE USERS | | DURING THE FOUR WEEKS WHICH BEGAN 27 DECEMBER, 1953 | |
|---|------------------------------|---|---------|
| Coconut oil | Crude and crude oleine | from £126 | to £134 |
| Palm kernel oil | Crude and crude oleine | £124 | £133 |
| Cottonseed oil | Crude | £137 | £136 |
| | Washed | £145 | £144 |
| Groundnut oil | Crude | £148 | £147 |
| Maize oil | Crude | £145 | £144 |
| Palm oil | .. .. | .. .. £68/10 | £71/10 |
|  | .. .. | .. .. £68 | £71 |
| Herring oil | Crude | £67 | £70 |
| | Crude No. 1 | £70 | £75 |
| Whale oil | Crude No. 1 | £75 | £80 |
| | Crude hardened to 42° | £86 | £92 |
| Whale/Herring oil | 46° | £87 | £93 |
| | 50° | £88 | £94 |
| | 54° | £88/10 | £94/10 |
| Iodine value 3/5 | .. .. | .. .. £88/10 | £94/10 |
| Coconut/Palm kernel acid oil | .. .. | .. .. £87 | £85 |
| Cotton acid oil ex-washed oil | .. .. | .. .. £60 | £55 |
|  | .. .. | .. .. £62 | £55 |
| Groundnut acid oil | .. .. | .. .. £60 | £55 |
| Maize acid oil | .. .. | .. .. £52 | £50 |
| Palm acid oil | .. .. | .. .. £60 | £55 |
| Mixed soft acid oils | .. .. | .. .. |  |

Per ton naked ex-works
Per ton c.i.f. in casks to be returned
Per ton c.i.f. in 10' drums
Per ton c.i.f. in bulk
Per ton naked ex-store

(N.B.—The entries relating to sunflower oil, sesame/beniseed oil, soya bean oil, seal oil, whale oil, crude No. 2, sesame/beniseed acid oil, sunflower acid oil, soya acid oil and seal acid oil have been deleted because the Ministry has no further supplies of these oils available.)

| PRICES OF REFINED OILS TO PRIMARY WHOLESALE AND LARGE TRADE USERS | | DURING THE EIGHT WEEKS WHICH BEGAN 27 DECEMBER, 1953 | |
|---|--|--|---------|
| Coconut oil | Refined deodorised | from £137 | to £147 |
| Palm kernel oil | Refined hardened deodorised | £144 | £153 |
| | Refined deodorised | £134 | £144 |
| Cottonseed oil | Refined hardened deodorised | £141 | £150 |
| | Refined deodorised | £163 | £162 |
| Groundnut oil | Refined deodorised | £168 | £167 |
| Palm oil | Refined deodorised | £90 | £101 |
| | Refined hardened deodorised | £101 | £110 |
| Whale oil | Refined hardened deodorised to 42° | £92 | £98 |
| | Refined hardened deodorised to 46°/48° | £93 | £99 |

Per ton naked ex-works

(N.B.—The entries relating to refined deodorised sunflower, sesame/beniseed, soya bean and maize oils have been deleted because the Ministry has no further supplies available.)

For Young SCI Members

THE committee of the Food Group of the Society of Chemical Industry wishes to introduce features into the Group programme which will appeal particularly to the younger members (born in the 1920's) and which will encourage them to play a more active part in the meetings. Arrangements are now being made for a meeting, not advertised in the current syllabus, to be held in May 1954. This may be a meeting at which younger members present and discuss short papers (not necessarily for publication) on new apparatus, methods,

techniques, etc., with which they are familiar. In addition, it may be possible to arrange a visit; or to show scientific films.

However, before proceeding, the committee is seeking the guidance of those for whom the meeting is intended. Young members, therefore, are being invited to forward to the honorary secretary of the group at the Government Laboratory, Clement's Inn Passage, London, W.C.2, their views on the type of programme they consider to be most appropriate, or alternatively to ask such potential young members of the group as they may know to forward their views.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

IN connection with an agreement between the Government of India and two German firms, Krupps and Demag, for the establishment of a 500,000 tons a year steel plant in India at a cost of Rs. 712,000,000 (£53,400,000)—see THE CHEMICAL AGE, 1953, 69, 717—a six-man delegation has arrived in India. The delegation consists of Drs. H. Seyboth, P. Hansen and K. Schumann (representing Krupps) and Drs. W. Thun, J. Schueller and P. J. Heider (representing Demag).

Discussions between the delegation and representatives of the Ministry of Production were held at New Delhi and the delegation is now on a tour of West Bengal, Orissa, Bihar and Madhya Pradesh with a view to selecting a suitable site for the location of the new plant. The overriding considerations in the location will be the availability of iron ore, coal and other raw materials, and the economics of production and distribution of steel.

The delegation will subsequently submit their recommendations to the Government of India and if these are accepted, a team of experts will arrive in the new year to locate the plant. The plant is to be constructed on the most modern lines and is expected to go into production in four years' time.

* * *

The Minister for Production, addressing the Salt Advisory Committee at Madras, said measures should be initiated 'to regulate production (of salt) in the interests of the industry itself.' Indian salt production, which in 1947 stood at 1,925,000 tons, rose to 3,060,000 tons in the first nine months of 1953. Increased production in 1952 enabled 200,000 tons to be exported to Japan. In the current year an export quota of 400,000 tons was fixed, and nearly half of that quantity has already been shipped to Japan. A salt factory has since been started in Thailand, with Japanese collaboration, to produce about 500,000 tons of salt per year.

However, said the Minister, as the NaCl content of Thailand salt was 94-95 per cent as against 98 per cent and more in the case of Indian salt, there was still scope for exporting high quality salt. The Salt Advisory Committee recommended raising the NaCl

content of edible salt to 96 per cent and further increasing the standard progressively, maintaining quality control, expanding exports, checking unlicensed production, reducing the salt cess and encouraging development of the heavy chemical and ancillary industries.

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The disposal of chlorine as a by-product of the alkali industry in India, has been a serious problem and has retarded the growth of the industry. Tata Chemicals Ltd., Mithapur (Saurashtra), a major producer of caustic soda and other chemicals, are now to utilise the surplus chlorine in the manufacture of insecticides. The company has concluded an agreement with a German firm for the manufacture of insecticides by a German process.

When the insecticide plant goes into production, not only will all the surplus chlorine be absorbed, but the electrolyzers will be operated to capacity, with a corresponding increase in the output of electrolytic caustic soda. A brine evaporator plant was brought into operation last year and has been working satisfactorily, producing about 40 tons of vacuum salt a day, free from impurities. Although the soda ash plant has been irregular in operation—because of imports and market conditions—certain additions and modifications have been taken in hand with a view to attaining the maximum rated capacity of the plant.

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The Government of India have exempted from import duty 21 pesticides when imported from the United Kingdom. The exemption from duty applies only when the chemicals are imported in their pure form. The Government have also exempted radioactive isotopes of iodine, phosphorus and cobalt from the whole of the custom duty hitherto leviable on them when imported into India.

The Ministry of Industry and Commerce has announced that, on the recommendation of the Tariff Commission, the protection granted to the ferro-silicon industry need not be continued beyond this year. Ferro-silicon is manufactured in Bhadravati (Mysore) and a fair selling price has been fixed.

The Indian Chemical Manufacturers' Association, at their recent annual meeting at Calcutta, urged the Government to be more positive and helpful in utilising the existing idle capacities in different sections of the chemical industry in India.

Swedish Preservation Research

HIGH-frequency and other novel methods of preservation were demonstrated to the Minister of Commerce, John Ericsson, and a number of scientists at the recent inauguration of the new laboratory building of the Swedish Institute for Preservation Research in Gothenburg.

The Institute, which was started in 1948, has during the past five years carried on large-scale researches in practically all fields of preservation technique under the leadership of Professor Georg Borgström, an internationally-known expert on food chemistry and food supply problems.

In the course of the experiments it has been found, among other things, that eggs can be kept fresh at room temperature for six weeks if they are pasteurised and the shells are covered with a protective oil coating. Even after nine weeks 86 per cent of the eggs showed no sign of deterioration. On the other hand, tests with the rapid-preservation of food by means of X-rays and electrons have proved less successful. The bacteria are killed, but at the same time certain undesirable changes take place in the composition of the foodstuffs, even if the radiation lasts no more than one-millionth of a second.

'Electric' preservation is now to be the object of practical experiments in collaboration with Chalmers Technical Institute, also of Gothenburg. When this method is applied, the cans have to be placed in a high-frequency field. The entire process takes but 3-4 minutes, as compared with approximately one hour for conventional heat sterilisation.

Among other forthcoming projects are investigations into new and improved methods of utilising Swedish fruit, processing waste into useful products, etc. The Institute, which serves as a central laboratory for the Swedish food industry, will next year take into use a factory building housing cold-storage space and a department for packaging investigations.

India-Yugoslavia Pact

THE Trade Agreement between India and Yugoslavia signed in July, 1953, has been ratified by both Governments. The agreement comes into force for one year from 8 November, 1953. The agreement provides for most favoured treatment as regards shipping and other facilities.

The Government of India has confirmed that within the currency groups, there would be no territorial discrimination and accordingly applications for licences for goods for import from and export to Yugoslavia would be treated equally favourably with applications from any other countries of the currency group to which Yugoslavia may belong. All payments between India and Yugoslavia will be made in rupees or sterling as mutually convenient.

Commodities available for export from India to Yugoslavia include linseed oil, castor oil, hydrogenated oil, certain essential oils, shark liver oil, certain chemicals, mica, manganese ore, shellac, artificial leather, rubber tyres and tubes. Exportable goods from Yugoslavia to India include certain chemicals, explosives, polyvinyl moulding powders, certain dyestuffs, wood-pulp, paper and cardboard, asbestos manufactures, and a wide range of industrial equipment.

Glass Industry 'Must Attack'

MOVING the adoption of the annual report of the Glass Manufacturers' Federation, held in London, the president, Colonel C. E. Ponsonby, said the past six years had seen the greatest activity ever experienced in the British glass industry. Production of glass containers, for example, had risen from 17,000,000 gross a year to a peak production of 25,000,000 gross. Last year the total exports of glassware was worth £12,000,000.

The theme today, however, was competition, not only from competitive materials, but from foreign producers. The executive committee was well aware of the dangers of rising costs of production and action to counter the spiral of inflation had been the overriding feature of the past year's work. No longer on the defensive, the industry must go out and attack.

On the proposition of Colonel Ponsonby, Mr. E. A. S. Alexander was elected president.

South African Newsletter

FROM OUR OWN CORRESPONDENT

SOUTH African Minerals Corporation, in its report for the September quarter, states that the rate of production of chrome ore, both in the lump form and as concentrates, is being maintained. During the quarter rail transport was severely restricted, but since the beginning of October additional rail facilities have been available.

The tonnage of manganese ore hoisted at the mine has been increased considerably in the past five months by the use of mechanical equipment, and approximately 30,000 tons of ore is awaiting sorting. It is hoped that the labour force will be increased considerably, and that with the help of the mechanical sorting aids now being planned the bottleneck in sorting will be removed.

* * *

As the potential production of tin in the Union is now in excess of the country's requirements, arrangements have been made to export part of the Rooiberg Mineral Development Co.'s production of tin concentrates, according to the annual report. A somewhat lower return is expected than would be received if the concentrates were sold to local smelters.

In August, five additional stamps were brought into operation, but a breakdown in a power generator has prevented full-scale operations. The fully developed ore reserves showed an increase during the year of 54 per cent in tonnage, and an overall increase of 16 per cent in value.

Total development footage was 46 per cent above that for the previous year, and about 75 per cent of the footage sampled was again payable. Monthly tonnages during the latter part of the year improved in comparison with the year's average. The profit for the year ended 30 June, 1953, was £338,506, against £343,151 for the previous year, and the balance carried forward was £46,690, against £36,043.

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The Minister of Economic Affairs told the Congress of the Federated Chambers of Industries in Durban that purchasing power in the internal markets had grown, creating conditions favourable to healthy industrial expansion. It was likely, therefore, that a number of industries established during the

past five years would prove to be sound economic propositions. These undertakings deserved to be assisted if necessary.

Suspended duties could be used as a means of protection. These could be brought into operation on the recommendation of the Board of Trade and Industries when required, without recourse to Parliament. The Minister of Finance had also to be consulted, and the final decision as to the application of a customs duty rested with him.

* * *

O'okiep Copper Co. reports a net profit of £3,372,162 for the year ended 30 June, compared with £3,269,909 for the previous year. Four dividends of 12s. a share were paid during the year, making 48s. per 10s. share. In the previous year the dividend payments totalled 460 per cent and in the year before they were 290 per cent. The total capital expenditure for the past year was £723,303, made up as follows: mill plants, £132,483; mine plants, £98,287; smelter plant, £21,837; power and general surface plants, £132,053; housing and townsite improvements, £192,835; tungsten mine and mill, £145,808. The last amount completes the current capital expenditures for the tungsten project. By March last the tungsten mill was operating at its rated capacity of 200 tons a day.

On 6 March, 1953, the company acquired the whole of the issued share capital of Klein Letaba Mining Co. (Pty.), Ltd., amounting to 11,500 fully-paid shares of £1 each. O'okiep Company lent the Letaba Company £147,000.

* * *

The chairman of National Match Co. states in his annual review that glass fibre for insulation purposes has been produced successfully in a pilot plant in Johannesburg. Early in 1954 a properly laidout plant is to start production on the company's Pretoria property, to which the pilot plant from Johannesburg will be transferred. It is to be operated by a new company—Universal Glass Industries (Pty.), Ltd. A satisfactory profit was earned by the other subsidiary—Universal Wood Industries, Ltd. The group profit of the National Match Co. was £44,736 after taxation at £17,443, and divi-

dends totalling 20 per cent were declared for the financial year.

* * *

Active exploratory work on the uranium discovery at the Mindola Mine, Nkana, Northern Rhodesia, is being undertaken at a pilot test plant at Nkana in an effort to develop a satisfactory flotation process. An announcement to this effect was recently made by the acting Commissioner for Labour and Mines in the Northern Rhodesian Legislative Council. He said the Nkana Mine management was working in close touch with the Atomic Energy Research Station at Harwell, and recently Dr. Burstall, head of the radiochemical division of the chemical research laboratory there, came over for discussions with technical experts of the Rhokana Corporation.

* * *

A recent report on the production of wattle bark and extract in the Union mentions that output during the second quarter of this year was curtailed because stripping had to be suspended earlier than usual as a result of dry weather. The export trade in wattle products, however, was well maintained by good shipments of extract to Britain, Europe and Japan. Exports of wattle bark were consigned mainly to Europe and the United States. Growers had hoped to resume stripping operations towards the end of September, but the start of the season was delayed by a period of dry weather. Consequently, deliveries to the extract mills have been small up to the present, but it is possible the recent heavy rains may produce conditions moist enough for full-scale stripping to be undertaken in most of the wattle-growing districts of Natal.

In the first seven months of 1953 South African exports of wattle bark were 38,200,000 lb., worth £547,056, as compared with 32,700,000 lb., worth £458,329, for the same period of 1952, but the exports of extract at 121,500,000 lb., worth £4,194,524, declined from the 141,900,000 lb., worth £4,538,513, for the same period last year.

* * *

Randfontein Estate's directors say in a circular to shareholders that the Atomic Energy Board has approved a further expansion of the company's plant for extraction of uranium. This will enable the company to handle larger quantities of slimes which will arise from the treatment of additional tonnages of ore from the Bird

Reef series. The total cost of the uranium and acid project is estimated at £6,541,000, which will be financed by loans. Increased borrowing powers are being sought by the directors.

* * *

Substantial funds for capital expenditure would be required by the Pretoria Portland Cement Co. over the next few years, said Mr. W. M. Frames at the recent annual meeting. He recalled that in 1951 he had drawn shareholders' attention to the fact that much had to be done to complete the modernisation of all the company's factories. The extent and cost of this work was being investigated, and it was certain to be substantial. Furthermore, on the assumption that these conditions would persist, it was expedient that the company should maintain its productive capacity intact. In these circumstances the board considered it prudent to make a substantial appropriation to the fixed assets replacement reserve.

* * *

Cement supplies have been rather restricted in the Union lately, and as a consequence the Minister of Economic Affairs has banned the further export of cement until the position materially improves.

Irish State Nitrate Plant

THE building of a large plant for the production of ammonium nitrate is at present being considered by Irish Government officials and a final check of technical data is at present underway. It is expected that shortly experts will decide whether one of the biggest chemical industries ever planned in the State will go ahead.

If the industry is established it will mean a cut in Ireland's outlay on artificial fertilisers—now averaging more than \$26,000,000 over a three-year period.

Experts say that the cost of the plant will be in the region of some \$6,000,000 and will cover approximately 30 acres of floor space. Peat from Ireland's bogs would be the basic raw material for the projected undertaking.

It is understood that in the event of the scheme coming into being it would be financed by money provided by the Government, and probably operated by a Corporation on the lines of the National Electricity Undertaking and Turf Boards.

Safety in Materials Handling

by **ALEC WEBSTER, M.Sc., M.I.Chem.E., A.R.I.C.**

THE Factories Act classifies liquids as being hot, scalding or corrosive, and this classification could, of course, apply to solids and gases as well. There is but one general principle underlying the handling of all chemical substances which may be regarded as dangerous, and this is that these substances should not be involuntarily allowed to escape the confines of the apparatus or plant, in which they are being handled. Defects in the application of this principle must be the cause of at least 90 per cent of the accidents attributed to the handling of dangerous goods.

Lack of Adequate Instruction

A perusal of the annual reports of HM Chief Inspector of Factories shows that the majority of accidents caused by dangerous substances take place during operations which are ancillary to general manufacturing process, e.g., weekend cleaning, replacement of leaking flanges, cleaning of drums, and similar work. Some of the accidents described make it very clear that the persons carrying out these operations have not usually received adequate instructive guidance before they start.

A reasonable appraisal of some of the snags arising in the handling of dangerous goods can be realised by considering the basic chemical engineering principles involved. For example, if a pipe containing a viscous liquid is to be emptied to have its joints overhauled, it will take quite a time to drain, even after flow has been properly stopped. The basic laws governing fluid flow will give a reasonable clue to the time required, and it seems an obvious precaution that the fitter who is to carry out the overhaul should be told very clearly that under no circumstances must he loosen the flange without taking precautions, until after the lapse of a certain time.

The draining of pipes can usually be facilitated if the pipes are laid at a slope, although it is realised that this is not always practicable. If the job is urgent, the fitter should also be told to put a drip tray underneath each flange and a piece of lead ribbon over the outside of the flange before he starts to loosen it. The wearing of goggles

would then be unnecessary, but it would still be advisable for the man to wear gloves.

It is a usual practice when laying town gas mains to put a syphon box at intervals and, where gases are being passed through pipes and there is a likelihood of condensation, the use of such a syphon box has obvious advantages. It also should be clear from the first principles that, if one has a long length of pipe filled with liquid, one should not have a valve closed at each end, as the strains set up in the pipe due to the expansion of the liquid may cause a fracture.

Leakage from joints in pipes can, of course, be almost eliminated by welding pipes into long lengths, in which case expansion bends will have to be fitted at frequent intervals. It is very doubtful whether one could, or should, lay down a hard and fast rule that all pipes be welded, as some flanges in a long length of pipe are a decided advantage because of the ease of breaking joints for inspection. Generally speaking, a pipe is likely to leak at a flange and, therefore, where pipes cross over walk-ways of any sort, it should be arranged as far as possible that there are no flanges overhanging these walk-ways, as it is almost certain that any

For the fifth time in succession we publish, in the first issue of the month, an article on safety in industrial premises. The preceding articles—on Non-sparking Tools, Safe Floors, Works Fire-fighting Equipment, and Bursting Disks—have been so well received that we intend to publish articles on safety as regular features. Readers who have knowledge of accident control and safety installations are invited to share their experience with others. These communications may deal with any aspect of works safety or accident prevention

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drops of corrosive liquid will fall at the same time as somebody is walking underneath.

When breaking a flange joint, it will often be found difficult to remove the packing, and it is never advisable to replace a piece of packing once removed, as it is almost certain to have been somewhat torn. All these joints must be re-made with new packing and it should be ascertained that this will not react with the liquid flowing through the pipe.

It is a good policy to insist on the regular use of drip trays underneath flange joints. They reduce the cost of floor cleaning and repairing considerably. Regular emptying is, of course, a necessity.

Vessels under Pressure

In dealing with vessels which are under pressure, troubles usually start when it is necessary to bring the vessel to the same pressure as the atmosphere outside, before removing the cover. The rate at which a gas flows through an orifice depends on the pressure forcing it and so, when the vent from a tank is opened, the last stages of the attainment of equilibrium can take some time. It is, therefore, necessary to open the vessel with care (it should be remembered that pressure of 1 lb. per sq. in. is equivalent to 144 lb. per sq. ft.—a pressure probably more than that needed to lift the lid of a vessel).

The procedure should be to ease the bolts just a little, so that pressure equalisation is completed without incident. In the reverse direction when tightening up the lid of a reaction vessel, care should be taken not to tighten the bolts too hard. It is possible without the use of a spanner to tighten a small bolt up by hand until it is stressed beyond its elastic limit, and a certain dangerous condition may arise on this account.

The same remarks, of course, apply to vessels working under vacuum, but there is another precaution which is desirable in this case. It may be that the reaction inside the vessel may have to be carried out in an inert atmosphere and so, if the vacuum is released and air allowed to rush into a vessel, it may be that the presence of the air will induce either an ignition or, worse, a detonation. It may, therefore, be neces-

sary to arrange to do this purging with an inert gas such as nitrogen.

Solid materials present their own handling problems and some apparently harmless materials can be difficult in this connection. For instance, it is fairly well known that employees handling sugar crystals in a bakehouse frequently contract what is called dermatitis, but which may, in fact, be a roughening and rupture of the skin from the sharp edges of the crystals. Powders frequently have to be handled hot and quite nasty burns can result. Again, some materials, for example, sulphur, can be handled in a molten condition but, when in the condition, are extremely sticky and can produce very painful and possibly septic burns. A common example of this type of burn is that from ordinary red sealing-wax.

There is one important point in the handling of materials at or above their melting point, which is the tendency to form solid crusts on cooling, and warning should always be given to all persons concerned that they must, under no circumstances, walk on hot powders.

There is one aspect of work with dusts which has not been given the prominence which it surely deserves. Certain chemicals normally used as medicines are of such a strength that the required dosage is very small and this, in the final prescription, is achieved by mixing the chemical concerned with a large quantity of an inert diluent. This condition is not always realised during manufacture and, unless the ventilation is adequate, it is quite possible for operatives to inhale quantities of these chemicals which are very much in excess of the safe limits.

Dust Retained in Nose

Figures have been quoted showing the size of dust particles which would normally be retained in the nose, and these figures have been obtained with very great care. They, unfortunately, do not take into account the fact that, owing to the prevalence of catarrh, especially in winter, a considerable number of persons are habitual mouth-breathers, and this rather vitiates the value of such work.

Even with the best ventilation, some form of dust respirator is essential for all workers operating grinding plants; not that this respirator should be worn the whole time, but it should be there ready to put on when the grinding machine is opened up for inspec-

tion. When grinding powders, the generation of a dust cloud is almost unavoidable, and it is important that this dust cloud be removed from the general atmosphere of the works, and also should not, if possible, be disseminated into the atmosphere, particularly if the dust is toxic. The use of a cyclone for recovery is not uncommon, and it is a very convenient method.

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It should be remembered that a large number of dusts are explosive and, therefore, any trunking through which dusts are passed and any cyclone should be fitted with adequate explosion reliefs and these should be arranged that the explosion wave is harmlessly dissipated into the open air. This, of course, assumes that there is adequate ventilation, and that the dust is drawn away at the source.

It is usually not difficult to educate an operative into the habit of putting his respirator on when carrying out certain specific operations, but there must be clear instruction on this point at the outset. In dealing with dusts as a general thing, a high regard for cleanliness is very necessary, and the buildings and equipment, especially places like window-sills, should be regularly swept down. Any dust swept up from the floor should, so far as possible, be burnt, and it is quite useful to have a special incinerator for this purpose situated in some remote part of the works yard. The destruction by burning of products of this type is not the kind of work which one would allot to the lowest grade of worker. It usually involves both skill and care.

Gas Leakage

In dealing with gases, it should be remembered that a gas leak cannot usually be seen, nor can it be heard unless the vessel concerned is under considerable pressure. This means that very rigid inspection is necessary at all times to ensure the freedom from leaking conditions. Where gas is passing through a pipe, or is in a vessel which is under a pressure greater than an atmospheric, the gas will tend to leak outwards. If the vessel is under vacuum, a leak will tend to draw air inwards, and this may cause undesirable reactions. These, if any, are more likely to take place in a gaseous medium than in a liquid medium, and it is very necessary to ensure adequate purging. This need not be a very complicated operation, if the basic principles are known and followed.

For instance, the purging of a large gas-holder with carbon dioxide is a relatively simple operation and can be conducted with complete safety. After the gas-holder has been cleaned, it is then, of course, necessary to purge it from air by the same process before running the gas in. Despite the fact that gases are considered to diffuse into one another with considerable rapidity it is well known that certain gases, carbon dioxide being a notable example, will tend to form pockets at low levels. There have been a number of fatalities in brewery vessels due to this cause.

Opening-up for Repair

Any vessel which is opened up for cleaning and repair should be certified to be free of all dangerous chemicals before anyone is allowed to enter it without a breathing apparatus. This is a statutory requirement under the Factories Acts, but the design of the certificate is left to individual choice. Too much care, however, cannot be exercised in the design of such a certificate to ensure that it entirely fulfils the purpose for which it was intended.

While dealing with gases, it may be opportune to consider the vapours of solvents. These are generally heavier than air, and are prone to form pockets at low levels. These vapours will travel great distances; in fact, there is a case on record where ether vapour travelled nearly $\frac{1}{2}$ -mile along the ground before finally coming into contact with an open brazier. The mixture was within the limits of inflammability and flashed back over the whole of the distance from source, causing a serious explosion.

Where such vapours are handled, low level ventilation is essential. If the vapour has an upper limit of inflammability, it is generally assumed that, outside this limit, conditions are quite safe. Such an assumption is reasonable, but it should be remembered, in handling an atmosphere containing a concentration of vapour greater than the upper limits of inflammability, that, should one stop the supply of the mixture and continue pumping, the concentration of the vapour will, in time, be within the inflammability limits.

Probably the best protection for both the plant and the personnel using dangerous

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chemicals is the principle of planned maintenance which, in effect, means that the plant is overhauled and repaired before repairs are vitally necessary. No opportunity should ever be lost to inspect the interior of a tank and this inspection should be extremely thorough, and should always be preceded by a proper cleaning of the tank. It is not difficult to arrange for this to be done if the plant is designed with sufficient margin to enable the vessel to be taken out of service for a day or so now and again.

Even though it is not in accordance with the plan, should there be voluntary stoppage of a continuous plant, there is no reason why inspections should not be carried out before the plant is re-started. These inspections would, of course, be additional to those made necessary by the nature of the repairs.

Another 'must' in this connection is to ensure that each operation, including maintenance, is adequately covered by operating instructions, and the personnel carrying out

this maintenance should be fully conversant with what must be done.

When selecting respirators for use in an atmosphere containing dust, it is necessary to ensure that the respirator is adequate enough to give the required degree of protection and that its resistance to breathing is not so high as to be fatiguing in wear. The official test in this connection is extremely stringent, probably more stringent than may be necessary, and there are very few types of respirators which actually pass this test.

The question of protective clothing is a very real, and also a very vexed, one. Protecting clothing is not usually comfortable. In fact, a recent advertisement for one type of respirator rather epitomises the whole position by stating that 'our respirators are as comfortable as respirators can be.' Generally speaking, the aim should be to dispense with the wearing of protective clothing, except for certain work where this may be regarded as an absolute essential. This is mainly concerned with maintenance, and includes such operations as breaking joints, blanking-off flanges, and similar work.

IMPROVEMENT IS POSSIBLE— —CONSTANT VIGILANCE IS NEEDED

AT a recent inquest at Huddersfield on Henry William Rowan (38), chemical process worker, of 3 Hollin Avenue, Marsh, Huddersfield, when a verdict that death resulted from malignant growths in the bladder which could have arisen from the man's contact with β -naphthylamine, was recorded, the borough coroner, Mr. S. Lister, said that it was highly probable that the growths were caused by Rowan's occupation.

Mr. Alexander Y. Livingstone, chemist at Imperial Chemical Industries Ltd., Deighton, Huddersfield, said that during Rowan's 14½ years with the company he would have been in contact with β -naphthylamine for about 9½ years. He added that the factory had now discontinued the manufacture and use of this substance.

Mr. F. B. Webb, solicitor for I.C.I. Ltd., in a reference to Rowan's complaint, said that he understood that carcinoma of the

bladder was now scheduled as an industrial disease. The coroner commented: 'I have had no notice of that at all. I don't know about it. We won't take it for certain that it has been scheduled. If it has, it will save a lot of work.' (N.B.—As stated in THE CHEMICAL AGE, 1953, 69, 1218, papilloma of the bladder has been added to the list of diseases prescribed under the Industrial Injuries Act by regulations made by Mr. Osbert Peake, Minister of Pensions and National Insurance, with effect from 7 December last.—Editor.)

* * *

WHILE working at the works of the Yorkshire Rolling Mills, Ltd., Low Moor, Bradford, on 21 December, a worker fell feet first into a 3 ft. deep tank of boiling caustic soda, the caustic soda splashing on to his chest and face as well as on to the face of a colleague who stood nearby. Before either

this colleague or the foreman of the descaling department who also stood nearby, could rush to the assistance of the unfortunate man, he climbed from the tank and went running 200 yards through the works into the open air shouting for help. He was bleeding from the face, body and one leg. It took four men to hold him down while they stripped him and then hosed him with fire hoses. He was then wrapped in blankets until the ambulance arrived. He had sustained burns to his left arm and left leg, and his conditions was later stated at Bradford Royal Infirmary to be 'fair.'

* * *

ON the ground that her action was raised outside the time limit of six months laid down by the Public Authorities Protection Act, 1893, Lord Hill Watson recently rejected a claim for damages in the Court of Session by the widow of a Dundee workman against his employers, Angus County Council.

As stated in THE CHEMICAL AGE, 1953, 69, 962, Mrs. Betsy Gibson Mackie claimed £4,000 from the county council who employed her husband, Robert Mackie, for about 26 years until June, 1951, as a motor driver, his duties for some years before that date consisting of loading and driving road materials from Longhaugh Quarry, Angus, to roads nearby.

She alleged that he frequently came into contact with tarred road metals and tar fumes, as a result of which he contracted a skin condition which resulted in his ultimate death.

Giving his reserved judgment as stated above, Lord Hill Watson said it might well be that if the action were brought under the appropriate English statute it would be maintainable.

* * *

There was a slight outbreak of fire at the premises of the Scottish Tar Distillers Ltd., Maryhill, Glasgow, on 25 December, when a vapour explosion occurred in the flues after a break in the pipe-still distillation plant. The plant contained about 1,000 gal. of tar in coils. Workmen saw flames leaping up from the brick setting, which they sprayed with foam and water, so preventing the fire from spreading. The plant was in course of being closed down for repairs.

* * *

TWO men lost their lives on 28 December in a 12-ft. deep lime kiln at the quarries of

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the Bothel Limestone Company, between Cockermouth and Wigton, Cumberland.

John Simpson, aged about 50, was overcome by carbon monoxide from the kiln and was seen to fall head first through a man-hole. A fellow worker, Ernest Lomas, aged about 30, tried to rescue him by climbing down an iron ladder inside the kiln, but he, too, was overcome and died.

Deputy Chief Fire Officer D. Woods and five others from Workington fire station went into the kiln in relays, wearing breathing apparatus. They tied ropes round the bodies and brought them to the surface. During their efforts, Mr. Woods, Station Officer A. Fraser and Leading Fireman T. Hagan, were overcome, but recovered after medical treatment.

Two other workmen had unsuccessfully attempted to help Simpson before Lomas went to his aid. The accident occurred at the end of the day's work when the kilns were being loaded to burn all night.

* * *

A WORKS accident might not have happened, but for the noise of machinery, the Stockton Deputy Coroner said at a recent inquest. A verdict of accidental death was returned on a fitter killed during the dismantling of a stack at I.C.I. ammonia works, Billingham.

It was stated that the lifting tackle broke under the strain and the stack toppled over. The rigger in charge of the job admitted that he had under-estimated the weight of the stack, but said he had told the men to stop while he fetched additional gear. He felt sure that they had heard his instructions, but there was a lot of noise at the time.

The tackle was sufficiently strong to have withstood the weight of the stack, if it had not suddenly been jerked. A maintenance fitter gave evidence that he had seen one of the other men rocking the stack to and fro until it came away with a jerk, when the tackle gave way.

* * *

NAPHTHALENE from nine storage tanks capable of holding 10,000 gal. caught fire on 22 December at the Mirvale Chemical Works, Mirfield, after what a fire-brigade officer described as an 'explosive ignition' of vapour.

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The tanks were part of a refining plant, which also contained a distillation tower, two heat exchangers and a flash pan. The heat of the fire melted the seals of the tanks, and as the contents ran out they too ignited. Eighteen men were on night shift, but none was hurt.

Firemen had the blaze under control in about an hour. Although the fire was a serious one, it is believed that the total damage will not prove too great, and it is unlikely to interfere considerably with production.

* * *

IN the House of Commons recently Mr. H. Wilson asked the Minister of Pensions and National Insurance whether, in the light of evidence given at the inquest on a man who lived at Prescot and death certificates of other persons which had been handed to him, he would hold an inquiry into the incidence of cadmium poisoning in the copper refining industry at Prescot, with a view to the scheduling of cadmium poisoning as an industrial disease.

Mr. Peake replied that benefit could be claimed for acute cadmium poisoning as an industrial accident. The question whether the continued absorption of cadmium in industry could cause a chronic form of cadmium poisoning was under investigation by the Medical Research Council.

* * *

A CONTINUOUS campaign of the Manufacturing Chemists' Association to reduce accidents was agreed upon by the General Safety Committee of the American Manufacturing Chemists' Association at a meeting in New York on 10 December. Fire prevention was one of the important subjects discussed at the gathering. Reports were heard on various activities of the committee, including a summary of progress on a publication called a 'Guide for Safety in the Chemical Laboratory.'

* * *

THE Royal Society of Arts offers the following prizes during the year 1954:—

Benjamin Shaw Prize for Industrial Safety.—The Benjamin Shaw Trust was founded in 1876 'for the promotion of improvements in all matters relating to unhealthy and dangerous occupations,' a subject in which the Royal Society of Arts

has taken a practical interest ever since its foundation in 1754. A prize of £20 is offered in 1954 in accordance with the terms of the Trust 'for any discovery, invention, or newly-devised method of obviating, or materially diminishing any risk to life, limb or health, incidental to any industrial occupation, and not previously capable of being so obviated or diminished by any known and practically available means.' Entries may be in the form of descriptive essays or models.

Fothergill Prize for Fire Prevention or Fire-Fighting.—Under the Fothergill Trust (established by the will of Dr. Fothergill in 1821) a prize of £20 is offered in 1954 for a descriptive essay or model embodying some new idea for the prevention or suppression of fire.

Entries for these prizes must be received by the Secretary of the Royal Society of Arts, 6/8 John Adam Street, Adelphi, London, W.C.2, not later than 31 July, and must be clearly marked with the entrants' name and address and the prize for which they are submitted. Essays must be typewritten.

Corrosion Testing Course

BEGINNING on 6 January next, a course of seven lectures on 'Some Aspects of Corrosion Testing,' will be given on Wednesday evenings at Northampton Polytechnic, St. John Street, London, E.C.1. Each lecture will begin at 7 p.m.

6 and 13 January: 'General Principles of Corrosion,' by Mr. S. C. Britton, M.A., of the Tin Research Institute.

27 January: 'The Preparation of Specimens,' by Dr. F. A. Champion, Ph.D., A.R.C.S., F.I.M., the British Aluminium Co.

3 February: 'The Atmospheric Corrosion of Uncoated Metals,' by Mr. J. F. Stanners, B.Sc., British Iron & Steel Research Association.

10 February: 'The Immersed Corrosion of Uncoated Metals,' by Mr. G. H. Botham, B.Sc., F.R.I.C., the A.P.V. Co. Ltd.

17 February: 'Tests for the Selection of Protective Coating,' by Mr. S. C. Britton.

24 February: 'The Assessment of Corrosion,' by Dr. F. A. Champion.

The fee for the course is £1 11s. 6d. Fuller details are obtainable from Dr. J. E. Garside, head of the department.

Water Purification

Reverse Flow Washing of Sand Beds

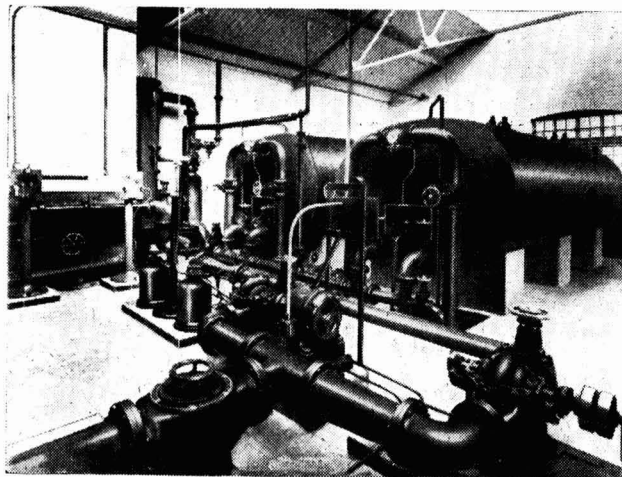
UNTIL a few years ago the large-scale filtering of water was usually carried out on the slow sand or gravity principle, in which the water was allowed to flow through a bed of sand. This was cleaned by hand methods, that is, wheeling away the dirty sand and returning it to the bed after washing. However, it was a tedious and lengthy cleaning procedure, and the method almost universally employed today is to use a reverse current of water introduced by a pump and assisted by high pressure air from a steam driven air blower or motorless air compressor. The high pressure air violently agitates every part of the filtering medium and loosens the adherent impurities, which are drained away in the washing water through an outlet pipe.

Interesting in this connection is the water purification plant of the Pulsometer Engineering Co. Ltd., of Reading, which consists essentially of a closed metal cylinder or cylinder containing a sandy medium, cleaned by blowing compressed air up through the filtering medium. Equipment of this kind is used extensively for swimming baths, drinking water supplies, and general industrial purposes.

A typical installation is at West Bromwich Swimming Baths, for three baths treating 258,000 gallons of water in four hours, and consists of two horizontal duplex elliptical filters, each 19 ft. in length, designed so that one filter can be washed at a time.

Courtesy Pulsometer Engineering Co. Ltd.

Pumps installed at West Bromwich swimming baths



Two horizontally split casing pumps supply the water for the filters, and the installation includes an aerator and a hydraulic air pump, the latter being fitted into the filtered water main leading to the aerator. Two coagulant reagents are injected by means of parallel feed chemical gear, and there is also fitted a flow meter to show the rate of chemical injection.

In the industrial field, one typical installation which may be mentioned consists of two batteries of filters, each with a capacity of 24,000 gallons of water per hour. The water is pumped from neighbouring river and contains a large amount of suspended matter, often discoloured. The lower battery, first installed, was supplemented by a second battery built on a raised platform above, owing to the expansion of the works and the shortage of ground space. The high pressure air used to clean the filter beds is reduced to 5 psi. to prevent ejection and waste of the filter medium by careless manipulation of the filter valves. The water is filtered at fairly high pressure, the shells being tested to 100 psi. to afford ample cover for any contingencies likely to arise on the site.

An advantage of filters of this type is that they can be quickly and thoroughly cleaned without removal of the filtering medium, while there are no internal mechanical movements and they will work with a few feet head, and can also be arranged to work under pressure. Additional advantages are easy sterilisation of the filter and filtering medium, low cost of upkeep, and relatively small space required for installation.

Synthetic Rubber Imports

Applications for Licences

THE Board of Trade are now prepared to consider applications for licences to import, during the period ending 30 June, 1954, relatively small quantities of synthetic rubber from dollar sources for all purposes, including general use on the home market. Until now licences have been issued only when the use was considered essential (e.g. for export or defence orders).

Applications for licences to import the following during the first half of 1954:—

(a) high styrene copolymers other than for use in footwear soling;

(b) GR-S other than for the manufacture of tyres;

(c) butyl other than for use in the manufacture of inner tubes;

should be submitted on Form ILB/A and be accompanied by the following information (where appropriate):—

(a) stocks held at the time of application;

(b) stocks expected to be held at the end of June, 1954;

(c) quantity required for consumption purposes in respect of Government and Defence Contracts (giving contract numbers and quantities required against each contract);

(d) quantity required for the manufacture of goods for export to dollar countries;

(e) quantity required for the manufacture of goods for export to non-dollar countries;

(f) quantity required for the manufacture of goods for dollar saving uses on the home market;

(g) quantity required for general home uses (giving full details).

Applications should describe the technical purpose for which the material is required. Where importers submit applications in respect of the requirements of several customers the above information should be supplied for each customer's requirements separately. All such applications should be submitted to the Board of Trade through the Ministry of Materials, and should reach Branch 1A, Ministry of Materials, Horse Guards Avenue, London, S.W.1 (Room 9380), by 14 January.

Applications for licences to import the following:—(a) neoprene and nitriles; (b) high styrene copolymers for use in footwear soling; (c) GR-S for manufacture of tyres; (d) butyl for the manufacture of inner tubes; (e) any other types of synthetic rubber not

mentioned in paragraph 2 above, should be submitted direct to the Board of Trade. They should be made on Form ILB/A, and should be addressed to the Import Licensing Branch, Board of Trade, 43 Marsham Street, London, S.W.1.

Copies of Form ILB/A can be obtained from the Board of Trade at the address given above or from any Regional Office of the Board.

Next Week's Events

TUESDAY 5 JANUARY

Institution of Chemical Engineers

London: Geological Society's rooms, Burlington House, Piccadilly, 5.30 p.m. The George E. Davis Memorial Lecture by Norman Swindin.

Institute of Metals

Oxford: Cadena Cafe, Cornmarket Street, 7 p.m. G. E. Gardam: 'Industrial Methods of Electroplating.'

WEDNESDAY 6 JANUARY

Institute of Metals

Birmingham: The University, Edgbaston Road, 10.30 a.m. Informal discussion: 'Lubricants for Metal-working Operations in the Non-ferrous Metal Industries.'

Midlands Society for Analytical Chemistry

Birmingham: The University, Edmund Street, 7 p.m. G. Knowles: 'Analytical Problems of River Pollution.'

Manchester Metallurgical Society

Manchester: Central Library, 6.30 p.m. A. E. De Barr: 'Recent Developments in Magnetic Materials.'

THURSDAY 7 JANUARY

Society of Chemical Industry

Nottingham: Nottingham & District Technical College, 7.30 p.m. B. D. Shaw: 'Explosives.'

Institute of Metals

London: 4 Grosvenor Gardens, S.W.1. 6.30 p.m. F. King: 'The Rogerstone Strip Mill.'

Leeds Metallurgical Society

Leeds: The University, 7.15 p.m. A. B. Everest: 'Applications of Spheroidal Graphite Cast Iron.'

. HOME .

Change of Address

Mr. K. A. Spencer, B.Sc. Tech., A.M.I.Chem.E., A.M.C.T., consulting engineer specialising in anti-corrosion measures, including coating specifications and designs of cathodic protection installations, occupies new offices at 19 Grosvenor Place, London, S.W.1. (Tel.: Sloane 4884.)

Rubber Workers' Higher Wages

Day-wage workers in the rubber industry are to receive an increase of 1½d. an hour for men and 1d. for women, following negotiations between employers and four unions representing 85,000 workers throughout Great Britain. In the case of piece workers, the increase is tied to local bonus schemes.

Fertiliser Society Papers

The next general meeting of The Fertiliser Society will be held on Thursday, 21 January, 1954, at 2.30 p.m. in the Tudor Room at Caxton Hall, Caxton Street, Victoria Street, London, S.W.1, when a paper, 'The "Kachkaroff" Process,' will be introduced by M. J. Dior, of Société des Usines Dior and read by M. J. M. Lerolle, of the Compagnie de Saint-Gobain. M. Durand, of Société des Usines Dior, will take part in the discussion. Another paper, 'Flash Roasting' will be given by W. H. Coates, B.Sc., A.M.I.Chem.E., of British Titan Products Co. Ltd.

Labelling of Food Order Amended

Sales of Atholl Brose will be permitted from 1 January under the Labelling of Food (Amendment) Order, 1953. Atholl Brose is a well-known home-made drink in the Highlands of Scotland which is made from malt whisky, oatmeal, honey and cream. Under the Order it must contain not less than 25 per cent proof spirit. The Order also allows flour, national flour, and national brown flour to be sold without a declaration of ingredients, provided they comply with the requirements of the Flour Order, 1953. The same Order removes from the principal Order specific reference to soft drinks, saccharin and sweetening tablets since these are now the subject of separate Standards Orders and are therefore included in the general category of foods the ingredients of which need not be declared on the label.

Abbey Fund Donation

The Westminster Abbey Appeal Fund has received a cheque for £1,000 from the Dunlop Rubber Co. Ltd.

Chemical Exports in November

The value of chemical exports showed a further encouraging rise during the month of November, being £12,182,910, compared with £11,496,156 during October. Figures for the same months in 1952 were £10,914,397 and £10,670,457. The total value for 1953 will, however, be below 1952 figures.

New Fertiliser Plant

Sir John Primrose, Lord Provost of Perth, recently performed the opening ceremony at a new fertiliser manufacturing plant which has been set up at Perth by Joseph Gartshore & Sons, Ltd. The plant has a potential annual output of 25,000 tons.

Phthalic Anhydride Shortage

The President of the Board of Trade was asked by Squadron Leader Cooper in the House of Commons recently whether he was aware of the shortage of phthalic anhydride, which was causing difficulties to synthetic resin manufacturers; what was the reason for the shortage; what quantity was exported during 1953; what quantity had been imported during the same period; and if he would relieve this product of key-industry duty during periods of shortage. Mr. Heathcoat Amory, Minister of State, Board of Trade, replied: 'Growing demand for this material and large scale American purchases in Europe have caused a temporary shortage, which should be ended next year by new capacity coming into production. I regret that figures of imports and exports during 1953 are not available, since this material is not separately distinguished in the trade returns. The possibility of temporary exemption such as was made between 1950 to 1952 is at present under consideration.'

The late PROFESSOR JOHN TRENGOVE NANCE, formerly professor of organic chemistry at Liverpool University, who died at the age of 76, left £17,759 net (duty paid, £2,017).

. OVERSEAS .

Copper Corporation's New Interest

According to a message from New York, Kennecott Copper Corporation has acquired a minority interest in Kaiser Aluminium and Chemical Corporation, the third largest concern in the USA aluminium industry.

Indonesian Rubber

Rubber exports from Indonesia for the first half of 1953 totalled 329,703 metric tons, according to the Central Bureau of Statistics. The monthly average was 54,950 metric tons, compared with 64,787 metric tons in 1952.

Mining in Orange Free State

Values disclosed by developments in the Orange Free State Goldfield have, in general, exceeded those expected from the results of the drilling programme in the pioneering stage of that goldfield, according to Mr. H. J. Joel, the chairman, at the annual meeting of the Johannesburg Consolidated Investment Company recently. Of the 13 mines so far established on the new goldfield, ten have published development figures. These show about 200,000 ft. of development on basal reef. Of this figure, about 120,000—or 60 per cent—was payable. It was a result which could be considered 'extremely satisfactory.'

Japan-Israel Exchange

Israel will export in the middle of January the first consignment of 5,500 tons of phosphate fertilisers to Japan against a consignment of shark liver oil—this was stated in Jerusalem by Mr. Furusaki, representative of the Japanese importers. Another 8,000 tons of phosphates are to be delivered in April against shark liver oil and perhaps fish meat. Further possibilities of barter with Japan include raw material for the plastics industry and non-ferrous metals.

India's Mineral Prosperity

Detailed prospecting for some important minerals and metals is being carried out in certain areas in Eastern India. Minerals containing gold, uranium and some other metals have been found in some parts of West Bengal, Bihar and Orissa. Prospecting is being done by the Indian Bureau of Mines.

New Fluting Paper Mill

Fluting paper is being made from bagasse at Felixton, Natal. Starting with an output of 20 tons of paper a day, the new mill is expected to double its production within the next two years.

Second Largest in the World

Claimed to be the largest aluminium plant in the USA and the second largest in the world, next to Arvida, the Chalmette plant of Kaiser Aluminium & Chemical Corporation is now in full production. Its eight pot-lines with a total of 1,152 pots are estimated to have an annual capacity of 400,000,000 lb.

Expansion in Sweden

Stockholms Superfosfatfabriks AB has decided to increase its share capital from Kr. 30,000,000 to Kr. 45,000,000 (£3,103,000; \$9,000,000) through a new issue. The funds are to be used for a large-scale expansion of the ammonia and nitric-acid factories at Ljungaverk which will double the saltpetre production, and also for a 50 per cent increase in the output of raw material for the plastics industry.

Seventh International Citrus Fair

The seventh International Fair of Citrus Fruits, Essences and Oils will take place in Reggio, Italy, from 15 to 30 March. The exhibition will be in three sections, namely: (a) agricultural machines for the cultivation of citrus fruits and flowers; (b) aspects of sale and transport of the products; (c) machines, equipment and apparatus for the industrial treatment of citrus fruit and essences.

Israel Exports Acid

Under an agreement between Fertilisers & Chemicals Ltd. of Israel, and the Turkish firm of Guvza Fabricalari the Israel firm is to export to Turkey 20,000 tons of sulphuric acid during 1954. The acid will be bartered against 35,000 tons of iron pyrites with a sulphur content of 48 per cent to 50 per cent. The total barter amounts to about \$640,000. Under the agreement, this barter arrangement may be extended for another year, and the extent of the exchange may be increased by up to 50 per cent.

PERSONAL

The engagement has been announced of **MR. JOHN GARNETT HOPKINSON**, elder son of Mr. George G. Hopkinson and the late Mrs. Hopkinson, of Wilmer Field, Heaton, Bradford, and **MISS SHIRLEY ANNE WOOD**, only daughter of Councillor and Mrs. F. S. Wood, of One Acre, Shepley, near Huddersfield. Mr. Hopkinson is a director of Hopkinson & Shore, Ltd., piece dyers and finishers, Brighouse, and of Novello & Co., of Bradford. He is hon. secretary of the Society of Dyers and Colourists. He held a commission in the Navy during the war and later took his M.A. at Oxford University. Miss Wood, holder of a B.A. degree with honours in English at Leeds University, where she is taking a post-graduate course in social science, is business manager to the Leeds University Theatre Group.

SIR EWART SMITH, technical director of Imperial Chemical Industries Ltd., has been appointed deputy chairman of the British Productivity Council. He succeeds Sir Lincoln Evans, who was appointed vice-chairman of the Iron & Steel Board earlier this year and resigned from the council on relinquishing the appointment of general secretary of the Iron & Steel Trades Confederation.

The council of the Institute of Metals has made the following awards of medals for 1954:—The Institute of Metals (Platinum) Medal to **DR. LESLIE AITCHISON**, M.Sc., in recognition of his services to metallurgy in industry, in education and in public service; the Rossmhain Medal to **PROFESSOR ALAN HOWARD COTTRELL**, B.Sc., Ph.D., Professor of Physical Metallurgy, University of Birmingham, in recognition of his outstanding contributions to knowledge in the field of physical metallurgy, with special reference to the deformation of metals.

The board of Gas Purification & Chemical Co. Ltd. has been reconstituted in accordance with the terms of the offer accepted by the requisite majority of ordinary shareholders. **MR. JOHN TERRACE** (chairman), **MR. S. O. STEPHENSON** and **MR. A. JONES** have resigned; **MR. P. R. V. WHEELER** has been appointed chairman, and **MR. P.**

WHEELER and **MR. J. E. BARNARD** have been appointed directors. **MR. E. MCCARTHY** and **MR. J. H. TAYLOR** will remain joint managing directors.

MR. CHALMER G. KIRKBRIDE, president and director of the Houdry Process Corporation, Philadelphia, has been elected president of the American Institute of Chemical Engineers for 1954. Elected as vice-president was **MR. BARNETT F. DODGE**, Professor of Chemical Engineering and head of the Chemical Engineering Department at Yale University. **MR. GEORGE GRANGER BROWN**, Professor of Chemical Engineering and Dean of the University of Michigan, was elected treasurer and **MR. STEPHEN L. TYLER** was re-elected secretary of the Institute.

Four new directors were chosen by the members through a mail ballot to serve for a three year term. They are: **MR. LOREN P. SCOVILLE**, vice-president of Jefferson Chemical Co. Inc., New York; **MR. RAY P. DINSMORE**, vice-president in charge of research and Development at The Goodyear Tyre & Rubber Co., Ohio; **DR. GEORGE E. HOLBROOK**, assistant director, Development Department, E.I. Du Pont de Nemours & Co., Del.; and **DR. W. L. FAITH**, director of engineering, Chemical Division, Corn Products Refining Co., Ill.

DR. C. G. LYONS, vice-principal of Portsmouth College of Technology and head of the chemistry and biology departments there, has been appointed principal of the Flintshire Technical College at Kelsterton. Dr. Lyons won an open scholarship to Cambridge University, where he gained his B.A. in 1927 with first class honours in chemistry, his Ph.D. in 1930 and his M.A. in 1933. He was also demonstrator in the chemical laboratories and supervisor for chemistry in Trinity Hall. In 1931 he was appointed lecturer in the departments of chemistry and pharmacy at Bradford Technical College.

During the war Dr. Lyons was in charge of the analysis section of the Ministry of Home Security research and experiments department, which involved work on bombs and explosives. He became an Associate of the Royal Institute of Chemistry in 1936 and

FRIC in 1939. He has been vice-principal at Portsmouth since 1938.

MR. GEOFFREY W. GREENWOOD, who joined the staff of the Atomic Energy Research Establishment, Harwell, as a scientific officer, last August, has had the degree of D.Ph. conferred upon him for his research in physical metallurgy at Sheffield University. A former student of Low Moor Church Schools and Grange Grammar School, Bradford, Dr. Greenwood obtained an Edgar Allen Scholarship to Sheffield University and after gaining an honours degree in physics was awarded a George Senior Research Scholarship.

DR. V. E. YARSLEY, president of the Institute of Plastics, at a joint meeting of the Midland Section of the Institute and the Co-Polymer Society of Birmingham College of Technology, presented Institute diplomas and certificates of the City & Guilds of London Institute to four candidates who were successful in the 1952-53 examinations—R. BENTLEY, J. W. LANGFORD, R. J. HERBERT and M. J. CAWKWELL.

MR. A. HEALEY, an executive director of Dunlop Rubber Co., Ltd., is retiring early this month after more than 38 years' service with the Dunlop group of companies. He has been mainly associated throughout this period with research, development and production. He became a director in 1942.

At a recent gathering in Glasgow, held to mark the retirement of MR. J. ROBINSON from the position of a joint managing director of I.C.I. Ltd. (Nobel Division), a television set was presented to him by MR. I. MACFARLANE. The gathering was presided over by DR. W. J. JENKINS, chairman of the division. Mr. Robinson joined the chemical industry 46 years ago and after service in Glasgow went to London as deputy sales manager when Nobel Industries was formed.

MR. G. H. LATHAM, chairman and managing director of the Whitehead Iron & Steel Co. Ltd., has been appointed president of the British Iron & Steel Federation as from 1 January. He succeeds SIR ELLIS HUNTER, chairman and managing director of Dorman, Long & Co. Ltd., who has been president of the Federation since 1945. MR. A. G. STEWART has been appointed president elect.

Acting upon medical advice, LORD TRENT is retiring from the chairmanship and from his position as a director of the Boots Pure Drug Company and its associated companies, at the end of January. The directors have invited him to be honorary president of the company of which he has been chairman for over 30 years, and will recommend his election at the next annual meeting. They have elected MR. J. P. SAVAGE to be chairman, and MR. E. R. WALKER and MR. WILLOUGHBY R. NORMAN to be vice-chairmen; both Mr. Savage and Mr. Walker have been with the company for more than 40 years and Mr. Norman for 14 years. LORD SELBORNE will continue as deputy chairman.

MR. E. A. S. ALEXANDER, who has been elected president of the Glass Manufacturers' Federation, is managing director of the United Glass Bottle Manufacturers Ltd. and is the third generation of Alexanders to be connected with the glass industry. He joined the company in 1927 and spent several years at the works before being appointed a member of the board in 1934. He became managing director in 1950.

MR. D. M. YOUNG has been appointed a director of William Briggs & Sons, Ltd.

The Council for Scientific Research have invited DR. R. BELCHER, Ph.D., F.R.I.C., F.Inst.F., Senior Lecturer in Analytical Chemistry, the University of Birmingham, to give a series of lectures in Spain.

PROFESSOR N. F. MOTT, Professor of Physics at Bristol University, has been elected Cavendish Professor of Experimental Physics at Cambridge in succession to SIR WILLIAM LAWRENCE BRAGG, who is taking another appointment. The election takes effect from 1 August next.

Obituary

We record with regret the death of MR. WALTER STEPHEN LLOYD-WILLEY, who for many years has been a director of Thos. Hill-Jones Ltd., Invicta Works, Bow Common Lane, E.3 and had been associated with the company nearly 50 years. Mr. Willey, who was 76, had been ill for several months. He was a fellow of the Chemical Society and the Royal Society of Arts and was assistant managing director of his firm.

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.)

ARGUS CHEMICAL CO., LTD., Dublin. 3 December, equitable mortgage, securing all moneys due or to become due to the Provincial Bank of Ireland Ltd., charged on yard and premises at Pleasants Street, Dublin, held under grant in perpetuity dated 27 June, 1889. *Nil. 31 December, 1951

ALLIED METALS LTD., London, E.C. 18 November, two charges, to Midland Bank Ltd., each securing all moneys due or to become due to the bank; respectively a general charge and charged on equitable interest of the Co. in specified land at Fowler Road, Dagenham. *Nil. 31 December, 1949.

New Registrations

Burniston Chemical Co. Ltd.

Private company. (526,930). Capital £1,000. Manufacturers of and dealers in chemicals and their auxiliaries and derivatives, chemical intermediates, salts, acids, gases, insecticides, germicides, fungicides, chemical and colouring compositions of all kinds, &c. Directors: George W. Burniston and Mrs. Hilda F. Burniston. Reg. office: Albion Chemical Works, Marfleet, Hull.

Paroxite (London) Ltd.

Private company. (526,846). Capital £1,000. Importers, exporters, manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris; machinery and metal merchants, pattern and model makers, chemical engineers; to acquire any patent or invention or secret processes and in particular to acquire a licence from

Societe CACI, of 11 Rue St. Augustin, Paris, to exploit Paroxite and other chemical processes. Directors: Pierre C. Petroff, Victor Szidon, and Ludmila Gray. Registered office: 417 Victoria House, Southampton Row, London, W.C.1.

A. C. Barnes (Pharmaceutical) Co. Ltd.

Private company. (526,620). Capital £1,000. Manufacturers of and dealers in chemicals and chemical substances, etc. First directors to be appointed by the subscribers. Solicitors: McKenna & Co., 12 Whitehall, London, S.W.1.

H. Stride & Sons Ltd.

Private company. (526,834). Capital £100. Salt proprietors and miners, brine owners and pumpers and manufacturers of and dealers in mineral and chemical products of all kinds, etc. First directors are not named. Solicitors: Clifford-Turner & Co., 11 Old Jewry, London, E.C.2.

Rhu Ltd.

Private company. (526,806). Capital £100. Manufacturers of and dealers in chemicals, gases, drugs and medicines, manufacturers and distributors of and wholesale and retail dealers in aluminium, paint, solder, flux lacquers, etc. Directors: Wm. J. Stebbing and Harry O. Ormiston. Reg. office: 65 Balham Road, London, S.W.12.

L. Todd Ltd.

Private company. (526,784). Capital £3,000. Wholesale, retail and manufacturing chemists, druggists, drysalters, oil and colour men, etc. Directors: Mrs. Hilda M. Todd, Mrs. Ethel Yorke and Jas. R. Haworth. Solicitors: J. Bright Clegg & Son, Rochdale.

George Cohen Sinteel Ltd.

Private company. (526,155.) Capital £100. Consultants in the use of metal powders and other similar materials, and in general metallurgical methods of production and in all matters relating to civil, mechanical, electrical, chemical and general engineering, etc. First directors to be appointed by the subscribers. Solicitors: Harris, Chetham & Co., 6 Stratford Place, London, W.1.

Springfield Park Chemists Ltd.

Private company. (526,493.) Capital £100. Manufacturers of and dealers in chemicals, gases, drugs, medicines; chemists, druggists, etc. Directors: Hermann Rubin and Mrs. Joyce J. Rubin. Solicitors: Percy Holt & Co., 2 Brighton Road, Purley, Surrey.

Company News

The Staveley Coal & Iron Co. Ltd.

In the course of a statement circulated in connection with the recent annual meeting of the Staveley Coal & Iron Co. Ltd., the chairman and managing director, Mr. Thomas A. McKenna, recalled that for the past seven years the company had been 'engaged in the toils of nationalisation'—since 1946 in connection with its coal interests and since 1948 in connection with its iron and chemical interests. Following the passing of the Iron & Steel Act, 1953, the shares in the Staveley Iron & Chemical Co. Ltd. passed from the Iron & Steel Corporation of Great Britain to the Iron & Steel Holding and Realisation Agency on 13 July, 1953. The directors of the Staveley Coal & Iron Co. had decided against purchasing the Staveley Iron & Chemical Co. from the Holding & Realisation Agency, 'because after seven years' experience of the frustration and totally uncreative effort necessarily involved in negotiating compensation for your nationalised interests, they doubt whether it would be in the stockholders' interests to reinvest a very large sum of money in an industry which is specifically threatened with re-nationalisation.' The directors recommended a capital dividend to stockholders of £1, in cash, tax free, for each £1 of stock held; also the issue to stockholders of one new £1 ordinary share, credited as fully paid, for each £1 of stock held. Earlier in the statement Mr. McKenna pointed out that of the current year's profit attributable to the group, £1,521,113, taxation absorbed approximately 66½ per cent, dividends 27 per cent and the amount reinvested in the business 6½ per cent. The final dividend was 14 per cent, making a total gross dividend for the year of 22½ per cent, less tax. The bonus share issue was approved at a subsequent extraordinary general meeting.

R.H.C. Reclamations Ltd.

The reconstitution of thermoplastics

scrap and the problems involved in its re-processing have aroused much interest and stress has been laid on the importance from an economic standpoint of reclaiming all available and usable scrap material in the plastics industry as in other fields. Even more important is the application of scientific methods and 'know-how' in order to obtain the maximum value, and most satisfactory results, in the use of the reconstituted material. The formation of a new company making full use of the knowledge and experience gained in dealing with such problems is therefore of topical interest. Under the title R.H.C. Reclamations Ltd. a company has been formed by R. H. Cole & Co. Ltd., which couples their own activities with those of Plasticators Ltd. Management and personnel will comprise the existing members of both companies who have a wide experience of the requirements of the plastics moulding industry, the board of directors being that of the two combined companies. The company's processes will be carried out at the existing plants at 85 Southdown Road, Harpenden, Herts, under the direction of Mr. G. G. Small, who has been appointed technical director. Plans for extensive developments have been laid.

Market Reports

LONDON.—The industrial chemical market have re-opened on the quiet side following the Christmas holiday with interest chiefly centred on contract replacement business, and the end of the year period of stock-taking. Prices generally are unchanged, but buyers are looking for more competitive conditions in the new year. A number of chemicals have been freed from import licensing control. The tone of the coal tar products market remains firm.

MANCHESTER.—Trading conditions this week on the Manchester market for chemical and allied products have, from the point of view of new business, been relatively slow. This, however, is almost wholly seasonal and was generally expected. Traders are looking for an early return to normal trading and are hopeful that the demand for the alkalis and other leading chemicals from the textile trade and other big outlets on the home markets will be maintained at least on the level of recent months, though the difficulties facing exporters are fully recognised.

CLASSIFIED ADVERTISEMENTS

BUSINESS OPPORTUNITY

A LARGE engineering concern in Manchester, of long and well-known repute, has capacity, large and small, to manufacture complete machines, units or installations. Available capacity for immediate use includes Iron Castings, Brass or Aluminium, fitting and erecting and Machining.

Please communicate with **BOX NO. C.A. 3284, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4**, when technical men will be available to discuss any requirements or problems.

SITUATIONS VACANT

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

CHEMICAL ENGINEER required, to take part initially in the development of specialised heat exchangers. Candidates should be qualified chemical engineers, age 25-30, and should preferably have experience in operation of full-scale and pilot plants. Salary will be in the region of £700-£1,200 p.a. according to age and experience. Candidates should apply, giving full details in writing to **DIRECTOR OF RESEARCH, G.K.N. GROUP RESEARCH LABORATORY, BIRMINGHAM NEW ROAD, LANESFIELD, WOLVERHAMPTON.**

LEADING DRAUGHTSMEN are required to work on Chemical Plant design in the Development Department at the Head Office of **FISONS LIMITED** at Felixstowe. Pension, good prospects. Apply to the **PERSONNEL OFFICER, FISONS LIMITED, HARVEST HOUSE, FELIXSTOWE, SUFFOLK.**

YOUNG GRADUATE CHEMIST required for a position as assistant to **WORKS CHEMIST** with **ENGLISH ELECTRIC VALVE CO., CHELMSFORD.** Candidates should have had previous experience or be interested in problems of Cathode coatings. Please apply to **DEPT. C.P.S., 336-7, STRAND, W.C.2.** quoting Ref. 328A.

FOR SALE

CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1880; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE 3285 EAST.**

ONE STEAM DRIVEN VACUUM PUMP by **DAWSON & DOWNE.** Water cylinder 10 in. dia. by 10 in. stroke working at 45 lb. p.s.i. against back pressure 2-3 p.s.i. 120 r.p.m. Unused. **BOX NO. C.A. 3285, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

FOR SALE

C. BARBER, LTD.

- C.I. FILTER PRESS, 25½ in. square, by MANLOVE ALLIOTT, plate and frame type, 13 chambers, arranged for washing. Excellent condition.**
- TWO HYDRO EXTRACTORS, 72 in., by BROADBENT. (One new and unused.)**
- TWO "HORMANN" 30 cm. Stainless Steel FILTER PRESSES.**
- STORAGE BINS** in stainless steel, cylindrical, with covers. 40/12/14/10 gallons capacity.
- CANNON STEAM-JACKETED ENAMEL-LINED PANS, 10 and 25 gallons. All new and unused.**
- DOULTON 25-gallon COPPERS** with lids. **NEW** and unused.
- WELDED VESSELS** of all types, in mild steel or stainless. Fabricated to customer's specifications.
- HYDRO-EXTRACTOR, 26 in., by CHERRYTREE.**

C. BARBER LTD.

**SILVERDALE GARDENS
HAYES MIDDLESEX**

Telephone—Hayes 2735/6

- 8 brand new jacketed STERILIZING VESSELS, 7 ft. long by 3 ft. diam., complete with fittings.**
- 2—18 in. KEK PLATE MILLS, complete with feeders delivery bins, motors and entablature.**
- 9 Worssam ROTARY PRESSES.**
- POWDER DRESSING or SIFTING MACHINES, various sizes.**
- 1 Johnson FILTER PRESS, 36 in. square, plate and frame type, double inlet and enclosed delivery ports.**
- 1 Johnson FILTER PRESS, 47 plates, 32 in. square, centre feed, bottom corner open delivery.**
- Wood FILTER PRESS, fitted 69 ribbed plates, 2 ft. 8 in. square, with top centre feed and bottom enclosed delivery channel.**
- 24 in., 30 in. and 36 in. HYDRO EXTRACTORS, self-balancing, swan-neck type, self-emptying bottom, belt and motor driven.**
- 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.**
- Bennett 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.**
- "U" shaped horizontal jacketed MIXER, 7 ft. long, 3 ft. wide, 3 ft. 3 in. deep, belt and gear driven.**
- 3—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.**
- 1 No. 1A water-cooled CIRCULATOR MILL.**
- 6—Excellent Nickel-lined Jacketed TILTING PANS, 60 gallons capacity and for 40 lb. working pressure.**
- 2—Brand New Enclosed Aluminium TANKS, approximately 11 ft. long by 4 ft. 9 in. wide by 7 ft. 3 in. deep.**
- 5—Excellent Porcelain DISC MILLS.**
- 1—Aluminium STILL, steam jacketed, dished top and bottom; approximately 4 ft. 8 in. diameter by 6 ft. deep.**
- 1—Very fine GARDNER SIFTER and MIXER. Internal dimensions of trough, 5 ft. 9 in. by 24 in. by 28 in. deep, complete with wood-built hopper, elevator, A.C. motor and starter, all in first-class condition.**

**RICHARD SIZER, LTD.,
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FOR SALE

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PROCESS PLANT

LABELLING MACHINE by Rawsons, for pint or 16 oz. size flat or square. Capacity, 24-30 per min. Numbering device. Motorised 400/3/50. Unit mounted on rubber-tyred wheels.

BOTTLE-RINSING MACHINE by Thomas & Hill. Chain conveyor type, 12 ft. centres, double-row bottle fixtures, 132 head. Rotary jet rinsing. Capacity, 150 doz. half or pint bottles per hour. Motorised 400/3/50.

Electric **M**AGNETIC SEPARATOR by H. G. Richardson. Reco type D.83, 180 volts, 1 amp.

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ONE TORRANCE MICRO TWIN-ROLLER MILL. Cast rolls, 14 in. by 8 in. Water cooled. Fast and loose pulley-drive.

TWO DE LAVAL SEPARATORS, VEE-BELT DRIVE. Good condition.

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PHONE 98 STAINES

PAIR "WATSON LAIDLAW" ELEC. HYDROS, 30 in. monel baskets 400/3/50.

"KUSTNER" JAC. VAC. TWIN 'Z' BLADE MIXERS, 20 in. by 19 in. by 16 in. deep.

Three—STAINLESS STEEL PORTABLE TANKS, 275 gall. each.

Two—150 gall. WELDED STEEL JACKETED MIXING PANS, 4 ft. 10 in. deep by 2 ft. 10 in. diam. DITTO, 20, 30, 100 up to 1,300 galls.

UNUSED WEIR CONDENSERS, 105 sq. ft. (brass tubes) area.

CYL. VAC. OVENS, 8 ft. by 5 ft., 7 ft. by 5 ft., 7 ft. by 4 ft. and 7 ft. by 3 ft. diam.

"GARDNER" MIXERS, 5 ft. 6 in. by 2 ft., by 2 ft. 4 in., 5 ft. by 19 in. by 20 in., also sifter/mixers.

50 gall. S.S. GAS HEATED JAC. MIXER, 22½ in. by 36 in. deep.

BOILERS, STILLS, PUMPS, CONVEYORS, DRYERS, AUTOCLAVES, ETC.

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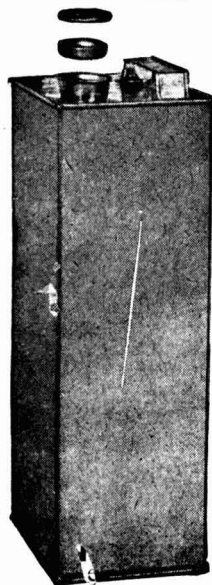
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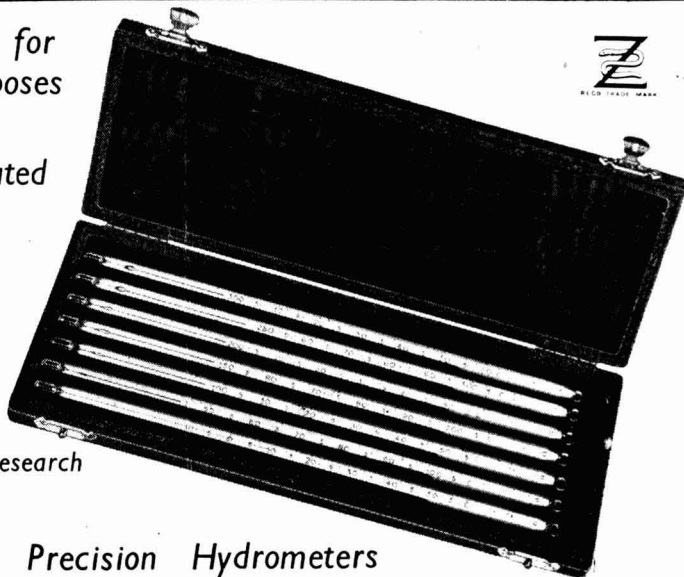
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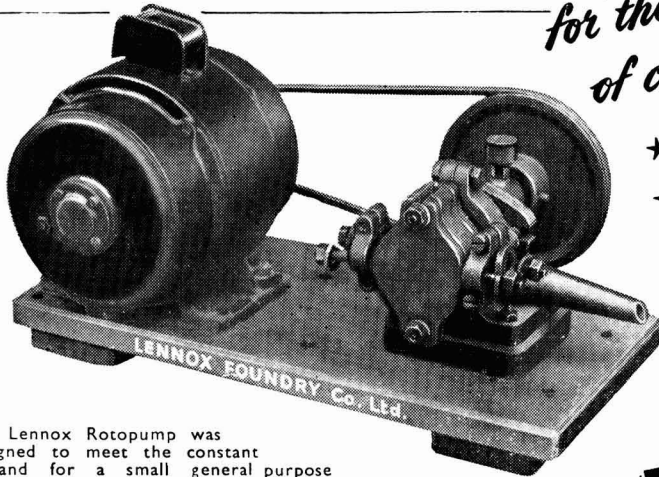
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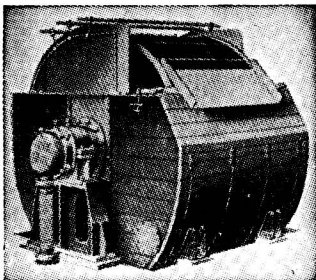
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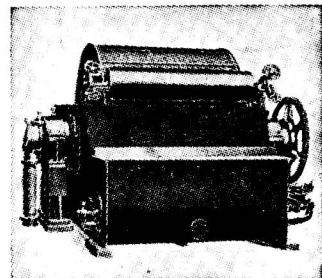
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