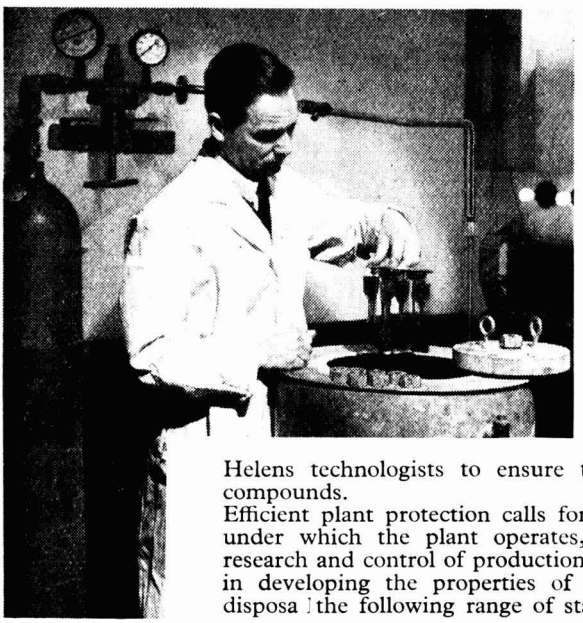
The
Chemical Age

VOL LXIX 25 JULY 1953 No 1776

COMBATING CORROSION



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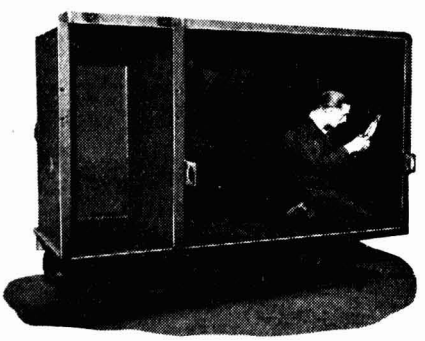

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The
Chemical Age

Established 1919

The Weekly Journal of Chemical Engineering and Industrial Chemistry

BOUVERIE HOUSE 154 FLEET STREET LONDON E.C.4.
Telegrams: ALLANGAS FLEET LONDON · Telephone: CENTRAL 3212 (26 lines)

Volume LXIX 25 July 1953 Number 1776

Water Fluoridation

IN practice the fluoridation of domestic water supplies involves the addition of sodium fluoride or sodium silicofluoride so that the final content of fluoride is (as fluorine) 1 p.p.m. Millions of people live in areas where the natural water contains considerably more than 1 p.p.m. of fluorine, and it was, indeed, through observations that such people, especially in childhood, kept very free from dental caries that a connection between fluorine and carie-incidence was first suspected. An expert committee or mission from this country recently reported upon their studies of fluoridation in North America, where today some 35,000,000 people regularly receive fluoridated water (see THE CHEMICAL AGE, **69**, 82, [1953]). They have concluded that fluoridation is useful for reducing dental caries in North America, and regard it as reasonable to assume that it would also be useful here. In view of the great mass of satisfactory evidence collected and reported, it is surprising that their major recommendation is no stronger than saying that the adoption of fluoridation should be considered here.

Preliminary fluoridation studies with selected communities are suggested as a first step. But before such studies can be started baseline information on the incidence of caries in children and adults in the selected communities and, if possible, in comparable communities as controls must be obtained. This slow and repetitive approach to fluoridation must inevitably delay its significant introduction in the United Kingdom. Must it always be cautiously assumed that biochemical benefits that are surely and safely achieved with Americans may not be comparably achieved with British people? The years that have been spent in group-studies in the United States must now be duplicated here, and probably we shall take longer still to reach the degree of certainty that is now existent there. Admittedly, there is reaction to fluoridation in America—what is called 'mass medication' is vigorously attacked by minority groups of opinion. A Select Committee of the House of Representatives conducted a public inquiry last year and found that a sufficient number of unanswered

questions on the safety of fluoridation exists as to warrant a conservative attitude. We may well anticipate a similarly cautious reaction in political discussions here, perhaps even more strongly expressed in local government debates than in the Houses of Commons and Lords. We do feel, however, that a technical committee should have the courage of technical convictions, and in that sense the British Mission would seem finally to have begged all the questions which the rest of their Report has most admirably answered. The evidence for great dental benefit from fluoridation is overwhelmingly stronger than the nebulous evidence against it. The well-presented appendices to the Report amply demonstrate this.

The enamel and dentine of teeth contain fluorine; the content of fluorine in teeth of people living in areas where the fluorine in water is high is also higher. It is known that the inorganic matter of enamel and dentine is composed of apatites, that is, of complex forms of calcium phosphate. Apatite minerals are also used (as phosphate rock) for the manufacture of phosphatic fertilisers. Into these minerals of the earth's surface there has been considerable infiltration of fluorine during the many centuries of deposition, and it is the fluoride content of these apatite minerals that makes them so insoluble and inactive when used as direct fertilisers. Activating treatments that remove fluorine—acid or heat treatments—must be given. These treatments enable the phosphate to become slowly soluble in weak acids such as 1 per cent citric acid; complete simplification of the phosphate complex actually leads to water-solubility, but this stronger degree of treatment need not be considered here. The essential fact to be borrowed from fertiliser technology is that reducing the fluorine content of apatites makes these minerals more soluble in weak acids. It follows inversely, therefore, that a greater availability of fluorine at the time when enamel and dentine apatite is being formed should lead to enamel and dentine that is more resistant to attack by acids in the mouth. Children's teeth develop fewer caries in areas where (a) natural water is unusually high in fluorine, and (b) town water has been fluoride-fortified. The theory fits also with the widely held view that the cause of caries is the action of acids produced by carbohydrate fermentation.

We believe that the recommendations of the British Mission should have been more forthright, that the evidence already available is strong enough to justify the urgent introduction of fluoridation in at least a number of population centres here. Seven hundred tons of sodium silicofluoride—recoverable from phosphate processing industries—would be ample for all British water fluoridation requirements. Has so much expectable benefit ever been so available from so little?

On Other Pages

The annual subscription to THE CHEMICAL AGE is 42s. Single copies, 1s.; post paid, 1s. 3d. SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3954/5). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784/5). LEEDS OFFICE: Martins Bank Chambers, Park Row, Leeds, 1 (Leeds 22601). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited.

Notes & Comments

New Synthetic Rubber?

AN entirely new type of synthetic rubber was recently announced in Boston at a meeting of the American Chemical Society's rubber chemistry division. It has twice the abrasion resistance as present cold rubbers, and offers high tolerance to oils and oxidation. Also its tensile strength is said to be 50 to 100 per cent greater than any other 'artificial rubber.' The new synthetic is made from ethylene and propylene glycols and adipic acid—these three chemicals produce the polyester base for the rubber. This base is treated with an isocyanate. Details of this process remain secret. Accelerators, vulcanising agents, or carbon black are not required. The name so far used for the rubber is Chemigum SL. The producers, the Goodyear Tyre & Rubber Co., describe it as an elastomeric polyester urethane.

'British Abstracts'

THE news that publication of British Abstracts is to be resumed will be generally welcomed even though some chemists consider that our own services merely duplicate those of the USA *Chemical Abstracts*. It is to the credit of the Government that two grants from the DSIR, one of £7,500 and another described as 'generous,' allowed not only time for bridging the immediate financial emergency, but also helped to create funds for continued publication. Financial help has come, too, from industry. The intervention of the Government is not laudable as an event so much as for its swiftness. It is right that important scientific services such as these should be aided by both the Government and industry. Certainly it is not equitable that their costs should fall wholly or mainly upon scientists' professional organisations. Research is the fount of progress, of national progress and of private enterprise developments, and abstracts are primary tools of research.

Trouble Yet to Come?

THERE have been recent indications in America that the task of abstract publication is causing concern even there. An appeal for more abstractors was made a few weeks ago (*Chem. & Engng. News*, 1953, **31**, 21, 2212), addressed particularly to younger chemists. The fee payable was stated to be relatively small and at $8.00 per page of abstracts no one could dispute the economic comment, particularly when the purchasing power of $8 in America is realistically considered. The editor was able to say that in 38 years he had never had difficulty in maintaining an adequate staff of abstractors: but the widening and ever more specialised fields of chemistry constantly enlarge staff requirements and we suspect that the editor's good fortune may prove in time to be retrospective rather than prospective. More recently (*ibid.*, 1953, **31**, 25, 2160) a new building for the editorial offices of *Chemical Abstracts* has been decided upon. Working space per person will be increased from 30 to 100 square feet. The growing mass of literature has caused congestion in present quarters more than staff increases. All this must add to abstracting costs and we need not assume that cash crises are associated only with *British Abstracts*. It may, indeed, be better in the long run for us to have met our most severe crisis now.

European Potash

OF the major fertiliser materials potash is by far the simplest from a technological viewpoint. It is mined in its useable form, purification and concentration being achieved by crystallisation methods. Processing to alter chemical nature, such as is found in the nitrogen and phosphate branches of the fertiliser industry, is almost unknown. In France and Western Germany reserves of potash are huge, and annual production is largely a matter

of providing the necessary labour and equipment. The post-war plans of the French industry were highly ambitious. Very large increases in output and sales were visualised, but there are now clear signs that this planning was over-optimistic. In 1952 output rose by about 10 per cent, but sales, both at home and abroad, fell sharply. This set-back is perhaps mainly attributable to steady increases in potash production in Western Germany: and output in the Russian zone has always been considerable. The plain fact is that for the existent market the productive capacity of Europe is now dangerously high, and what was once a unified monopoly is a three-cornered international industry in which France, Western Germany and Eastern Germany must inevitably complete.

Market Will Suffer

STEPS have already been taken in France to slow down production. Shorter working hours have been introduced in Alsace. There is not enough optimism left for the expansion programme to be continued, and the problem of the future has shifted to sales departments. However, the formation of the International Potash Institute, based at Berne, is a more enterprising decision than mere contraction. West German and French potash interests have combined in this research project, and it is hoped that sales of potash to countries that at present use little fertiliser will eventually be increased. India and South-East Asia as a whole are particular targets. It is unlikely that the market for potash can be speedily expanded. The history of potash demand shows that potash follows nitrogen and phosphates: it is not until crops have been increased by the use of the other two major nutrients that the further need for potash becomes imperative. The development of British potash deposits in Yorkshire takes on a new aspect against this background. The United Kingdom is one of the biggest markets for continental potash. What would happen if production began in Yorkshire in a year or two's time?

IN THE EDITOR'S POST

Pickle Liquors Treatment

SIR,—I have noted with interest on page 923 of your issue of 20 June a brief mention of an improved method for the treatment of pickle liquors embodying the use of HCl which is constantly re-cycled.

I have noted that you refer to this process as being an American development but I feel that it will be of interest to your readers to know that we are developing a process which appears to be identical to that described. This process was in fact originally of Austrian origin and the world rights have recently been allocated, a large American concern acquiring the rights for the USA while my company has obtained the rights for the whole of the British Commonwealth.

It will no doubt be of further interest to your readers to know that Messrs. Richard Thomas & Baldwins, together with Messrs. Steel Company of Wales, have actively co-operated with us and have, in fact, placed on order a pilot plant installation for their Ebbw Vale works which we are in the process of supplying.

I entirely agree with the claims made for this process, namely, that it is self-generating and that its only by-product is iron oxide. The advantages of this process will be self-evident as far as the steel companies are concerned but of equal importance is the fact that all effluent discharge is avoided and that, potentially, many of the pollution problems affecting our River Boards can be overcome.—Yours, etc.,

G. H. BLACK.
Kestner Evaporator & Engineering Co., Ltd.

Chance Brothers Ltd.

Heavy demand for certain specialised Hysil products, including cathode ray bulbs, has resulted in Chance Brothers Limited, Smethwick, deciding to discontinue manufacture of laboratory ware. It has been ascertained that James A. Jobling & Company, Ltd., are able to meet any additional demands for Pyrex laboratory ware as a result of Chance Brothers discontinuing the manufacture of Blown Hysil and Hysil Tubing.

Dowtherm Heating Systems

A Variety of Applications by Foster Wheeler, Ltd.

IN many industrial processes it is necessary to provide closely controlled temperatures ranging from 200 to 400°. If steam were used with indirect heating to supply this temperature range, exceedingly high pressures would be required and the equipment would be costly to install and maintain. The use of oils having especially high boiling points would make available temperatures of only about 300°, and costs of installation and operation would again be high.

High temperature problems are being successfully overcome by installing heating systems based on 'Dowtherm,' a chemical developed by the Dow Chemical Company some twenty years ago. Dowtherm 'A,' the grade normally used in high temperature processes, has a composition of 26.5 per cent diphenyl and 73.5 per cent diphenyloxide. It is fluid at 12° and has a boiling point of 260° at atmospheric pressure. The vapours have a temperature of 370° at a pressure of only 88 lb. gauge.

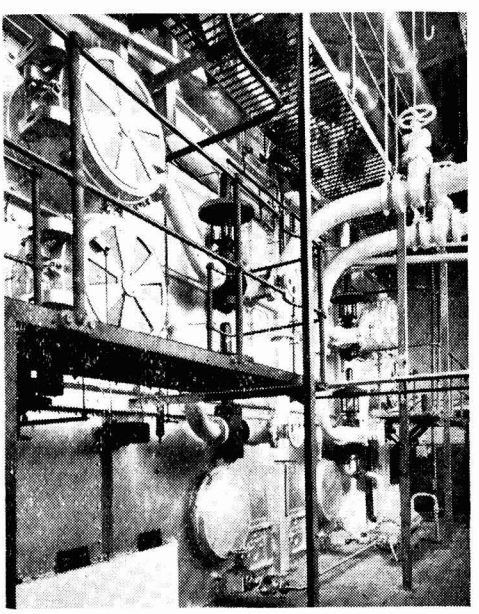
This chemical is non-corrosive and non-poisonous. At room temperature it has a rose-geranium odour, which serves as a highly practical leak detector. At its freezing point contraction occurs, thus removing the possibility of damage to process equipment when shut down in cold weather. Although inflammable, Dowtherm 'A' is not particularly hazardous, the possibility of either the liquid or the vapour exploding being negligible. The liquid has a flash point of about 101°, but cannot support its own combustion at that temperature.

For several years the Dow Chemical Company and the Foster Wheeler Corporation co-operated in developing high temperature installations based on this useful chemical. Recognising that precise application of heat energy in industrial processes involved a complete understanding of the process itself, an extensive research and pilot plant programme was embarked upon. The information so obtained served not only for the design of adequate heating systems, but contributed in many cases to a definite improvement in the efficiency of the process itself.

In Britain Dowtherm vaporisers have been supplied to a number of leading manufacturers by Foster Wheeler, Ltd. This company is widely experienced in the design, fabrication and construction of complete installations based on the Dowtherm system. It is also able to draw upon the valuable fund of pilot plant data and process design, which has been accumulated by its associates in the United States.

For a complete heating system the usual and most desirable arrangement is one employing natural circulation, in which not only the boiler proper but the distribution and return lines operate with gravity return and without pumps. In this arrangement the vapour rises from the boiler to the heated vessel and condenses, and the condensate flows back to the boiler by gravity, thus providing an entirely automatic closed system without any moving parts.

Wherever a reasonable difference in elevation is available between the vaporiser and the process heating vessel, a system based



Two Dowtherm vaporisers, each delivering 11,000,000 B.Th.U. per hour.

on natural circulation is preferable. In some plants, however, the necessary difference in elevation to effect complete natural circulation for the system is not available, and a positive form of circulation must therefore be included in the system. In such cases a small centrifugal pump is provided.

Dowthern systems may be operated under pressure or under vacuum. Even when the system is designed to operate under pressure, it is desirable to include a vent condenser and an ejector in order to free the piping system from air before starting up.

A wide range of standard Dowtherm vaporisers is available For small capacities up to 500,000 B.Th.U./hr. per hour, the vaporisers are usually of the electrically heated shell-type. For larger capacities the units are of the steel cased two-drum type which resemble normal water tube steam boilers in construction.

The two drums are connected by a bank of tubes, some of which line and protect the furnace walls, roof and floor. Baffles are installed in the main tube bank to direct the flow of combustion gases and ensure efficient transfer of heat and positive circulation of Dowtherm within the unit. The vapour generated leaves the upper drum through piping to the process plant, where it condenses. The condensate returns to the lower drum, thus completing the cycle. Vaporisers of this type can be arranged for firing either by oil or gas or by a combination of both fuels. Automatic control of the fuel supply is a normal feature of these vaporisers and ensures that the final temperature of the Dowtherm vapour is maintained at constant pre-determined level.

Safety Devices

A comprehensive system of safety devices is usually installed to protect the unit against low liquid level in the upper drum, a rise in operating pressure, or flame failure in the combustion chamber. These safety devices automatically cut off the fuel supply and give audible and visible warning of the occurrence. The mechanical design is very similar to that of steam boilers, except that special precautions are taken to ensure tight joints throughout the system, in view of the very searching nature of the heat transfer medium.

An indication of the wide scope for Dowtherm heating systems in modern processes is afforded by some typical applications.

Phthalic Anhydride

To meet trade specifications crude phthalic anhydride is normally purified by distillation before sale to the plasticiser or alkyd resin industries. Since the boiling point of the product is 283° at atmospheric pressure, the use of Dowtherm vapour has proved to be the most satisfactory method of heating the still. The vapour is used as the heat source for melting the crude solid charge in a vessel with a heating jacket equipped with Dowtherm heating elements. These elements are so arranged that, as the liquid level drops, the upper, exposed elements may be cut out of service to avoid overheating. A fractionating column, mounted on top of the still, is equipped with a tubular condenser of special design. The cooling medium is maintained at a high temperature in this condenser to avoid solidification of the phthalic anhydride. After the still has been charged, distillation proceeds under a vacuum. Some impurities are removed as a first overhead cut, while the heavy impurities concentrate in the still body as distillation progresses, and are removed as a residue at the end of the operation.

Distillation of Fatty Acids

An improved continuous still for fatty acids, incorporating the use of high-vacuum and Dowtherm heating, has been developed by Foster Wheeler. The crude fatty acid charge stock is introduced into a deaerating and drying zone fitted with cascade trays, where the charge material is heated by direct contact with fatty acid vapours, causing a substantial removal of air and moisture before it passes to the lower part of the chamber, where it is heated further by a tubular Dowtherm heated reboiler. The deaerated and heated stock then flows continuously by gravity to the distillation zone, which is actually a horizontal extension of the vessel comprising the deaeration zone. Here the stock is further heated by a Dowtherm heating element, the vaporised fatty acids passing out to a tubular condenser and the condenser distillate being removed to a product receiver.

The deaeration treatment of the stock removes a small portion of 'light ends,' in which are concentrated odour- and colour-bearing materials, so that this first step results in a distilled final product having improved colour and odour, as compared

with the conventional straight continuous distillation unit.

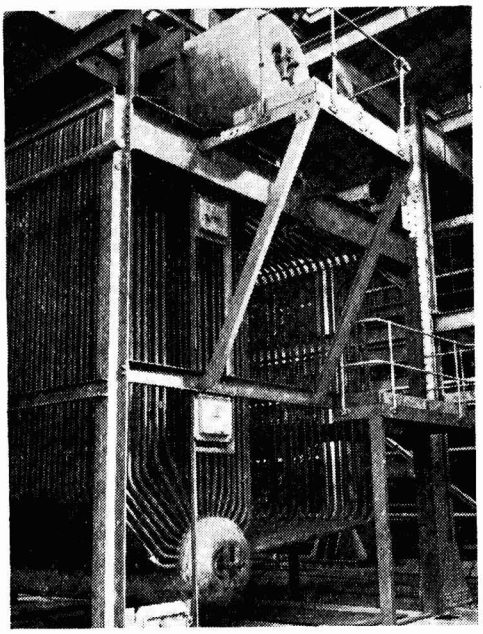
Fatty Acid Fractionation

Fatty acid fractionation as a means of obtaining pure fatty acids calls for higher temperatures than in fatty acid distillation, and since fatty acids are heat-sensitive, being subject to decomposition and polymerisation at elevated temperatures, they must be vaporised and fractionated under high vacuum. An adequate heat input system is also needed to obviate the possibility of localised overheating while vaporisation is taking place The combination of a high vacuum system of sufficient capacity, plus a carefully designed indirect heating system, using Dowtherm, has served in many installations to minimise product degradation and provide smooth operating conditions over extended periods of time.

The feed stock is pumped to a preheater and enters the first column, where a small overhead fraction containing a concentration of odour and colour-bearing constituents is produced. This distillate is condensed and a part is returned to the tower as reflux. The remaining distillate flows into a separator from which it is pumped to storage. This separator is connected with the two-stage air ejector system and a comparatively moderate vacuum is maintained in the first tower.

The unvaporised portion of the charge is drawn from the first tower by a side stream connection, and flows into the main fractionating tower. The heat required for vaporisation is supplied by a Dowtherm reboiler in the bottom of the tower. The overhead distillate containing the remainder of the odour- and colour-bearing constituents is condensed in a specially designed tubular unit, which is connected to the four-stage air ejector high vacuum system. A part of the condensed distillate is returned to the tower as reflux and the remainder flows into the vapour separator, from which it is pumped out of the process, a side stream near the top of the main fractionating tower removing the main fatty acid distillate cut. This distillate is pumped through a cooler to storage.

The unvaporised fraction representing the bottoms in the main fractionating tower is pumped to a final flash tower. Another Dowtherm-heated reboiler provides the necessary heat for the vaporisation of the third overhead distillate. This distillate is condensed and pumped through a cooler to storage. Non-condensibles are withdrawn



Dowtherm vaporiser, capacity 26,000,000 B.Th.U. per hour

by the same four-stage high vacuum unit serving the main fractionating tower. The pitch bottoms of this flash tower are pumped to the lower section of the first tower and are stripped by steam of any volatile fatty acids present. The residue pitch is then pumped from the first tower, through a cooler, to storage.

Continuous Deodorisation

A continuous process for the deodorisation of vegetable oils has also been developed by Foster Wheeler. The products are essentially satisfactory and the operating costs are less than half of the usual batch system.

The raw oil is first pumped through a heat exchanger and thence into the top of the deodorising tower, where it is thoroughly deaerated under a high vacuum. The oil is next heated to the maximum processing temperature by passing it through an external oil heater, receiving heat from Dowtherm vapour as the heating medium. The hot oil then re-enters the tower in the bubble tray section and passes through the trays in a shallow stream.

Low-pressure, super-heated steam is introduced at the bottom of the tower and passes

up through the oil in the bubble trays in a direction counter-current to that of the descending oil. The bubble trays are so designed that the steam completely strips the oil of free fatty acids and other volatiles that cause objectionable odours, tastes and rancidity. The deodorised oil falls to the bottom of the tower and is pumped through the heat exchanger, where it gives up about 60 per cent of its heat to the incoming charge, and through a final cooler to storage.

A high vacuum is maintained in the tower by means of a steam-jet booster ejector and barometric condenser. The pressure drop from top to bottom of the tower is very slight and all the oil is under high vacuum during its entire passage through the tower.

The oil is heated and the steam is superheated by Dowtherm vapour. During this heating the Dowtherm vapour condenses and the liquid returns to the vaporiser by gravity. If superheated steam is not already available in the plant for stripping, Dowtherm vapour may also be used to superheat steam for use in the deodorising tower.

Miscellaneous Applications

In the fractional distillation of mineral oils, where reboiling or reheating of the bottom products is required, and where the oil must be reheated at temperatures ranging from 200-350°, it is possible to use indirect Dowtherm heating to considerable advantage. Where Dowtherm is used for this purpose, the vapour is generated in the Dowtherm vaporiser, and is then used to heat the oil in a shell-and-tube type reboiler. By this method a closer temperature control can be obtained than is possible with direct firing.

This fact might not be apparent in the average temperature as usually recorded, but would be observed if the temperatures at all parts of the tube were measured. The maximum temperature of the stagnant film on the inside of a tube in a direct-fired oil heater may be critical on account of the danger of localised overheating, which may result in partial break-down or cracking of the oil. Due to the fact that Dowtherm is not scale forming, the maintenance costs on the Dowtherm vaporiser would be lower than on a direct-fired still, where periodic carbonisation might require costly shut-down and considerable delays.

Bodied or modified oils give varnish or paint better drying qualities and improve the toughness of the resulting protective film. Linseed, soya bean, tung and other natural drying oils are bodied by heat treatment under controlled conditions. The bodying is a batch operation in which the oil is processed in a jacketed or coil-heated vessel, equipped with a mechanical agitator. Bodying temperatures range up to about 300° and rapid heating is assured by a Dowtherm vapour system. Because the reaction is exothermic, controlled cooling facilities must also be available. A combined Dowtherm vapour heating and liquid cooling system not only maintains a controlled temperature during the bodying cycle, but also cools the finished oil before discharge to storage.

In some chemical processes, where sulphuric acid is used to bring about an intermediate reaction, the final step releases the acid diluted with water. Before being recycled back to the process, the acid must be concentrated by evaporating this excess water. This is accomplished in a Mantius concentrator, a vertical cylindrical vessel with heating elements inserted through its walls. To resist corrosion the elements are made of a high nickel alloy. Under the vacuum maintained, the acid boils at approximately 175° Since Dowtherm vapour supplies the heating elements at 310°, a relatively high temperature difference of 135° is attained. This makes possible the use of a minimum amount of expensive heating surface.

In many chemical reactions involving the use of a catalyst, heat must be supplied during the reaction and, in addition, the catalyst must be reactivated periodically. The heat generated by the reactivation process may be recovered by a system employing a liquid Dowtherm circulating system, supplemented by a Dowtherm vapour heating cycle. In this case, one catalytic reactor is 'on stream' while the other is 'off line' being reactivated.

The system is reversed once each cycle. The reactivation is accomplished in the tubes, with varying amount of steam admitted to control the rate of combustion of the carbon particles contaminating the catalyst. During reactivation Dowtherm liquid circulating through the reactor shell removes the heat generated by this combustion. The resulting heated Dowthern liquid is mixed with the Dowtherm liquid circuit from the operating reactor, thus recovering the heat for use in the 'on stream' reactor.

Organic Sulphur Compounds in Agriculture

Wide Range of Potential Uses

RECENTLY organic sulphur compounds have found applications as herbicides acaricides, fungicides and also as veterinary compositions. It is obvious that the work in search of new insecticides is no mean task in consideration of such problems as phytotoxicity and animal toxicity.

Perhaps the most interesting of organic sulphur compounds utilised in this field are the thiazoles, used as accelerators in rubber mixes, and biologically interesting because of their association with the pyrimidine fragment in vitamin B_1. Thiazole derivatives are noted for their contact insecticidal characteristics, the S- and N- lower alkyl derivatives being toxic to aphides, the S-methyl compound, in addition, having been successfully utilised in the extermination of blow flies.

It has been further observed that the pyridine fragment in such molecules as nicotine, well known as a powerful insecticide, may be successfully replaced by thiazyl fragments (Erlenmeyer and Marbet, *Helv. Chim. Acto*, 1946, **29**, 1946), such compounds as 2-thiazyl pyrrolidine possessing pronounced insecticidal properties. Structurally near derivatives as the 2-mercaptobenzoxazoles are used for the removal of weeds, 2-mercapto-(nitro, chloro or alkyl) benzoxazoles being of particular interest.

Synergistic Fungicidal Compositions

Like the thiazoles, the sodium dialkyldithiocarbamates find use not only as accelerators, but in association with sodium-2-mercaptobenzthiazole are used in fungicidal compositions. The thiazole compound appears to have a synergistic effect on the other component (USP 2,614,957). Other similar compositions include mixtures of Fe dimethyldithio-carbamates with either zinc-2-mercaptobenzthiazole or bismuth 5-chloro-2-mercaptobenzthiazole (USP 2,614,958 and 2,614,960).

Other fungicides are prepared by modifying the S-Na linkage to a *tert*-butylthiosulphenyl fragment, such derivatives as N, N-dimethyl-S-*tert*-butylthiosulphenyl dithiocarbamate being dissolved in 1 to 10^3 parts of inert solvent (USP 2,598,989) such compounds finding use as grain insect repellent (USP 2,621,143). In order to prevent the formation of moulds in oil resisting rubbers, fungistatic ingredients are prepared by admixing sulphur, copper 8-hydroxyquinoline and dithio-bisbenzthiazole (USP 2,608,551).

Other important thiazole compounds having fungicidal characteristics include the trichloromethylsulphenyl alkylidene-2: 4-dithio-zolidonedione, the synthesis being accomplished in an inert solvent in the presence of alkali, by the action of trichloromethysulphenyl chloride on a 5-alkylidene-2: 4-thiazolidinedione. The toxic properties of this molecule, like other halogenated insecticides, probably depend upon the release of HCl *in vivo*, the lyophobic properties being modified by variations in the alkylidene chain which may vary from C_3 to C_9.

Isothiocyanates as Insecticides

Isothiocyanates such as α-naphthylisothiocyanate have been used as fly sprays, and the facile reaction of isocyanates and isothiocyanates with amino and carboxyl groups, such as are present in the proteid mœity, could be regarded as a possible explanation for the reaction of these poisons with the constituents of the living cell. Examples of other insecticides of this class are afforded by the alkylisothiocyanomethyl benzoates (USP 2,620,292) the length of the alkyl group tending to improve the lipoid solubility of the insecticide.

The reaction of the isothiocyanates *in vivo* could be further enhanced, possibly by the judicious selection of both di- and tri-isothiocyanates, which would give cross linked thiocarbamide units distributed along the proteid macromolecule:

$$2\ R.CO.NH.R + SCN.X.NCS \rightarrow R.CO.N.(R).CS.NH.X.NH.CS.N(R)CO.R$$

R = Residual proteid fragment. X = Alkyl or aryl radicle.

The availability of HO, NH_2 and COOH groups in the constituents of the living cell would render such points in their molecules vulnerable to attack by the isothiocyanate molecule. Such substances, found in the

nervous system, as sphingosin, and having hydroxyl and amino centres in the molecule, would *a priori* be readily senstive to attack by the isothiocyanate molecule, the probable toxic mechanism being suggested below.

$CH_3(CH_2)_{12}CH:\ CH.CH(OH).CH(NH_2).$
$CH_2OH + 3\ R.NCS \rightarrow$
$CH_3(CH_2)_{12}.CH:CH.CH\ (O.CS.NH.R.).$
$CH(NH.CS.NH.R).CH_2.CS.NH.R.$

The application of di-isocyanates would tend to institute a cross-linking process with warp and weft attachments, such a mosaic of linkages completely immobilising the biochemical activity of such cell constituents.

The toxicity of such stomach poisons as 2-thio-3-phenyl-5-methyl-tetrahydro-1 : 3 : 5-thiadiazine is suggested as due to the decomposition of these compounds to the corresponding isothiocyanates (Sexton, *Chem. Soc. Quart. Rev.*, 1950, **IV**, 280).

Tetraalkylthiuramsulphides

Tetraalkyl thiuram mono and dis-sulphides have recently been used for the treatment of coccidiosis in poultry, these substances being mixed with S before application (USP 2,610,140), and such near derivatives as the di-xanthates of the formula $(iso\text{ProO.C:S})_2S_2$ have been successfully used as weed killers.

Phenothiazine, although generally recognised as an anthelmintic, has also been applied in insecticidal preparations against leaf eating insects. The toxic action of such compounds is said to be related to interference in the reduction-oxidation systems of the living cell, since these substances readily oxidise to quinones or the appropriate sulphoxide. It is probable for the latter reasons that ultraviolet opacifiers, such as TiO_2 or carbon black, are used to advantage in insecticides containing phenothiazines.

On the other hand phenothiazines can form stable complexes with stannous chloride, exemplified by their use in the stabilisation of natural and styrene synthetic rubbers, and such a tendency to form possible chelated complexes suggests the possibility of phenothiazine complexes with Fe in the pyrromethine fragment of hæmoglobin.

The transformation from the monoxide to the dioxide *in vivo*, may, in conjunction with the possible labile nature of the halogen atom, account for the acaricidal characteristics of the halogenophenylsulphoxide compounds. On the other hand alkyl vinyl sulphones are sometimes utilised as herbicides, and this would suggest that the oxidation products of certain thio and sulphoxide compounds may also be phytotoxic.

Other methods of destroying weeds involve the use of thiophene derivatives such as the benzoylthiophenes (USP 2,634,200) or the corresponding alkyl aryl derivatives. USP 2,631,935 describes phytotoxic compositions composed of thiolacetic esters and monohydric phenols. Certain sulphinic and thiosulphinic acids are claimed to alter the growth characteristics of plants (USP 2,632,698).

Trade with Canada

Official Register of British Products

A NEW and vigorous drive for Canadian/UK trade began on 17 July, with the publication of the 'CABMA Register 1953' —the first officially sponsored directory in which British manufacturers list their products which are available for Canada, and their channels of distribution in that country.

Published for the Canadian Association of British Manufacturers Agencies (CABMA) —parent organisation of the British Trade Centres in Canada—by Kelly's Directories Ltd., and Iliffe & Sons, Ltd., this new, 800-page volume, in six sections, is a complete buyer's guide to British products for the Canadian businessman. It tells him who manufactures and distributes almost every conceivable type of article, and where it can be obtained. The names and addresses of over 4,500 British manufacturers, 2,750 Canadian distributors, and 3,750 British-manufactured articles are listed. Included is a glossary of French-Canadian product terms, and guides to proprietary names and trade marks.

The 'CABMA Register'—which hereafter will be published annually—is produced in collaboration with the Dollar-Sterling Trade Council in Canada, and the Dollar Exports Council, the Federation of British Industries; the Association of British Chambers of Commerce, the National Union of Manufacturers, the Scottish Council (Development and Industry) and the Norhern Ireland Industries Council in the UK.

Rust Prevention by Pre-Treatment

Chemical Installation by a Small Firm

ALL over the world, corrosion is industry's heaviest burden. In Britain alone it costs an annual £200,000,000 (or about £6 per second), and in the United States it is ten times that figure. Obviously, most of the older methods of rust removal and prevention in current use can no longer deal with the problem. Although today wire-brushing and scraping is still universally employed for rust removal, it has three major drawbacks: it takes far too long; it cannot remove deeply embedded corrosion; and it provides no protection against re-rusting.

Normally, the anwer to the latter problem is application of priming paint. Unfortunately, such paint cannot inhibit corrosion unless it is applied to a chemically clean surface—which wire-brushing does not provide. As evidence of this, it is often possible to see on a cross-section of, for instance, a steel girder anything up to six coats of bright priming paint sandwiched between layers of completely corroded metal.

Most Effective Method

Many firms are now adopting chemical pre-treatment, which is becoming known as the most effective and economical method of rust prevention. It comprises three distinct operations: removal of oil, grease and similar contaminants; removal of scale, rust or oxides; and provision by a phosphate coating of a rust proofed surface keyed for paint adhesion.

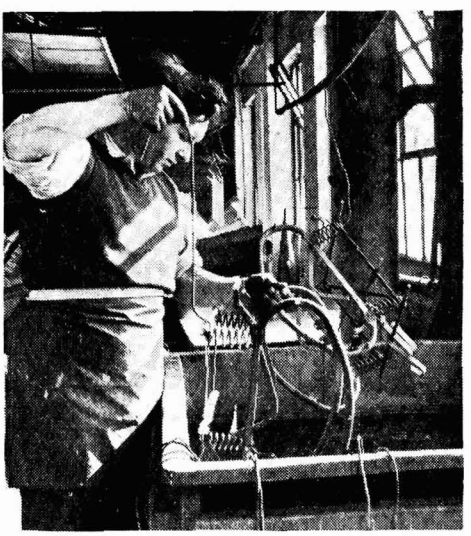
While many of the heavier industries have incorporated installations for this chemical process into their production sequences, it is something of a departure for a comparatively small firm to follow this lead. Such a firm is W. J. Harris & Co., Ltd., of Peckham, who have been well known as manufacturers of baby carriages for over seventy years.

Large supplies of metal are stored in the factory, and prior to initial construction much of it is coated with rust. In 1948 it was decided to employ modern metal pre-treatments to assist in the removal and prevention of rust and the attainment of superior paint adhesion. Tanks for degreasing, rust removing, rust proofing (phosphating) and paint keying were duly installed by the well-known firm of Jenolite Limited.

The metal comprises high-grade tempered steel for the springs of the carriages, the rest of the metal employed (apart from the axles) being flat mild steel. After assembly the chassis and other metal parts are passed to the dipping and painting sheds, where the pre-treatment tanks are lined side by side. The first operation is degreasing in a tank containing a solution of trichloroethylene degreaser heated to meet specific requirements.

After a short drying period, the components are passed to the 'jenolising tank' containing a heated 1 : 2 solution of the rust remover and neutraliser; this is followed by a rinse in another tank filled with the same chemical mixed at 1 : 40. Components take about four minutes to dry, after which they go to the painting booth.

The Peckham factory takes in a considerable number of carriages for overhaul and repairs. Of those pre-heated, very few show any evidence of rust or corrosion. Where the paint film has been broken, rusting is confined to the exposed portions of the metal



After degreasing, the parts are dipped in the first 'Jenolite' tank

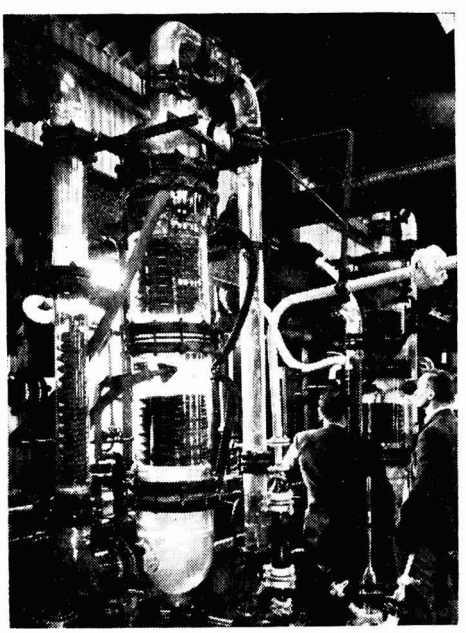
and has not spread under the enamelwork or phosphate coating.

The firm have found that pre-treatment has paid considerable dividends not only as regards superior finishes but also for saving time and labour, while the process adds less than a penny to the overall cost of each complete unit. Such items as motor cars, bicycles and baby carriages must not only be protected from the damage and high costs of corrosion. They must also retain their handsome appearance, for products of this type have a certain social importance beyond their immediate utility.

Chlorination Plant

Modern Use of All-Glass Equipment

OF the many industrial processes which have benefited by the application of plant-scale glass equipment, one of the most important is the chlorination of organic compounds. The development of chlorination as a unit process has, of necessity, waited on the availability of suitable materials for the severely corrosive conditions encountered, and the use of boro-silicate glass by Quickfit & Quartz, Ltd., of Stone (Staffs.) has resulted in notable advances in manufacturing technique.



A Quickfit chlorination plant

Chlorine may be introduced to the organic molecule either additively or by substitution of hydrogen, and, in the latter instance, the liberated hydrogen combines with excess halogen, giving by-product HCl. The presence of this powerful corrosive agent and the need, in many cases, to remove heat of reaction, make the design of chlorination plant a complex matter.

'Quickfit' glass offers complete resistance to chlorine, chlorinated carbon compounds and by-products, and can readily be fabricated in suitable forms for chlorination equipment.

A further advantage of importance in some reactions is the high transmission efficiency of boro-silicate glass in respect to ultra-violet light. Certain chlorinations are accelerated by UV light, and the use of vessels in glass simplifies considerably the application of photo-catalysis of this nature.

The plant arrangement shown in the photograph includes examples from the 'Quickfit' range of condenser type heat exchangers, in addition to glass pipe-line and fittings in various sizes, used as vapour mains. In this instance, chlorination is carried out, using an inert solvent as a vehicle for the organic material, the solvent being vaporised in the reactor to control temperature and to remove excess heat.

The solvent vapour, together with excess chlorine and by-product HCl, is led to the top of, and passed down, a main reflux condenser, having a surface area of 50 sq. ft. The non-condensible portion of the stream is passed to a subsequent stage, high solvent recovery efficiency being effected by a small secondary condenser served by refrigerated brine.

Large-scale glass plants of this type are in widespread use in an extensive range of chlorination processes, which it would be difficult, if not impossible, to carry on in any other freely available material of construction.

Columbite in Australia

Following the discovery of a rich columbite deposit on a sheep station 60 miles from Port Hedland, Western Australia, more than 2,300 acres have been pegged for mining and interest is being shown by Eastern States mining companies.

South African Newsletter

From Our Own Correspondent

FERGUSSONS Goodlass Wall (Pty), Ltd., Jacobs, Durban, have been experiencing a good demand for their Cotolac brilliant quick-drying lacquer, for which, they claim, no undercoating is required, nor is it necessary to rub down between coats, but it has to be applied to a clean dry surface. Where two coats appear to be necessary the second may be applied four hours after the first. It is claimed that this product can be applied to a variety of metal surfaces as well as to cement, concrete, wood, etc., and it is stated to be proof against steam, hot water, oils, greases and acid fumes. The product is also available as a clear varnish. An enamel and clear varnish for use on surfaces exposed to severe weather conditions are being marketed by the same company under the brand name of Elephant Alpine Synthetic Enamel. They dry in about eight hours. Tins containing these new products have the lids painted in the colour of the contents and with the type of product packed.

* * *

The Minister of Economic Affairs recently announced that although the Government allowed considerable relaxations in import control on certain items, abolition of import controls will not be possible in the near future. He said economic unrest throughout the world, as well as the 'inclination towards armament' by the Western nations, were two factors which greatly influenced the abolition or retention of control measures.

The Government was trying, however, to carry out as far as possible the views expressed at the 1952 Commonwealth economic conference in Britain to develop projects which would directly or indirectly contribute to the improvement of the area's balance of payments with the rest of the world. It was also the Government's aim to do away with impediments to the flow of trade between countries, such as import controls and other restrictions. He also emphasised the fact that in most countries there was a scarcity of capital, which affected the local position.

* * *

In its latest annual report the South African Shipping Board states that last year it received representations from the Mossel Bay Chamber of Commerce strongly urging the restoration of the facility of shipping silica rock from the Albertinia district at their own port instead of having to incur the extra expense of railing the material over the longer route to Cape Town for shipment to Europe. The Board made representations to the South African Railway Administration, as a result of which the Administration agreed to the resumption of this traffic through Mossel Bay.

Also during the year it was reported to the Board that UK importers of graphite complained that, owing to the prohibition of the use of jute or hessian containers for the export of minerals from the Union, the graphite export trade was threatened with stoppage owing to the Conference Lines' refusal to accept shipments packed in 100-lb. five-ply paper bags. The Board took up the matter with the South African Conference Lines and trial shipments packed in five-ply paper bags with the innermost inner-ply bituminised were accepted by the Lines. The Board understands that the handling of such bags was satisfactory. No further complaint in this regard has reached the Board.

* * *

African Explosives and Chemical Industries Ltd., are pressing on with their plans to increase the production capacity of the Modderfontein factory for the manufacture of ammonia, nitric acid and ammonium nitrate. When the new plant is in full production, about 150 tons of coke will be used daily, and so that this quality can be handled speedily and efficiently, the human factor is being eliminated as much as possible by the installation of conveyor belts.

The plant is being equipped with special sulphur removal boxes to extract sulphur from the gases. Made of the best reinforced concrete, the boxes are completely gas-tight.

The purification plant has been provided with towers to remove carbon dioxide. Manufactured to very close specification in South Africa, they are the first of their type to be made in this country. As they are over 90 ft. high, it was necessary for the manufacturers to construct them in two sections, which were taken separately to Modder-

fontein for final assembly. They are made of thick steel plating, hand-welded along the inner and circumferential seams, but all the outside seams have been machine welded.

As it was essential for the towers to be of the strongest possible construction, a special stress-relieving furnace was used in the building process. Furthermore, the welded joints were all submitted to X-ray examination by officers of the South African Bureau of Standards.

* * *

The Northern Lime Company, Ltd., one of the companies in the Central Mining-Rand Mines Group, is stated to possess a recently discovered reserve of high-grade primary limestone at Silverstreams, about 100 miles from Kimberley. The deposit is not too far from the railway line. Preliminary boring results are said to have indicated sufficient good limestone to meet most of the South African lime requirements for several decades. The Northern Lime Company is planning to provide one of the latest mechanised lime-burning rotary kiln plants near the Silverstreams deposit, as the quality of this limestone is considered to be particularly suited to calcination in this type of kiln.

When the new plant is installed it will be the first of its kind used in South Africa for burning lime. As the project will involve considerable capital outlay, it has planned to proceed with the development programme in several stages. The first of these should be completed in 1954, when one rotary kiln with an output of at least 100,000 tons of lime a year should be in service. It is planned to manufacture this kiln in South Africa, also much of the other heavy equipment needed, but it will be necessary to import some of the essential machinery. The company has been operating the Taungs lime deposits for about 30 years under the older system of lime burning in the vertical shaft type of kiln in which the coal fuel is mixed with the limestone feed.

As it is intended to proceed with the development of the Taungs deposit, this older method will probably be used alongside the newer methods to be introduced at Silverstreams. By operating the two plants the company hopes to maintain production on the level necessary to meet demand. The first stage in the Silverstreams development programme has been estimated to cost £1,200,000.

Rolfes Ltd., P. O. Box 50, Germiston, have taken over the interests of C. F. and H. Rolfes Brothers (Pty.), Ltd., who have been established in the Union for nearly 30 years as chemical and pigment producers and manufacturers of explosives and blasting accessories. The firm states that several of the chrome pigments shades it produces have been made in conformity with the quality specifications of the South African Bureau of Standards. It is also producing a number of shades to match various popular shades, so that unusual variations can be matched accurately. The company is planning shortly to produce molybdated orange chrome pigments, which are likely to be in strong demand because of superior tinting strength and the brilliancy of the shade

Odourless Plasticiser

MANUFACTURE of an odourless plasticiser which will open up new markets for PVC in the packaging field for foods and tobacco is shortly to be started by Robert Corbett Pty. Ltd., Lane Cove, Sydney, New South Wales.

Known in the trade as DOP, the colourless di-2-ethyl hexyl phthalate plasticiser is in production in the USA, but owing to import restrictions is not available to the Australian trade. It is shortly to be manufactured in Britain and the Australian company has acquired the production technique through its trade links with the British manufacturers. The necessary materials are already manufactured in Australia.

Australian Sulphuric Acid

AT a cost of £A1,000,000, a sulphuric acid production plant is being built at Cockle Creek, New South Wales, for Sulphide Corporation Pty. Ltd., 99 Collins Street, Melbourne.

Instead of sulphur, local pyrites will be used for the manufacture of the acid and it is estimated that the daily output will be 100 tons, enough to make 300 tons of superphosphate. For many years superphosphate has been in short supply in Australia, with adverse effects on agricultural production. In New South Wales last year output was 166,000 tons, compared with the estimated demand of 220,000 tons.

Jealott's Hill Anniversary Celebrated

Speakers at 25th Birthday Luncheon

ON 15 July the 25th anniversary of the I.C.I. agricultural research station at Jealott's Hill was celebrated by a luncheon, attended by many guests representative of all branches of agriculture and industry. Those present included the Minister of Agriculture, Sir Thomas Dugdale.

The toast of 'Agriculture' was proposed by Mr. S. W. Cheveley, chairman of I.C.I.'s Central Agricultural Control, who said:—This is for many of us a day rich in memories, memories of that other day some twenty-five years ago when Jealott's Hill was opened and of the years which have passed so quickly since then. Those of us who have spent more than a quarter of a century on the agricultural side of I.C.I. and who saw the station being formed brick by brick, and man by man, may perhaps be forgiven if today we allow ourselves some small indulgence in emotion and pride.

It was the vision of our founders—Sir Alfred Mond supported by Lord McGowan—which brought Jealott's Hill into being. Mond foresaw the need to bring the full resources of the chemical industry to bear on increasing food production in Britain and the Empire and he found in Sir Frederick Keeble a man of like mind and imagination. Their monument is all around us.

At the beginning the theme of our work was higher production through better use and understanding of fertilisers. But the community of research brought together in I.C.I. soon discovered other products of value to farming, and so we have developed a trinity of effort embracing crop production, plant protection and animal health. Our task is to study the living plant cell, to nourish it and protect it through all its developing phases until it is finally translated into food for man.

British Discoveries

But we have not confined ourselves too closely at home and at all times some of our colleagues are overseas. They go not to find the convenient answer but the right answer for we seek always in research to encourage private enterprise within our own vast private enterprise. This method seems to work for our colleagues have developed new and important techniques for growing and conserving crops, and particularly grassland, and they have given to the world selective weedkillers, methods of controlling wireworm and locusts and a means of combating tsetse fly. These are British discoveries.

I hope this century will be written in agricultural history as the grassland age, the century when Britain saved itself from hunger by developing the resources with which we have been blessed.

Long Trials Necessary

It was about 1925 that T. B. Wood, Stapledon and Keeble in their several ways drew attention to the possibilities of grass; and what we have been doing here is largely an extension of their thoughts. But it has taken twenty-five years for their teachings to find substantial acceptance in farming practice despite the great urgency from 1939 onwards, and we must recognise that any great development in farming requires a long period of trial and introduction. If therefore we believe that within ten or fifteen years we may be more hard pressed for food, now is the time to plan and to act.

Our work which centres around Jealott's Hill and the other I.C.I. Research Stations and farms could never have been done without the help of the farming community. Their record is unique. No call for sustained effort has ever failed to bring complete response from farmers and farm workers throughout the land.

I give you the toast of Britain's basic occupation and surest line of defence—'Agriculture' coupled with the name of the Rt. Hon. Sir Thomas Dugdale, Minister of Agriculture.

Sir Thomas then spoke in response to the toast:—I am greatly honoured by your invitation to me to respond to the toast of 'Agriculture' which was so effectively proposed by Mr. Cheveley, and I must thank him for his kindly references to the holding of the office of Minister of Agriculture.

Before I pass to any wider issues I must make my own bow to Jealott's Hill and the

admirable work which it has done over its 25 years of life. Its reputation is a tribute to the foresight of Sir Alfred Mond—as he then was—and Sir Frederick Keeble, who together did so much for its establisment, and is also a tribute to the many distinguished research scientists who have worked at the Station.

I need not, I think, go over the well-known work which the Station has carried out in many spheres. I see from Sir William Gavin's interesting account of the Station that the list of publications by the staff covers ten pages. There has been the natural attention to fertiliser problems—the properties of fertilisers; their relative effectiveness; the manurial requirements of crops. But the Station quite early on cast its net wider and began to work on grassland management and grass conservation—a development the significance of which we appreciate more and more deeply as time goes on.

Many Problems

Then there has been (to the layman) the rather dizzying work in plant protection products. Here again Jealott's Hill and its fraternal establishment at Fernhurst—I hope I have got the relationship right—have been well to the fore. To quote quite specific examples, the Station gave us benzene hexachloride, which has solved the age-old problem of the wireworm; discovered the first of the so-called hormone weed-killers that have changed so many corn fields from red and yellow to a pleasanter and more productive green; and solved the problem of the 'Teart' pastures of Somerset which had defeated so many workers. And rumours have reached me that the I.C.I. hounds are hot on the scent of the potato eel worm. I am sure all farmers would wish them good hunting.

I must also applaud the way in which the Station has looked beyond the problems of this country to those of the Commonwealth and Empire. The importance of agriculture in those lands can hardly be overstated; but its development meets many serious problems. This country can, in the scientific and technical field, make a great contribution to their solution and it is evident that Jealott's Hill is taking its full share in this work, so necessary for the peace and prosperity of the world.

What all this work at the Station shows—as does our whole experience of the last two decades—is, first, the paramount importance of research and development for our agriculture. Secondly, how valuable it is to have Government and commercial agencies engaged in research activities side by side.

To take my first point. Is it conceivable that the tremendous challenge to our agriculture which the last ten years or so have presented could have been met without the advances in agricultural science which have been made in so many spheres? I think not, and it is in recognition of this fact that the Government, for its part, is continuing to develop research, experimental, advisory and educational services far more widely than in the past. I expect that you will know of the steady growth in the volume of State-aided research. We are doing our best to equip the research institutes with the facilities of buildings and staff which they need.

At the Ministry, we have, moreover, launched out into the new venture of Experimental Husbandry Farms and Experimental Horticulture Centres which will, we hope, link the work of the research stations to practical applications on the commercial scale.

Looking back over the history of Jealott's Hill, one thing that strikes me in particular is the combination of flexibility and tenacity it has shown. Arable crops and grassland, root development in cereals and selective weed-killers, the rotation of crops and animal health have all received attention. Mr. Cheveley asked whether I had any message or task for you. You seem, if I may say so, well able to be your own task-masters, and pretty hard task-masters at that.

'Go on as you have begun'

As to a message, if I gave you one at all it would be: Go on as you have begun, tackle each new problem as it arises, turn your trained minds and tried techniques on to each different aspect of farming as the situation demands and opportunity offers. In short, continue to be as ready as ever to do what politicians are popularly supposed to do, and explore every avenue that may lead to increased agricultural production.

I should like again to express my pleasure at having the honour to be the bearer of congratulations to Jealott's Hill on this occasion, and to give it my heartiest good wishes for its continued prosperity.

Liverpool Borax Completely Re-Equipped

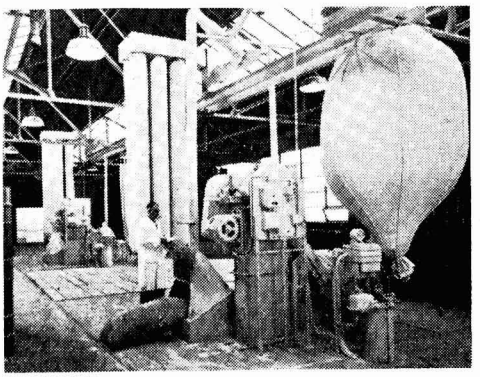
Installation of Modern Machinery

THE old established firm of The Liverpool Borax Co., Ltd., have recently carried out the reconstruction and modernisation of their Liverpool Works, completely re-equipping their plant with up-to-date machinery.

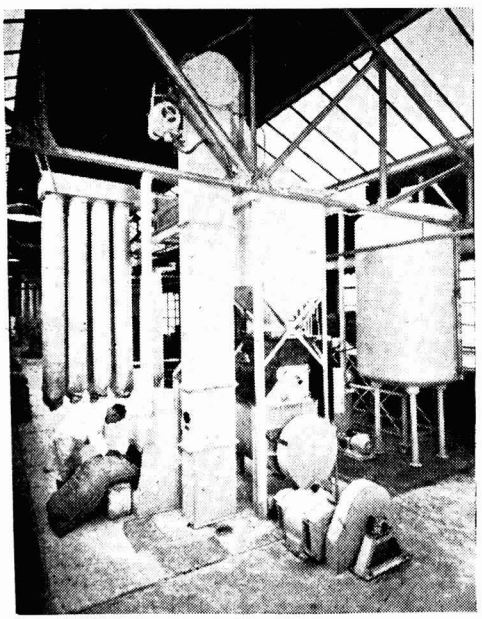
The premises in which the plant has been erected have been occupied by the Company for over 50 years, and these were completely re-built at the end of the last war, on the original site as a two-storey building. Products for their subsidiaries, Feedwater Specialists Company and Andrew Maxwell, are manufactured at this factory.

Feedwater Specialists, as the name implies, specialise in the treatment of water for steam-raising plant and other industrial purposes ('Algor'). It is well known that different formulæ are necessary in this field to meet the varying conditions found in different parts of the world, and the Feedwater Specialists modify these formulæ to suit the individual needs of their various clients.

The Andrew Maxwell subsidiary is mainly concerned with paint cleaning materials ('Veevic'), industrial cleaners for food and dairy industries ('Lamol') and bituminous products and protective coatings ('Rito' and 'Ritolastic'). The Liverpool Borax Co., Ltd., also specialises in products for the wool scouring industry.



View of two grinding plants



Sifting, mixing and spraying plant

Some of their raw materials require to be disintegrated. This is done in a special rotary-tooth breaker situated on the first floor and the material is then conveyed automatically by means of elevators to the mills, situated again on the first floor. From here the ingredients, which are now of a uniform fineness, are fed by gravity to the mixer situated on the ground floor, thus ensuring intimate blending of the different chemicals making up the batch. The finished product is then drawn off into suitable containers.

The mixers situated on the first floor are fed by a feeder/elevator, the material being tipped into this, from the first floor, and elevated into the mixer. Spraying apparatus is arranged so that correct quantities can be added to the mixer. This is done by a series of storage tanks from which the liquid is sprayed into the mixer through nozzles by means of pumps. The final mixed material is then fed by gravity to the automatic fillers situated below

The new factory plant which has been installed has been designed to give maximum economy and efficiency, and the major part has been supplied and erected by Wm. Gardner & Sons (Gloucester) Ltd.

British Radioactive Products on View

Amino Acids Added to Labelled Compounds of Carbon-14

A COMPLETE range of amino acids, now added to the labelled compounds of carbon-14, of which some 80 individual species can be supplied, were offered for sale for the first time on a Ministry of Supply stand where British radioisotopes could be ordered 'over the counter' at the International Congress of Radiology in Copenhagen from 20-25 July.

The stand displayed some of the radioactive products from the Radiochemical Centre at Amersham. Scientific staff from Harwell and Amersham were in attendance to explain and discuss with prospective users the application of radioactive isotopes in various fields of research, particularly in animal and plant biochemistry, in radiotherapy and in industrial radiography.

Three main groups of products were featured on the stand: chemical compounds containing radioactive isotopes—the so-called 'labelled' or 'tagged' compounds; gamma-ray sources for radiotherapy and industrial radiography; and beta-ray sources for medicine and industrial use. Natural radioelements were included in the display, as well as artificial radioisotopes produced in the pile at Harwell.

The complete range of amino-acids to which reference has been made were prepared by biological synthesis. To have them available uniformly labelled with carbon-14, at high specific activity, chemically pure and in the optical form in which they occur naturally, will be a valuable asset to research workers who use tracer methods.

Radioactive Isotopes

The list of labelled compounds of carbon-14 includes aromatic compounds of benzene and naphthalene, which can be supplied containing carbon-14 at high specific activity (i.e. radioactive purity), and several hundred compounds of other radioactive isotopes, such as phosphorus-32, sulphur-35, iodine-131 and calcium-45.

Another aspect of the supply of radioactive materials in which progress has recently been made is in the manufacture of radiation appliances. For many purposes radioactive isotopes, as such, are of little use unless they can be fabricated into safe and convenient sources of radiation. This is particularly true, of course, of applications in medicine and industry, where safety and reliability are most important.

The Radiochemical Centre has developed a series of metallic products in the form of foils, plates and wires which incorporate a radioactive isotope. Many isotopes can be used in this way, but perhaps the most important is the fission product strontium 90, which is now being produced in substantial quantities at Amersham. This, in the form of foils or plaques, provides an excellent source of high energy beta radiation for medical and industrial purposes.

Another new fission product announced is caesium-137, which is likely to become important in industrial radiography.

An entirely new catalogue issued at the exhibition describes some 600 radioactive appliances and compounds made at Amersham, including a number of important materials which are new and have not previously been available in any country. The catalogue is intended as a source of reference to scientists and others interested in radioactive methods.

In the scientific section of the exhibition the Ministry displayed a wide range of electronic instruments developed by the Atomic Energy Research Establishment.

'. . . this Sceptred Isle.'

COUNTLESS people have never ceased to comment on one of the most famous of all books on 'England,' that written by the Very Rev. Dr. W. R. Inge, K.C.V.O., F.B.A., D.D., and first published under its one-word title in 1926. A second edition in 1933 was equally popular and now, in his 93rd year, 'Dean Inge,' as he is still affectionately known, has completed the revision of a book in which he lays bare his hopes and fears for the country he loves. (Ernest Benn Limited, 25s. net). Under the microscope of his brilliant mind he puts the time in which he has lived, and in a clear, forceful and provocative manner examines the problems confronting Church and State today. In a letter to Sir Ernest Benn, the author expressed delight at being asked to revise the text, and added: 'I am very feeble at 92, but I hope not quite imbecile.'

The Chemist's Bookshelf

CHEMICALS OF COMMERCE. By Foster Dee Snell and Cornelia T. Snell. D. Van Nostrand Co. Inc., New York. Macmillan & Co., Ltd., London. 1953. Pp. 587. 48s. 6d.

This volume, it is claimed, contains 'all the principal facts about commercial chemicals from abalyn to zirconium oxide revised and brought up-to-date for handy reference.' There is, however, no index: after reading through 26 pages of Chapter XXIV, 'Esters,' one finds abalyn between glycol phthalate and dibutyl sebacate, and learns that it 'is a mixture of the methyl esters of the acidic components in rosin. It is a thick yellow to white liquid miscible with organic solvents. Industrially it is sold in drums for use as a solvent for natural and synthetic resins and rubber, and in adhesives.' After studying the chapter headings, one comes to the conclusion that zirconium can only appear in Chapter XV, 'Miscellaneous metals and compounds,' where, indeed, it is, together with platinum, tungsten, molybdenum, titanium, uranium, cerium, thorium and thallium, all in the space of six pages.

It is hard, in fact, to decide for whom this book is intended. The manufacturer, however small, will have his price lists and specialist books, which deal, in far greater detail than this volume, with his particular interests. The general chemist will learn nothing that he could not better discover elsewhere, in a small library of carefully selected books. As for the common reader, he could, by dipping into the volume at his leisure, acquire a large number of interesting facts, which might prove of service to him in a chemical general knowledge test, but which would help him not at all to an understanding of the subject. And no references whatsoever are given to sources of further information.

No solubility figures are given; here and there melting and boiling points are given, but some in Centigrade and some in Fahrenheit; and the arrangement of chapters is distinctly capricious. This is another of those abortive efforts, so popular in America, which combine a vast number of almost incompatible facts into an almost incomprehensible whole, too bulky to be sold at a reasonable price, and too incomplete to be worth buying.—B.I.

EXPERIMENTELLE EINFUEHRUNG IN DIE ANORGANISCHE CHEMIE. By Biltz, Klemm and Fischer. 45th-47th impression. Walter de Truyter & Co., Berlin. 1953. Pp. 191. Quarter bound cloth, limp manila cover, DM 10.80.

This introduction to practical inorganic chemistry, which was first published in 1898, has become a well-known textbook in German universities and technical schools. It is not a book on qualitative or quantitative analysis, but it provides a practical course which illustrates in considerable detail the facts and principles of inorganic chemistry.

Language difficulties will put this book beyond the reach of most first-year students, but it will be of help to teachers in designing practical courses. The course covered by the book is elementary but very thorough and it would make an excellent foundation for honours students interested in inorganic chemistry. However, many first-year students find that the facts of inorganic chemistry become much more palatable when they are taught in the framework of a course in qualitative analysis. For these the book will be of little value except for purposes of reference.

The book begins with an excellent section on general laboratory technique. This is followed by a chapter on the simpler non-metallic compounds and a chapter on metals. The experiments are done with the minimum of apparatus and detailed instructions are given to encourage tidy and methodical working from the very beginning. The reactions of the various elements and their compounds are discussed in detail, comparisons are drawn whenever possible and the chemistry of the elements is related to their

position in the periodic table. The last two sections of the book deal with the chemistry of the remaining non-metals and of some of the more common 'rare' metals.

At appropriate points during the course the student is introduced to the theory of acids, bases and salts, normal solutions, ionisation, oxidation and reduction, mass action, equilibria, solubility products, complex salts, etc. These theoretical sections are clear and convincing. When an argument has been oversimplified for the sake of clarity, this is always pointed out in a footnote. It is perhaps unfortunate that the authors do not distinguish clearly between electrovalent and covalent bonds. Thus the sulphate ion is represented as a central sulphur ion carrying a charge of +6 which is surrounded by four oxygen ions each with a charge of −2. This representation is misleading (although it is useful in the discussion of oxidation and reduction) and it is hoped that a subsequent edition will include a brief section on the electronic theory of valency.

The reviewer finds the printing and lay-out unattractive. The material is too cramped for a book of this sort, and the more frequent use of tables and clear subheadings is desirable. However, the book is remarkably free from ambiguities and misprints, and it has an excellent index. It is quite clear that it has gained much from frequent revision in the light of teaching experience. —J.C.P.S.

CHEMISTRY OF CARBON COMPOUNDS. Vol. II. Part A. Edited by E. H. Rodd. Elsevier Publishing Company, London. Cleaver-Hume Press, Ltd., London. 1953. Pp. xxiv + 488. £4 4s.

There can surely be few chemical libraries which are not graced already by Volume I of this series, and few organic chemists who have not discovered for themselves how vast are the benefits, and the pleasure, to be derived from the efforts by Dr. Rodd and his collaborators to provide a modern successor to Richter's 'Organic Chemistry.' In these circumstances, any attempt by the reviewer to describe the general character of the series, or to draw attention to its outstanding features, would be quite superfluous, and he will be content to give some indication of the subjects covered in the latest section, for which the stage has already been set by discussions of aliphatic compounds and of the general principles of organic chemistry.

Volume II deals with alicyclic compounds and will appear in two parts; with the exception of the last two chapters (one of which is contributed by R. F. Hunter, and the other by R. G. R. Bacon), the whole of Part A has been written by R. A. Raphael. Following a consideration of the theoretical aspects of the structure and stability of saturated carbon rings, five chapters are devoted, in increasing order of complexity, to the cyclopropane, cyclobutane, cyclopentane and cyclohexane groups, and to macrocyclic compounds. Then attention is turned to polynuclear alicyclic compounds, containing both separate and condensed ring systems, to spiro-compounds, and to bridged rings.

The carotenoid group has been assigned a separate chapter (written by R. F. Hunter), in spite of the fact that some of the members are of an aliphatic nature and might have been expected to appear in volume I. Likewise, the discussions (by R. G. R. Bacon) of rubber and of the polymerisation of olefinic compounds were postponed, and now appear in the same volume as the terpenoids. This willingness of the Editor to depart, when desirable, from a strictly systematic arrangement facilitates the presentation of compact and reasoned accounts of the main groups of naturally-occurring compounds and is to be commended.

While the student is being shepherded stepwise from simple ring systems to quite complex structures, he will gather confidence and see his horizons widen as new aspects and problems are presented and explained, until finally he will be ready to appreciate the intricacies of the terpenoids and the steroids, which are the topics to be covered in Part B.—E.J.B.

German Fibre Output Increased

During the first half of this year, German output of rayon and perlon were higher by 20 per cent and 40 per cent respectively in comparison with the first half of 1952, according to a statement made at the annual meeting of the Vereinigte Glanzstoffwerke at Wuppertal. Germany is now the third largest producer of chemical fibres after the USA and Japan, providing 9 per cent of world production.

HOME

To Distribute Insulins

Evans Medical Supplies, Ltd., Speke, Liverpool, are shortly to distribute in the UK insulins manufactured by Novo Terapeutisk Laboratorium, A.S.

Selective Weed Killers

The Agricultural Research Council is of the opinion that selective weed killers are saving the country nearly £4,000,000 a year. This was stated by the chairman, Lord Rothschild, at a Press conference arranged to announce the publication of a new booklet, 'The Agricultural Research Service' (2s. 6d., HMSO).

End of Copper Control

The Minister of Supply (Mr. Duncan Sandys) has made an Order to come into operation on 5 August revoking the Copper, Lead and Zinc Distribution Orders. The effect of this Order is that when the London Metal Exchange resumes dealings in copper in August licences will no longer be required for the purchase of any form of copper.

Increased Cement Deliveries

A booklet issued by the Blue Circle Cement Group—the parent of which is Associated Portland Cement Manufacturers—states that in 1952 deliveries of cement from the home works reached the record figure of about 7,000,000 tons—700,000 tons more than in 1951. In the home works alone the group used during the year more than 13,000,000 tons of raw materials, such as chalk, clay and limestone, and more than 2,000,000 tons of coal.

Chemicals in Overseas Trade

Exports of chemicals, drugs, dyes and colours in June were valued at a total of £9,853,226, some £600,000 less than in June, 1952. Figures for ammonium nitrate and sulphate were about half last year's, and copper sulphate also showed a marked decrease. The fall in value of caustic soda exports was largely due to a considerable decrease in demand from the Commonwealth countries, except for India. Total value of exports for the six months ended 30 June, 1953, was £62,648,201, as compared with £75,842,717 over the same period last year.

C

Scottish Electro-Chemical Proposals

No further progress has been made on proposals for an electro-chemical or electro-metallurgical expansion in the Scottish Highlands. Although there is still definite interest in the proposals, the stumbling block so far has been the cost of the power required.

First Full Treatment

Chemical pre-treatment of the entire hull of a Clyde-built ship, internally and externally, before painting has been carried out by a Clyde shipbuilding yard. This is said to be the first ship in the world ever to be so treated in its entirety. The work was carried out by Jenolite (Scotland), Ltd.

New Recreation Field

Employees at the British Rayon Research Association's £1,000,000 centre at Moss Nook, Wythenshawe, will have an 11-acre recreation field adjoining their laboratories by next summer. The land is part of a 25-acre site not immediately needed for building. The field, to cost £5,500, will include cricket and soccer pitches, and later three tennis courts.

Removal of Sulphur in Oils

A new plant to remove sulphur from petroleum products, the first of its kind to be built in the world, is now under construction at Stanlow Oil Refinery. This is a 'hydrodesulphurisation' plant designed to enable the sulphur content of oils to be materially reduced by the new and relatively simple 'trickle-phase' technique developed by Shell. The unit, estimated to cost £1,000,000 and built almost entirely of British materials, is expected to be in operation next year.

Copper Refinery Explosion

Twenty night workers at the plant of British Copper Refiners Limited, Prescot, ran for their lives when the breaking of a furnace tap hole sent about 200 tons of molten copper splashing into the cooling pits last week. White hot copper came into contact with water used for cooling, thus causing an explosion which lifted the glass and asbestos roof of the 400 ft. long building, and flung hot metal into the air. No one was injured.

• OVERSEAS •

Oil Search in Turkey

The province of Antalya, Southern Turkey, is reported to contain rich oil deposits following preliminary investigations by USA oil specialists. Further investigations are being instituted by the Mineral Research Institute.

Australian Uranium

The Atomic Energy Commission Combined Agency has advanced £A1,000,000 for developing the Rum Jungle uranium field near Darwin, Northern Territory, Australia, and is expected to advance a like amount in the near future. It is thought that the field will begin paying for itself next year.

Natural Gas Prices

Now that natural gas price controls have been lifted in the USA, the main producing states, such as Texas, Louisiana, Oklahoma, Kansas and New Mexico, expect a big rise in prices at the well-head. Large pipeline operators who paid 4.61 cents per 1,000 cu. ft. in 1949 were paying an average of 9.43 cents this year, and as a result of the growing demand the price is now expected to reach 15 cents.

Italian Cement Production

As Italian cement production is not expected to cover this year's requirements for the southern half of the peninsula and the Mediterranean Islands, clinker is to be imported to provide the additional 200,000 tons needed. The output of new and enlarged factories, together with increased output from existing factories, is expected to provide for normal requirements later.

Petrochemical Industry in Canada

Canada's petrochemical industry is growing rapidly, the number of plants in operation or soon to be placed in operation being 23, representing a total investment of $216,000,000. This does not include investment in chemical facilities based otherwise than on petroleum and natural gas sources, nor the overall cost of oil refining and natural gas plants providing the basic materials, nor the cost of plants which manufacture finished products based partly on petrochemicals.

Suez Refinery Control

The Egyptian Government oil refinery at Suez is to be controlled by a non-Governmental body, provided the Cabinet approves a law now being drafted by the Minister of Commerce and Industry. The control body will comprise businessmen and possibly representatives of the leading oil companies in Egypt.

USA Ceramics Research

The use of 'cermets'—combinations of ceramic materials and metals, with the best qualities of both—for the construction of nuclear reactors, is being investigated at Oak Ridge National Laboratory, which Union Carbide and Carbon Corporation operates for the USA Atomic Energy Commission. The research programme also includes the study of oxide, boride and nitride ceramics as structural materials; techniques for the application of ceramic coatings to materials used in reactors; and evaluation of the effect of radiation damage on ceramic materials.

ICI Canadian Plant Contract

A contract to fabricate and erect all the structural steel for the new $20,000,000 'Terylene' plant at Millhaven, near Kingston, Ontario, for Imperial Chemical Industries of Canada, has been awarded to the Dominion Bridge Company.

Technical Aid for Japan

Two USA concerns—the Monsanto Chemical Company and Cluett Peabody & Company—have concluded arrangements with leading Japanese interests for the provision of technical aid to the Japanese spinning industry. Japan, in turn, may offer technical and financial aid to textile interests in Central and South America.

Turkish Government & Oil

The Turkish Minister of State Enterprises Bay Sitki Yircali, has announced that an American oil specialist, Mr. Max Ball, has been engaged by the Government to be its counsellor on oil matters. One of his first duties, apparently, will be to draft a Bill to facilitate the work of foreign companies prospecting for oil or wishing to invest in Turkish oil.

• PERSONAL •

Messrs. Kaylene, Limited, have recently appointed MR. R. E. PARKER to their staff as a representative.

The directors of The Brush Electrical Engineering Co., Ltd., announce that the HON. A. C. GEDDES has requested that, in order that he may be free to develop his personal business interests, he should be released from the present agreements whereby his services are available to the companies of the Brush Group, and has tendered his resignation as a director of the company. In accepting his resignation, the board desire to place on record an acknowledgment of the valuable services which he has rendered to the company.

A Beit Fellowship for Scientific Research of the value of £500 a year, tenable at the Imperial College of Science and Technology, has been awarded to K. R. H. WOOLDRIDGE, B.Sc., A.R.C.S., for research on hydrogen transfer under the supervision of Professor R. P. Linstead, F.R.S.

MR. S. P. CHAMBERS, a deputy chairman of I.C.I., who was announced last week to have been appointed chairman of a committee set up by the Government to inquire into London Transport, has been appointed a director of the Royal Insurance Company and of its subsidiary, the Liverpool and London and Globe Insurance Company. He is also a director of the National Provincial Bank.

DR. R. H. CRIST, who has been appointed Director of Research, Physical Processes Department, Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, New York, joined the Carbide organisation in 1945 after working for five years on the Manhattan Project. Born in Mechanicsburg, Pennsylvania, he graduated from Dickinson College in 1920 with the degree of B.A. and in 1927 received his Ph.D. in physical chemistry from Columbia University. He was a faculty member of Columbia University and just before joining Carbide was Associate Professor of Physical Chemistry.

Richard Hudnut Limited announce that as a result of continued expansion, it has been necessary to reorganise the foreign operations of Richard Hudnut Limited and associated companies. The group's foreign business in cosmetics and pharmaceuticals has greatly expanded in the last few decades and exceeded $27,000,000 last year. The company is planning an aggressive campaign to increase its market abroad further. This effort, together with the prospect for expanded sales generally, has led the company to divide its foreign business in 122 countries into three major geographical operations—British Commonwealth and the Far East, Latin America and Europe.

Much of the credit for the group's expanded foreign business has been due to MR. DAVID A. WALKER, vice-president, who has headed it for more than a quarter of a century. Although Mr. Walker has reached the company's retirement age and therefore will relinquish his duties as vice-president in the autumn, he will continue to be active as a consultant on foreign matters and as a director of the company.

F. C. Cleary

Three new directors of foreign operations have been appointed and the director of British Commonwealth and the Far Eastern operations will be MR. FRANK C. CLEARY. Mr. Cleary was formerly the managing director of the Canadian branch and has had more than 25 years' service with the company. He filled a number of managerial posts for the company in Central America, the Orient and Australia as well as in New York, prior to assuming responsibility for the Canadian subsidiary in 1946. He is a native of Illinois and attended Georgetown University, Washington, D.C. The other directors named are ROBERT H. GLECKNER, director of Latin American operations, and PAUL R. VAN DER STRICHT, director of European operations.

DR. C. H. CLARKE, who was a director of Unilever Limited until he retired last month and for many years was chairman of the Technical Division of that firm, has been appointed a director of Brotherton & Company, Ltd.

Faced with additional responsibilities as the result of his recent appointment as Assistant Director of Research at the Wool Industries Research Association, MR. JOHN BARRITT has found it necessary to give up the post of honorary secretary of the Society of Dyers and Colourists, and his resignation has been accepted by the council of the society with the greatest regret. Nevertheless Mr. Barritt retains an active interest in the work of the society, for he is continuing to act as chairman of the editorial panel, and as part editor of the second edition of the Colour Index, he has accepted the chairmanship of the Society's Publications Committee. His successor as honorary secretary of the society is MR. JOHN GARNETT HOPKINSON, a director of Hopkinson & Shore, Ltd., cloth dyers and finishers, Royd Mills, Brighouse. A Bachelor of Arts and an associate of the Royal Institute of Chemistry, he lives in Wilmer Drive, Bradford. After serving three years in the Royal Navy, he graduated at Oxford with honours in chemistry, and later spent some time studying further dyeing and textiles at Leeds University and Bradford Technical College. His father, also a director of the same firm, is MR. GEORGE G. HOPKINSON, a former vice-president of the society and at one time honorary secretary, as well as a former president of the Bradford Textile Society.

MR. C. L. GUEST, Dunlop's chief industrial engineer at St. James's House, has retired after 36 years' service. He joined the company at Para Mills, Aston Cross, Birmingham, in 1917 as technical assistant in the efficiency department, of which he was made manager three years later. After various appointments at Fort Dunlop he was appointed chief efficiency engineer at St. James's House and chief industrial engineer three years ago.

The directors of Joseph Crosfield & Sons, Limited, of Bank Quay Works, Warrington, announce that DR. J. E. TAYLOR has been appointed chairman of the directors in succession to the late Mr. P. A. W. Came. Dr. Taylor is a B.Sc. and a Ph.D. of Leeds University. He joined the British Oil & Cake Mills Limited, at Selby, in 1934 and subsequently was engaged with the technical division of Unilever Limited. He joined the board of Joseph Crosfield & Sons, Limited, in 1952. Dr. Taylor has also been appointed chairman of the directors of William Gossage & Sons, Limited.

The wedding took place at St. Luke's Church, Eccleshill, Bradford, on 18 July, of DR. RONALD WHITELEY, son of Mr. and Mrs. Edwin Whiteley, of Pullan Avenue, Eccleshill, and MISS AUDREY ISABEL WHITELEY, daughter of Mr. and Mrs. C. H. Whiteley, of Ravenscliffe Avenue, Bradford. The bridegroom, who was educated at Bradford Technical College and Leeds University, is on the staff of I.C.I. at Billingham, Stockton-on-Tees, as chemist in charge of spectroscopic and radio-chemical research.

It is now nearly a year since the murder of SIR JACK DRUMMOND and his family in France, and, in a letter to *The Times* on Friday, 17 July, LORD WOOLTON 'recalls the great debt that we in Britain owe to him for his work as scientific adviser to the Ministry of Food during the war . . . This work ought not to be forgotten and a committee has been formed, under my chairmanship, to ensure that his name and work may live.

'We have thought that the most suitable memorial would be to endow a Drummond Research Fellowship in . . . nutrition. The Fellowship would cost about £25,000, would be administered by a body of university trustees and be tenable in any university or appropriate research institution.'

The members of the committee who joined Lord Woolton in the appeal are Lord Horder and Professor E. Dodds, representing medicine; Sir Harold Himsworth and Sir William Slater, secretaries of the Medical and Agricultural Research Councils respectively; and Mr. Norman Wright, of the Ministry of Food. Academic biochemistry is represented by Professors A. C. Chibnall, G. F. Marrian and F. G. Young, and the Provost of University College, London, Dr. Ifor Evans, is also a member. Industry is represented by Mr. Leonard Anderson, Dr. H. J. Channon, Sir Harry Jephcott and Mr. W. Vernon.

Subscriptions, whether by gift or covenant, should be addressed to the Drummond Memorial Fund, c/o Westminster Bank Ltd., 154 Harley Street, London, W.1.

Publications & Announcements

UP-TO-DATE and authoritative information on the performance and characteristics of modern permanent magnets is given in 'Permanent Magnets,' recently issued by the Magnet Department of Mullard Limited, Century House, Shaftesbury Avenue, London, W.C.2. A feature of the book is the inclusion of comparative charts and characteristics relating to all permanent magnets commercially available at the present time. Reference is also made to the magnetic behaviour of the commercial irons and steels normally used in conjunction with permanent magnetic alloys. Magnetic symbols and terms are given.

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AMONG the earliest of the engineering companies in the country to recognise the importance of scientific control in industry, the Brush Electrical Engineering Co. Ltd. established a works laboratory in 1908. This branch of the organisation has steadily developed and expanded until now the research laboratories have seven main divisions—chemical and spectrographic, mechanical and physical, electrical and magnetic, electronic and stress analysis, metallographic, radiographic and science library—all equipped with modern facilities. An article on the work carried out at these laboratories is one of several interesting contributions contained in the June issue of 'The Technical Journal of the Brush Group.' It is announced that new chemical and metallographic laboratories will be opened shortly.

* * *

'PIONEERS of scientific industrial lighting' is the proud claim of the Benjamin Electric Ltd., Brantwood Road, Tottenham, London, N.17. The company was founded in 1908, following the establishment of associated Benjamin companies, first in the USA in 1901 and later in Canada. Those companies were formed to market, for the benefit of industry, some of the inventions of the late Mr. R. B. Benjamin, internationally known as a prolific inventor. The parent company has now issued a brochure which briefly sets out its history and describes its plant and research and technical facilities.

RECOMMENDED for all heat-processing applications requiring an accurate local or remote continuous indication of temperatures from 100° C. to 1,700° C., the Metrovick thermo-electric pyrometers are fully illustrated and described in Special Publication 7351/1 of the Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester. These pyrometers are claimed to be particularly suitable for surface temperature measurement and for applications where the detecting element must be small on account of space limitations, etc. The company's Special Publication No. 7352/2 is concerned with the Metrovick Velometer, which has been specially designed to fulfil two purposes—to show whether a ventilation system, an air conditioning plant or other device in which there is a stream of air, is operating effectively, and to estimate the efficiency with which an air-flow system or device is operating.

* * *

INCREASING recognition of chemical plant construction as a specialised branch of industry is reflected in the numbers of directories to manufacturers recently published. The latest addition is the 'Catalogus van Chemische Apparatuur,' published by the Bureau voor Bedrijfsdocumentatie (Economic Documentation Office), Hilversum. Volume I details chemical apparatus and plant manufactured in the Netherlands, and Volume II, to be published shortly, will contain a full guide to the Dutch representatives of foreign manufacturers. Although the publication is in Dutch, there are comprehensive indexes in English, French and Spanish. The catalogue has been edited under the supervision of the 'Committee for Chemical Engineering' (formed by the Royal Institute of Engineers, the Dutch Chemical Association, and the Central Institute for Industrial Development), chairman, Professor Eng. E. F. Boon.

* * *

IN a short illustrated list, just reprinted, Voss Instruments, Ltd., describe the range of laboratory and industrial stirrers they manufacture, including flameproof, micro and magnetic models. A copy may be obtained from the company at Maldon, Essex.

LIBRARY Bibliography No. 5, 'References to Scientific Literature on Fire,' Part V, 1951, has just been received from the Fire Research Organisation. This deals chiefly with information published in 1951, although a few earlier references not given in Part IV are also included. Altogether 550 references are given, and there are author and subject indexes.

* * *

SEVERAL new brochures have been received from W. Edwards & Co. describing sections of their range of high-vacuum equipment. Latest additions to the range are detailed in a booklet devoted to all the 'Speedivac' rotary pumps; moisture and mercury vapour traps for rotary pumps, mercury diffusion pumps and vacuum lines are the subject of another leaflet; and a third describes vacuum coating plant. The series of 'Vacuum Notes' advertisements has been reprinted in booklet form.

* * *

RESEARCH work carried out in Shell Laboratories on a variety of petroleum products has resulted in the further development of 'Dutrex' R which is both a processing aid and softener for natural rubber compounds. A new booklet issued by Shell Chemicals Limited, from which copies are available on request, gives a detailed account of the results obtained by using 'Dutrex' R as a softener in a variety of natural rubber mixes typical in the rubber industry. The booklet includes comprehensive tables relating to natural rubber tyre tread compounds containing reinforcing furnace black, natural rubber tread compounds, conveyor belt and shoe sole compounds containing channel black and there are also tables showing the effect of varying the proportion of accelerator, and of 'Dutrex' R in natural rubber tyre tread compounds containing reinforcing furnace black.

* * *

BDH announce further additions to its catalogue. Three important new reagents are included: 4-amino-4′-chlorodiphenyl for determination of sulphate; Triton B for the colorimetric estimation of digitonin; and 1 : 1′-dianthrimide for the colorimetric determination of boron. Allyl ethyl ether is restored to the list, and the range of hydrazine compounds has been enlarged. Further organic analytical standards are available, and two new Permutit resins, 'De-acidite G and H.

EVERY two years the Engineering College Research Council of the American Society for Engineering Education publishes a 'Review of Current Research and Directory of Member Institutions.' The purpose is to make known the research programmes at all member colleges and this has become of increasing importance as more sponsors of both basic and applied research want to know who else is working in the same field. The current (1953) edition includes lists of research projects, totalling approximately 7,500, in which more than 13,000 people are engaged in 103 institutions, including all the major engineering schools in the USA. It is estimated that the money spent by those institutions during the present year will total nearly $200,000,000.

* * *

IN recent years non-metallic magnetic ferrites have been increasingly adopted as core materials for inductors and transformers. Their high permeability permits the design of high-efficiency wound components having reduced dimensions, and their high resistivity reduces eddy-current losses to negligible proportions. A brief account of the development of these ferrites is given in a new publication entitled 'Ferroxcube,' issued by the Components Division of Mullard Limited, Century House, Shaftesbury Avenue, London, W.C.2. Descriptions are given of the properties of the various grades of Ferroxcube, together with comprehensive data and application notes which will be of value to the equipment designer.

* * *

AN up-to-date guide to the growing literature on air pollution and techniques being developed to bring about cleaner air is being published by the Manufacturing Chemists' Association, USA. Chapter 12—Bibliography, Appendix 2, the second semi-annual supplement to the 'Air Pollution Abatement Manual' is the first of the series to include references obtained from the Batelle Technical Review and lists pertinent American and foreign literature which appeared during 1952, with some earlier references. A revised cumulative index appearing with this supplement includes a new classifications, lawsuits. Six pages of technical literature references indicate the attention industry is giving to air pollution abatement. Loose-leaf form enables supplement pages to be arranged with preceding references.

British Chemical Prices

LONDON.—Activity on the industrial chemicals market has been quite good for the season, with the home market quietly steady without any predominant feature. The call for export is perhaps a little better but chiefly from the Commonwealth countries, and for other destinations there is room for improvement. Prices for the coal tar products are unchanged and steady, but there is very little new business and no improvement in the volume of inquiry is expected until after the holiday season.

MANCHESTER.—Price changes on the Manchester chemical market during the past week have been relatively few and slight, the general undertone remaining steady. Contract deliveries of textile chemicals, allowing for the effect of the holidays, have been maintained at a reasonably satisfactory level, and most other industrial consumers in Lancashire and the West Riding are taking fair supplies. There have been fresh inquiries in the market for the soda and potash compounds and for a fairly wide range of other chemicals. In the fertiliser section a moderate weight of business has been placed in sulphate of ammonia and the other nitrogenous materials, with fair activity reported in basic slag.

GLASGOW.—The momentum of the last few weeks has been maintained and satisfactory business is reported in general chemicals for the home market. There has been a slight increase in demand for chemicals for export and it is to be hoped that this will develop.

General Chemicals

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

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

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

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

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

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

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

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

Aluminium Sulphate.—Ex works, £14 15s. per ton d/d. MANCHESTER : £14 10s. to £15.

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

Ammonium Bicarbonate.—2 cwt. non-returnable drums ; 1 ton lots £58 per ton.

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

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

Ammonium Persulphate. — MANCHESTER : £6 5s. per cwt. d/d.

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

Antimony Sulphide.—Golden, d/d in 5 cwt. lots as to grade, etc., 2s. 3½d. to 3s. 1½d. per lb. Crimson, 3s. 4½d. to 4s. 5½d. per lb.

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

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

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

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

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

Borax.—Per ton for ton lots, in free 140-lb. bags, carriage paid: Anhydrous, £59 10s.; in 1-cwt. bags; commercial, granular, £39 10s.; crystal, £42; powder, £43; extra fine powder, £44; B.P., granular, £48 10s.; crystal, £51; powder, £52; extra fine powder £53.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granular, £68; crystal, £76; powder, £73 10s.; extra fine powder, £75 10s.; B.P., granular, £81; crystal, £88; powder, £85 10s.; extra fine powder, £87 10s.

Butyl Acetate BSS.—£173 per ton, in 20-ton lots.

***sec.* - Butyl Alcohol.**—5 gal. drums £159; 40 gal. drums: less than 1 ton £124 per ton; 1 to 10 tons £123 per ton; 10 tons and over £122 per ton; 100 tons and over £120 per ton.

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

Calcium Chloride.—70/72% solid £12 10s. per ton.

Chlorine, Liquid.—£32 per ton d/d in 16/17-cwt. drums (3-drum lots).

Chromic Acid.—2s. 0½d. to 2s. 0¾d. per lb., less 2½%, d/d U.K.

Citric Acid.—1 cwt. lots, 200s. cwt.; 5 cwt. lots, 195s. cwt.

Cobalt Oxide.— Black, delivered, 13s. per lb.

Copper Carbonate.—MANCHESTER: 2s. 5d. per lb.

Copper Sulphate.—£79 per ton f.o.b., less 2% in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £10 2s.

Ethyl Acetate,—20 tons and upwards, d/d, £151 per ton.

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

Formic Acid.—85%, £82 10s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G. £14 19s. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hydrochloric Acid.—Spot, 11s. to 15s. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—27.5% wt. £124 10s. per ton. 35% wt. £153 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 16s. 4d. per lb. in 28 lb. lots.

Iodoform.—25s. 10d. per lb. in 28 lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight £122 per ton; dark tech., 44 per cent by weight £67 per ton ex works one ton lots; dark chemical quality 44 per cent by weight £102 per ton, ex works; usual container terms.

Lead Acetate.—White: About £136 10s. per ton.

Lead Nitrate.—About £116 per ton.

Lead, Red.—Basis prices per ton. Genuine dry red lead, £125 15s.; orange lead, £137 15s. Ground in oil: red, £152; orange, £164.

Lead, White.—Basis prices: Dry English, in 5-cwt. casks, £141 15s. per ton. Ground in oil: English, under 2 tons, £162 10s.

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

Litharge.—£125 15s. per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex works, £22 to £24.

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

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

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

Magnesium Sulphate.—£15 to £16 per ton.

Mercuric Chloride.—20s. 6d. per lb. in 28 lb. lots; smaller quantities dearer.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 5s. 4½d. per gal.; pyridinised 64° O.P. 100 gal., 5s. 6½d. per gal.

Methyl Ethyl Ketone.—10-ton lots, £141 per ton del.

Methy *iso*Butyl Ketone.—10 tons and over £162 per ton.

Nickel Sulphate.—D/d, buyers U.K. £154 per ton. Nominal.

Nitric Acid.—£35 10s. to £40 10s. per ton, ex-works.

Oxalic Acid.—Home manufacture, in 5-cwt. casks, £138 per ton, carriage paid.

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £87 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.

Potash, Caustic.—Solid, £98 per ton for 1-ton lots ; Liquid, £37 15s.

Potassium Bichromate.—Crystals and granular, 11§d. per lb. ; ground, 1s. §d. per lb., standard quantities.

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

Potassium Chloride.—Industrial, 96%, 6-ton lots, £20 to £22 per ton.

Potassium Iodide.—B.P., 14s. 10d. per lb. in 28-lb. lots ; 14s. 4d. in cwt. lots.

Potassium Nitrate.—Small granular crystals, 81s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 9½d. per lb. for 1-cwt. lots ; for 3 cwt. and upwards, 1s. 8½d. per lb. ; technical, £8 11s. 6d. per cwt. ; for 5 cwt. lots.

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

Salammoniac.—Dog-tooth crystals, £72 10s. per ton ; medium, £67 10s. per ton ; fine white crystals, £21 10s. to £22 10s. per ton, in casks.

Salicylic Acid. — MANCHESTER : Technical 2s. 7d. per lb. d/d.

Soda Ash.—58% ex depôt or d/d, London station, £9 10s. to £14 10s. per ton.

Soda, Caustic.—Solid 76/77% ; spot, £25 to £27 per ton d/d. (4 ton lots).

Sodium Acetate.—£85 to £91 per ton d/d.

Sodium Bicarbonate.—Refined, spot, £13 10s. to £15 10s. per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 9¾d. per lb. ; anhydrous, 11¼d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite.—Powder, 60/62%, £40 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£87 to £95 per ton.

Sodium Cyanide.—100% basis, 9¾d. to 10¾d. per lb.

Sodium Fluoride.—D/d, £4 10s. per cwt.

Sodium Hyposulphite.—Pea crystals £28 a ton ; commercial, 1-ton lots, £26 per ton carriage paid.

Sodium Iodide.—B.P., 16s. 4d. per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £123 ton.

Sodium Metasilicate.—£22 15s. per ton, d/d U.K. in ton lots.

Sodium Nitrate.—Chilean Industrial, 97-98% 6-ton lots, d/d station, £29 15s. per ton.

Sodium Nitrite.—£31 per ton (4-ton lots).

Sodium Percarbonate.—12½% available oxygen, £8 2s. 10½d. per cwt. in 1-cwt. drums.

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £78 10s. ; tri-sodium, crystalline, £39 10s., anhydrous, £75 10s.

Sodium Prussiate.—1s. to 1s. 1d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber's Salt).—£8 per ton d/d.

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

Sodium Sulphide.—Solid, 60/62%, spot, £30 17s. 6d. per ton, d/d, in drums; broken, £31 12s. 6d. per ton, d/d, in drums.

Sodium Sulphite.—Anhydrous, £59 per ton ; pea crystals, £37 12s. 6d. per ton d/d station in kegs ; commercial, £23 7s. 6d. per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £22 16s. 6d. to £25 6s. according to fineness.

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

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

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d : white seal, £92 10s. ; green seal, £91 10s. ; red seal, £90.

Rubber Chemicals

Antimony Sulphide.—Golden, 2s. 3¼d. to 3s. 1½d. per lb. Crimson, 3s. 4¼d. to 4s. 5¼d. per lb.

Carbon Bisulphide.—£60 to £65 per ton, according to quality.

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

Carbon Tetrachloride.—Ton lots, £74 10s. per ton.

India-rubber Substitutes.—White, 1s. 6¾d. to 1s. 10¼d. per lb. ; dark, 1s. 4½d. to 1s. 8½d. per lb.

Lithopone.—30%, £50 per ton.

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

Sulphur Chloride.—British, £55 per ton.

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

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

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, £16 10s.

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

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

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

Coal-Tar Products

Benzole.—Per gal, ex works, 90's, 4s. 4½d. ; pure, 4s. 8d. ; nitration grade, 4s. 10d.

Carbolic Acid.—Crystals, 1s. 4d. to 1s. 6¼d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 4½d. to 1s. 6¼d. per lb., d/d crude, 8s. naked, at works.

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

Cresylic Acid.—Pale 99/99½%, 5s. 8d. per gal. : 99.5/100%, 5s. 10d. American, duty free, for export, 5s. to 5s. 8d. naked at works.

Naphtha.—Solvent, 90/160 , 4s. 10d. per gal. for 1000-gal. lots ; heavy, 90/190°, 4s. 3½d. per gal. for 1000-gal. lots, d/d. Drums extra : higher prices for smaller lots.

Naphthalene.—From 1 July : crude, 4-ton lots, in sellers' bags, £14 12s. to £22 per ton, according to m.p. ; hot pressed, £28 per ton in bulk ex-works ; purified crystals, £53 per ton.

Pitch.—Medium, soft, home trade, 160s. per ton f.o.r. suppliers' works ; export trade, 230s. per ton f.o.b. suppliers port.

Pyridine.—90/160 , 32s. 6d. to 35s. per gal. MANCHESTER : 42s. 6d. to 45s. per gal.

Toluol.—Pure, 5s. 7d. ; 90's, 4s. 10d. per gal., d/d. MANCHESTER : Pure, 5s. 3d. per gal. naked.

Xylol.—For 1000-gal. lots, 5s. 7d. to 5s. 9d. per gal., according to grade, d/d.

Intermediates and Dyes (Prices Nominal)

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

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

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

Dichloraniline.—2s. 8½d. per lb.

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

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

***p*-Nitraniline.**—4s. 5½d. per lb.

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

Nitronaphthalene.—2s. per lb.

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

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

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

Law & Company News

Commercial Intelligence

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

Mortgages & Charges

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

AERLEC (ALUMINIUM), LTD., London, W. (M., 18/7/53.) 16 June, £12,000 (not ex.) charge to British Emulsifiers, Ltd.; charged on cottage with outbuildings and garden, and land and factory premises at Stoke Heath, nr. Bromsgrove. £7,715. 17 December, 1951.

BRITISH SOLVATES, LTD., London, W. (M., 25/7/53.) 29 May, £18,000 mortgage to Sarah Bright, London, charged on land at Eleys Estate, Edmonton, with buildings thereon or in course of erection. 8 August, 1951.

Satisfactions

CHANCE BROTHERS, LTD., Birmingham. (S., 25/7/53.) Satisfactions 25 June, £800 part of £3,207, etc., and £1,400 part of £2,730, etc., both registered 12 September, 1952 (2 Middle Meadow Avenue, Quinton, and 34 Clydesdale Road, Quinton, having been released from the respective charges).

Receivership

The following has ceased to act as Receiver: Mr. H. L. Barlow, 66 Alma Street, Luton, of FERTILISER COMPOUNDERS, LTD.

Increase of Capital

The following increase of capital has been announced: CLENSOL LTD., from £10,000 to £75,000.

New Registrations

Cemented Carbide Products Ltd.

Private company. (521,609.) Capital £500. Dealers in metals, chemicals and merchandise of all kinds, etc. Directors: E. W. Townshend, J. R. Callaghan. Reg. office: 4 New Burlington Street, W.1.

Drummond & Co. (Gasholders) Ltd.

Private company. (521,813.) Capital £25,000. To acquire the business of a gas, structural and chemical engineering contractor carried on by William Drummond at Bridge & Boiler Works, Workington, as 'Drummond & Co.' Directors: W. Drummond, J. F. Robinson. Reg. office: The Marsh, Workington, Cumberland.

Company News

British Glues & Chemicals Ltd.

In a review of the activities of British Glues & Chemicals Limited during the year ended 31 March, the chairman, Sir Roger Duncalfe, stated that there had been a continuance of the notable contribution made by the technical department by way of new process development. He referred especially to one aspect of it—the Chayen Process, by which, for instance, animal fats, fish oils and vegetable oils could be extracted continuously and in the cold. This process was being used advantageously in several of their works, here and in Canada. Patent protection had been granted in a number of countries, including the USA. Although they started the current financial year on rather a better basis than the previous year, there still persisted the difficult period of adjustment which he had mentioned in his review last year.

British Tar Products Co. Ltd.

A final dividend of 17½ per cent has been declared by British Tar Products Company, Ltd. This makes 22½ per cent for the year, compared with 25 per cent for the previous year. Net profit went down by £15,234 to £25,637 after allowing £32,669 for tax (as against £68,708) and £17,292 for depreciation (against £18,127).

William Blythe & Co. Ltd.

Application to the Capital Issues Committee for permission to make a scrip issue of 1,760,000 ordinary shares of 3s. each, in the proportion of one new share for each ordinary share held, is being made by William Blythe & Co. Ltd., Accrington. This is in place of the recently proposed scrip issue of Second Preference shares, which has been abandoned.

Chemical & Allied Stocks & Shares

STOCK markets have been more active under the influence of hopeful views of developments in international affairs. British Funds displayed a further rise after an earlier reaction, and there was a broadening of interest in industrial shares, helped by the favourable impression created by recently-issued financial results and a number of dividend increases. It is realised that financial results are likely to fluctuate much more now the period of post-war shortages is over and competition is increasing. This means that dividends, too, are likely to fluctuate more than in recent years, but in good years the City believes the tendency will be to pay more liberal dividends than hitherto.

Chemical and kindred shares reflected the more active conditions in stock markets, and although the past year's financial results created disappointment, sentiment was helped by indications of a better trend in the earnings of some sections of the industry in the current year. Imperial Chemical at 45s. were higher on balance, partly because of the revelation that the TUC does not agree with some aspects of the Labour Party nationalisation programme. Albright & Wilson 5s. shares have been a firm feature at 15s. 4½d., British Chrome & Chemicals 5s. shares were 16s. 9d., Monsanto 5s. shares strengthened to 21s. 3d., and Laporte 5s. shares to 11s. 1½d. Fisons at 35s. 9d. remained under the influence of the increased interim dividend. Yorkshire Dyeware & Chemical 5s. shares were firm at 6s. 9d. following the results and chairman's statements. Anchor Chemical 5s. shares were quoted at 14s. at Manchester. Elsewhere, Reichhold Chemical 5s. shares have been firmer at 5s. 6d. and Coalite & Chemical changed hands at close on their par value of 2s. Borax Consolidated were 33s.

In other directions, Hardman & Holden 5s. units were 17s. 6d., following publication of the results. William Blythe 3s. shares showed firmness at 9s. 3d. on the revised share bonus proposals. Calor Gas 5s. shares have been active around 25s. 6d.. Pest Control 5s. shares were 3s. 6d. There has been an upward tendency in plastics shares since the resumption of interim dividends by British Industrial Plastics. The 2s. units of this company were 4s. 4½d. xd., Kleemann 1s. shares active around 7s. 6d. with British Xylonite 26s. 3d. and Bakelite 10s. shares 17s.; 10½d.

Elsewhere, the 4s. units of the Distillers Co., after easing to 16s. 1½d. on the fall in profits, recovered to 16s. 6d. on the good impression created by the maintained 22½ per cent dividend and the directors' statement that, though the profit-set back was due to all sections of the business, particularly the chemical section, the latter has shown improvement in the current year. The 10s. units of the United Molasses Co. have been steady at 27s. 9d., Turner & Newall were 53s., Unilever 49s. 1½d., Glaxo 10s. shares were 38s. 9d., and Boot Drugs 5s. units were 20s. Sangers were firm at 14s. 3d. xd. helped by the maintained dividend. Oils moved in favour of holders with Anglo-Iranian up to 130s. and Shell 87s. 6d. Paint shares eased with Pinchin Johnson 10s. units at 30s. and Lewis Berger 4s. units at 9s. following the lower dividends. British Glues 4s. units were firm at 9s. 3d. on the maintained dividend and the chairman's reference to a better trend in current earnings.

CLASSIFIED ADVERTISEMENTS

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.

EXPERIMENTAL OFFICERS AND ASSISTANT EXPERIMENTAL OFFICERS in various Government Departments. The Civil Service Commissioners invite applications for pensionable posts. Applications may be accepted up to December 31st, 1953, but an earlier closing date may be announced either for the competition as a whole or in one or more subjects. Interviews will generally be held shortly after the receipt of the completed application form.

The posts are divided between the following main groups and subjects :—(*a*) Mathematical and Physical Sciences ; (*b*) Chemistry and Metallurgy ; (*c*) Biological Sciences ; (*d*) Engineering subjects ; and (*e*) Miscellaneous (including e.g., Geology, Library and Technical Information Services).

AGE LIMITS. For Experimental Officers, at least 26 and under 31 on December 31st, 1953 ; for Assistant Experimental Officers at least 18 and under 28 on December 31st, 1953. Extension for regular service in H.M. Forces.

Candidates must have at least one of a number of specified qualifications. Examples are Higher School Certificate, General Certificate of Education, Scottish Leaving Certificate, Scottish Universities Preliminary Examination, Northern Ireland Senior Certificate (all in appropriate subjects and at appropriate levels), Higher National Certificate, University degree. Candidates taking their examinations in 1953 may be admitted. Candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. In general a higher standard of qualification will be looked for in the older candidates than in the younger ones.

Inclusive London salary scales :—

Experimental Officer £681-£838 (men) ; £586-£707 (women).

Assistant Experimental Officer £274-£607 (men) ; £274-£511 (women).

Starting pay according to age up to 26. At 18, £274 ; at 26, £495 (men) ; £467 (women). Somewhat lower in provinces.

Further particulars and application forms from **CIVIL SERVICE COMMISSION, SCIENTIFIC BRANCH, TRINIDAD HOUSE, OLD BURLINGTON STREET, LONDON, W.1,** quoting No. S94-95/53. Completed application forms should be returned as soon as possible.

21283/176/EH/a.

CHEMICAL ENGINEER. Gentleman required with experience in Chemical, Dairy and Allied Industries. The successful candidate would be required to maintain existing and establish new contacts in the chemical and processing fields, and be able to follow a project through all its stages to final erection. The position offers excellent prospects for a man with the necessary qualifications. Please write, giving fullest particulars, together with suggested salary, addressing the envelope to **THE WORKS MANAGER, THE LONDON ALUMINIUM CO., LTD., WESTWOOD ROAD, WITTON, BIRMINGHAM, 6.**

SITUATIONS VACANT

CABOT CARBON LIMITED at **STANLOW,** near **CHESTER,** requires an **ASSISTANT TECHNICAL MANAGER** as a result of their expansion programme.

Duties would involve the supervision of an analytical and rubber laboratory after a period of training, conceivably with some technical service and research direction as well. The training would include a period in the United States at the Cabot plants and laboratories. The position has excellent opportunities for development and promotion of the right applicant.

Educational qualifications are an Honours B.Sc. Degree in Chemistry, Physics, Chemical Engineering or an A.R.I.C. Some industrial experience is essential, preferably in Rubber Technology or in raw materials supply to the rubber industry. The position is a challenging one, requiring high energy, mental alertness, and the ability to co-operate with people at all levels. Emotional maturity and growth potential are necessary, and the applicant should be in the 24 to 32 years' age group.

Applications will be treated in confidence and should give age, marital status, details of educational and industrial qualifications and salary required, and addressed to :

THE TECHNICAL MANAGER,
CABOT CARBON, LTD.,
STANLOW,
ELLESMERE PORT.

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

Candidates must have obtained a University Degree with First or Second Class Honours in an appropriate scientific subject (including Engineering or in Mathematics, or an equivalent qualification ; or for Scientific posts, possess high professional attainments. Candidates for senior Scientific Officer posts must in addition have had at least three years' post-graduate or other approved experience. Candidates for Scientific Officer and Patent posts taking their degree in 1953 may be admitted to compete before the result of their degree examination is known.

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

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

20094/150/LMS.

SITUATIONS VACANT

CHEMIST ANALYST, with knowledge of modern methods of Inorganic and Organic Analysis, required by N.W. London Fine Chemical Manufacturers. Permanent pensionable position for right applicant, who should hold degree or equivalent. Particulars age, education, experience and salary, to **BOX No. C.A. 3237, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

TRANSPARENT PAPER LIMITED, Bridge Hall Mills, Bury, have vacancies for Graduate Chemists who have experience in the application of synthetic resins, adhesives and printing inks for use on all classes of regenerated cellulose film. These posts are essentially for men between 28 and 35 who have energy, initiative and experience of development works. Salary will be in accordance with experience and qualifications. Applications in writing, addressed to the **PERSONNEL OFFICER,** envelopes endorsed **CHEMIST.**

FOR SALE

CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" MILLS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE 3285 EAST.**

ECONOMIC BOILERS—9 ft. diam. by 12 ft. 6 in. Foster Yates, 200 lb. w.p.; 8 ft. diam by 14 ft. Paxman, 180 lb. w.p. Twenty others, all sizes.
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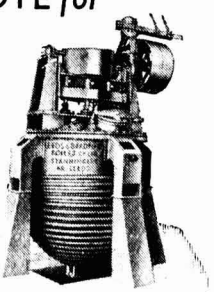

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