The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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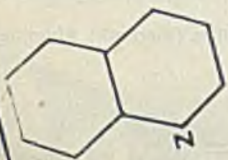
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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Fuel Utilisation

THE Fuel Efficiency Committee of the Association of British Chemical Manufacturers has discontinued this year its practice of the past two winters of holding discussions on the efficient use of fuel in the chemical industries. It was perhaps inevitable that this change should be made sooner or later, because in a sense these meetings were beginning to assume the character of meetings of the Chemical Engineering Group or the Institution of Chemical Engineers and were taking on functions that might very well have been sponsored by those two bodies.

There might even be a slight voice of criticism in that the technical bodies of the chemical industry did not fill the breach by themselves arranging such meetings when the fuel efficiency campaign was launched. If there be criticism, however, it must be said at once that they sinned in good company, since fuel efficiency discussions were generally left to the industries concerned and not to the technical associations or institutions. The technical discussions on fuel efficiency sponsored by the A.B.C.M. were a good deal more advanced than those of many other bodies, and in this they reflected the higher technical calibre of chemical engineers in this particular matter of fuel utilisation. Fuel technology is to a great extent a branch of chemical engineering.

The cessation of these meetings, however, makes it all the more necessary that chemical engineers should devote as much attention as they can spare to whatever is published in the transactions of other bodies dealing with fuel utilisation. Mr. Shinwell, having begun to implement his party's policy of nationalising the coal industry, has now confessed that nationalisation is not likely to reduce the price of coal. In our view it is much more likely to increase the price. This means for industry that economy in the use of fuel is quite as necessary to-day as it was during the darkest days of the war, and that it will continue to be important in the future. The Institute of Fuel is the body which is clearly marked by its normal functions and activities to deal with all subjects of fuel utilisation. Other institutions have, in the past, staked their claim to do so, and the Institutions of Civil, Mechanical, and Electrical Engineers have all busied themselves on fuel problems from time to time. That was all very well until the Institute of Fuel became established, but now that there is an

On Other Pages

Institute of Fuel we suggest that that is the body to which industry generally should look for guidance in fuel matters, and it is from the papers published by that body that most of the new information in this country on fuel utilisation is likely to come.

Last winter the Institute of Fuel staged a series of meetings to discuss the question of insulation in industrial plant. A number of papers were read and informative discussions followed. It may be said at once that the papers varied considerably in value and that this was due not necessarily to the personal idiosyncracies or limitations of the authors, but rather to the state of the art in their respective industries. The papers reveal important gaps in our knowledge, or at least in our practice, and there is little doubt that they have led experts to re-examine their problems in the light of the interchange of information secured through the publication of these papers and discussions. Every heat-using industry requires insulation, and the interchange of experience between these industries has been provocative of much that will bear fruit within the next few years.

The Institute has this year devoted its primary attention to the recovery of waste heat in industry. The use of insulation prevents the waste of heat through its escape into the atmosphere. The recovery of waste heat operates on the sensible heat of the waste gases leaving any plant, and recovers a proportion of that heat in the form of an easily available source of energy. This energy may be in the form of hot air, of hot gases, or of steam. One of the chief methods of recovery of waste heat is by the use of economisers for steam-raising plant. A recent statement has been made that "a conservative estimate, based on manufacturers' records, indicates that the fuel economiser has in the last 100 years saved fuel to the extent of something like 500,000,000 tons."

The economiser, however, is not being discussed in the present series of papers, which is confined to the recovery of heat from furnaces. We shall hope to say something more at a future date on this latter aspect of the subject. It is our intention here primarily to call the attention of chemical engineers to the present series of papers, in the hope that they can find some means of applying, to their own particular problems, the information there given. The use of waste-heat boilers and of recuperators demands careful consideration. It is understood that the Institute of Fuel is likely to promote a conference on the subject of waste-heat recovery at the close of the session, in which the general subject will be discussed in the light of the papers presented during the session. This method was followed with considerable success last year in connection with the insulation of furnaces.

The recovery of waste heat in industry goes a long way beyond the immediate problem of recovering heat from any particular furnace or appliance. It involves ultimately the recovery of waste heat from all fuel-using plant wherever it is economically practicable and a use can be found for the heat recovered. There must be, in addition, some integration within industry with a view to the exchange of heat, power, steam, and industrial gas from one factory to another adjacent to it. In the past, industry has operated chiefly as separate units, and many factories which have had surplus heat or power unusable within their own organisation have let it go to waste. If fuel efficiency in factories in all its aspects is to be achieved, there should be integration whereby one factory may will its power or heat to another factory in its vicinity. Such integration would be generally profitable to both parties, and the co-ordinating authority of the Ministry of Fuel and Power should be utilised to see that no factory is wasting either power or heat if such power or heat could be economically used by transferring it to other factories near by. These views, contained in a recent paper by a well-known author, suggest that the nationalisation of the fuel industries may at least pave the way for smoothing many of the difficulties that lie in the path of the most efficient utilisation of fuel.

Valuable scientific contacts have been made in Russia, according to Dr. Evatt, Australian Minister for External Affairs, by Professor Ashby of Sydney University, who has returned to Australia after a term as Counsellor at the Australian Legation in Moscow. Professor Ashby worked in the laboratories of the Russian Academy of Sciences, and visited 50 scientific institutes between the Arctic and the Caspian.

NOTES AND COMMENTS

The Trend of Wholesale Prices

REVIEWING prices during the year 1945, the *Board of Trade Journal* accentuates, by giving it a headline, the fact that the increase during the period was the smallest yearly rise since the outbreak of war—1.1 per cent. for all articles. Food prices, indeed, reversed the tendency of the previous two years by showing a slight increase, but this was more than offset by the greatly decreased rise in the price of industrial materials and manufactures. Moreover, food prices have again come into the general line, by reason of a steady though slight drop since the peak figure of 161.0 was reached last July. The substantial fall of 4.7 per cent. in the chemicals and oils group was due mainly to the reduction in the price of petroleum products; lubricating oils fell by as much as 30 per cent., though this item as a " weight " of only one-half in making up the index. The only other appreciable drop in this group was a 5 per cent. fall in the price of sulphuric acid. Increases of about 3½ per cent. were recorded for coal-tar products and drugs, while the price of white lead paint was some 3 per cent. higher than a year ago. The December index figure for chemicals and oils was 144.3, as against 151.6 in December, 1944. Iron and steel rose from 185.7 to 189.9, while non-ferrous metals fell from 128.0 to 126.9, a figure that will doubtless be altered this month by the change in the price of lead.

The Technical Press

THE lecture delivered by Dr. Ivanovszky, editor of *Petroleum*, last week before a joint meeting of the London Sections of the Royal Institute of Chemistry, the British Association of Chemists and the Association of Scientific Workers, on the present and future rôles of the technical press in this country, represents the first really systematic approach to this not unimportant subject. In an exceedingly well documented speech, a review of the development of the technical press (in the wider sense of the word) and an appreciation of its importance were given. To this the speaker added a powerful and timely plea for a speedy increase of the paper allocation, a quickening of the flow of news (still rather slack owing to the wartime secrecy hangover) and an appeal to readers to show a closer interest in their technical journals.

Readjusting the Economics

HE postulated as his ideal that the editor of a journal devoted to industrial chemistry should be a chemist, and that he should be assisted by a chemical engineer, a journalist and an economist, with associate editors for special subjects. This rather lavish system can easily be objected to on economic grounds, but it must be linked with Dr. Ivanovszky's claim that the lower rates charged for advertisements in the British technical press, as compared with that of the U.S.A., have the effect of reducing the income and thus lowering the resources available for the payments both of staff and of contributors. Among the many other important subjects referred to by Dr. Ivanovszky, all of which require further careful examination, mention should be made of the provision of improved indexes, of the elimination of overlapping in abstracting and, last but not least, of the future of the German technical press. Some of these we propose to consider in a future issue.

The Quality of Design

DESIGN is an idea that is greatly to the fore in these days. We have already commented at some length on Dr. Cronshaw's important pronouncement on the subject made recently at Manchester; and currently a good deal of publicity is circulating in promotion of the " Britain Can Make It " Exhibition, which the Council of Industrial Design proposes to hold some time this year. The engineer's maxim, " If it looks all right it probably will work all right," is a fairly good guide in principle; at least it serves as a guard against fantastic exaggeration. However, if there is any consistent weakness in the production of British goods, from the point of view of design, it is rather that they have the appearance of being too stodgy rather than too fantastic. Novelty has never been a highly favoured catchword in British industry. " We have allowed the name of Britain to stand for solid worth and durability," as Mr. Philip Whalley, director of Lewis's, Ltd., one of Britain's largest stores, has said in a recent statement on the subject of design. These are, indeed, not bad qualities, and, coupled with imagination, they are in no way inconsistent with good and striking design, as the great designers in all walks of life have shown throughout the centuries. Modern plant and modern scientific instruments demonstrate that the chemical engineer with the highest skill can produce designs that are inspiring and beautiful without a touch of the meretricious. It will be interesting to see whether the proposed exhibition can produce désigns that shall combine traditional British worth with the eye-catching qualities that count for so much nowadays. Every manufacturer, whether he is concerned with boots or with chemical plant, will remember that it is the repeat orders which count in the long run.

A New Hazard

HAZARDS in the chemical industry have often been the subject of articles and comments in our pages; but we have never thought to include instructions on how to avoid being chloroformed by gangsters when employed by a chemical manufacturing concern. This was the unhappy fate, however, of the watchman at an I.C.I. store somewhere between Tel Aviv and Jaffa, according to a Reuter report appearing in the newspapers last week. It is a credit to the watchman and to the chemical industry that it took "seven armed men and a woman" to bring off this feat of violence. Their booty was eight tons of nitrate of soda—a ton apiece, apparently—which they drove off in a couple of lorries. In the report the nitrate is described as a "chemical used for the manufacture of explosives"; but it is more than probable that the material in question had been intended as a fertiliser, or for some other peaceful commercial purpose—there are quite enough explosive materials available in Palestine to-day. It would have been interesting to follow up the thieves in order to study the methods which they proposed to use to convert the nitrate to a more conveniently explosive form. No doubt the police would also have found this interesting, but the raiders "covered their tracks"—presumably the wheel-marks of the lorries—"with pepper to harass police dogs." We await, but probably shall never receive, further news.

Industry and Research

F.B.I. to Hold Spring Conference

A TWO-DAY Conference on Industry and Research is to be held, under the auspices of the F.B.I., at the Kingsway Hall, London, on March 27 and 28. The intention is to provide an opportunity for representatives of organised industry and those who, in this country, are leading and directing industrial research, to meet and discuss their common problems. The conference will take as its leading subject the application of science by industry and the part that research is playing, and can play, in promoting industrial efficiency, exports, full employment, and a higher standard of living.

Four Sessions

The conference will be divided into four sessions, as follows: (1) *Science, Industry and the Community*: Speakers: Sir William Larke, Sir Edward Appleton, F.R.S., Sir Harold Hartley, F.R.S., Sir Ernest Simon.

(2) *Scientific Research and Production*: Papers: Research and Quality, Dr. J. R. Hosking (I.C.I.); Research and Production Costs, Mr. A. Healey (Dunlop & Co.); Conversion of Research into Production, Dr. C. C. Paterson, F.R.S. (General Electric Co.).

(3) *Scientific Research and Industrial Expansion*: Papers: How New Industries Arise, Dr. R. E. Slade (lately Research Controller, I.C.I.); Modernisation of Processes and Plant, Mr. C. H. Davy (Babcock & Wilcox); The Part Co-operative Research Can Play, Mr. A. J. Philpot (Scientific Instrument Research Association).

(4) *The Application of Research in Industry*: Papers: The Firm with a Research Department, Dr. P. Dunsheath (President, I.E.E.; and Henleys W.T. Telegraph Works); The Firm without a Research Department, Sir Raymond Streat (chairman of the Cotton Board). At the end of the conference, Sir William Larke, chairman of the F.B.I. Research Committee, will sum up.

LACTIC CASEIN PRICES

A revised schedule of selling prices for lactic casein sold by the Ministry of Supply through the agency of the Lactic Casein Importers' Association, Ltd., 23 St. Swithin's Lane, London, E.C.4, will come into effect on February 1, in accordance with an announcement of the Director of Sundry Materials. Prices per ton will be as follows, for lots of one ton and over; 90-mesh, £130; 60-mesh, £125; 30-mesh, £125; soluble, £135. For lots of under one ton, £5 per ton extra.

Gaseous Fuels in Britain

Their Efficient Utilisation

by D. D. HOWAT, B.Sc., Ph.D., F.R.I.C., A.M.I.Chem.E.

PUBLICATION of the report of the Heyworth Committee of Inquiry on the Gas Industry has focussed attention on one of the most important problems of the immediate post-war years in Britain—the fullest and best utilisation of gaseous fuels both for the domestic market and for industry. While town gas is primarily a domestic fuel, industry absorbs large volumes of gaseous fuels of various types, the urgent question at the present time being to secure the maximum national advantage from the development of these different sources of power.

Probably the most significant development in fuel technology during the past 150 years has been the rapid expansion in the utilisation of gaseous fuels for industrial purposes. The original idea of employing coal-gas for domestic lighting came from William Murdoch in 1792, and developments of his idea led rapidly to extended application of gaseous fuels in industry. Particularly during the past half-century gaseous fuels derived from coal have assumed a steadily increasing importance in the industrial potential of this country. For high-temperature processes gaseous fuels have proved of the greatest value, the only other comparable fuel in this country being pulverised coal. Introduced just over fifty years ago, pulverised-coal firing has made rapid progress and now occupies a position of key importance in electric-power generation, in lime burning, and in cement and ceramic manufacture. Although in many respects pulverised-coal firing resembles gas firing it has the disadvantages of lack of the very fine regulation possible with gas, the deposition of slag in the combustion space, and the presence of high percentages of grit in the exit gases.

Four Main Fuel Types

Of first importance, so far as industrial development in this country is concerned, is the adequate utilisation of all available fuels. Supplies of coal are restricted now and are likely to remain so for a very considerable time, while there is no immediate prospect of any substantial reduction in price. Every incentive, therefore, exists to further the fullest and most efficient utilisation of all possible sources of fuel. The immediate question arises as to what fuels are actually available in Britain in quantities sufficient to constitute important industrial assets. With no large-scale indigenous sources of oil, the only gaseous fuels are those ultimately derived from the carbonisation of coal. Such fuels may be classified broadly as: town gas, coke-oven gas, blast-furnace gas, and producer gas.

Town gas and coke-oven gas resemble one another closely both in chemical composition and calorific value. During the war years about 350,000 million cu. ft. of town gas were manufactured by the carbonisation of about 21 million tons of coal. Even under war conditions the greater percentage of this output found its way to the domestic market for cooking, lighting and heating. According to the Heyworth Committee's report[1] domestic use of gas accounts for 65 per cent. of the total demand, although sales of gas for industrial purposes are now more than 50 per cent. higher than before the war.

An almost equal quantity of coal was treated in coke ovens for the production of metallurgical coke with a yield of probably well over 200,000 million cu. ft. of coke-oven gas as a by-product. About 60 to 70 per cent. of the metallurgical coke so produced is absorbed in the manufacture of pig-iron in blast furnaces, the remainder of the coke being employed for foundry work and other purposes.

Blast-Furnace Gas

Iron blast furnaces, in which some 9 to 10 million tons of coke are consumed annually, are sometimes described as gigantic gas producers. The exit gases from these furnaces, containing about 30 per cent. of carbon monoxide, have a calorific value of about 100 B.Th.U. per cu. ft. If the thermal value of the coke charged to the furnace is taken as 100 per cent., then the heat value of the gas produced accounts for 55 to 70 per cent. of the total. Expressing the same fact in another way, for each ton of coke charged to the furnace the exit gas carries heat equivalent to that liberated by the combustion of 1340 lb. of coal, each lb. having a heat value of 12,500 B.Th.U. While exact statistics are not obtainable, a very rough estimate may be made of the total quantity of blast-furnace gas available throughout Britain by taking an average figure of 160,000 cu. ft. of blast-furnace gas produced per ton of coke burned. On this very approximate basis and assuming a consumption of about 9½ million tons of coke for the production of about 7½ million tons of pig-iron, the total annual yield of blast-furnace gas will be about 1,500,000 million cu. ft. In terms of heating value this represents 150 million million B.Th.U. or 1500 million therms. This may be compared with a heating value of about 180 million

million B.Th.U. or 1800 million therms in the total of 350,000 million cu. ft. of town gas manufactured during the peak production yar of 1943. Blast-furnace gas is therefor capable of providing over 80 per cent. of the total heating value of the entire national output of town gas.

The fourth large-scale gas supply in this country is obtained from producer gas. Manufacture of producer gas offers many advantages, among which are: complete gasification of the coal or other fuel, high thermal efficiency (70 to 78 per cent.), cheapness of operation, low capital costs, and a wide range of permissible fuels. The low calorific value (approximately 140 B.Th.U. per cu. ft.) of the gas, with the attendant necessity for preheating, constitutes the only serious operational disadvantage. For the same reason the gas would not prove suitable for distribution by a gas-grid. Actual, quantities of producer gas manufactured in Britain annually are not easily assessed. According to one estimate,[2] of the total of 11 million tons of coal consumed by the iron and steel industry over 4 million tons are absorbed in the manufacture of producer gas. Taking average figures of 75 cu. ft. of gas yield per lb. of coal treated and gas with an average calorific value of 140 B.Th.U. per cu. ft., the total quantity of producer gas manufactured in the iron and steel industry has a heating value of about 90 million million B.Th.U. or 900 million therms. Large quantities of producer gas are also manufactured for the glass industry. According to the latest returns,[3] consumption of coal in the manufacture of china, earthenware, and glass amounted to 1,470,000 tons in 1943. Of this total it will be assumed that roughly 500,000 tons were treated in producers yielding 80,000 million cu. ft. of producer gas with a total heat value of 11 million million B.Th.U. or 110 million therms. By another rough approximation, 4¾ to 5 million tons of coal may be assumed to be treated annually in producers yielding about 750,000 million cu. ft. of gas with a total heat value of 100 million million B.Th.U. or 1000 million therms.

The general position with regard to the supplies of gaseous fuels available in this country is indicated in Table 1. In a number of cases the quantities have been estimated as closely as possible from the available date, but in those cases it should be understood that the totals are only estimates for which no very high degree of accuracy may be claimed.

TABLE 1
SOURCES OF GASEOUS FUEL IN BRITAIN.

Type of gas	*Source of supply*	*Tons of coal treated per year (millions)*	*Calorific value (B.Th.U. per cu. ft.)*	*Volume produced annually (million cu. ft.)*	*Total heat value (million million B.Th.U.)*	*Uses*
Town gas ...	... Gas works	20.8 (1943)	450/500	347,851 (1943)	180	Domestic and industrial.
Coke-oven gas ...	... Coke-oven plants	20.9 (1943) 19.1 (1938)	450/500	200,000 (1938)	100	Mainly in coke ovens
Blast-furnace gas	... Iron blast furnaces	By-product	100	1,520,000 (est.)	150	Mainly in blast furnaces and steel plants
Producer gas ...	... Iron and steel industry	4.25 (est.)	140	670,000	90	Iron and steel production
do.	... Glass and ceramics	0.50 (est.)	140	80,000	11	Mainly in glass manufacture

In two out of the four sources the gaseous fuels are essentially by-products, *viz.*, coke-oven gas and blast-furnace gas, the volumes made available in each case being directly related to the prosperity of the iron and steel industry. On the other hand, gas production is the primary aim in the remaining two processes. Location of gasworks for the manufacture of town gas is obviously controlled by the centres of population, the domestic market absorbing the largest percentage of both the gas and coke produced. According to the Heyworth report, the total cost of distribution, including capital charges, usually represents about 20 per cent. of the cost of supply, and of this practically one-half goes to meet capital charges on mains, services, holders, and governors. Producer gas is made as close to the point of combustion as possible to obtain the maximum utilisation of the oils and tarry matters carried over with the gas. Capital cost of the equipment is low and the auxiliary services are slight.

Location of the coke ovens in Britain varies from one district to another; local conditions may favour the colliery site in some instances, while in others the ovens are built at the blast-furnace plants to which the coal must be transported. Primarily, therefore, purely industrial conditions govern the choice of the site, the optimum utilisation of the coke-oven gas produced taking a place of secondary importance. Similarly, blast-furnace gas is only available at the blast furnaces, satisfactory utilisation of the gas again occupying a position of secondary importance. While the high calorific value of the coke-oven gas makes possible transmission over comparatively long distances, blast-furnace gas with its low calorific value must be utilised almost on the site.

Good reasons could be adduced for these

relatively haphazard arrangements when coal was cheap and plentiful in this country. In view, however, of the straitened coal position now existing and liable to persist for years to come, it is essential to consider much more efficient methods for the utilisation of all the gaseous fuels available. When it is remembered that coal is the ultimate source of these four important industrial gaseous fuels the necessity for efficient exploitation becomes more urgent. Of these four fuels the utilisation of coke-oven gas and blast-furnace gas must be more fully investigated, as it is believed that with present industrial methods the best results have not yet been obtained.

Utilisation of Coke-Oven Gas

According to the latest detailed figures available, which are those for 1938, total production of coke-oven gas was 198,418 million cu. ft., 19.1 million tons of coal being treated in the ovens. This gas was employed as follows: 105,220 million cu. ft. (47 million million B.Th.U.) for heating the coke-ovens; 49,489 million cu. ft. (22 million million B.Th.U.) for steam raising and for driving gas engines; 36,520 million cu. ft. were sold to statutory gas undertakings or other companies; while 7087 million cu. ft were wasted. Even those figures do not reveal the worst features, for in a number of industrial plants coke-oven gas was employed to heat blast-furnace stoves, no other outlet being available. One hopeful feature must be noted: as will be shown in Table 5, the sale of coke-oven gas to statutory gas undertakings has risen steadily, especially during the war period. As some coke ovens of the older type become replaced by more modern installations, during the reconstruction work inevitable in the post-war years, the quantities of gas required for heating the ovens will be steadily reduced. In such conditions the problem of the more efficient utilisation of the gas becomes even more pressing.

Utilisation of Blast-Furnace Gas

In this field the position is even more vague and nebulous. No statistics are available either for the total quantities produced or for the utilisation of the gas. It is generally agreed that there is a substantial volume of surplus gas available after the essential needs of the blast-furnace plant have been met. Subsidiary blast-furnace plant operated by the combustion of the gas comprises the stoves for heating the blast, power plant for the blowing engines and for other auxiliary services, cranes and hoists, and lighting. A certain proportion of the total make of gas is essential for these services which should be so efficiently operated as to leave the maximum quantity of gas available for other industrial developments. The quantity of gas required for these subsubsidiary services varies with a number of factors, the most important of which are the actual method of utilisation and the efficiency of the plant installed. According to the data given by Clements[4] an average of 21.5 per cent. of the total make is required for heating the stoves for the blast, while mechanical losses from the furnace and in the washing plant account for a further 8.5 per cent., giving a total absorption of 30 per cent. This figure remains substantially constant no matter what methods of gas utilisation may afterwards be employed.

The next largest absorption of gas is for power generation to supply the blowing engines and other auxiliary plant. There are two alternative methods of meeting this requirement. In this country the method most commonly employed is to burn the gas under boilers generating steam at high pressure, subsequently supplying the steam to the blowers and electric generators, this method being described as "indirect utilisation." In contrast to this the trend in Europe and particularly in Germany is to use the gas in gas engines directly coupled to blowers or generators, while, in addition, the low-grade heat in the exhaust gases from the engines is recovered in waste-heat boilers. Steam from the waste-heat boilers may also be applied for power gneration or for other essential services. Employment of blast-furnace gas in gas engines may be termed "direct utilisation."

TABLE 2
UTILISATION OF BLAST-FURNACE GAS.

Heating value of estimated total production of blast-furnace gas annually in Britain : 150 million million B.Th.U.

Method of gas utilisation	*Gas employed on furnace services* — *Per cent. of total make*	*Total heating value (million million B.Th.U.)*	*Heating value of surplus gas available after all blast-furnace services have been supplied (million million B.Th.U.)*
1. Stove heating, followed by steam boilers and turbo-blowers	45	68	82
2. Stove heating, followed by gas engines and blowers	38	57	93

Gas-engine installations are large, requiring high buildings and occupying extensive floor-space and involving considerably greater capital outlay than the steam boilers and turbo-blowers. From the thermal efficiency standpoint, however, gas-engine installations are much superior. Clements[4] estimates that only 6 per cent. of the total gas make is required to operate the blowers when using gas engines, while steam boilers and turbo-blowers absorb almost 13 per cent. of the total make to supply the same volume of blast.

Where no immediate market exists for the surplus blast-furnace gas the lower capital cost of the steam boilers and turbo-blowers more than offsets the greater gas consumption. In this country the record of cheap coal availability and the use of coal-fired power stations for power generation entirely favoured the installation of steam boilers and turbo-blowers, only one large gas-engine plant having been installed, at Staveley in Derbyshire. Table 2 shows the heating value of the gas absorbed for furnace services using both steam boilers and gas engines, together with the heating value of the surplus gas available after all the needs of the blast furnace have been met.

At a comparatively conservative estimate, therefore, there should be available in Britain surplus blast-furnace gas with a total heat value of about 80 million B.Th.U. or 800 million therms, or about 40 per cent. of the heat value of the total make of town gas in 1943. Efficient utilisation of this quantity of surplus gas is a matter of extreme urgency and should constitute an important factor in any national plan for the gas industry.

Gases as Chemical Raw Materials

From the point of view of the chemical industry, town gas and coke-oven gas are of prime importance for the development of the new synthetic chemical industries: plastics, synthetic rubbers, dyes, and pharmaceuticals. Light oils, tars, and benzols, obtained by the carbonisation of coal in town gas manufacture and in coke ovens, are raw materials of supreme importance to the chemical industry and, in fact, provide the only indigenous source in this country of such key raw materials as benzene, phenol, cresol, and naphthalene. War-time demands made it imperative to devise the most efficient methods of recovering the maximum quantities. In actual fact, removal of the tar and certain other constituents from the gases is essential if serious distribution troubles are to be avoided, so that in those cases a virtue is made of necessity. With benzol recovery conditions are rather different; no difficulties arise in distribution, while the presence of the benzol increases the calorific value of the gas. It is essential, however, for the successful development of the synthetic chemical industry in this country, that strenuous efforts be made to recover the maximum quantities of this valuable raw material from carbonisation gases. The modification, in accordance with the Ayre Committee's recommendations, of the fiscal regulations discriminating against the fullest use by the chemical industry of hydrocarbon oil products is a very important step in this direction.

After removal of the light oils, tars, and benzol, the carbonisation gases consist mainly of methane, hydrogen, and ethylene. While by far the greatest percentages of these gases are employed as fuels, their possibilities as sources of chemical raw materials are highly significant. By suitable fractional liquefaction processes it is possible to separate the gases into different fractions containing the bulk of the hydrogen, the methane, or the ethylene. From the hydrogen fraction synthetic ammonia may be manufactured. While a commercial plant for this purpose is now in operation in this country, for some years past large-scale applications of the process have been developed extensively in the U.S.A., Germany, and the U.S.S.R. The methane fraction may be utilised to produce numerous important chemicals, such as hydrocyanic acid, methanol, formaldehyde, and methyl chloride. While great technical progress along these lines has been made in the U.S.A. and Germany, commercial development in this country is very slow. Possibly for the highly significant new branches of industrial chemistry the ethylene fraction of the carbonisation gases is most important of all. Applications of ethylene for the synthesis of plastics, rubbers, alcohols, acetone, etc., are positively legion.

Economics of Ethylene Production

A recent estimate by the Coal-Processing Industries Panel[5] suggests that the post-war price of ethylene will be about £20 per ton, or 13s. 4d. per 1000 cu. ft. The Panel assumes a charge of 2d. per 1000 cu. ft. of coke-oven gas would be made to the plant operating the liquefaction process. Given an ethylene content of 2 per cent. in the coke-oven gas, this would be equivalent to a buying price of 8s. 4d. per 1000 cu. ft. for ethylene, leaving a sum of only 5s. per 1000 cu. ft. of ethylene to cover all compression and operating costs, capital charges, interest and depreciation. In the opinion of the Panel this sum would not be sufficient except in very large extraction plants. While these estimates allow for a reduction of only 40 B.Th.U. per cu. ft. in the calorific value, figures published by Napier[6] indicate that the separation of the ethylene fraction from the coke-oven gas represents a loss of almost one therm per 1000 cu. ft. of gas treated, so that the purchase price of 2d. per 1000 cu. ft. of coke-oven gas is by no means excessive.

The immediate question that arises is whether, by suitable allocation and more efficient utilisation of cheaper alternative fuels, increasing quantities of coke-oven gas might not be diverted for chemical synthesis.

So far as town gas is concerned the statutory authorities exist primarily to supply the domestic market. In this market fittings and appliances are designed exclusively for fuel of a given calorific value and purity, so that absorption of town gas as a chemical raw material does not offer any great possibilities. On the other hand, frequent criticisms have been levelled at the methods of utilisation of coke-oven gas. According to the figures already quoted the two largest uses of this gas are for heating the ovens and for steam raising. Gas with a total heat value of 47 million million B.Th.U. is absorbed for heating ovens, and 22 million million B.Th.U. for steam raising, giving a total utilisation for these purposes of almost 70 million million B.Th.U. (700 million therms) or 70 per cent. of the total gas make. When it is borne in mind that practically every modern coke oven has provision for the use of blast-furnace gas or producer gas as alternative fuels, the wasteful use of a very valuable fuel becomes even more obvious. From Table 2 it will be seen that there is more than sufficient blast-furnace gas available to supply all the heating required for all the coke ovens in this country. Yet, until recently, coke-oven gas was employed, in at least one important industrial area of this country, to heat blast-furnace stoves while blast-furnace gas was burned as waste. A more inadequate utilisation of valuable raw materials would be difficult to instance.

A Chance for Co-ordination

Unfortunately, as indicated earlier, coke ovens are not always situated in such close proximity to blast furnaces as to enable this obvious procedure of alternative fuel utilisation to be followed. Even, however, when the coke oven is located at the colliery and supplies of blast-furnace gas are not available, arrangements should be made for the entire output of coke-oven gas to be purchased in bulk and for the necessary fuel for oven-heating to be provided by producer gas. As a first step towards this, plans should be made to co-ordinate any new blast-furnace and coke-oven installations so as to ensure some measure of improved utilisation of coke-oven gas. According to the recently published five-year plan of the British Iron and Steel Federation, new coke-oven plants with an annual output of 2½ million tons will be built, together with 19 new blast furnaces. Here, obviously, is the first opportunity for the establishment of a co-ordinated scheme for coke ovens and blast furnaces, allowing large quantities of coke-oven gas to be made available for general industrial purposes. Dissent must be registered with the finding of the Heyworth Committee that "the best arrangement for the use of coke-oven gas is its utilisation to the greatest possible extent within a fully integrated coke- and steel-producing unit." It may be argued that coke-oven gas is too valuable a gaseous fuel for general industrial and domestic purposes and too promising a source of chemical raw materials for it to be used where a cheaper fuel is available.

(*To be concluded*)

British Oil Refining

The Case for New Plants

SIR FREDERICK WEST took the chair at the North-Western Fuel Luncheon Club meeting in Manchester, on January 16, when Mr. Harold Moore, the well-known petroleum technologist and consultant, addressed the Club on "The National Economics of British Petroleum Refining." He said that the question of whether we should establish oil refineries in this country was primarily one of tariffs and, therefore, one for the public rather than the interested industries to decide. Oil refining, he said, was our one industry which was not protected by tariffs, and it should be given the same treatment as other industries.

The international oil situation was changing, and the U.S.A. was gradually losing its position as the chief oil producer and exporter to the Middle East. Mr. Moore thought new refineries should be set up in the consuming countries rather than in the Middle East. Economically, the advantages were that crude oil could be transported more cheaply than refined oil, the refineries would be nearer the consumer, and they would be less likely to become redundant than they would at the producing end, when the field ceased to produce oil.

From the point of view of national advantage, employment would be stimulated in the engineering industries, which would have to equip the new refineries, and they could supply petroleum by-products needed by the large organic chemical industry which was now developing. In addition, there would be a saving in foreign currency.

The opposition offered to home refining by the international oil companies was, he said, chiefly based on objections which could equally be applied to other British industries. It was imperative that oil refineries should be established now.

Quinalizarin

Qualitative Reagent for Lead

A PRECIPITATE of lead sulphate was found to acquire a lilac colour in neutral solution in presence of quinalizarin, whereas barium sulphate and other white sulphates merely took on the pink colour of the reagent. A lilac colour was also imparted by the same reagent to precipitates of other white lead salts, *e.g.*, lead chloride. Advantage can be taken of this fact to effect a rapid differentiation of the three metals of the first analytical group on the spotting plate, using Feigl's rhodamine test for silver, the ammonia test for mercury, and the lilac colour reaction with quinalizarin for lead. (*Burriel* and *Pino*, *Anal. Soc. Esp. Fis. Quim.*, 1945, *41*, 226, through *Ion*, Sept., 1945, 597.)

U.S. Organic Chemicals

Statistics in 1944

THE United States Tariff Commission has issued a preliminary report on production and sales, in 1944, of synthetic organic chemicals and the raw materials of which they are made. The report includes statistics for tars, chemical crudes derived from coal tar and petroleum, intermediates, and such finished products as dyes, pharmaceutical products, plastics, rubber-processing chemicals, and miscellaneous chemicals. Detailed statistics for surface-active agents and for plasticisers are shown in separate tables for the first time.

Coal Tar Products

The quantity of oil-gas tar, water-gas tar, and coal tar produced in 1944 is estimated at 968 million gallons, compared with 928 million estimated in 1943. Production of coal-tar crudes continued the upward trend of the past decade. The total output of toluene from all sources (excluding plants under Ordnance control) was 134 million gallons, compared with 96 million in 1943 and 43 million in 1942. Most of the toluene, however, was produced synthetically from petroleum rather than coal tar—96 million gallons in 1944, and 58 million gallons in 1943.

The output of crude naphthalene totalled 301 million pounds in 1944, or slightly less than in 1943 (305 million), but 20 per cent. greater than in 1942 (251 million). Production was maintained at this high level chiefly because of the great demand for naphthalene as a raw material in the production of alkyd resins and for phthalate plasticisers.

In 1944, production of chemical raw materials derived from petroleum (exclusive of toluene) amounted to 3 billion pounds and sales accounted for 2.8 billion pounds, valued at $200,000,000. The output of cyclic intermediates totalled 2.2 billion pounds in 1944, an increase of 34 per cent. over the previous record output in 1943. Production of finished cyclic products was 2.6 billion pounds, a 90 per cent. increase over 1943. Production of acyclic synthetic organic chemicals reached 10.7 billion pounds in 1944, an increase of 18 per cent.

Sales in 1944 of intermediates and finished cyclic products, combined, were 4.0 billion pounds, valued at $882,000,000; sales of all acyclic organic chemicals were 6.0 billion pounds, valued at $1,000,000,000. Total sales of intermediates and finished organic chemicals accounted for 65 per cent. of the total quantity of such chemicals produced in 1944, the remainder being consumed in further processing by the producers.

For purposes of comparison, it should be remembered that the "billions" are American.

Distilling Efficiency Improved

New Glass Fibre Packing

AN improvement in distilling efficiency contributing to accelerated production of ethyl alcohol for synthetic rubber manufacture and beverage spirits has been achieved at General Distillers Corporation of Kentucky, Louisville, U.S.A., by the use of Fiberglas tower packing in a fusel oil decanter.

To meet Government standards requiring removal of fusel oil, distillers have long used a conventional type of tower construction equipped with metal baffles. Mr. W. H. Stone, production superintendent of General Distillers, reports that by equipping a decanter with random-oriented glass fibre packs, his firm has been able to save construction materials by using supports of lighter gauge, to step up production of fusel oil "very satisfactorily," and to eliminate the labour previously needed for subsequent purification of the oil.

Mr. Stone describes the decanter's design as a radical innovation in the distilling industry. The decanter, which handles the distillate from approximately 2000 bushels of grain daily, is 15 ft. high and 22 in. in diameter. It has more than ample capacity, and eliminates the need for large storage tanks required for after-treatment of the fusel oil. Fusel oil as high as 98 per cent. pure has been produced by the decanter. The negligible weight of the Fiberglas packing, Mr. Stone says, means that in designing supports for the column, only the weight of the liquid to be handled needs to be considered.

Large Surface Area

Mr. Stone attributes the superior performance of the newly-installed decanter to the large surface area afforded by the glass fibre packs. The packs are similar to those used for filtration, evaporation, absorption, and fractionation purposes by many process industries. Supplied by Owens-Corning Fiberglas Corporation, the packs have an average surface area of approximately 196 sq. ft. per cu. ft. The decanter at General Distillers is packed with 80 cu. ft. of the Fiberglas tower packing which is installed at a density of 5 lb. per cu. ft. Thus, as the liquids (water, fusel oil, and alcohol) rise in the decanter, they encounter approximately 15,680 sq. ft. of area—approximately three-eighths of an acre—which effectively intermixes the ingredients and washes the fusel oil free of alcohol. The surface area, afforded by 400 lb. of glass fibre packs, is many thousands of times the area provided in a decanter of conventional design. (*J. Franklin Inst.*, 1945, *240*, 396.)

New Apparatus

Progress by Griffin & Tatlock and B.T.H.

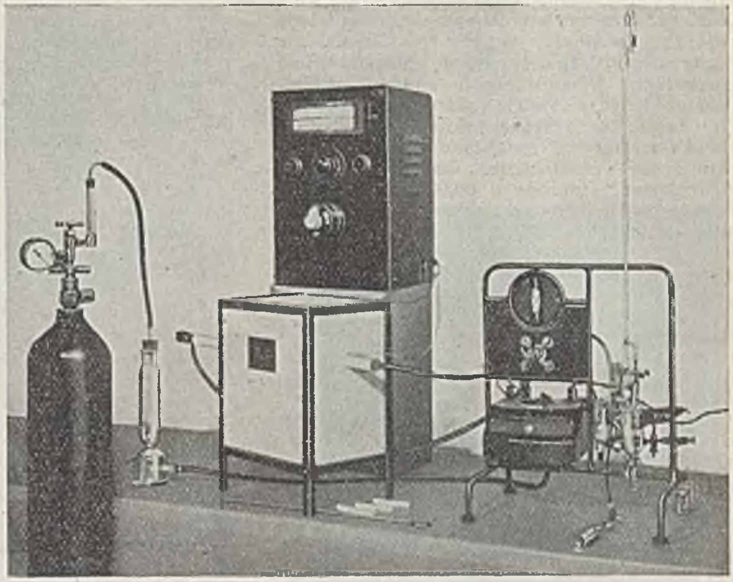

Fig. 1. Sulphur-in-steel determination apparatus.

A SULPHUR-IN-STEEL determination apparatus, manufactured by Griffin & Tatlock, Ltd. London, W.C.2, is illustrated in the accompanying photograph (Fig. 1). A complete sulphur determination by the use of this apparatus requires about four minutes. It is assembled on a tubular welded metal stand designed especially for the works laboratory, and it accommodates, among other things, a galvanometer and a reversible sand glass for timing the combustion. The apparatus has been successfully applied to the determination of sulphur in iron, steel and ferro-alloys over the range 0.008 to 0.4 per cent. with an accuracy about ±5 per cent. It has also been used for the estimation of sulphur in sulphide- and sulphate-containing ores such as magnetite, micaceous iron ore, etc, and may be found suitable for materials such as coal, coke and oils.

Another piece of new apparatus produced by Griffin & Tatlock is the Microid Organic Stencil (Fig. 2). The idea of this is to overcome the difficulties encountered when

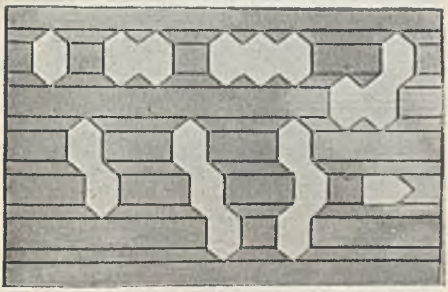

Fig. 2, Microid organic stencil.

using the rubber stamps which have been employed for many years for formulæ. It consists of eight characteristic ring systems shaped in transparent plastic, *viz.*, one five-membered ring, one benzene ring and two arrangements each of the naphthalene, anthracene and phenanthrene types of ring. The stencil can be used with pen, pencil or style, and alignment is facilitated by the provision of a number of horizontal lines. The transparency of the material from which the stencil is cut makes the building up of complex formulæ easy. The various types of formulæ are separated from one another by exactly the width of one benzene ring.

Another Griffin & Tatlock production is the Microid Flask Shaker, which carries up to four 500 ml. flasks, each half full of liquid. Silent in operation, it can be placed on the laboratory bench as it does not need permanent fixing. In a round-bottom flask suitably adjusted, the liquid can be made to swirl around the flask on a hollow horizontal axis. In a conical flask the liquid can be made to rise spirally up the walls; in returning in droplets to the bottom, it is brought into intimate contact with the gaseous phase and is effectively "aerated" for such purposes as hydrogenation. Fig. 3 shows a "still" of the shaking, which has been studied in detail by the use of an ultra-high-speed camera.

The following references to work

by the British Thomson-Houston Company, undertaken or in progress during 1945, are indicative of their increased industrial activity at home and overseas. In all departments, from those dealing with turbo-alternators and heavy electrical plant to the smallest motors or electronic instruments, the greatest activity has prevailed. A considerable amount of important hydro-electric plant, particularly for India, is on order, while for New Zealand very large " synchronous condensers " are under manufacture. Orders for power transformers include a 60,000 kVA 15/132 kV unit for the Nottingham Corporation, and an 18,750 kVA, 11/34 kV unit for the Torquay Corporation. Large numbers of transformers are also being made for overseas. A wide range of drives and equipment for rolling mills is in hand and paper mills are being re-conditioned. Equipments for rubber mills are being installed; a new line of loom motors for textile mills has been completed and a large number of special drives for the hosiery trade are on order. In the field of electronics, the development of dielectric and induction heating equipment has continued (Fig. 4). Many electronic servo mechanisms have been produced and, generally, there has been great expansion here. The almost countless applications of electronics, indeed, are of so highly technical a nature as to preclude treatment of them in a general survey.

Fig 3. Effect of Microid flask-shaker studied by ultra-high-speed camera. The circulation of the liquid is shown by the position of the blackened cubes of teak (of nearly the same density as water).

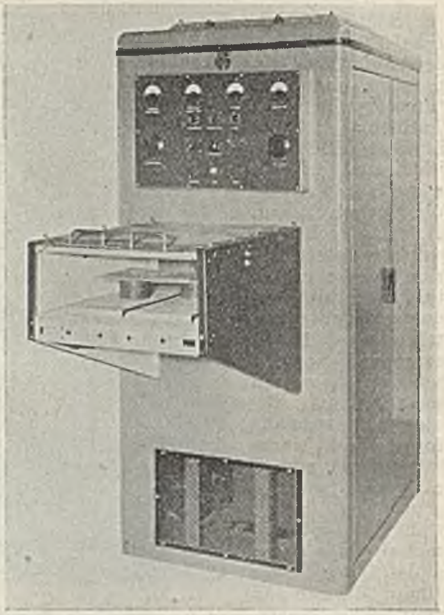

Fig. 4. BTH 4/5 dielectric heating equipment with enclosed work electrodes which are automatically operated.

The first list of 43 industrial plants declared available for allocation on the German reparations account by the Allied Control Council has been released by the interested departments of the U.S. Government, according to the U.S. Information Service. The plants are stated to include (among others) chemical, pig-iron, and coke and by-products plants, but no actual names are yet available. It is expected that wholly German-owned plants will be the first to be earmarked for removal from Germany.

The U.S. Bureau of Mines will carry out, in a $15,500,000 converted war plant at Louisiana, Mo., peace-time experiments with the production of synthetic gasoline from coal and oil shale. The Missouri Ordnance Works, where the studies will be made, were operated by the War Department during the war to produce synthetic ammonia on a 390-acre site about 100 miles from St. Louis. The scheme involves the expenditure of $30,000,000, authorised by the Synthetic Liquid Fuels Act.

Anti-Corrosive Chemical Plant

A Recent Report from America

AN interesting comparison may be made between the accounts, published during this month in THE CHEMICAL AGE, of studies on anti-corrosive plant carried out in Russia (January 5, p. 5) and Germany (January 19, p. 81), with similar work which has been proceeding in the United States.

The feature "Corrosion Forum" in *Chem. and Met. Eng.*, recently (1945, 52, 11, p. 231) contained an article on materials of construction in a metabisulphite plant, contributed by Messrs. G. S. Wheaton and R. S. Sunderlin, of the Pittsberg Chemical Company, Vernon, California, and detailing the corrosion difficulties involved in the process and the steps taken to overcome them. The company began the production of potassium metabisulphite—familiarly known as "pot. meta."—in their plant at Vernon in 1941.

In theory, nothing could be simpler than the chemical reaction by which caustic potash is neutralised with bisulphite solution and the resulting normal sulphite saturated with SO_2 to yield pot. meta. In practice, there are more complicated factors than the chemistry involved—the problem of corrosion. These complicating factors include acidity or alkalinity; concentration and physical state of each raw material, intermediate, final product, and by-product; temperature and sometimes pressure; time of contact; combination of physical states; catalytic action; type and amount of agitation; and, of course, the nature and combination of the constructional materials.

Fig. 1. Lead-lined neutraliser (left) and evaporator feed tanks. The agitator is made of stainless steel.

The chemicals involved in the manufacture of potassium metabisulphite are: sulphur dioxide (liquid and gaseous), sulphurous acid (very corrosive), caustic potash, potassium sulphite (essentially neutral), potassium bisulphite (highly corrosive to iron), potassium metabisulphite (moderately corrosive), potassium sulphate, oxygen, sulphur, and ferric hydroxide.

When the Pittsberg Company decided to manufacture potassium metabisulphite, a thorough study was made of the basic corrosion problems, as they wanted to keep their books clear of this insidious, insatiable "cost of contamination." The principal raw materials used in their method of making pot. meta. are 50 per cent. caustic potash and a bisulphite solution from the neutralisation of normal potassium sulphite with liquid SO_2. The caustic potash is stored in ordinary steel tanks from which it is pumped into the neutralising tank. Here the small amounts of iron compounds are converted into ferric hydroxide. As little as 0.009 per cent. iron in pot. meta. will cause some yellow coloration in the crystals; the trade demands an iron-free, white product.

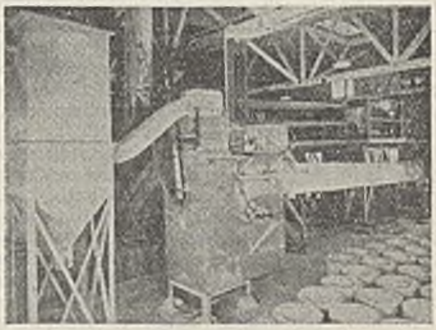

Fig. 2. Stainless steel continuous rotary dryer used in the production of potassium metabisulphite.

Actually, the neutralising liquor contains some bisulphite, excess SO_2, and a host of by-product chemicals in small amounts. Acidity of the liquor is about *p*H 4 and the $KHSO_3$ content corresponds to saturation. The neutralising tank is lined with chemical lead; wood proved unsatisfactory because of the acidity and dehydrating effect. The agitators are either of stainless steel or are lead-coated. Care must be taken to provide good agitation and always have to have an excess of bisulphite in the vessel, otherwise the caustic potash will dissolve some lead, an impurity particularly objectionable for the food or photographic product.

Neutralised liquor, now having a *p*H of about 6.1 and consisting essentially of 35 per cent. normal potassium sulphite together with a slight excess of bisulphite, is pumped through a wood plate-and-frame press to remove precipitated iron and other solid impurities. The filtrate goes to the evaporator feed tanks, which must be lead-lined, since the hot liquor is not completely neutralised and has a dehydrating effect on wood. Iron pick-up must be carefully avoided (Fig. 1).

The vacuum evaporator, in which the concentration of normal sulphite is raised to approximately 40 per cent. on a weight basis, is stainless steel. The heat exchanger is 18.8 Cr-Ni-Mo steel, use of which is largely necessitated by the increased corrosiveness of bisulphite and liberated SO_2 at the higher temperature. Maximum temperature in this step is about 70°C.

Settling tanks, in which precipitated salts such as K_2SO_4 and sludge settle out, are rectangular in shape and lined with lead. Temperature of the solution is now about 50°C. The storage tank for the settled liquor, now containing only normal sulphite and essentially neutral (*p*H about 6), is made of ordinary steel.

Normal potassium sulphite liquor is pumped into the heated saturator, into which SO_2 is fed with constant agitation until the chemical absorption of SO_2 is complete and the normal sulphite is converted into the meta compound. The *p*H shift during the reaction is from 6 to 4, while the maximum temperature is 90°C.

Liquid SO_2 is stored in the customary iron or steel cylinder. The saturator crystalliser is a jacketed 18-8 Cr-Ni-Mo stainless steel vessel. After several years of constant use, the attack on this vessel and on stainless steel lines has been so slight that the shine of the steel has not been taken off. A pump of the same material has shown no corrosion after four years, whereas an ordinary 18-8 sleeve was corroded out within a week.

Plastic-Coated Storage Tank

The slurry of potassium metabisulphite crystals is next cooled and dropped into a centrifuge having a stainless steel basket. Cooled liquor from the centrifuge contains dissolved $KHSO_3$ and is still highly corrosive to ordinary steel. The bisulphite storage vessel, therefore, consists of a steel tank lined with a plastic coating of the urea-formaldehyde type. This type of vessel provides the necessary protection against corrosion and contamination and yet is cheaper than one of special stainless steel. This bisulphite liquor is recycled to be neutralised with caustic potash to provide normal sulphite.

Wet meta. crystals pass through a stainless steel continuous rotary dryer at about 57°C. (Fig. 2), about 2.5 ft. in diameter and 20 ft. long; the crystals enter with 5 per cent. moisture and leave with less than 0.1 per cent. moisture. Pot. meta. is sensitive to temperature, so that good control of the dryer is necessary. Once decomposition starts it will continue spontaneously in the presence of air, since the free sulphur liberated burns to SO_2 and thereby produces sufficient heat to free additional sulphur. At ordinary temperatures, metabisulphite is quite stable.

From the dryer, the granular pot. meta., which dissolves more readily than coarse crystals, goes to a steel elevator which feeds a rotary hammer mill grinder. The product is stored in regular steel hoppers from which it is packaged into fibre drums for shipment. The final product must analyse 55 per cent. SO_2 and not more than 0.009 per cent. iron. Potassium sulphate, which occurs throughout the entire system, must be kept to a minimum to maintain the required strength.

As a large percentage of the potassium metabisulphite produced by this firm goes into wineries for use as a fermentation arrester and settling agent, purity, especially from soluble lead salts, is of prime importance. In fact, it is the higher purity of the metabisulphite that gives it an advantage over anhydrous bisulphite of soda for this purpose. The next largest use is as a preservative for photographic solutions, also requiring high purity; while some pot. meta. is now being used as a substitute for SO_2 and in the treatment of dried fruits.

Analysis of Zinc

New British Standard Issued

WHEN B.S. 1001 and 1002 for high-purity zinc castings were prepared, a companion document was issued dealing with the chemical analysis of zinc. It was realised, however, that many of these methods required a considerable amount of work and time, and it was felt that consideration should be given to the adoption of quicker methods such as by the use of the polarograph or the spectrograph. It is appreciated that these methods have not yet become sufficiently established to enable standards to be laid down, so recommended methods have been prepared in order to enable comparative information to be collected, and have now been published in the form of B.S. 1225 (available from the British Standards Institution, 28 Victoria Street, S.W.1; 3s. 6d., post free).

These recommendations have been based on a considerable amount of experimental work which has been carried out by a number of interests, and it is hoped to review the position at an early date in the light of further experience gained with the use of the recommended methods, to see whether steps can be taken to establish standards.

South African Chemical Notes

Further Developments Reviewed

VALUABLE information has been gained in a preliminary experiment to determine the possibilities of controlling the tsetse fly by spraying DDT from the air, says a statement by the Department of Agriculture. Chiefly because of mechanical difficulties, the first spraying was not thorough enough to enable the effect on the tsetse fly population to be studied.

A second experiment is being conducted with a different type of aeroplane. "The indications obtained among tsetse flies exposed in cages augur well for future sprayings." The statement says the ideal of eradicating tsetse fly does not seem to be impracticable, because of the insect's low rate of reproduction and the restricted area in which it can live. Of the effect on other insects, it adds, all that can be said at present is that some species are evidently more susceptible to DDT than others. Grasshoppers, crickets and other members of the same order were apparently unaffected, while flies generally seemed to be very susceptible. To test the effect on different kinds of insects, a large number were trapped, divided into orders, and put into cloth cages in the area. Other methods of trapping and congregating insects were also used. Wire gauze stretched across the Mkuzi River caught up great numbers of flies and small beetles carried down the river after the experiment.

Plascon Paint & Chemical Industries, Box 3714, Johannesburg, are the first South African firm to incorporate DDT insecticide in a washable wall distemper. The toxic effects are lasting, and the distempered surface may be washed without affecting the properties of the DDT. This distemper is made in the usual range of colours and is packed in paste form in 9 lb. to 80 lb. containers.

No Cement Shortage

The chairman of the Cape Portland Cement Co. said recently that whatever delay there might be in the building programme it was not due to a shortage of cement. Ample supplies were available, and the company's reserves alone were sufficient to supply half the Union's housing needs. The temporary shortage of cement in 1944 was due to military requirements overseas, but military demands had ceased early in 1945. Cement was one of the few products that had remained at pre-war prices almost throughout the war. The good market for cement had enabled the company to carry the higher manufacturing costs, and the only increase that was passed to the consumer was the rise in railway rates imposed in 1944

Gypsum production in South Africa has grown steadily in the past few years, much of the output being absorbed by the cement industry. The development of new uses and the wide range of research discoveries suggest that the future of gypsum is sound. The minor uses of gypsum, either crude or calcined, include land plaster or fertiliser, for plate-glass beds, pottery and terra-cotta moulds, statuary and other art work, foundry moulds, surgical casts, dental plaster, crayons, terra alba for fillers, gypsum paint, as a substitute for horn and hard rubber in making buttons and poker chips, and even in road building, where climates are sufficiently dry. Gypsum is also used in cleaning wool, and as a filler in rubber goods, while both gypsum and anhydrite have lately been extensively employed as a source of sulphuric acid, by a process yielding as a by-product clinker which, when ground together with blast-furnace slag, is sold as blast-furnace cement. Much of the sulphuric acid made from gypsum and anhydrite is used to convert ammonia obtained from the air into ammonium sulphate. Although the South African product does not compare with deposits from other countries in regard to purity, it can be cleaned successfully to produce a high-grade article.

Litharge and Paint

The Johannesburg company manufacturing litharge, oxide of lead, for assay service on the gold mines, and for making motor-car batteries, is planning to increase its output. South African litharge is of a high purity and is claimed by the manufacturers to compare quite favourably in quality with the litharge formerly imported.

Discussing the outlook for a new factory now under construction near Cape Town, a paint manufacturer said that the best quality of production was ensured by agreements with overseas manufacturers about the exchange of technical information. Thus he had made arrangements with a Norwegian firm about marine paints, with an English firm about traffic paints, and with an American firm about plastic, or rubber-base paints. The latter variety was absolutely waterproof, and expanded or contracted with the changes of temperature. This paint, it is said, can be brushed, sprayed, or dipped, and tests have demonstrated its resistance to highly concentrated acids, alkalis, alcohols and oils.

Leather Chemistry

In view of the fact that there may still exist some doubt as to relationships between the leather industries and chemical and other research, the director of the Leather Industries' Research Institute at Grahamstown has outlined some of the functions of his institute. In the technical field, which covers all the chemical, bacteriological, entomological and engineering problems, over 200 medium and long-range researches have been undertaken, and over 300 reports and scientific papers have been published. Sixty new formulæ have been worked out for the manufacture of finishes, adhesives and other materials in short supply. The Institute has also evolved new methods of eliminating all insect and bacterial damage which will be of great value to the tanning, leather and other industries.

The number of tung trees in South Africa is now approaching 150,000, but no tung oil has as yet been produced in the Union. This fact was recently the subject of a recommendation that steps to that end be taken, but the difficulties in the way seem to be rather considerable. Now that the war is over it is possible that the high prices obtained for the seed will drop, and with a possible falling off in the demand, it may not be an economic proposition to produce the oil locally. It is expected that even if prices drop they will still remain at an encouraging level, and thus the output of seed from South Africa will continue to be good. The bulk of the plantings have been made in E. Transvaal, Natal and Swaziland.

Although the European export trade in perfumes and cosmetics has been resumed, South African products are apparently still in demand in the Belgian Congo and manufacturers recently reported receiving new orders. It is hoped to hold a substantial portion of this trade.

A CHEMIST'S BOOKSHELF

THE ADVANCEMENT OF SCIENCE, Vol. III, No. 11. London: The British Association. 5s.

Unlike many hybrids, this cross between a book and a magazine, the ingenious product of the British Association, is a continuing success. It certainly achieves one purpose of the organisation which published it, by interesting scientists in branches of science other than their own. The "leading article"—if it may be so entitled—of the present number is an exposition of Science in Education, by Dr. A. E. E. McKenzie, and we were at once inclined in its favour by the author's pigeon-holing of science as one of the three main approaches to reality, along with art and religion, and his assumption, as an axiom, that the man of liberal education, whatever his specialist interests, should have some apprehension of science as a whole. We were not, therefore, surprised to find the article (or pamphlet, as it calls itself) to be a sober and considered treatment of this vital subject, well worth careful perusal.

Dr. G. D. Hobson contributes a valuable survey of "Producing Oils," to which he gives the modest sub-title, "Science Lends a Hand." Not unnaturally, the major portion of the article is devoted to the nature, winning, and treatment of petroleum; but a brief summary is also included of the characteristics of animal and vegetable oils. The other articles, "Plant Breeding and Genetics" and "Science in Building," take us farther from our own subject, but are none the less worth reading for that. We would cite the development of the sweet lupin as an example of a stirring piece of scientific research and its application to topical problems. A small item of "private" good news is the re-opening of Down House, happily intact after many hazards.

HANDBOOK FOR ELECTRIC WELDERS. Waltham Cross, Herts: Murex Welding Processes, Ltd. Revised edition, 1945. Pp. 185. 5s.

The purpose of the revised edition of this well-produced handbook is to bring the information contained in previous editions into line with modern knowledge. Less emphasis is now laid on the elementary aspects if welding and such instructions as are given are of the special rather than the general type. Altough the handbook is not meant as a textbook, those who wish to perfect their knowledge of the applications of electric welding, and students in particular, will undoubtedly find the revised edition, which contains many illustrations, of considerable value. It is to be noted with regret that the publishers follow the bad custom of defacing the flyleaf with a rubber stamp "complimentary copy."

U.K. Lead Supplies

Further Licensing Arrangements

IN continuation of their measures to ration supplies of lead (*see* THE CHEMICAL AGE, January 19, p. 86), the Ministry of supply now announce the basis on which licences will be granted for unwrought lead of less than 99.97 per cent. lead content and for scrap lead.

This basis is, for each month of the first quarter of 1946, 100 per cent. of the average monthly receipts of such lead in the period September to December, 1945. Separate licences will be granted for unwrought lead of less than 99.97 per cent. lead content and for scrap lead. Licences already granted in January will count against each consumer's allocation on the above basis, and any necessary adjustments will be made in the licences to be issued for February and March. The above arrangements apply to all consumers of over two tons a month.

Further Technical Reports from Germany

Synthetic Fuels and Alloy Steels

THE following additional reports, submitted by teams of industrial experts, who have visited Germany under the auspices of the Combined Intelligence Objectives Sub-Committee of the British Intelligence Objectives Sub-Committee for the collection of scientific and technical intelligence from German industry, have just been published by H.M. Stationery Office. A previous list of reports thus published appeared in THE CHEMICAL AGE of December 22, 1945. All prices are exclusive of postage.

The following reports are of special interest to the chemist and metallurgist:

CIOS XI—13. *Elektrowerk-Weisweiler, nr. Eschweiler*: Plant lay-out and equipment for manufacture of ferro-alloys of silicon, chrome, manganese, molybdenum and tungsten (2s.).

CIOS XXIII—19. *Gustave Seigal A.G., Feuerbach, nr. Stuttgart*: Production of aluminium hydroxide pigment and silicate catalysts (6d.).

CIOS XXIV—21. *I.G. Farbenindustrie A.G., Mainkur Works, Fechenheim*: Production of intermediates for plastics and resins (1s.).

CIOS XXIV—22. *The Electrochemical Industry, Bitterfeld Area*: Production of magnesium, aluminium, magnesium alloys, chlorine, and fabrication of light metal (3s.).

CIOS XXIV—28. *The Deutsche Edelstahlwerke, Krefeld*: Production of alloy steels (2s.).

CIOS $XV—1. *Kaiser Wilhelm Institut fur Kohlenforschung, Mülheim*: Chemical and chemical engineering laboratories (2s.).

CIOS XXV—4. *Wirtschaftliche Forschungs G.m.b.H., Aussenstelle München* 1 (*W.I.F.O.1*) *Stockdorf, nr. Munich*: Aviation gasoline (6d.).

CIOS XXV—25. *Krupp Treibstoffe Werke G.m.b.H., Wanne-Eickel*: Inspection of Fischer-Tropsch and Krupp-Lurgi low-temperature carbonisation plant (1s.).

CIOS XXV—27. *War-time Research on Synthetic Fuels, Kaiser Wilhelm Institut für Kohlenforschung* (1s.).

CIOS XXV—38. *Deutsche Edelstahlwerke, Krefeld*: High-alloy steel production (2s. 6d.).

CIOS XXVI—32. *August Thyssen, Hülle A.G., Hamborn*: Steel production, including rails and shell steel (2s. 6d.).

CIOS XXVI—73. *Insecticides, Insect Repellents, Rodenticides and Fungicides, I.G. Farbenindustrie A.G. Elberfeld and Leverkusen* (4s.).

CIOS XXIII—12. *Pharmaceuticals and Insecticides at I.G. Farben Plants, Elberfeld and Leverkusen* (11s.).

CIOS XXIII—20. *Manufacture of Insecticides, Insect Repellents, Rodenticides, I.G. Farben, Leverkusen and Elberfeld* (1s.).

CIOS XXIV—12. *I.G. Farbenindustrie—Oppau Works, Ludwigshafen*: Manufacture of nickel carbonyl and iron carbonyl powder (1s. 6d.).

CIOS XXIV—20. *Work on Antimalarials, I.G. Farben, Elberfeld* (2s.).

CIOS XXV—6. *Steinkohlen-Bergwerk Rheinpreussen Moers-Meerbeck*: Synthetic fuel production (13s.).

CIOS XXV—7. *Plant of Klocknerwercke A.G. Castrop-Rauxel*: Synthetic fuel production (1s. 6d.).

CIOS XXV—13. *Messrs. Steeg and Reuter, Bad Homburg*: Production of piezo electric crystals for frequency control (1s.).

CIOS XXV—16. *Manufacture of Phlegmatised P.E.T.N. at Fabrik zur Verwertung Chemischer Erzeugnisse G.m.b.H., Wolfratshausen* (1s.).

CIOS XV—26. *I.G. Farbenindustrie, Mainkur-Hoechst*: Crude oil demulsifying agents, and miscellaneous chemical products (3s.).

CIOS XXV—54. *Pharmaceuticals at the I.G. Farben Plant, Elberfeld* (12s. 6d.).

CIOS XXVI—51. *Plant of Chemische Werke Hüls*: Production of acetylene, etc., from natural gas (1s.).

CIOS XXVI—63. *Röhm and Haas, Darmstadt*: Plexiglas materials and enzymatic products (1s. 6d.).

CIOS XXVII—14. *I.G. Farbenindustrie, Hoechst/Main*: Chemicals and drugs (5s.).

CIOS XXVI—68. *Fischer-Tropsch Unit Leipzig Gas Works* (1s.).

CIOS XXVII—82. *Fischer-Tropsch and Allied Processes* (2s.).

BIOS 73. *Laboratorium für Elektronen und Ionenlehre at Schwarzenfeld*: Testing methods for gas filters and gas protection (1s. 6d.).

BIOS 82. *Inspection of Hydrogenation and Fischer-Tropsch Plants in Western Germany during September, 1945*: Developments in German synthetic liquid fuel industry (2s. 6d.).

BIOS 89. *Vereinigte Deutsche Metallwerke A.G., Frankfurt (Main)—Heddernheim*: Production of aluminium and magnesium alloy castings, crankcases, etc. (2s. 6d.).

BIOS 91. *Professor O. Mecheels (Textile Scientist), Hobenstein Schloss bei Bonningheim*: Improvements for protection against hazards (6d.).

BIOS 112. *Interim Report of Freon-12 at I.G. Works, Hoechst* (3s. 6d.).

BIOS 113. *The German Abrasive Industry* (6s.).

Personal Notes

MR. J. B. THOMAS has been appointed managing director of Hadfields, Ltd.

MR. I. H. PHILLIPS, until recently chief chemist at Samuel Wills & Co., Ltd., has been appointed a director.

MR. G. F. A. BURGESS has been appointed a managing director of the British Metal Corporation, Ltd.

LT.-COL. A. S. LOWE has been elected to the board of the Dorr-Oliver Co., Ltd., and MR. A. TERRY, jr., has rejoined the board.

MR. W. D. BUSH, shift process chargehand, of I.C.I., Ltd., was awarded the British Empire Medal in the New Year Honours.

DR. J. W. WHITAKER, Principal of Huddersfield Technical College, has been appointed Director of the Fuel Research Station, Dhanbad.

MR. J. A. PENTECOST and MR. C. C. HUSSEY have now resumed their duties with Messrs. A. Boake, Roberts & Co., Ltd., on their return from service with the R.A.F

MR. H. R. MACKILLIGAN has been elected a director of the Indian Copper Corporation on his retirement from the post of general manager in India.

MR. CYRIL LONG, lecturer in biochemistry at Queen's University, Belfast, has been appointed to a similar position at Aberdeen University.

MR. W. BANKES AMERY, head of the U.K. Food Mission in Australia, is to be United Kingdom member on the board of the British Phosphate Commissioners.

PROFESSOR A. R. TODD, Professor of Organic Chemistry at Cambridge, has been appointed to the Colonial Products Research Council, in place of SIR ROBERT ROBINSON, P.R.S., who has resigned.

MR. E. J. DRAKE, deputy controller of chemicals in the Australian Ministry of Munitions, is a member of a mission which left last year for Japan to investigate scientific developments.

THE HON. R. M. PRESTON (managing director, Rio Tinto Company), has been appointed chairman of council of the Copper Development Association, and MR. S. S. TAYLOR (managing director, Rhokana Corporation) vice-chairman of the council.

MR. G. B. O'MALLEY has resumed his duties as technical representative, in Australia, for North American Cyanamid, Ltd., and associated companies. For the past three years he has been associated in a part-time capacity with the Council for Scientific and Industrial Research as officer-in-charge of the joint physical metallurgy section of the Division of Industrial Chemistry.

DR. G. DUNN has been elected a vice-chairman of the international executive council of the World Power Conference. He has been chairman of the American National Committee of the Conference since June, 1945.

MR. L. BOON, who has been secretary of Genatosan, Ltd., for 22 years, has been appointed director and general manager, and DR. G. M. DYSON, who for some years has been chief chemist and technical manager, has been appointed a director.

PROFESSOR J. N. MUKHERJEE, Ghosh Professor of Chemistry, University College of Science, Calcutta, has been appointed Director, Imperial Agricultural Research Institute, Delhi, in succession to Dr. B. Vishvanath.

MR. P. C. DICKENS has relinquished his appointment as treasurer of Imperial Chemical Industries, Ltd., on his retirement from the service of that company, and has been succeeded by MR. J. L. ARMSTRONG.

MR. L. V. FILDES has given up the office of secretary of Lever Brothers & Unilever, Ltd., which he has held since 1919, and has been appointed an advisory director. MR. H. SAUNDERS, of the Middle Temple, is to succeed him.

SIR CLIVE BAILLIEU, president of the F.B.I., has been nominated for a second year of office. The Grand Council meeting also decided that Sir Guy Locock, the retiring director, be recommended for election as a vice-president.

MR. E. G. FUDGE has been appointed Under Secretary in the Ministry of Fuel and Power, Health, Safety in Mines and Training Division, and MR. F. C. STARLING has been appointed to the same post in the Petroleum Division.

MR. C. S. EVANS has relinquished his position as head of the Fuels and Furnaces Department in the laboratory of High Duty Alloys, Ltd.. and has been appointed development engineer with Gibbons-Wild-Barfield Electric Furnaces, Ltd., Dudley.

MR. A. N. LEATHER, B.Sc., F.R.I.C., the Manchester deputy city analyst, was appointed City Analyst of Salford on January 21s, in succession to DR. G. H. WALKER, B.Sc., Ph.D., F.R.I.C., now Lancashire County Analyst.

DR. S. SIDDIQUI, officiating director of the chemical laboratories of the Council of Scientific and Industrial Research, Delhi, has proceeded to the United Kingdom. He will be attached to the Dominion Scientific Liaison Offices in the U.K. and will represent the C.SI.R., India, in connection with the preparation of the agenda relating to the Empire Scientific Conference, proposed to be held in the U.K. in July, 1946.

Professor W. H. Roberts, M.Sc., F.R.I.C., has had his term of office as Liverpool's City Analyst extended by a further six months. He was due to retire some four years ago and during this extension he will celebrate the fiftieth anniversary of his graduation as a scientist.

Mr. J. Douglas has relinquished his position as chairman of the Bradford Dyers' Association, but retains his directorship. He is being succeeded by Mr. J. Ewing. Sir Thomas Robinson, who has been vice-chairman for 22 years, has retired but will remain a director.

Lieut.-Commander F. G. Williams, R.N.R., late of British & Continental Traders, Ltd., London, has been demobilised after 4½ years' naval service, and has now joined the sales staff of Bradley & Foster, Ltd., Darlaston Iron Works, Darlaston, Staffs.

Mr. W. E. Redfern, founder of Redfern's Rubber Works, Ltd., Hyde, Cheshire, retired from the board of directors on December 31, 1945, after 46 years of unbroken service, which included 33 years as a managing director and 41 years as chairman.

Dr. Robert Stewart, who has been appointed head of the advisory department of Fisons, Ltd., fertiliser manufacturers, of Ipswich, is Professor of Chemistry at the West of Scotland Agricultural College, Glasgow, and was an officer under the Ministry of Agriculture's advisory service at the Universities of Manchester and Bristol. He will supervise research on fertilisers for Fisons.

Mr. D. W. Cooper, who in 1942 was seconded from George Cohen, Sons & Co., Ltd., to take up the appointment of Assistant Controller of Machine Tools, and has for the past years been Director of Machine Tool Disposals, has joined the board of the Selson Machine Tool Co., Ltd., one of the "600" group of companies, of which George Cohen, Sons & Co., Ltd., are the parent concern.

Obituary

Mr. Harry Hankey, who died at Burnley on January 15, aged 61, was head of H. Hankey & Co., Ltd., manufacturing chemists, Standish Street, Burnley.

Mr. D. G. Sutherland, who died on January 10, had been Senior Bacteriologist to the Metropolitan Water Board until his retirement on March 31, 1930, after 24 years' service with the Board. His entry into the service of the Board coincided with the inception of the Water Examination Department. He had had wide experience in all questions relating to water supply, drainage, sewage disposal, etc., and had been Medical Officer of Health to the County of Sutherland for nine years.

Monsieur Charles Berthelot, who died on November 24, at the age of 59, was also a distinguished member of the Société de Chimie Industrielle. He specialised as a chemical engineer in fuel problems, and was chief research engineer to the Coke-Oven Society of Paris in 1917-20. He had travelled much abroad, and contributed extensively to the literature of mining, of coal in all its aspects as well as of peat and oil shale, synthetic fuels, wood distillation, etc.

The December issue of *Chimie et Industrie* records the death of two distinguished Frenchmen. Monsieur Felix Binder, who died on October 20, his 85th birthday, was one of the leading spirits in the foundation, after 1918, of the French Society of Chemical Industry. A native of Alsace, he was well known in the textile chemistry and dyestuffs industries, and had been president of the Association of Textile Chemists as well as a director of the Société des Matières Colorantes et Produits Chimiques de St-Denis.

Dr. E. H. Boomer, M.Sc., Ph.D., who died recently at his home in Edmonton, Alberta, was chairman of the Petroleum and Natural Gas Conservation Board of Canada, head of the chemistry department at the University of Alberta, and an expert in liquid fire warfare. After studying at the University of British Columbia and at McGill University, he worked under Lord Rutherford in the Cavendish Laboratory at Cambridge, as a Ramsay Memorial Fellow. He was elected Fellow of the Royal Society of Canada in 1942, and in 1945 he went to Germany to study the German oil industry.

NEWS FROM JAPAN

The Japanese chemical industry is, according to *Reuter*, rapidly recovering from the war, the chief bottleneck being the coal shortage. An official survey recently carried out for the U.S. Chief of the reparations commission indicates that despite heavy bombing, output will approach pre-war levels if coal can be supplied to the industry during the first months of this year.

Only three of Japan's twenty pre-war nitrogen fixation plants are at present in operation, while capacity for superphosphate production almost equals output in 1939. Camphor-producing plants suffered considerably from war damage, but output by the middle of the year is expected to be at about half the pre-war rate. Japan has four soda ash factories capable of producing approximately 150,000 tons a year, compared with an output of more than 350,000 tons in 1938.

General News—From Week to Week

By the Control of Textile Bags (No. 2) Order, 1946 (S.R. & O. 1946, No. 83), sandbags are released from control.

The Annual General Meeting of the Royal Institute of Chemistry will be held on March 12, following the Anniversary Luncheon, at the Savoy Hotel, London

New industrial safety groups have been formed at Bristol and Wolverhampton, and are holding their inaugural meetings immediately. Plans to form a group at Norwich are also proceeding.

Exports of crude glycerine from Eire showed a considerable drop during 1945. Shipments for the first ten months amounted to only 489 cwt. (£1124), against 2727 cwt. (£6311) in the same period of 1944.

The British Colour Council announces that it has acquired No. 13 Portman Square, London, W.1, for the post-war development of its services to industry. At the annual general meeting Dr. C. J. T. Cronshaw was elected president.

The Birmingham and Midlands Section of the Royal Institute of Chemistry is repeating the chemical engineering course (given in 1944), in response to many requests. The lectures will be given by Mr. E. Woollatt, B.Sc., A.M.I.Chem.E. Applications for the course, which will be held from April 6 to 13, should reach Mr. E. M. Joiner, 15 Halton Road, Sutton Coldfield, before January 31.

In their advertisement in our issue of January 12 (p. xxxviii) the address of Spencer, Chapman & Messel, Ltd., was given as 33 Chancery Lane, W.C.2, and the telephone number as Holborn 0372. This is in fact a little premature, and we are asked to state that their address remains, for the time being, 23 Grange Road, Sutton, Surrey. (Telephone, Vigilant 1195.)

The working arrangement between the Royal Society for the Prevention of Accidents and the Ministry of Labour comes to an end on April 1 next, and advantage is being taken of the opportunity to make certain changes in the Industrial Membership Scheme. Full details may be obtained on application to the Society at 52 Grosvenor Gardens, London, S.W.1.

Awards amounting to £10,000 were made on Tuesday from the Harmsworth Trust Fund to the three leading scientists who discovered and developed penicillin. Sir Alexander Fleming was presented with a cheque for £5000, Sir Howard Florey and Dr. Boris Chain with cheques for £2500 each. Lord Horder made the presentation at a luncheon given by Sir Harold Harmsworth at the Savoy Hotel, London.

The latest addition to the "Hints to Business Men," series of pamphlets, published by the Department of Overseas Trade, has just been issued, and deals with Southern Africa. (H.M.S.O., 6d.), including the Union, Northern and Southern Rhodesia, and Nyasaland.

Studies of the toxicity and pharmacological action of α-naphthylthiourea are included in *Pub. Health Rep.*, 1945, *60*, 1101, and *J. Amer. Med. Assoc.*, 1945, *129*, 927. A brief résumé of these article, with a report of the efficacy of the material as a rat poison, is published in *Pharm. J.* (1945, *156*, 28).

The X-ray Analysis Group of the Institute of Physics announces that, by kind permission of the managers, its 1946 Conference will take place at the Royal Institution, London, on July 9, 10, 11 next, and is open to all without charge. It is hoped that several distinguished foreign scientists will participate.

Foreign News

Bolivian State oil refineries will be given a grant of $5,000,000 to build a pipeline and a new refinery.

Employing approximately 1300 workers, the Canadian Government's synthetic rubber plant at Sarnia is producing about 50,000 long tons a year.

The Société d'Electro-Chimie, Electro-Metallurgique et Aciéries Electriques d'Ugine is to increase its capital in one or more stages to 1500 million francs by the issue of new shares.

Since Nauru and Ocean Islands have been reoccupied, New Zealand will again receive shipments of phosphate, but of necessity it will be several years before the pre-war figure of 1,250,000 tons a year is reached.

New Austrian petroleum deposits with estimated reserves of 200,000 tons are reported to have been discovered at Leobrechten. They will be used to supplement production from the Zisterdorf deposits.

The B.F. Goodrich Company, Akron, Ohio, has announced plans for the construction of a new plant in Marietta, Ga., to be equipped for producing and processing plastics at a cost of four million dollars.

The Geological Survey of America has completed a report on the zinc-lead deposits of the Kokomo (or Tenmile) mining district, Colorado. This district, which is part of an extensive mineral-bearing area in the Rocky Mountains of north-central Colorado, has in the past yielded a substantial quantity of base metals, chiefly zinc and lead.

The Standard Chemical Company, Ltd., has been appointed as exclusive Canadian distributor for products of United States Industrial Chemicals, Inc.; it is one of the larger American chemical companies supplying such materials as synthetic and natural resins, solvents, etc.

Dolomite found in the northernmost Chilean province of Tarapaca, said to be the only deposit on the South American continent, has demonstrated extraordinary qualities in tests made in the laboratories of the University of Chile and of the New York State College of Ceramics. Reserves amount to 25,000,000 tons of crude dolomite and over 8,000,000 tons of select material.

Four superphosphate plants are now in operation in Sicily, with a combined annual capacity of 750,000 quintals. A fifth plant, it is hoped, will be able to resume production at an early date, and, provided sufficient supplies of phosphate rock from North Africa can be obtained, annual output should then be in the region of 1,000,000 quintals—or almost equal to Sicily's annual requirements.

One of Belgium's largest manufacturers of copper sulphate has resumed operations. The copper supply situation has improved considerably, with copper now arriving from the Belgian Congo and copper scrap available inside the country, but the scarcity of fuel continues to remain a major obstacle. The company will supply France with 3000 tons of copper sulphate inside six months.

The Republic Chemical Corporation, 94 Beekman Street, New York, 7, has issued a 272-pp. catalogue of inorganic and organic chemicals, including more than 500 items. It gives the formula, chemical and physical characteristics, uses and trade customs of old and new chemical products, and claims to keep abreast of all developments in the chemical industry. It is obtainable free of charge on application.

The Stabilimento Minerario del Siele, an Italian mercury company second in importance to the Monte Amiata Company, reports that its mines in Piancastagnaio have suffered only slight war damage. However, a large number of flasks had been removed by both the Germans and by officials of the so-called Neo-Fascist Republic. The Italian Government is reported to have now paid a fair compensation for this damage.

Forthcoming Events

January 28. Chemical Society. Chemistry Theatre, University College, Swansea, 6 p.m. Professor J. Kendall: "The Separation of Isotopes and Thermal Diffusion."

January 28. Electrodepositors' Technical Society. Northampton Polytechnic Institute, St. John Street, London, E.C.1, 5.30 p.m. Mr. E. H. Laister: "Rhodium Plating."

January 29. British Association of Chemists. Moon Hotel, Spondon, Derby, 7 p.m. Film Show.

January 30. British Association of Chemists. Gas Industry House, 1 Grosvenor Place, London, S.W.1, 6.30 p.m. Mr. S. B. Heys: "English Banks at Your Service."

January 30. Society of Chemical Industry (Newcastle-upon-Tyne Section). Chemistry Lecture Theatre, King's College, Newcastle-upon-Tyne, 6.30 p.m. M. E. Haine: "The Electron Microscope."

January 30. The Institute of Welding. Institution of Civil Engineers, Great George Street, Westminster, London, S.W.1, 6 p.m. Capt. R. B. Croft and Capt. O. Lithgow: "Mobile Welding with the Royal Engineers."

January 31. The Association for Scientific Photography. Caxton Hall, Westminster, London, S.W.1, 6.30 p.m. Mr. H. T. F. Rhodes: "Forensic Photography."

February 1. Royal Institute of Chemistry. (Birmingham and Midlands Section). Birmingham University, Edmund Street, 7 p.m. Sir Howard Florey, F.R.S.: "Penicillin."

February 1. Society of Chemical Industry (South Wales Section). Royal Institution of S. Wales, Swansea, 6.30 p.m. Dr. R. T. Colgate: "Technics of Tins."

February 1. Institution of Chemical Engineers and Society of Chemical Industry (Chemical Engineering Group and Glasgow Section). Royal Technical College, Glasgow, 7.15 p.m. Dr. E. T. Wilkins: "The Preparation of Clean Coal for Special Purposes."

February 4. Society of Chemical Industry (Food Group and London Section). Rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1, 6.15 p.m. "The Treatment of Water for Food Manufacturing Purposes." Mr. G. Carter: "Purification of Water for Food Purposes"; Mr. F. Howard and Mr. E. C. Spooner: "Removal of Taints from Water"; and Mr. E. L. Holmes and Dr. E. I. Akeroyd: "The Rôle of Ionic Exchange in the Treatment of Water."

February 5. Electrodepositors' Technical Society (Birmingham Section). James Watt Memorial Institute, Great Charles Street, Birmingham, 6.30 p.m. Dr. J. H. Nelson: "The Reflectivity of Metals."

February 6. Institute of Fuel. Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. Mr. E. C. Evans: "Utilisation of Waste Heat in Metallurgical Furnaces."

February 6. Institute of Fuel. Engineers' Club, Manchester, 2.30 p.m. Mr. A. T. Green: "Factors Influencing the Durability of Refractory Materials in the Carbonising Industries."

February 6. British Association of Chemists (Birmingham Section). Chamber of Commerce, Birmingham, 6.30 p.m. Mr. R. V. Wadsworth: "Insect Pests and the Food Chemist."

Company News

English China Clays, Ltd., report a profit, to December 31, 1945, of £67,503 (£53,460). An ordinary dividend of 2½ per cent. (2 per cent.) has been declared.

The Whitehead Chemical Company, Ltd., Manchester, has increased its nominal capital beyond the registered capital of £1000 by the addition of £4000 in £1 ordinary shares.

Benn Brothers, Ltd., have declared a dividend of 3 per cent. on the preference shares for the half-year ended December 31, 1945, and an interim dividend of 5 per cent. on the ordinary shares (same).

Drug Houses of Australia, Ltd., are endeavouring to hold and expand the export trade in drugs and chemicals developed by the company and its associates during the war, and a company, known as Drexo Pty., Ltd., has been formed to take over that important project.

Redfern's Rubber Works, Ltd., report a net profit, for 1945, of £23,911 (£18,210). Final dividends of 3¾ per cent. on the A and B preference shares, making 7½ per cent., and of 6½ per cent. on the ordinary shares, making 10 per cent., plus a bonus of 2 per cent. have been declared.

The directors of **Lever Brothers & Unilever** have called extraordinary meetings for February 18, to approve the promotion of a Bill in Parliament to remove doubts as to the interpretation of the Bromborough Dock Acts, 1923 to 1930, and to reaffirm the Equalisation Agreement made with Lever Brothers and Unilever N.V. in 1937.

British Titan Products Co., Ltd., Billingham, have increased their nominal capital beyond the registered capital of £325,000, by the addition of £800,000. The additional capital is divided into 800,000 "A" shares of £1 each. Holders of the shares already issued include Goodlass Wall & Lead Industries, Ltd., R. W. Greeff & Co., Ltd., Imperial Chemical Industries, Ltd., Non-Ferrous Metal Products, Ltd., and the Titan Co., Inc.

New Companies Registered

Wilkinson's (Chemicals), Ltd. (403,180). Private company. Capital £2000 in £1 shares. Manufacturers of and dealers in chemicals, gases, drugs, etc. Directors: A. Youd, A. V. Youd, H. Rhoades, J. B. Gower. Registered office: Arcade Buildings, Station Road, Blackpool.

State Chemicals (London), Ltd. (403,084). Private company. Capital £100 in £1 shares. Manufacturing chemists, etc. Subscribers: Eileen Hawtin, Renee Sharon. Registered office: 203 Regent Street, W.1.

F. M. & B. Cranborne, Ltd. (403,143).—Private company. Capital £100 in £1 shares. Manufacturers of and dealers in chemicals, fine chemicals, chemical products, oils, etc. Director: Mrs. B. Roberts. Registered office: 30 Brown Street, Manchester.

Ventilation & Vessels, Ltd. (403,237).—Private company. Capital £2,000 in £1 shares. Chemical plant, sanitary, heating, ventilating and general engineers, designers, manufacturers and erectors of pressure vessels, etc. Directors: E. J. Saggars, R. R. Saggars, Olive M., Joplin. Registered office: 46 The Viaduct, Roxeth Green Avenue, South Harrow, Middlesex.

Commercial Intelligence

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

Mortgages and Charges

(Note.—The Companies Consolidation Act of 908 provides that every Mortgage or Charge, as described therein, 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 and 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.)

BRITISH ALUMINIUM CO., LTD., London, E.C. (M., 26/1/46.) December 21, charge contained in a conveyance securing to Lady Ethel B. Edgar, Gerrards Cross, all moneys that may be properly and reasonably expended by chargee (or her successors in title, etc.), in the repair and maintenance of a private roadway and repayable by the company; charged on two pieces of land at Chalfont St. Peter. *£3,227,336. April 10, 1945.

WINSO, LTD., London, W., chemical manufacturers. (M., 26/1/46.) December 10, charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on Arcadia Works, Arcadia Avenue, Finchley. *——. July 28, 1944.

Chemical and Allied Stocks and Shares

DESPITE a tendency to await Parliamentary discussion on coal nationalisation and the forthcoming Bill for creation of a National Investment Board, business

in stock markets has been active, with prices in most sections moving higher under the lead of continued strength in British Funds. The further sharp gains in the latter have given rise to the assumption that a big new Government loan may be impending. Colliery shares, electricity supply issues, and other nationalisation groups tended to be firmer but movements did not exceed more than a few pence, and there was a general reaction in South African gold-mining shares, while base metals lost some of their recent gains.

After easing to 40s. 4½d. Imperial Chemical rallied to 40s. 7½d., and there was buying of Turner & Newall up to 82s. 9d., while the units of the Distillers Co. moved up to 122s. 6d. Higher dividend hopes maintained activity in British Plaster Board which were 36s., with Associated Cement 56s. United Molasses were 45s. 3d., British Oxygen active around 65s. 9d., Murex steady at 93s. 9d., and Metal Box 96s. 3d., while Borax Consolidated deferred remained at 43s. 3d. B. Laporte have been firm at 83s. 9d., with business up to 60s. recorded in Johnson Matthey ordinary. Greeff-Chemicals Holdings 5s. shares again changed hands around 11s. 3d., and there was more business up to 13s. 9d. in British Glues 4s. Ordinary. Erinoid held their recent rise to 12s. 3d., British Industrial Plastics were 6s. 9d., and De La Rue £10¼.

Iron and steel shares continued to attract rather more attention on the belief that the industry will not be included in Government nationalisation schemes. Hadfields were 32s., United Steel 25s. 9d., Ruston & Hornsby 59s., and Babcock & Wilcox 60s. 3d. Among collieries, Powell Duffryn were 21s. 1½d., with Staveley 45s., and Bolsover 48s. Courtaulds remained active and were around 57s. 6d., but cotton textiles eased despite hopes that various restrictions may shortly be removed in order to stimulate export trade. Bradford Dyers showed firmness at 26s. 4½d., but Lancashire Cotton receded to 36s. 9d.

Gas Light & Coke were 20s. 7½d., and among electric supply shares County of London advanced to 41s. 4½d., on talk of higher dividend possibilities. Electric equipments became firmer with Associated Electrical 57s. 7½d. and General Electric 94s. Sangers were 30s. 9d. "ex" the maintained interim dividend, and Boots Drug were firm at 57s., with Timothy Whites 45s., and Beechams deferred 21s., while British Drug Houses were maintained at 50s. Hopes that further restrictions in the base metal industry may be removed assisted Amalgamated Metal, which improved to 19s., and Imperial Smelting became firmer at 15s. In other directions Tube Investments at £5 15/16 lost part of an earlier rise. Burt Boulton were 26s., and Cellon 5s. ordinary 27s., while British Ropes 2s. 6d. ordinary shares transferred around 9s. On the next occasion the report of the last-named company is expected to be accompanied by consolidated accounts for the whole group. Lawes Chemical 10s. ordinary have been attracting some attention, dealings ranging around 13s. 9d. In other directions, Lancashire Dynamo shares held firm at £5¼, Leeds Fireclay preference have been dealt in at 14s. 9d., and Keith Blackman ordinary strengthened to 42s. 6d.

Application for permission to deal in the issued share capital of British Alkaloids is being considered by the Stock Exchange Council as we go to press; dealings were expected to open on Friday at 8s. 6d.-9s. for the 1s. ordinary shares and at about 55s. for the partly paid preference shares.

After a general improvement, oil shares tended to ease, Shell, Anglo-Iranian, and Burmah Oil all losing part of earlier gains. Canadian Eagle Oil remained active up to 24s., and C. C. Wakefield firmed up to 59s. 9d.

British Chemical Prices

Market Reports

FIRM price conditions characterise all sections of the London general chemicals market, there being a sustained demand both for home and export account. Contract deliveries to the leading consuming industries are proceeding satisfactorily and traders report a fair volume of new bookings. An active inquiry has been maintained for bichromate of soda, caustic soda, yellow prussiate of soda, and sodium sulphide, quotations for the last-named item being slightly dearer. The potash products are all well held on an active demand with permanganate of potash a brisk market. Acetic, oxalic, citric, and tartaric acids continue in strong request, while a steady trade is passing in acetone and formaldehyde. Following the recent advance in the price of the metal; higher quotations are now operating for white lead and red lead. Dry English white in 8 cwt. casks being £67 per ton, ground in oil £78 10s. per ton for 5 cwt. casks. Dry red lead is quoted at £54 per ton. The market in the coal-tar products is steady, with values firm. A good export inquiry is reported for xylol, naphtha, and toluol.

MANCHESTER.—Generally firm price conditions have continued on the Manchester market for heavy chemicals during the past week, and fresh inquiry, both for home use and for shipment, has been circulating in a fairly wide range of materials. The cotton trade has been taking steady deliveries of bleaching, dyeing, and finishing chemicals, and there has been a steady call also from other textile branches. The leading alkalis, ammonia and magnesia compounds, and mineral acids have all been moving to the consuming end in good quantities. Among the fertilisers, superphosphates, basic slag, lime, and sulphate of ammonia are meeting with a fairly steady demand.

GLASGOW.—In the Scottish heavy chemical trade, business during the past week has shown a decided improvement. Prices remain firm. Export inquiries are still being received regularly.

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