The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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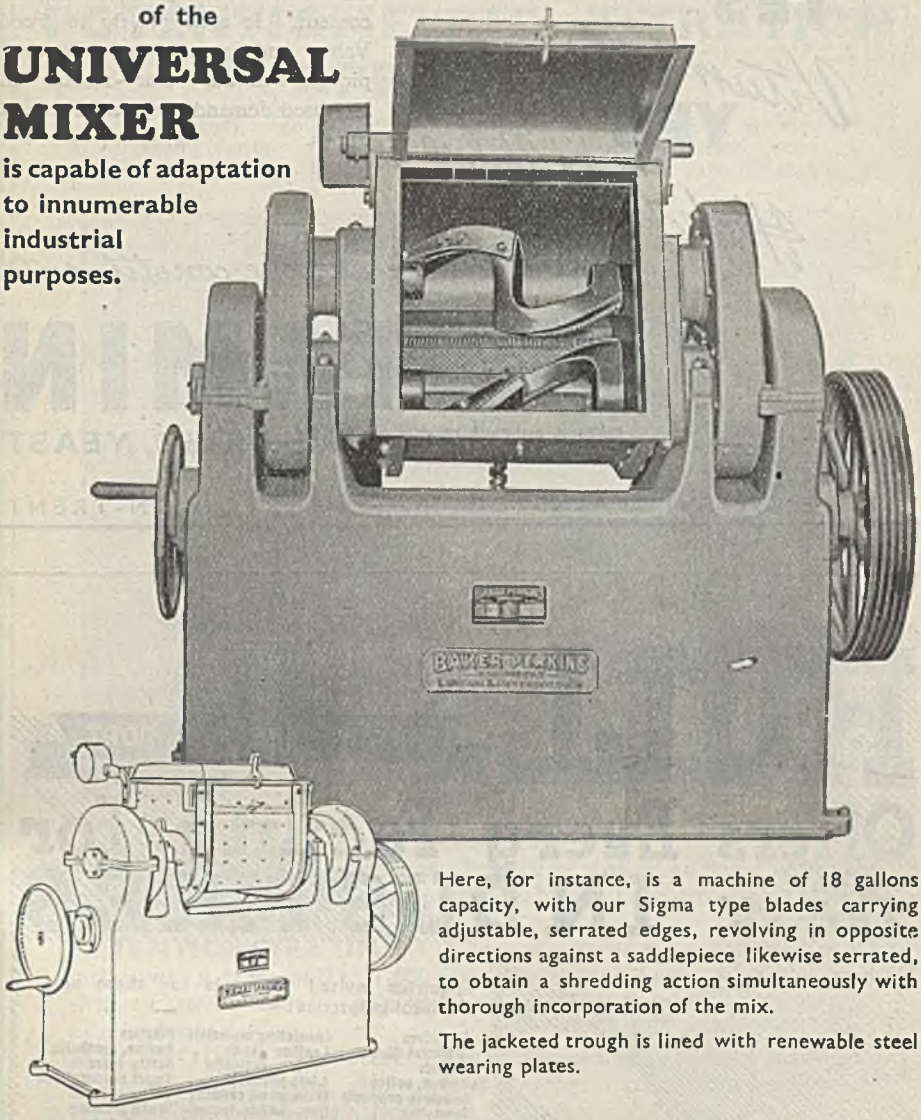

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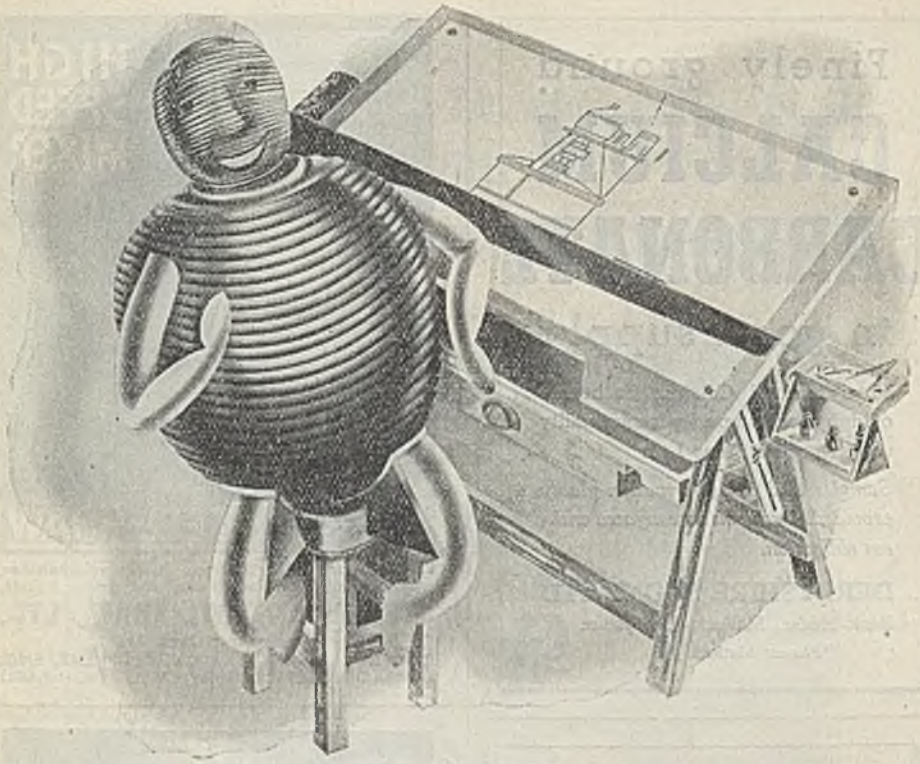

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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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No Revival for I.G. Farben

IF Germany is to regain a balanced economy, she must pay with exports for the imports she will be obliged to receive from this and other countries. So say the economists, and certainly the British taxpayer cannot be asked to pay Germany's food bill. The Quadripartite Control Commission has already made its decisions restricting certain German manufactures, including heavy chemicals, and the trouble now is to discover what commodities Germany can be allowed to export which will not constitute a potential danger to the future peace of the world.

One proposal which has been put forward is that Germany shall be allowed to resume the free export of dyestuffs and pharmaceuticals. It is quite obvious to any chemist that this proposal has been made by someone who has no conception of the implications involved. The very title of the greatest industrial asset of German military power—I.G. *Farben*—betokens its origin in a dye-making concern. Dyestuffs and pharmaceuticals are among the cardinal products of the organic chemical industry, which nowadays is at least as important as the heavy chemical industry in the preparation for a change-over from peaceful to warlike manufacture. Toxic gases, synthetic rubber, synthetic fuels, special propellants, are only a few of the munitions of war whose existence depends on a full knowledge of the technology of organic chemistry.

Another danger implicit in the export of dyestuffs on a large scale is that these commodities require a technical service to supply advice to users concerning the methods by which the various materials are to be employed. Germany always maintained a high-class technical service of specialists in the countries to which she exported her dyestuffs; but these specialists did not limit their interests to the commercial sphere; they also carried on underground activities on behalf of the warmongers of their own country, not excluding military espionage. To re-establish such a service would be to provide Germany with the network of tentacles which she would need to strangle her enemies yet once again when the time is ripe—such tentacles as nearly strangled the world in the period between the last two German wars. It is no argument to say that the head of the octopus will no longer exist because the Allies will have split up the I.G. into component parts. As soon as Allied control disappears, as in time it must, the Germans will quickly find a way

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to organise a co-ordinating centre from which to galvanise the tentacles into action. The operating brain—the men with the "know-how"—will be ready.

In spite of all this, it seems that certain influential sections of the Control Commission are recommending that the dyestuffs industry should be seriously considered as a means through which Germany should rehabilitate her finances. Information has reached this country from French sources that there is some prospect that the present proposal may soon become a decision.

It is not surprising, therefore, that the Council of the Association of British Chemical Manufacturers should be urging with all their might that the German dyestuffs industry must be completely eliminated before Allied control is removed. While world shortages of these commodities exist, the German dyestuffs industry may be allowed to continue under appropriate control; but as soon as these shortages can be made up from other sources, as they will be, then the German industry should be abolished and its technicians dispersed. It may be that after a period of re-education, when Nazi ideas have been eliminated from the German mind, the potential danger of this industry will also vanish, just as no one seriously considers the British dyestuffs industry as a weapon of war. Then, mayhap, the Germans can be allowed to reconstitute their dyestuffs industry, and take their place as ordinary competitors in the commercial market. Meanwhile, however, the teams of technicians, many of whom are tarred with the Nazi brush, must be allowed to die out. The danger involved in the distorted minds of the present generation is surely too great to be allowed to subsist. Those who would urge that Germany should be allowed to retain her domestic dyestuffs industry may revise their opinion when they realise that in 1938 Germany exported 40,000 tons, valued at 140 million marks, out of a total dyestuffs production of 60,000 tons.

Similarly, the German pharmaceutical industry must be reduced to a position in which it can supply only domestic needs, as soon as world shortages of drugs are eliminated. Here it will probably not be possible to do away with the industry altogether, but it must at all events be reduced to such a level that there is no danger of the reconstitution of technical squads who can be turned over to warlike production at a moment's notice.

There is need for immediate action. Other methods must be found whereby Germany can pay her import bill, and found very rapidly, as the scheme now in hand is for Germany to be able to balance her budget again as early as 1949. Many other commodities can be suggested by way of export—superphosphates, rayon, wood products, and coal are a few which occur to the mind at once. The important thing is, as the A.B.C.M. points out, that the German organic chemical industry, the great training ground of chemical experts of all kinds, should be drastically dealt with, and that some other types of export much less likely to assist in the revival of the German war potential be selected to effect a balance with imports.

We know to our cost the difficulty of building up an organic chemical industry from scratch. This was the position we were faced with in 1914 and it has taken thirty years—a generation—to bring the British organic chemical industry to the firm position it has at last gained to-day. Is it too optimistic to hope that a new generation of Germans, unaffected by Nazi doctrine, but still possessing the essentially German characteristics of scientific ability and industriousness, may build up, in the future, a German dyestuffs industry which shall be simply that and nothing more sinister? It will take a long time, but there is a heavy debt to pay.

Trade in February

Chemical Exports Again Increased

EXPORTS of chemicals, drugs, dyes and colours from the U.K. during February again showed an increase over those for the previous month. According to the Board of Trade accounts for February, they were valued at £5,283,517, which is £463,167 more than the January total and no less than £3,176,324 higher than the figure for February of last year. Most went to British India (£622,511), France (£354,751) and British West Africa (£337,231).

Imports for February were valued at £1,069,427. This is a decrease of £93,627 in comparison with the previous month and is £1,232,367 less than the figure for February of last year. As in January, the U.S.A. topped the list of suppliers, with goods valued £310,228, and Spain was again second, at £172,816. Third place (occupied in January by Canada), was taken by Palestine, with £117,307.

NOTES AND COMMENTS

Technical College Equipment

A SOMEWHAT sparse attendance distinguished the debate on technical education in the House of Commons last week. Mr. Blackburn, indeed, was mildly sarcastic on the subject of the emptiness of the Opposition benches, which gave some substance to his claim that the Labour party had consistently taken a greater interest in scientific and technical progress than any other party in the country. However that may be, some interesting points were raised during the debate. Among the most immediate of these is the question of the transfer of surplus Government equipment to technical colleges and university laboratories. Mr. Blackburn cited Professor Oliphant's complaint of the shortage of radio and electronic stores at Birmingham University; while Mr. Cobb mentioned the case of another professor, who managed, through the good offices of a friend, to get into a sale of Government equipment and purchase some for his college. On returning to buy more, however, at the instance of some colleagues, he found everything had been sold to the dealers, who in turn were offering for sale to the college at £20 items of equipment which had cost them 10s. each. Mr. Cobb's claim that there should be some kind of initial sorting process, whereby universities and colleges might get their fair share of any equipment that may be available, seems to us both reasonable and practical.

The Government's Ideal

THE South of England came in for some hard knocks from Mr. Skinnard, who has found employers there to be highly contumacious on the subject of technical education; on the other hand, he found the North and the Midlands more praiseworthy, and gave a generous pat on the back to Loughborough College, placing it on a par with the Boston "Tech." Details of administration were fully ventilated and the debate as a whole was unusually constructive. Mr. Hardman, winding up on behalf of the Ministry of Education, declared that he had found several of his foremen to be of more use as teachers than any lecturer he had since heard "in an ancient institution like Cambridge University." However, he appeared to approve of raising the status of the major technical colleges, and agreed on the desirability of encouraging research. The National Council for Technology, which the Government intends to establish in due course, is to co-ordinate the work of the regions, Mr. Hardman said, and to ensure that a comprehensive national view is taken and provision made. To end up, he quoted Bernard Shaw's word's, describing the ideal state of mankind as "a commonwealth in which work is play and play is life." In those words, he suggested, lies the ideal of technical education. We have a long way to go yet to reach this, or any other, ideal of technical education; or indeed to find sufficient accommodation for any sort of adequate education. Still, it is an encouraging sign to have the subject debated at full length in Parliament, even though some Members still show an unworthy apathy.

Scientists in Industry

MORE than once in these columns we have urged the increasing importance to industry of an adequate supply of trained scientists and technicians. Few can question that unless the number of such men (and women) is commensurate with the development and modernisation of our industrial processes, we shall drop sadly behind in our competitive position in world trade. Normal difficulties have been accentuated by the interruption caused by the war, which has meant that for about six years there has been practically no intake of these essential young people into industry. The result is that at the present time many of our industries are woefully deficient in technically trained minds, just when the speed of scientific progress has been greatly accelerated by the pressure of war.

Postponement of Call-Up ?

THE feeling is growing that if the young man who has entered upon a course of scientific or technical education is taken away at the age of 18, for two years or more, to serve in the Armed Forces, he will in all probability be completely lost to industry as a technical expert. In the vast majority of cases such young people, on their return to civilian life, will seek administrative positions and

are unlikely to recapture the aptitude for research which they previously had. With this in mind, the National Union of Manufacturers will doubtless find ready support in industry for its plea that arrangements should be made for exempting such young people from military service, or, if that is not feasible, for their calling up to be deferred until their technical training has been completed. Admittedly, this plea will probably meet with all manner of objections and is likely to be quickly followed by the entry of other organisations into the lists on behalf of other sections of industry. At the same time, there is justification for emphasising the case of the scientist and technician because of their particular value to industrial invention and development. Moreover, the numbers involved could not be so great as to add appreciably to the man-power problem.

Incentive to Study

IT has been computed that in the U.S.A. fully 15,000 scientific workers joined the Armed Forces during the war. Laboratory benches were left well-nigh empty, but now that workers are being demobilised they are filling up again. As in pre-war days, the granting of numerous scholarships, fellowships, and stipends to gifted young men and women is proving a big incentive, especially as there is no shadow of conscription. Apart from universities and other non-profit-making institutions, nearly all large commercial companies in the U.S. provide such scholarships. A competition sponsored by an electrical company showed that chemistry is one of the most popular subjects among young people.

COKING AND NATIONALISATION

The contention that as a coal-using industry coking is akin to the chemical industry was put forward by Mr. R. Alsop, chairman of the British Coking Industry Association, at a meeting in London last week. Pointing out that the coking industry is not ancillary to coal mining, but is an independent coal-using industry producing by-products, he protested against the inclusion of the coking industry in the Government's nationalisation plans. Mr. Alsop maintained that it was inconsistent to justify nationalisation of the coal-mining industry on the ground that that industry was inefficient, and then proceed to nationalise the coking industry because that was efficient.

Penicillin Agreement

Publication of Terms

A WHITE Paper (Cmd. 6757: H.M.S.O., 2d.) has been issued giving the text of the agreement made between the British and United States Governments on the principles applying to the exchange of information relating to the synthesis of penillin, thus removing the doubts and quashing many of the rumours which have been circulating, doubtless owing to the wide public interest in the subject-matter. The agreement covers a "Period of Exchange" defined as extending from December 1, 1943, to October 31, 1945.

Each Government agreed during this period of exchange, to "furnish to the other Government all information pertaining to the purification, structure, and synthesis of penicillin and/or a therapeutic equivalent, obtained by the participants during or prior to the said period . . . the information to be furnished once a month or oftener." During the period all such information was to be classified as secret; afterwards, any such information, whether patented or not, could be published by either Government, after consultation with the other.

Reciprocal clauses define the conditions for making applications for patents, and the determination of their value; while each Government agreed, at the request of the other, to grant a licence on appropriate terms to participants of the other side, at a total royalty rate not in excess of 5 per cent. of the lowest wholesale price of penicillin charged by the licensee.

U.S. PENICILLIN

U.S. scientists have been active in their researches on penicillin, and it is reported from Chicago that they also have developed a new culture which increases the rate of production. The new strain, called "Wisconsin Q-176" from the University which developed it, claims to double the rate of penicillin production. Professor W. H. Petersen, of the biochemical department of the University of Wisconsin, has offered it to producers for the good of mankind. The Q-176 culture, he said, was isolated by Dr. M. Backus and Dr. J. F. Stauffer of the University's department of botany, who employed ultraviolet light to double the rate of production.

The Moroccan mining industry is reported to have made good progress since the end of the war, and shipments of lead, antimony, and cobalt have already arrived in France. Manganese output is also on the upgrade, with large quantities available for export.

Chemical Works and the Factories Act

III. Welfare and Special Conditions

by B. S. DYER, B.Sc., A.R.I.C.

IN the second article of this series, Parts I and II of the Factories Act, 1937, were considered from the point of view of the works chemist. In the present article, this treatment is continued for the remaining parts of the Act, of which the most important are those relating to welfare, the general provisions authorising special regulations such as the Chemical Works Regulations, and those relating to the employment of women and young persons.

Part III—Welfare—contains six sections relating to the general provision of welfare facilities within the factory. Certain additional welfare requirements originally necessary under war-time conditions, and made under the power of the Defence (General) Regulations, 1939, are published in an appendix to the Factory Orders. Suitable welfare facilities have a considerable effect on general efficiency, and it is probable that this subject will receive increasing attention in the future, particularly as regards the provision of factory canteens.

Section 41 states that a supply of drinking water shall be conveniently accessible to all persons employed, the supply, if not from a public main, having been approved by the district council. Except where the water is delivered as an upward jet, as is most usual, cups or vessels must be supplied, with facilities for rinsing them in drinking water.

Washing Facilities

Provision of washing facilities is considered in Section 42, which requires that soap and clean towels shall be provided, and the whole maintained in a clean and orderly condition. Washing requirements are included in many of the special regulations and orders relating to particular classes of work, most of which were published under the authority of the Factory and Workshop Act, 1901. The Chemical Works Regulations are of particular relevance here; these require the provision of baths for certain named processes, for which also a bath register must be kept. Section 43 requires that provision be made for the suitable accommodation of clothing not worn in working hours. Certain of the regulations relating to particular trades require that provision shall also be made for drying. Section 44 states that in the case of female workers in standing occupations, suitable facilities shall be made for them to sit, so that they may take advantage of any opportunities which may occur for resting during their employment.

First-aid appliances are dealt with in Section 45. The unit of calculation is one box per 150 workers, and each box must be under the charge of a responsible person who must be trained in first-aid in the case of factories employing more than 50 persons. The provisions of this section may be modified by a certificate of the chief inspector in cases where an ambulance room is provided. The requirements as to the contents of the first-aid boxes in different-sized factories are laid down in The First Aid in Factories Order, No. 486, of 1938, to which the chemist is referred for fuller details.

General Welfare

Welfare regulations in general are covered by Section 46, which confers on the Minister wide powers to make special regulations relating to specific industries, in addition to those in the foregoing sections. A large number of such regulations were made prior to the Act, and these are still in force for the respective industries (*see* pp. 47-74 of Factory Orders, 1944). In addition, Orders under the Defence (General) Regulations, 1939, such as The Factories (Medical and Welfare Services) Order, 1940, and The Factories (Canteens) Order, 1943, have relevance in certain cases.

Part IV contains 17 sections relating to aspects of health, safety, and welfare not specifically covered by Parts I-III.

The prevention of inhalation of dust or fumes arising from industrial processes is required by Section 47. It is interesting to note that dust or fumes, which are merely "offensive" and not necessarily injurious, must also be prevented by the provision of exhaust appliances as near as possible to the point of origin. The fumes from the exhaust of internal combustion engines are specifically mentioned. Section 48 prohibits the taking of meals by workers in rooms where poisonous substances give rise to dust or fumes. Substances specifically mentioned are lead, arsenic, siliceous dust and asbestos dust, and the Minister is given power to extend the provisions to any other process which appears injurious to health or otherwise undesirable. The Minister is empowered by Section 49 to require that suitable goggles or effective screens shall be provided to protect the eyes of persons employed where there is a special risk of injury to the eyes from particles or fragments thrown off in the process. In The Protection of Eyes Regulations, No. 654, of 1938, the processes to which this applies have been defined and include dry grinding, turning, and welding operations. The use

of white phosphorus in the manufacture of matches is prohibited by Section 51.

Section 52 relates to the conditions in factories where an artificial degree of humidity is maintained. The provision of hygrometers and their records is laid down, together with the maximum temperature at which artificial humidification is permitted, and the use of the table of humidity published as the first schedule to the Act. The specification of the water used is defined in terms of its reduction of potassium permanganate.

Underground Rooms

The power conferred upon the factory inspector to condemn the use of underground rooms which are unsuitable for particular processes is laid down in Section 53, an underground room being defined as one in which more than half the total height is below the surrounding ground level. Condemnation may be on grounds of construction, height, light, ventilation, hygiene, or escape in cases of fire. Sections 54 and 55 deal respectively with the specific cases of conditions in bakehouses and laundries. Section 56 prohibits the employment of young persons to lift, carry or move any load which may cause them injury, and empowers the Minister to make special regulations prescribing the loads which may be lifted by any class of person in particular factories.

Sections 57, 58, and 59 relate to the employment of particular classes of workers in certain processes. The first prohibits the employment of female young persons in processes of melting or annealing of glass, and of the evaporating of brine in open pans or the stoving of salt, and empowers the Minister to extend this prohibition to other processes which he may consider to be undesirable. The remaining two sections (i) prohibit the employment of women and young persons in processes connected with lead manufacture, and (ii) lay down provisions for the employment of women and young persons in certain processes involving the use of lead compounds. The main provisions of Section 59 are that dust and fumes shall be drawn away from the persons employed; they shall undergo a medical examination prescribed in Order No. 1714, of 1921; no food or tobacco shall be consumed in the room; protective clothing shall be provided; special cloakroom and washing facilities shall be provided as laid down in Order No. 1715, of 1921. The meaning of the term " lead compound " and the method of determination are laid down in Order No. 1713, of 1921. The three Orders cited were made on the authority of The Women and Young Persons (Employment in Lead Processes) Act, 1920.

Section 60 empowers the Minister to make special regulations for safety and health in particular occupations as he may consider necessary, and may extend the application of the provisions of Parts I and II of the Act. The special regulations for safety and health in particular trades are published between pages 77 and 273 of Factory Orders. It is obviously impossible to discuss these in detail, but the works chemist may explore those which relate to his own trade. Of most universal interest to the chemist are the Chemical Works Regulations, No. 731, of 1922, which are discussed in more detail below. Of the remaining three sections of this part of the Act, No. 62 may interest the works chemist, since it gives power to the factory inspector to take samples of material which is thought to be used in contravention of the requirements of this part of the Act, and to submit them for anaylsis to the Government Chemist.

The Chemical Works Regulations were made under the authority of the Factory and Workshop Act, 1901. The processes to which they apply are defined in the schedule; those which are exempt are specifically mentioned at the beginning; and it should be noted that the Chief Inspector of Factories has power to waive any of the provisions which may be considered inappropriate. The regulations are divided into two parts, the first (1-17) applying to all chemical works, and the second (18-31) to specific processes such as the manufacture of chlorate or bleaching powder, the use of nitric acid in the manufacture of nitro-compounds, etc. The first part only will therefore be considered. Almost all the regulations in this part are parallel with similar provisions for health, safety, and welfare in the Factories Act, and they will be discussed in this order.

Exhaust Draught

Regulation 2 is concerned with the provision of an efficient exhaust draught in certain processes, and is therefore covered by the more general requirements of Sections 4 and 47 of the Act. Regulation 4(a) requires the efficient lighting of all places where persons are employed, and is thus similar to Section 5 of the Act. Regulation 1 is similar to Section 18 of the Act in providing for the fencing of open vessels, but is extended to define the minimum width of gangways and of the prevention of access to spaces between vessels which are less than 18 in. apart. Regulations 4(b), (c) and (d) are parallel with Section 28 in preventing the ignition of inflammable gases or dusts; in addition to prohibiting the use of naked lights, steam pipes must be placed not less than 2 in. from the nearest wall and must be protected by a wire screen. Regulation 5 requires the fitting of a safety valve to any closed vessel containing gas under pressure, and is therefore also covered by Sections 29, 30 and 31, concerning steam boilers, steam receivers, and air receivers, respec-

tively. Regulations 6, 7 and 8 relate to the precautions necessary for cleaning confined spaces, as does Section 27. It should be noted that all safety gear required for this purpose must be examined once every month, and a record of this examination must be kept for inspection by the factory inspector.

Regulation 3 relates to the prevention of dust in the lime-grinding process, and is therefore a special case of Section 47. Facilities for allowing females to sit during resting periods in employment are covered by both Regulation 15 and by Section 44; and for the provision of drinking water by Regulation 16 and Section 41. First-aid requirements are covered by Regulations 11, 12, 13, and 14, and are parallel with Section 45. The special precautions required where strong acids or dangerous corrosive liquids are used are enumerated in Regulation 10, which provides for the use of goggles, gloves, eye-wash bottles and means for drenching with cold water. The official precautionary notice (Factory Form No. 395), relating to gassing and burns, must also be displayed in such places. Regulation 9 requires the use of non-metallic tools for cleaning the residues from vessels which have contained sulphuric or hydrochloric acids or substances which may cause evolution of arseniuretted hydrogen. Regulation 17 lays down the responsibility of the persons employed in carrying out these regulations, and particularly for using correctly the appliances, etc., provided.

Part V—Notification and Investigation of Industrial Accidents and Diseases—contains six sections. The first, Section 64, provides that where an accident in a factory causes loss of life to a person employed, or disables any such person for more than three days from earning full wages, written notice in the prescribed form must be sent to the district factory inspector. Section 65 states that the provisions of the previous section may be extended to certain dangerous occurrences even if no personal injury or death has resulted. The occurrences are defined in the Dangerous Occurrences Notification Order, No. 1046, of 1935, and include explosion or fire due to the ignition of dust, gas, or vapour; the explosion of pressure vessels; and any explosion or fire which causes complete suspension of work for more than 24 hours.

Industrial Diseases

Section 66 requires the notification of prescribed details of industrial diseases by both the occupier of the factory and by any medical practitioner who may be called in to visit a patient suffering from lead, phosphorus, arsenical or mercurial poisoning, or from anthrax. The Minister is empowered to extend the requirements to any other type of industrial disease, and this has been done by certain orders published prior to the Act, for the instances of toxic jaundice, epitheliomatous and chrome ulceration; carbon disulphide, aniline, and chronic benzene poisoning; manganese poisoning; compressed air illness; and toxic anæmia. Section 67 relates to coroner's proceedings arising from an industrial death. Section 68 empowers the Minister to direct a formal investigation of any accident or industrial disease, and lays down the requirements for this investigation. Section 69 defines the duty of the examining surgeon in relation to industrial accidents and diseases.

Part VI—Employment of Women and Young Persons—contains 31 sections. The works chemist is not normally concerned with the details of this part, but should have a general knowledge of the main requirements, especially now that women are employed to a greater extent than before the war. The large number of sections and of the associated regulations is probably an indication of the early exploitation of these classes of labour. The definition of a "young person," already referred to above, in the second article of this series, is one who has attained the age of 14 years but not 18. A woman is a female who has attained the age of 18 years, but it should be pointed out that the requirements do not refer to women employed in positions of management.

Working Hours

For the interpretation of the requirements as to the number of hours allowed, the difference between the terms "hours worked" and "period of employment" should be noted. The latter term includes the periods allowed for rest and meals and represents the total time of attendance at the factory. For the classes of person considered, the total hours worked, exclusive of intervals allowed for meals and rest, must not exceed nine in any day nor 48 in any week, or 44 for persons under 16 years. The period of employment shall not exceed 11 hours in any day and shall neither begin earlier than 7 a.m. nor finish later than 8 p.m., except in the case of young persons under 16, when it shall not finish later than 6 p.m. On Saturdays, employment must finish before 1 p.m. A woman or young person may not be employed continuously for more than 4½ hours at a time without an interval of at least half an hour for a meal or rest, or, where a rest of not less than 10 mins. is given, the spell may be increased to five hours. The period of employment must be the same for all women and young persons employed in the factory, although certain exceptions are allowed. For factories operating the five-day week, the total hours worked may extend to 10, and the period of employment to 12 hours in place of the above hours for a six-day week. The chemist will recognise that these permitted

hours are generous by comparison with the totals normally found to give the greatest efficiency of work, the general post-war trend certainly being towards shorter working hours. A notice must be posted in the factory showing the periods of employment and the intervals allowed for meals and rest for all classes under this part of the Act, any change in the routine times being notified to the factory inspector.

Overtime

Section 73 lays down the conditions under which overtime may be worked by women and young persons. For such times as this is permitted, the total hours worked must not exceed 10 on any day, and the period of employment shall not exceed 12 hours, thus being similar to the five-day week requirements. The total overtime must not be more than six hours in any week, or 100 in any year. Sections 77 and 78 lay down the holidays to be given, the first prohibiting employment on Sundays, and the second stating the normal bank holidays. Sections 81-97 relate to the exceptions to the main provisions, and the Minister is also empowered to make special regulations relating to the application of these provisions to particular industries. The medical examination of young persons under 16 years is required by Section 99. Regulations dealing with the hours of employment of young persons under 16 are contained in pages 279-282 of Factory Orders; overtime regulations for women and young persons over 16 in pages 282-294; and special exceptions in pages 296-307.

Restrictions of Employment

Part VII consists of nine sections dealing with special applications and extensions, which do not on the whole affect the works chemist, except the last (No. 109), which may be of interest in that it extends the restriction in the employment of women and young persons in processes involving the use of lead compounds (Part IV) to any place other than a factory. Part VIII relates to homework and therefore does not concern the works chemist. Part IX is concerned with the conditions of piece-work in textile factories and empowers the Minister to extend the provisions to other types of factory as he may consider necessary. This has been done in a number of cases by regulations contained in Factory Orders Part X (Sections 113-121) deals with miscellaneous provisions, especially with reference to the registers to be kept and to the notices to be posted in the factory. Section 119, already referred to, is important in that it defines the duties of persons employed in carrying out the requirements of the Act, and this should be considered in conjunction with Sections 136, 137 and 138 of Part XII, which lay down the power of the occupier to exempt himself from liability on conviction of the actual offender, and of the proceedings and penalties in such cases.

Part XI relates to the administration of the Act, particularly with respect to the duties and powers of the factory inspector and examining surgeon. Part XII deals with the offences, penalties, and legal proceedings arising from the Act. Sections 136, 137, and 138 have already been referred to in connection with the duties of employed persons. Part XIII defines the application of the Act, Section 150 in particular dealing with crown factories in which the duties of the district Council are transferred to the factory inspector. Part XIV assists the interpretation of the Act. Section 151 defines the scope of the term " factory."

It is perhaps unnecessary as a conclusion to point out the growing awareness of the place of welfare and safety precautions in factories, both from the original humanitarian aspect and from the aspect of working efficiency. This trend has been accelerated by war-time conditions, where the great influx of fresh labour, and in particular the employment of women on a large scale, have brought their own problems. It is hoped that these articles will have served their purpose to the works chemist in indicating the main requirements of the Factories Act which are important from his point of view, and that they may help to prevent a return to that apathy in these matters to which the Chief Inspector of Factories referred in his recent report. It has obviously been impossible to do more than indicate the main requirements, and the chemist is urged to study both the Factories Act and the Factory Orders to obtain the more precise meanings associated with each section.

(*The first article in this series appeared in* The Chemical Age, *on* March 16, 1946, *p.* 283; *the second on* March 23, *p.* 303.)

A CHEMIST'S BOOKSHELF

Elastomeric Engineering (Andre Rubber Co., Ltd., Kingston By-Pass, Surbiton, Surrey, pp. 168, 21s.), provides engineers and designers with a complete guide to the application of rubber-bonded-to-metal elements throughout the field of engineering. Of the sixteen chapters, one deals with rubber in chemical engineering. The volume is well produced and, in addition to many drawings and illustrations, the text describes not only the applications of natural and synthetic rubber, but also details of the process of manufacture and the plant and tools involved. Executive engineers may obtain a copy from the company without charge if their request, stating their position, is made on business stationery.

Chemicals in Japan

Points from General MacArthur's Report

(from a Correspondent)

THE Report on Non-Military Activities in Japan and Korea during September and October, 1945* issued by General MacArthur, Supreme Commander for the Allied Powers, is a document full of interesting facts and figures. The report, copies of which recently became available in this country, surveys in 19 sections practically every aspect of the life of the Japanese nation and contains, in addition to a survey of the major war-time developments, particulars about the steps taken to bring about a democratisation of the country's political and economic system. This article deals with those sections that directly concern the chemical industry.

The Chemical Control

In the chemical industry, production was maintained at a fairly constant level until April, 1944, when a decline set in, due to the lack of proper maintenance of plant and the increasing shortage of labour and materials. The industry had been under strict governmental control for years and the control organisation set up in 1939 continued to function virtually without change up to the present. Control is exercised by three sections of the Industry Bureau of the Ministry of Commerce and Industry, which deal respectively with inorganic, organic, and administrative matters. The key personnel in these sections has recently been changed. The Chemical Industry Control Association, established by chemical manufacturers in 1943, as a self-regulating industrial board, has several practically autonomous branches and more than 20 companies allocating the output.

During the war, emphasis was laid on the production of essential chemicals and the only new products of importance introduced were synthetic rubber and plastics, production of which, however, was limited to small quantities. War damage varied considerably for the different classes of chemicals. At present, production of almost all basic chemicals is below estimated domestic requirements. Many of the difficulties, such as the lack of raw materials, fuel and power, and spare parts, are unavoidable, but some are the result of a lack of initiative on the part both of Japanese officials and industry. Limited repairs and conversions are under way and estimates of future production indicate that the Japanese intend to recover much lost capacity. The following table contains Japanese estimates of requirements for the current year, as well as figures showing the country's production capacity at the end of October, 1945.

	Estimated Requirements in 1946 (tons)	*Production Capacity Oct. 31, 1945 (tons)*
Sulphuric acid ...	2,700,000	2,500,000
Nitric acid	22,000	66,000
Caustic soda	275,000	200,000
Soda ash	183,000	150,000
Ammonium sulphate	1,600,000	300,000
Calcium carbide ...	502,000	348,000
Industrial explosives	28,000	32,960
Benzol	24,170	20,520
Toluol	5,750	4,900
Dyestuffs	14,000	8,000
Drugs (in 1000 kg.) ...	75,962	98,906

The scarcity of chemical fertilisers will undoubtedly be a factor in the critical food position of Japan in 1946. Before the war, the country depended on chemical fertilisers to supplement the plant food supply of the inferior type of soil. Consumption of ammonium sulphate, which averaged 1,143,000 tons annually between 1937 and 1940, decreased to less than 300,000 tons last year owing to war damage to plants and lack of raw materials. The corresponding figures for superphosphate are 1,169,000 and 50,000.

Experiments in the use of basic fertilisers on certain major crops are reported to have resulted in important increases in yields. For instance, where nitrogen in the form of ammonium sulphate was applied to the soil, rice yield increases averaged 43 per cent., wheat and barley yield increased by about 100 per cent., while potato yield increases amounted to about 45 per cent. According to official estimates, production of nitrogenous fertilisers in the current year will approximate 600,000 tons; that of phosphatic fertilisers will reach a similar level; and production of potassic fertilisers will not exceed 20,000 tons.

Pyrethrum acreage has decreased considerably during the last years and production is at present hardly sufficient to cover domestic needs.

A Chance for British Glass ?

Among the readjustments that must be considered in any prognosis of post-war trade, one of the most difficult arises from the elimination of Japan from world markets, points out the author of an article entitled : "Japan's Export Vacuum : Who Can Now Fill It?" in a recent issue of *Foreign Commerce Weekly*. In 1936, the last peace-time year in Japanese trade, it is stated, the value of its exports, including shipments to its colonies of Korea and Formosa, ranked as fourth largest in the world. The United Kingdom, the United States,

* Obtainable from the United States Information Service, Room 311, 33, Davies Street, London, W.1.

and Germany alone surpassed Japan in the value of their exports.

No mention is made of chemicals, but glassware is the subject of comment. Japan's share of world export trade in glassware was small in comparison with that of Germany, Czechoslovakia, and Belgium, which together controlled perhaps 75 per cent. of pre-war glass exports. Nevertheless, in cheap-grade glasswares Japan managed to compete successfully with the products of these and other countries, particularly in Asian markets, which took more than two-thirds of Japanese glassware exports. A relatively small quantity of window and plate glass, inferior to the comparable European product, was included, but the bulk of Japanese exports were thermos and other beverage bottles in which lack of clearness and purity of colour is less important.

British India—in which Czech, German, and Belgian glass competed—was nevertheless Japan's leading market, inasmuch as it obtained approximately 50 per cent. of its total imports of glass from that source. The second largest buyer was Korea, where Japanese products comprised 90 per cent. of the glass imports. The United States also was a large purchaser of Japanese glassware—predominantly of sunglasses of the cheapest grade, retailing at not more than 20 cents a pair. Magnifying glasses and microscopes, for popular rather than scientific use, also were supplied to the United States by Japan, which in 1932 replaced Germany in this lower-grade field.

Electrolysis in Alcohol

Results with Metallic Chloride

IN a series of researches on electrolysis in alcoholic media, C. Charmetant and R. Paris have attempted to find a method of interpreting the results in accordance with the theory applied to aqueuous solutions (*Comptes Rendus*, 1945, *220*, 314-316). Apparatus used was similar to that of Jolibois for the study of salts in aqueous solution; and consisted of two cylindrical vessels of 3.5 cm. diam. and 5 cm. high connected by a siphon, with circular electrodes of polished platinum of 2 cm.² area, placed vertically at a distance of 2 cm. from the bottom (*ibid.*, 1934, *199*, 706). The solution introduced by siphon was about 1 cm. deep, and the alcohol layer 2 cm.

Solutions were prepared of pure chlorides of magnesium, zinc, nickel, and cobalt. Electrolysis was continued for 24 hours with voltage from 480-240 v. according to the salt under test. They were gradually reduced during each experiment in order to maintain constant current density of 5-7 m./amps.

At the cathode, hydrogen was set free, with formation of a gelatinous deposit, which in the case of magnesium was found to contain mostly combined alcohol, with only about 5 per cent. in a free state. The deposits are probably alcoholates, partially decomposing in the air, that of cobalt being particularly unstable.

At the anode the solution became acid and aldehyde was formed. The presence of chlorine could only be determined in the case of methyl alcohol and in a sufficiently concentrated solution. It was found further that the purely chemical action of chlorine with ethyl alcohol was much more rapid than with methyl. Results are shown in the following table:

ANALYTICAL RESULTS

Salt	*Electrolysis in Methanol*			*Electrolysis in methanol*		
	Deposit	*Metal %*	*Alcohol %*	*Deposit*	*Metal %*	*Alcohol %*
$MgCl_2$	white	33.4	38.6	white	38.1	38.4
$ZnCl_2$	white + Zn	61.5	15	white	56	43
$NiCl_2$	light green	43.5	27.6	light green	43	28.5
$CoCl_2$	brownish-red	42.2	27.1	brown	60	5

These results may be interpreted by supposing, as in an aqueous solution, that the solvent, consisting of polar and ionised molecules, takes part in the first stage of electrolysis. The authors discuss reasons for the appearance of hydrogen at the cathode and the formation of alcoholate, and state that the latter would be difficult to understand in the case of heavy metals unless one attributes to the metal when deposited a chemical activity of a very high order, higher indeed than has usually been supposed. But such a view is further supported on the understanding that hydrogen has a deposition charge less negative than the metal.

Finally, the conditions of formation of HCl are considered, and comparison is made of the polarisation potentials of nitric, sulphuric, and phosphoric acid, also of dilute and undiluted HCl, in water and in methyl alcohol respectively.

New Patent Legislation

The Bill Before Parliament

by S. MITTLER, A.F.R.Ae.S., A.M.I.Mech.E.

A BILL has passed the House of Lords and reached the committee stage in the House of Commons which, when enacted, will be cited as the Patents and Designs Act, 1946. The principal Act (Patents and Designs Acts, 1907 to 1942) will, after being consolidated with the new Act, be cited as the Patents and Designs Acts, 1907 to 1946. While it is, of course, possible that amendments will be made in the committee stage, the main features of the new Act are already clearly emerging from the Bill in its present stage. Any important amendments will be reported as soon as they become available. The sections of the Bill are here discussed, as far as they concern patents.

Extension of Term

Section 1 simplifies substantially the present procedure of application for extension of term of patents where loss arises by reason of hostilities, by adding a new subsection 8 to Section 18 of the principal Act. Hitherto summons had to be originated, naming the Comptroller of Patents as respondent, a procedure that required the services of the Solicitor to the Board of Trade and of counsel instructed by him as well as those of applicant's solicitor and counsel, and involved costs of between £150 and £200 in straightforward unopposed cases. Now application may be made to the Comptroller of Patents by way of a simple and inexpensive procedure in which the applicant may either act for himself or be represented by his solicitor or patent agent only.

The necessity of advertising the intention to apply for the extension in several newspapers as directed by the Court has been abolished, but it can be assumed that the Comptroller will notify to the public any application made to him, in the *Official Journal (Patents)*. The application will be open to opposition and an appeal shall lie to the Appeal Tribunal of the Patent Office, open to the applicant and to any other parties in the proceedings, such as opponents. The Comptroller may at his discretion refer cases to the Court which would be more fittingly decided there, but this should rather be an exception, as more than 90 per cent. of all applications hitherto made were clear-cut, unopposed cases.

Section 2 of the Bill substitutes a new Section 91C for the one now dealing with inventions communicated under arrangements or agreements with other countries. While the existing Section 91C leaves it to the Board of Trade to make rules to secure that the communication of an invention, or the publication, making, use, exercise, or vending of it in consequence of such communication, shall not prejudice any application for, or invalidate the grant of, a patent of the person from whom the invention was communicated or his legal representatives or assigns (the " communicant "), the new Section 91C makes, in addition, more detailed provisions which may be summed up briefly as follows:

An application made by the communicant shall have priority over any application for the invention or part of it made by a communicatee.

An application made by a communicatee may be refused, or a patent obtained therefor may be revoked on the ground that the invention was obtained in consequence of a communication as aforesaid.

The benefits of this Section are to be limited to the nationals of states affording reciprocity to British nationals. The term " government " is to include persons authorised by the government concerned to make or receive any such communication.

Revocation of Patents

In addition to the revocation under Section 91C as aforesaid, *Section 3* adds a new ground of revocation to Section 25 of the principal Act, in sub-section (oo): The secret working of the invention by a Government department or any person authorised by it prior to the date a patent would bear (under the extended Convention priority of Section 91B of the principal Act or under any other enacted extension), otherwise than in consequence of a communication or disclosure by the applicant or "communicant" himself, would now be a ground for revocation.

It will be noted that the new sub-section (oo) goes far beyond sub-section (o) of Section 25 of the principal Act in that it does not qualify the " secret working " by the words " on a commercial scale, and not merely by way of reasonable trial or experiment, in the United Kingdom." It may be inferred that even secret experimental working of the invention by or on behalf of the Government, even if carried out outside the United Kingdom, would form a reason for revocation. Still another ground for revocation will be found in Section 4, below.

Section 4 empowers the Comptroller to refuse a patent application at any stage of the proceedings on the ground that the invention was made in Germany or Japan

(even by a non-German or non-Japanese, but there is a proviso for prisoners of war, *see* below), or by a German or Japanese national in any territory which was enemy territory during a period beginning one year before the outbreak of war with Germany and ending on the last day of 1945. Notice of opposition can be given under Section 11, or revocation can be applied for under Sections 25 or 26 of the principal Act, or the defence or a counterclaim in infringment proceedings can be based on the same ground.

Grounds for Exemption

Exemption may be granted on proof of (a) that the invention was made before the actual entry of Germany or Japan into the war (September 3, 1939 and December 7, 1941 as the case may be) and was at no time beneficially owned in whole or in part by a German or Japanese national or company, or (b) that the invention, apart from having been made in Germany or Japan or by a German or Japanese national, was also independently made outside Germany or Japan or by a non-German or non-Japanese national, and that the patent application was made before February 1, 1946, or (c) that the invention was made by a prisoner of war in German or Japanese hands and was not subsequently obtained by a German or Japanese national.

Section 5 provides for the laying open to public inspection of specifications, drawings, etc., of any patent application for an invention of a German or Japanese national which has been abandoned or become void during the "first war period" as defined by Section 29, 1B, of the principal Act, which is a period beginning with the outbreak of the war on September 3, 1939 and ending with the expiration of the Emergency Powers (Defence) Act, 1939, *i.e.*, in this respect on December 31, 1947. This is, as will be noted, a departure from the provisions of Section 69 of the principal Act (which prohibits the publication of abandoned specifications, etc.) with the purpose of making such enemy inventions available to British industry.

Section 6 empowers the Comptroller to refuse the benefits of Section 6, sub-sections 1 and 3 of the Patents, Designs, Copyright and Trade Marks (Emergency) Act, 1939, allowing for the extension of time limited under the principal Act for doing any act, on the ground that such act if done immediately before the expiration of the period so limited would have been done on behalf of a national or company of Germany or Japan or of any country that does not afford reciprocity to British nationals.

Section 7 gives interpretation of expressions used in the Bill, such as "company," "enemy territory," and for example, defines "Germany" as the territory comprised in the German state on March 1, 1938, which does *not* include Austria (invaded ten days after that date). Likewise, the term "German national" does not include citizens of territory incorporated in the German State after that date.

The new Bill incorporates some of the recommendations of the Council of the Chartered Institute of Patent Agents as published in July, 1945, and of the First Interim Report of the Departmental Committee (Cmd. 6618) presented by the President of the Board of Trade to Parliament in April, 1945, but goes beyond both of them in some respects and, on the other hand, does not adopt all their points.

Easier Permits for Patents Abroad

The Emergency Laws (Transitional Provisions) Act, 1946, contains some important modifications of the Defence (Patents, Trade Marks, etc.) Regulations 1941 (S.R. & O. 1941, No. 1780). Under Regulation 3(2) the Comptroller's permit was hitherto required before an application for the grant of a patent, or registration of a design could be made in a foreign country. From now onwards, the Comptroller's permit will not be required where (a) an application relating to the same invention or design has been made in the United Kingdom not less than four weeks before the application in the foreign country, and (b) directions have not been given prohibiting or restricting publication, or communication of information with respect to the subject matter of the application in the United Kingdom (see First Schedule, p. 19). This means that although the Comptroller's power of prohibiting publication is maintained it will be used in future rather in special cases, than as a rule.

Other provisions of the Act relating to patents are to be found in Section 7 (terminating the "first war period" in the meaning of Section 29, 1B of the Patents and Designs Act, 1907-1942 on December 31, 1947) and again in the First Schedule, p. 19. Section 3A of the Defence Regulations 1941, No. 1780 (as introduced by Statutory Rules and Orders 1942, No. 1882, Section 7) relating to the use of inventions, etc., in the U.S.A., is now amended so as to prohibit the transfer of any right which existed on September 1, 1945, in respect of the use in the U.S.A. of any invention, discovery, or design without a permit in writing by the competent authority, if the invention has been declared to be "in the interest of the defence of the realm or otherwise in the public interest" and the person concerned has been resident in the U.K. since September 17, 1942.

Lac Research Laboratory Closed

Dr. Gidvani's Statement

OWING to financial difficulties, the Indian Lac Cess Committee has decided to close, from March 31, the Lac Research Laboratory at present housed in the School of Mines, 79 Grassmarket, Edinburgh. The future of lac research under the auspices of the Indian Lac Cess Committee is under examination at present, and it may be that a research laboratory to continue the work will be re-opened in or around London. Meanwhile, a part-time officer is being retained to maintain liaison with industry and to advise on problems not involving experimental work in a laboratory. Technical inquiries, on which research work has to be carried out before a successful solution can be suggested, will be referred to the Indian Lac Research Institute, Namkum, India. All communications should be addressed in future to: Lac Information Officer, Office of the High Commissioner for India, India House, Aldwych, London, W.C.2.

Dr. B. S. Gidvani, director of the Lac Research Laboratory, in a statement issued this week, recalls that the laboratory has done some excellent work and been responsible for keeping alive the interest in shellac in face of competition from synthetic resins. It is fair to say, he comments, that but for the active assistance given to the lac-consuming industries by solving their technical difficulties, probably a large proportion of them would have switched over to other competitive materials. The orange-covered booklets of the London Shellac Research Bureau provide a vast fund of knowledge on the properties of lac and have been reported to be of great value to industry.

Future of Shellac

Now that the war-time restrictions are being progressively relaxed and the industries are gearing up for peace-time production, the laboratory would have proved its usefulness even more than hitherto. Shellac will have to face keener competition from new synthetic resins which have been developed in war time and which will be available soon for peace-time applications in appreciable quantities at competitive price. If shellac is not to meet the same fate as indigo, it must be backed by research and first-class technical service. Unless the large number of problems which are constantly being received from the lac-consuming industries are successfully and quickly solved, shellac may have to give way to other materials in a number of industries. In the circumstances, says Dr. Gidvani, it is to be regretted that Lac Research Laboratory is being closed at this time when every industry has become research-minded and is laying more and more emphasis on technical service. Servicing of the industries at a distance of 7000 miles, as proposed by the Indian Lac Cess Committee, seems altogether impracticable.

India exports about 90 per cent. of its annual output of lac and a small cess (export tax) is levied on the exports. The revenue thus obtained is handed over to the Indian Las Cess Committee, *i.e.*, the Committee is financed directly by the lac-consuming industries outside India. The average annual revenue of the Committee during the war years has been approximately £27,000, out of which £19,500 have been spent in India and only £5250 outside India. The peace-time annual average figures were £28,000, £18,000, and £5750 respectively.

Research History

The history of lac research in the U.K., financed by India, starts with the appointment of Mr. A. J. Gibson as Special Officer Lac Inquiry in 1929 to bring the capacities of natural lac more closely to the attention of users and manufacturers and to assist the Indian Lac Research Institute to establish contacts with lac-consuming industries and lac research outside India. By 1932 it became apparent that modern industrial conditions in regard to supply of raw materials such as shellac had radically changed, principally as a result of the competition of synthetic resins on highly organised scientific lines. The conclusion was inevitable that research was necessary to extend the knowledge of the properties of shellac, to adapt it to modern requirements, to show the consuming industries how to get the best out of shellac and to find new fields for its use. This work could be carried out only in close contact with the consuming industries. Accordingly, three Indian research workers were deputed from India in 1933, two to work on the use of lac in paints, plastics, and allied trades at the Paint Research Station, Teddington, and the third in the research laboratories of the British Thomson-Houston Co., Ltd., Rugby, on problems connected with the application of lac in the electrical insulation industries.

Towards the end of 1936, the Lac Research Laboratory was reorganised with increased staff and housed in the Chemical Engineering Department of University College, London, where more room and facilities for pilot plant were available. Meanwhile, agreements for co-operative research were entered into with the Rubber Research Association, Croydon, and with Metropolitan-Vickers Electrical Co., Ltd., Manchester. The committee also gave a grant to the New York Shellac Research Bureau, and gave a scholar-

ship to a research student to work in the Chemical Engineering Department, University College, London. The laboratory was evacuated from London to the School of Mines. Heriot-Watt College, Edinburgh, in December, 1940.

Since 1939, however, Dr. Gidvani continues, there has been a noticeable change in the policy of the committee in regard to research outside India. All agreements for co-operative research have been gradually liquidated and the staff of the laboratory progressively reduced. On the retirement of Mr. Gibson in 1943, the Bureau was reorganised with Dr. Gidvani as director and he had also to officiate as Lac Information Officer to carry out propaganda, etc. The staff in the laboratory at that time consisted of only one assistant chemist and two laboratory boys, and only after repeated requests were an additional assistant chemist and a laboratory boy authorised in 1944. Despite the inadequacy of the staff and lack of proper facilities at the School of Mines where there was no spare space to fix our mechanical equipment, the laboratory has contributed usefully to the war effort by solving a large number of technical problems of the consuming industries and by undertaking research work on behalf of the various Service Ministries. In addition, a number of new uses for shellac have been developed for replacing materials in short supply. By working long hours and cutting out all holidays the laboratory has been able to maintain the quality and quantity of its output, as judged by the number of problems solved, publications issued, and the letters of thanks received from the firms for whom work had been undertaken. It is a great pity that the goodwill which has been so hardly earned during the past 17 years should be thrown away by closing the laboratory at this time.

British Plastics Federation

Development of Research Planned

SPEAKING at the annual general meeting of the British Plastics Federation on March 20, the chairman, Mr. H. W. Graesser-Thomas, of Yorkshire Tar Distillers, Ltd., said:

"You will no doubt notice that both in the House of Lords, when Lord Barnby moved a Research Bill, and more recently in the Commons, where other measures were suggested, the Government is impressed with the need for the development of research in the industry. The Federation has given this matter very careful consideration as will be seen from the reference to the suggestion in the annual report that the industry should establish a testing station. The work done by such a station, if established, would be both complementary and supplementary to the research work already carried out by a number of our members, but it would need the whole-hearted support of the industry if it were to be successful. After consulting the Groups, the Council came to the conclusion that there was barely sufficient support to warrant proceeding further at the moment, but it has the matter still under consideration.

"I would also like to refer to the Control Commission for Germany. The reference in the report gives no indication of the considerable amount of work involved in this business. You will be pleased to know that the Federation's teams were among the first to go to Germany at the beginning of November for the purpose of ear-marking plant for reparation claims. Claims for German plants were submitted to the Government on behalf of the industry by the end of last year. Other teams have been, or are about to go to Germany to investigate processes both in the material and moulding branches of the industry.

"You will have observed the reference in the report to labour supplies. That reference is but brief and gives no indication of the many occasions and considerable time the executive committee and council have given to this subject, seeking always to watch the interests of the members, and to place their difficulties before the appropriate Government department. This has been done both officially by direct communication from the Federation and unofficially on many occasions through the close contact which the general manager maintains with several Government departments."

Mr. Graesser-Thomas is retiring from the chairmanship after holding office for the maximum period of two years and Mr. H. V. Potter, of Bakelite, Ltd., expressed the members' appreciation of the services he had rendered the industry during his term of office. Mr. Graesser-Thomas briefly replied.

At the close of the meeting a presentation was made by the chairman to Mr. M. P. MacFarlane, who was retiring from the position of honorary treasurer, which he has held continuously since the birth of the British Plastics Moulding Trade Association, the forerunner of the present British Plastics Federation, in 1930.

At the first meeting of the new council, following the annual general meeting, Mr. W. Charles Waghorne, of Insulators, Ltd., was elected chairman of the council and of the Federation for the session 1946-7; Mr. C. F. Merriam, of Halex, Ltd., vice-chairman; and Dr. W. J. Worboys, of I.C.I., Ltd., honorary treasurer.

Chemical Pilot Plant

Its Design and Operation

AT a meeting of the North-Western branch of the Institution of Chemical Engineers at the College of Technology, Manchester, on March 16, with Mr. J. M. Wishart in the chair, a paper, "The Design, Erection and Operation of Pilot Plant," of which the following is a summary, was read by Messrs. C. Buck, T. Hayes and R. R. Williams, graduate members of the Institution, before a large audience.

The authors of the paper assumed an organisation which had research and development laboratories, and engineering and production sections. The laboratory investigation and preparation of a chemical having been accomplished, the chemical engineer makes his preliminary assessment, which involves the development of a technical process, the separation of those parts of the process which require development on a pilot plant from those on which analogous experience has already been gained, and the size of the pilot plant. The preliminary assessment may show that further quantitative data are required, that suitable methods of analytical control are desirable, that the effluent should be treated and the by-products purified.

The First Steps

When the chemical engineer has obtained a satisfactory preliminary assessment, he proceeds with the detailed design of the pilot plant and compiles the design memorandum, keeping in view ten specific objects and three requirements of the pilot plant. These objects and requirements, with a suggested form of design memorandum, are given, one important object being the compiling of data for the design of a commercial plant.

The first step in the design is division of the project into unit processes, the next the compiling of a weight balance in the form of a materials flow-sheet which shows the problem of the effluent in relation to the amount of product, the whole giving a complete schematic diagram of the complete project. Having decided the size of the pilot plant, the engineer can find the production per unit time for a continuous process and the time per batch for a batch process. The selection of materials of construction for the pilot plant must be carefully considered, and a preliminary arrangement of the plant made so that exact data for the erection of the commercial plant are given while maintaining a maximum flexibility of the pilot plant to allow for possible modifications in that plant as experience in its operation is gained. The design memorandum—that is, the complete record of the work of the chemical engineer on the project—serves as a basis for the design of the commercial plant by the mechanical engineer and as an exposition upon which the selected processes and technique are based.

The Erection of the Plant

The next section of the paper described the erection of the pilot plant by a mechanical engineer, who collaborates with the chemical engineer responsible for the project.

The mechanical engineer must ever be alert for any mechanical problems which may assume dangerous magnitudes on the commercial plant and must ensure that sufficient data on them are given by the pilot plant to enable the commercial plant to be designed without difficulty. He makes the preliminary drawings, allocates the labour force required to erect the plant, and collects costing data on the erection. The amounts of process steam, water, power, and lighting are estimated, and meters arranged for their measurement; arrangements are made for drainage and for ventilation. Design specifications are drawn up and the drawing office prepares complete drawings showing vessels, drives, auxiliary equipment, and pipe lines; plant manufacturers are approached to ensure their co-operation on suitable designs for the plant. Where pilot plants are frequently erected, stocks of standard equipment are carried and arrangements are made for training tradesmen for their erection.

Programme of Operation

The last section of the paper described the work of the plant operator, who arranges a programme to provide the information required to design the commercial plant and who provides costing data for the product during a spell of uninterrupted production. The product is usually the first commercial example of such, and methods of packing, storing and dispatching it can be determined. Means of conveying the raw materials should be investigated. Careful records should be kept of the maintenance and of the suitability of the constructional materials, and of the number, training, and health of operatives. The possibilities of a public nuisance, and the efficiency and the cost of treating the effluent, are recorded. Good, accurate records made during the production periods are abstracted into records of equipment, of weights and analyses of the batches, of weekly stocks and production, of valves and their maintenance, and of illness of operatives. Production on the pilot plant should be started section by section, temporary buffer stores for the products being provided. After each unit has operated successfully,

the plant is run as a continuous operation and the anticipated conditions for commercial operation are gradually attained; the next stage should be the successful working of the plant for one month, which should be done without anxiety for the operators.

The paper was published by permission of the Chief Scientific Officer, Ministry of Supply. A vigorous discussion revealed that only a few operations, *e.g.*, continuous esterification and catalytic reactions, yield no additional data on a pilot plant. On the question of advice being given by the chemical engineer to the chemist who does the research in the laboratory, the authors of the paper stated that the chemist should be allowed to evolve the best process from his point of view and, this having been accomplished, the chemist should then determine the best technical process in collaboration with the chemical engineer. A hearty vote of thanks was accorded to the authors of this excellent paper.

German Technical Reports

Details from Latest List

APPENDED are details from the latest list of industrial reports by the British Intelligence Objectives Sub-committee (BIOS) and the Combined Intelligence Objectives Sub-committee (CIOS).

BIOS 25. *Copper smelting and refining, particularly from alloy scrap and residues at Zinnwerke Wilhelmsberg G.m.b.H., Hamburg* (2s.).

BIOS 26. *Nord-Deutsche Affinerie, Hamburg*: Copper smelting and refining, etc. (2s.).

BIOS 36. *Magnetic materials and beryllium* (2s. 6d.).

BIOS 104. *Vinyl chloride, polyvinyl chloride, chlorinated polyvinyl chloride, and bristles, cane and fibres* (3s. 6d.).

BIOS 144. *Wrought light alloy plants in North-West Germany* (9s. 6d.).

BIOS 161. *Interview with Dr. Barchfeld, chemist, at Dynamit A.G., at Troisdorf*: Manufacture of Dynal (phenol-resin-bonded, laminated, paper product) and Tronal (fibre board from waste fibres without added binder) (1s. 6d.).

BIOS 176. *Scholler wood sugar plant at Holzminden* (2s.).

BIOS 179. *German cable industry* (12s. 6d.).

BIOS 196. *German rayon industry* (6s. 6d.).

BIOS 206. *Artificial and special fibres manufactured in Germany* (1s. 6d.).

BIOS 261. *Vereinigte Flusspathgruben G.m.b.H., Stullin*: Hydrofluoric acid (2s.).

BIOS 263. *I.G. Farben, Oppau Works, Ludwigshafen* (Report on nickel and iron powder plants); and *Nord Deutsche Affinerie, Hamburg* (Report on treatment of nickel-copper ores and residues) (2s. 6d.).

BIOS 265. *The German bichromate and chrome compound industry* (1s. 6d.)

BIOS 266. *New technical applications of acetylene* (3s.).

CIOS IV—13 and 15, *V*—23 and *VI*—5. *Liquid oxygen production in France and Belgium* (5s.).

CIOS XXV—17. *The Electrochemical Industry, Burghausen Area* (3s. 6d.).

CIOS XXVIII—38. *S.A.F., Nurnberg; Institut für Anorganische und Physikalische Chemie, Darmstadt*: Selenium rectifiers (1s. 6d.).

CIOS XXIX—31. *Lutz and Co. Lauf/Pegnitz*: Ceramic developments (2s. 6d.).

CIOS XXIX—51. *Thyssen'sche Gas und Wasserwerke G.m.b.H., Duisburg-Hamborn; Krupp Treibstoffwerk, Wanne-Eickel*: Thyssen-Galocsy slagging gas-producer process (2s.).

CIOS XXXII—4. *I.G. Farben, Leverkusen*: Activated charcoal and other chemical warfare subjects (4s.).

CIOS XXXII—14. *Deutsche Erdöl A.G., Regis*: Low temperature carbonisation of soft brown coal (1s. 6d.).

CIOS XXXII—16. *Stuttgart Technische Hochschule: Forschungs Institut für Kraftfahrwesen und Fahrzeug Motoren*: Investigation of research activities on fuels and lubricants (2s.).

CIOS XXXII—23. *Production of cellulose acetate flake* (1s.).

CIOS XXXII—90. *Wintershall A.G., Lutzkendorf*: Schmalfeldt gasification plant for making synthesis gas; Fischer-Tropsch plant; hydrogenation plant and catalyst factory; lubricating oil (3s. 6d.).

CIOS XXXII—92. *Brabag I Plant, Bohlen*: Liquid fuels from brown coal by hydrogenation and Fischer-Tropsch processes, etc. (3s. 6d.).

CANADIAN CHEMICAL EXPORTS

Canadian exports of chemicals and allied products in 1945 were valued at $111,318,000 as compared with $100,688,000 in 1944 and were made up as follows: acids, $2,830,000 ($2,342,000 in 1944); industrial alcohols, $5.375,000 ($8,927,000); toilet preparations, $1,745,000 ($1,683,000); medicinal and proprietary preparations, $5,740,000 ($4,256,000); explosives, $29,248,000 ($19,072,000); fertilisers, $30,428,000 ($24,000,000); paints and varnishes, $3,973,000 ($2,534,000); soap, $3,974,000 ($1,468,000); inorganic chemicals, $12,685,000 ($14,914,000); calcium compounds, $4,027,000 ($5,709,000); soda and sodium compounds, $5,420,000 ($4,263,000); chemical products, other, $15,187,000 ($21,361,000).

Personal Notes

MR. FREDERICK FRANKS has resigned from his position as director of Ernest Hinchliffe Ltd., fluorspar producers, Sheffield.

MR. S. J. DAVIES has retired from the convenorship of the Technical Committee of British Laboratory Ware Association, Ltd., after three years' service, and MR. R. H. POWELL has been elected in his stead.

MR. W. H. NUTTALL, F.R.I.C., technical director of Ioco, Ltd., Anniesland, Glasgow, who has retired from business, was chief chemist and deputy director of the Cooper Research Laboratory, Watford, for some years before joining Ioco, Ltd., in 1919.

PROFESSOR J. HEADRICK, Professor Emeritus of Aberdeen University, has returned to the University a gift presented by his former students, with the request that it should be used for the presentation of an annual prize to the best student in the subject of agricultural chemistry.

DR. W. L. WOOD, M.I.Chem.E., A.R.I.C., and DR. E. C. CRAVEN, F.R.I.C., have been appointed development manager and chief research chemist, respectively, for the Hull factory of British Industrial Solvents, Ltd., consequent on expansion of research and development activities.

MR. H. JACK, MR. A. A. POLLOCK and MR. L. J. DAVIES, who are, respectively, chief electrical engineer, chief mechanical engineer, and head of the research laboratory of the British Thomson-Houston Co., Ltd., have been appointed directors of that company.

MR. ROBERT TOUGH, B.Sc., Labour candidate in the municipal by-election for the Waterloo Ward, Widnes, has been engaged in the chemical industry since he took an agricultural degree at Aberdeen in 1922. After a period as representative of fertiliser firms, he joined I.C.I. at Billingham in 1928 and was transferred to Widnes in 1939. An active trade unionist, he is a founder-member of N.U.D.A.W. (Technical Staffs) and is a vice-president of Widnes T.U. Council.

DR. T. F. MACRAE, O.B.E., D.Sc., Ph.D., has been appointed Head of Research to the Glaxo Laboratories and will direct and coordinate the work of the research departments at Greenford. Dr. Macrae graduated with first class honours in chemistry at Glasgow University and was awarded his doctorates in post-graduate research. After two years with Professor Wieland at Munich he served at the Lister Institute under Professor Gulland and later with the British Empire Cancer Research Unit. He returned to the Lister Institute in 1935, when he was appointed Adviser in Nutrition to the R.A.F. On leaving the R.A.F. he was appointed Civilian Consultant.

Obituary

MR. EVAN G. THOMAS, M.Sc., F.R.I.C., whose death occurred recently, was assistant manager at Nobel's Ardeer factory. He was an expert in the manufacture of T.N.T.

MR. A. C. H. BELL THOMPSON, of Woldingham, Surrey, who died on March 20, aged 71, was for 18 years managing director of Sternol, Ltd., London and Limpsfield, and had been associated with Sterns, Ltd., for 53 years.

MR. RUSSELL J. COLMAN, who died at Norwich, aged 85, on March 22, was a director of J. J. Colman, Ltd. He had been H.M. Lieutenant for Norfolk from 1929-44 and held many other public offices in the county, as well as in the city of Norwich, to which he was a notable benefactor.

DR. GILBERT NEWTON LEWIS, for many years Professor of Chemistry at the University of California, died at Berkeley, California, on March 24, aged 70. An outstanding figure among chemical scientists, he was the first to isolate heavy water and deuterium, and he developed to its logical conclusion the electronic theory of molecular structure.

Parliamentary Topics

Potash Supplies

IN the House of Commons last week Sir D. White asked the Minister of Agriculture whether in view of the delay in the delivery of potash fertilisers in Norfolk, he would give any information on the subject.

Mr. Belcher said that during the past few weeks the rate of arrivals of potash in this country had greatly increased, but supplies were not yet sufficient to meet current demand. Each area of the country, was receiving its fair share of the total supply.

Institute of Management

In reply to a question from Wing-Cdr. Cooper as to the progress made with the formation of the British Institute of Management, Sir Stafford Cripps said that he hoped soon to announce the names of the chairman and the members of the first council, which the committee recommend be appointed by the Government until elected representatives can take their place according to a formula worked out by the committee. The Chancellor of the Exchequer, he said, had agreed that, to ensure a favourable start for the Institute, contributions from members and from industry should, as necessary, be supplemented by an initial grant not to exceed £150,000 over five years, this money to be provided from public funds subject to its being voted by Parliament year by year. After that time the Institute would have to be self-supporting.

General News

From Week to Week

Telephone service with the Argentine Republic has been re-opened.

A Fife branch of the Institute of Welding is being formed with the co-operation of the East of Scotland branch.

The registered office of Ernest Hinchliffe, Ltd., fluorspar manufacturers, is now 60 Dunkeld Road, Sheffield, 11.

The Institute of Physics announces the election by the Board of 19 Fellows, 36 Associates, 11 subscribers and 46 students.

The Nuffield Foundation is to give £8000 a year for eight years to expand research in the Clarendon Laboratory at Oxford.

Instrument production for the scientific and chemical industries is now being undertaken by disabled workers, samples of whose work were included in a recent Glasgow "Back at Work" exhibition.

Letters, printed papers, commercial papers, samples and small packets, up to a weight limit of 1 lb., may now be sent by surface route to places in Cambodia and Cochin-China.

Rulers or scales of any length graduated more finely than in sixteenths of an inch or millimetres will in future be regarded as chargeable with purchase tax unless they have knife-cut graduations.

Members' Day, on which members of the British Cast Iron Research Association are invited to visit headquarters at Alvechurch, has been provisionally fixed this year for July 10.

Among other gifts and grants received by Leeds University is £1100 to the Inorganic and Physical Chemistry Department for the period May, 1946, to April, 1949, given by the Department of Scientific and Industrial Research.

Applications for telephone service from firms who claim priority on the ground that they are concerned in the export trade are referred to the Department of Overseas Trade and, if supported by that department, are given priority.

Kemball, Bishop & Co., Ltd., London, E.3, announce that they have manufactured itaconic acid and have small quantities available for research purposes. It will be manufactured by them on an industrial scale when conditions permit.

"Science in Local Government" is the subject of a series of lectures, organised by the North Staffordshire branch of the A.Sc.W., to be given in Hanley Town Hall. The first lecture, on town planning, was given by Mr. J. W. Plant, Reconstruction Officer, Stoke, on March 26.

Silica glass formed when the experimental atomic bomb was exploded in the desert in New Mexico was exhibited by Dr. L. G. Spencer at the annual meeting of the Mineralogical Society in London on Thursday.

A draft Order, to be known as the Foundries (Parting Powders) Special Regulations, 1946, prohibits the use in foundries of parting powders or parting sands containing more than 3 per cent. by weight of free silica. This Order applies to all factories in which metal castings are made and in which parting powder or parting sand is used.

An official statement as to the disposal of Government-owned surplus civilian stores in the U.K. up to the end of January shows that 190,000 tons of re-usable and scrap ferrous metal and 7000 tons of re-usable and scrap non-ferrous metal, including aluminium, were sold, during January, making the respective totals 1,090,000 tons and 68,000 tons.

Salford Royal Technical College celebrated its jubilee on March 26, when members of the public were admitted to inspect its work. Significant of present-day trends is the increase in the number of part-time day students, which for the first time exceeds that of evening students. Extensions are urgently required to meet the huge rise in the total number of students.

The Combined Tin Committee has now made further interim allocations of tin metals to be operative immediately against requirements for the first half of 1946, including 3000 long tons for UNRRA. In general, the tonnages concerned will be made available from United Kingdom or Belgian sources of supply and, in the case of South America, from the United States, though some supplies may be obtained for the U.S.A. from Siam (2000 tons) and the Netherlands East Indies (150 tons).

The House of Lords gave judgment on March 22, dismissing an appeal with costs by Lever Brothers and Unilever, Ltd., and confirming a decision of the Court of Appeal that for the purpose of Excess Profits Tax the payment of over £1,000,000 into a pension and benefits fund for employees and employees' widows did not create an asset in the shape of a greater feeling of security and contentment among the staff, thus leading to greater efficiency, and that such payement could not be included in the computation of the capital "employed in the business." Originally, Mr. Justice Macnaghten in the Revenue Court had upheld the company's point of view, but the Appeal Court found in favour of the Crown.

The Public Service Estimate for the Eire State Laboratory in the coming twelve months is £12,600, an increase of £623 on the vote for 1945-1946.

The Mineralogical Society announces that the field meeting originally planned to be held in the North of England in April has had to be postponed until July 1-5. The meeting will include visits to fluorspar, barytes and anhydrite mines.

Foreign News

The French Minister of Finance, in an interview with the *Tribune Economique*, denied rumours that the French iron and steel industry would shortly be nationalised.

Peru's imports of fertilisers in 1944 declined substantially in value from those of the preceding year, the totals being 7,100,000 and 10,000,000 soles respectively.

It is reported from Chile that new oil wells have been prospected near Springhill, Tierra del Fuego, at a depth of about 6000 ft., and that exploitation has already started.

Peru received large quantities of paints, particularly marine paints, from the U.K. during the third quarter of 1945. Colours and pigments are also being imported from Great Britain.

Two of the most important Italian mercury enterprises, Monte Amiata and Stabilimento Minerario Siele, have resumed production, after the repair of considerable war damage.

The production of penicillin has been taken up in the "Sverdlov" plant in the Soviet Ukrainian Republic, while two other plants are engaged in the manufacture of menthol and hormones respectively.

The largest pharmaceutical works in Denmark, Lövens Chemische Fabriken, have started the manufacture of penicillin to supply the country's demand. The yearly consumption amounts to 300,000 ampoules.

Interesting developments in Mysore include a scheme for the mining of kaolin, large deposits of which occur at Bagespur, the manufacture of cement asbestos sheets, and the construction of small cement plants, with a daily output of about 50 tons, to utilise extensive deposits of limestone.

Glass production in Palestine, concentrated especially at the Phœnicia Glass Works at Haifa, which used to restrict itself to the manufacture of window glass, has been extended to various other kinds of glassware. Machinery for a new plant at Hebron has been provided by Canada.

The Italian fertiliser industry, which was handicapped by lack of phosphates during the war, will be revived now that an agreement has been made by which Italy will supply France with 100,000 tons of pyrites in return for 80,000 tons of Tunisian phosphates.

From Belgium it is reported that the April export quota for glass has been fixed at the same figure as for March. This decision has caused some surprise, since April production should be 600,000 square metres greater than that of March, with the resumption of operations at the Verreries de Gilly.

Important new deposits of oil are reported to have been discovered by Soviet geologists in the steppes around Kirovabad (otherwise Elizavetpol), several hundred miles from the Baku oilfields. Deposits of naphtha have also been discovered around the thermal station of Naphtlan and in the region of Starnopol, in the Caucasus.

Two Czech coal-mining experts, who had been sent to Great Britain to study coal-blasting by the use of carbon dioxide (the "Cardox" system), have now presented their report, which covers also mechanisation in the Sheffield district, and the training of mining apprentices. It is reported that full use will be made of the experience they have gained.

A Pravda report announces that the first deliveries of natural rubber from guayule have been made from the new factory erected in Azerbaijan below the mountanous region of Upper Kalsbakh. The guayule plant has been adapted by Soviet agricultural technicians to the climatic conditions of Azerbaijan, where it is now cultivated on a considerable scale.

A new department of chemical engineering is to be inaugurated at McGill University, Montreal. Dr. J. B. Phillips, a former associate professor of chemistry at the University, becomes professor of chemical engineering, and will be chairman of the new department. During the war he spent a considerable time in Great Britain as liaison official on chemicals and explosives, and in 1945 was appointed Associate Director-General of Research and Development in the Department of Reconstruction.

Forthcoming Events

April 1. Society of Chemical Industry (London Section). The Chemical Society's Rooms, Burlington House, Piccadilly, W.1, 6.15 p.m. Dr. L. P. Walls: "The Chemotherapy of Phenanthridine Compounds."

April 2. Royal Institution. 21 Albemarle Street, London, W.1, 5.15 p.m. Sir Lawrence Bragg: "The Atomic Structure of Minerals—iii."

April 2. Electrodepositors' Technical Society. James Watt Memorial Institute, Great Charles Street, Birmingham, 6.30 p.m. Mr. R. A. F. Hammond: "The Recovery of Undersized Components."

April 3. Institute of Fuel (North-Western Section). Engineers' Club, Manchester, 2.30 p.m. Annual meeting.

April 3. British Association of Chemists (Birmingham Section). Chamber of Commerce, Birmingham, 6.30 p.m. Annual general meeting. Mr. J. Stewart Cook: "The Chemist as a Trade Unionist."

April 3. Royal Society of Arts. John Adam Street, Adelphi, London, W.C.2, 1.45 p.m. Member of the staff of research laboratories of General Electric Co., Ltd.: "Jewels and Stones for Industrial Purposes."

April 3. Society of Public Analysts. The Chemical Society's Rooms, Burlington House, Piccadilly, W.1, 6 p.m. Dr. E. C. Owen: "The Determination of Boron"; Dr. C. Boyland: "Separation of the Cobalt Complex of β-Nitroso-α-Naphthol from other Coloured Metallic Complexes."

April 4. Royal Institution. 21 Albemarle Street, London, W.1, 5.15 p.m. Dr. H. Fröhlich. "Theoretical Physics in Industry—II."

April 4. Society of Instrument Technology. London School of Tropical Medicine, Gower Street, 7 p.m. Mr. L. B. Lambert: "Production of Charts for Recording Instruments." Mr. C. S. Harman: "Recorder Pens."

April 4. The Chemical Society. Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, 2.30 p.m. Prof. H. W. Melville, Mr. C. W. Bunn, Prof. M. G. Evans, Dr. G. Gee, Prof. M. Polanzi, Dr. H. W. Thompson: "Some Aspects of the Chemistry of Macromolecules."

April 5. British Association of Chemists (Notts and Derby Section). Ernest Turner Private Cinema, Spa Lane, Derby, 7 p.m. Scientific film.

April 5. Royal Statistical Society. E.I.M.A. Lighting Service Bureau, 2 Savoy Hill, London, W.C.2, 6.30 p.m. Mr. A. Gait: "Statistics in Radio Valve Component Manufacture."

April 6. Institution of Chemical Engineers (North-Western Branch). College of Technology, Manchester, 3 p.m. Mr. H. R. C. Pratt, Mr. S. T. Glover: "Liquid/Liquid Extraction — Removal of Acetone and Acetaldehyde from Vinyl Acetate with Water in a Packed Column."

April 9. Hull Chemical and Engineering Society. Regal Cinema, Ferensway, Hull, 7.30 p.m. Annual general meeting.

April 9. Chadwick Public Lecture. Royal Sanitary Institute, 90 Buckingham Palace Road, London, S.W.1. Dr. D. Winston Aldred: "The New Building Science" (Benson Gift Lecture).

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.)

NORTH BRITISH ALUMINIUM CO., LTD., London, E.C. (M., 30/3/46.) February 27, disposition by Scottish Amicable Building Society with consents granted in implement of a Trust Deed dated September 12, 1934; charged on 4 Grange Terrace, Fort William. *—. March 27, 1945.

Satisfaction

TETROL, LTD., London, N.W., chemical manufacturers. (M.S., 30/3/46.) Satisfaction March 8, of debentures registered March 28, 1940.

New Companies Registered

Harker, Sanders, Ltd. (406,458).—Private company. Capital, £1000 in 4000 shares of 5s. each. Manufacturers of and dealers in paints, etc. Directors: E. S. Harker, E. Sanders. Registered office: 50a Abergele Road, Colwyn Bay.

G. R. L. Plastics, Ltd. (406,450).—Private company. Capital, £6000, in £1 shares. Manufacturers of and dealers in plastics materials, chemicals, etc. Directors: L. Cohen, G. B. Garnham, L. Elton. Registered office: 49 Bedford Row, W.C.1.

J. & J. Baxter, Ltd. (406,256).—Private company. Capital, £3000 in £1 shares. Importers, exporters, manufacturers, etc., of dyes, chemicals, drugs, paints, varnishes, fertilisers, tanning materials, etc. Director: L. M. Williams. Registered office: 11 Peters Street, Manchester, 2.

Cosmoplast, Ltd. (406,329).—Private company. Capital, £200 in £1 shares. Manufacturers of and dealers in plastic materials, chemicals used in the production of plastics, etc. Director: A. Goodman. Registered office: 22 Union Bank Buildings, Ely Place, E.C.1.

Milan Plastics, Ltd. (406,275).—Private company. Capital, £300 in 200 ordinary £1 shares and 400 preference 5s. shares. Manufacturers, importers and exporters of and dealers in all kinds of plastic goods, etc. Directors: C. Milan, R. Large. Registered office: 9 Albemarle Street, W.1.

Advanced Chemical Industries, Ltd. (406,362).—Private company. Capital, £2000 in £1 shares. Manufacturers, importers, exporters, etc., for special chemical formulæ to be acquired by the company. etc. Directors: M. Perlemuter; the Countess of Londesborough. Registered office: 28 Lincolns Inn Fields, W.C.2.

C.M.L. Ltd. (405,900).—Private company. Capital, £100 in £1 shares. Erection, installation and operation, for its own account or on behalf of clients of research laboratories dealing with metallurgical and chemical development of all kinds, etc. Directors: L. G. Day; M. L. R. Harkness; W. E. Prytherch, Little Hockridge, Ashley Green, nr. Chesham.

Company News

Anglo-French Phosphate Co., Ltd., report net profit of £19,245 for 1944 (£6,330 in 1943). Dividend at 10 per cent. is doubled.

Monsanto Chemicals, Ltd., report profit for 1945 totalling £491,026 (£618,717). Preference dividend will absorb £11,000 (same) and ordinary dividend £50,000 (nil).

Paripan, Ltd. (paint and varnish, etc., manufacturers) report net trading profit for 1945 totalling £20,246 (£20,013). A final ordinary dividend of 20 per cent. makes a total of 25 per cent. (same, including 5 per cent. bonus).

Chemical and Allied Stocks and Shares

FOLLOWING last week's reaction in markets, a better tendency developed on more hopeful views of international politics, and prices in most sections rallied. Earlier gains were not fully held because a waiting attitude prevailed, particularly in view of the forthcoming Budget. The Chancellor's decisions could have an important influence in stimulating trade, but anticipations are not pitched very high and there are continued fears that if E.P.T. were abolished it might be replaced by a new device for limiting dividends. Financial results have continued to create a good impression, and there have been a number of further dividend increases; but in some directions profits are lower owing to reconversion difficulties, reflecting shortages of labour and material. It is also being pointed out that the present position in respect of coal is so serious that some factories may shortly be compelled to close down or work short time. Generally, however, industrial shares have held up quite well, market sentiment being aided by the firm undertone maintained in British Funds, the latter reflecting continued expectations that a big new Government loan is in prospect.

Imperial Chemical showed small fluctuations and at 40s. were maintained on balance, the 4 per cent. yield on the 8 per cent. dividend basis attracting buyers. Levers were 50s. 3d., but United Molasses at 47s. 6d. failed to hold all an earlier improvement. The units of the Distillers Co. firmed up to 118s. 6d., although elsewhere Turner & Newall were dull at 81s. British Plaster Board eased to 32s. 9d., the proposed new issue having led to the view that the dividend is unlikely to be increased at this stage. Shareholders are offered one new 5s. ordinary share at 30s. for every ten shares held. The company is proceeding with the erection of new works and extensions to existing works involving expenditure of well over £1,250,000. Dunlop Rubber, after easing, firmed up to 53s.

Elsewhere, despite nationalisation uncertainties, there were a number of gains in iron and steel, Guest Keen improving to 42s. 9d., and Weardale Steel to 35s. Babcock & Wilcox moved up to 60s. 6d. on encouraging views of the outlook, although for the time being it is not generally expected there will be much relaxation of the conservative dividend policy followed for many years by this well-known company. Foster Yates & Thom shares strengthened to their par value of 5s. on the past year's results. Davis & Timmins were held firmly, the unchanged 30 per cent. dividend being accompanied by a victory bonus of 5 per cent. Dorman Long were 35s. 3d. on the results and chairman's statement indicating the company's big schemes and progressive policy, which, however, for the time being are hampered by Government controls. Dorman Long ordinary yield 6¼ per cent., while the preferred ordinary shares at 50s. 6d. return 6⅜ per cent. Cotton textile shares were maintained and movements were small, although Calico Printers were good at 22s. 1½d., expectations now being that this year preference dividend arrears are likely to be finally paid, leaving the way open for a resumption of dividends on the ordinary shares.

Anchor Chemical were 29s. at Manchester, but William Blythe 3s. shares eased slightly to 13s. on the unchanged 20 per cent. distribution for the past year. Newton Chambers transferred around 62s. at Sheffield. In other directions, B. Laporte were 83s. 9d., W. J. Bush 85s., and Fisons changed hands up to 56s. 6d. In anticipation of the results, British Drug Houses kept firm around 59s., Boots Drug were 57s., and in other directions, Beechams deferred showed firmness at 22s. 6d. on the higher payment. Paint shares eased on fears of reduced output owing to raw-material shortages, Pinchin Johnson being 37s. and Goodlass Wall 27s. 4½d. Oils were featured by a sharp rally in Anglo-Iranian on the more hopeful Persian news, the price recovering sharply to 103s. 1½d., a jump of 6s. 3d.

Prices of British Chemical Products

THE London market for general chemicals presents a very steady appearance and most sections report a sustained demand. Prices generally remain firm with no outstanding changes to record. Deliveries against existing contracts are proceeding satisfactorily and a fair amount of fresh business has been in evidence. Permanganate of potash continues in good call and available offers of caustic and carbonate of potash find a ready outlet. In the soda products section there has been a steady demand for hyposulphite of soda, chlorate of soda, and nitrate of soda. Among the miscellaneous chemicals sulphur and white-powdered arsenic are in good request and a steady demand is maintained for acetone and formaldehyde, and acetic, tartaric, and citric acids. Nothing of special importance falls to be reported in the coal-tar products market, where conditions remain as last week.

MANCHESTER.—Quotations maintain a firm front throughout the Manchester market for both light and heavy chemical products, and the past week has witnessed persistent buying interest in many sections. Home industrial consumers are pressing for deliveries and specifications have been circulating freely, while new inquiry and actual additions to order-books have been on a satisfactory scale. A feature of the market has been the continued demand from shippers for export parcels in a wide range of materials, especially "heavies." Most of the fertilisers are going steadily to the consuming end, and a good inquiry for the tar products has also been reported.

Price Changes

Rises: Antimony sulphide; carbon bisulphide; lithopone.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton, £47 10s.; 80% pure, 1 ton, £49 10s.; commercial glacial, 1 ton, £59; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £16 per ton, f.o.r. MANCHESTER: £16 to £16 10s.

Aluminium Sulphate.—Ex works, £11 5s. per ton d/d. MANCHESTER: £11 5s. to £11 10s.

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

Ammonium Bicarbonate.—MANCHESTER: £35 10s. per ton d/d.

Ammonium Carbonate.—£37 10s. to £38 per ton d/d in 5 cwt. casks. MANCHESTER: Powder, £38 10s. d/d.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

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

Antimony Oxide.—£110 to £117 per ton.

Arsenic.—Per ton, 99/100%, £26 10s. for 20-ton lots, £31 for 2 to 10-ton lots; 98/99%, £25 for 20-ton lots, £29 10s. for 2 to 10-ton lots; 96/99% white, £21 15s. for 20-ton lots, £25 15s. for 2 to 10-ton lots.

Barium Carbonate.—Precip., 4-ton lots, £19 per ton d/d; 2-ton lots, £19 5s. per ton. bag packing, ex works.

Barium Chloride.—98/100% prime white crystals, 4-ton lots, £19 10s. per ton, bag packing, ex works.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £18 15s. per ton d/d; 2-ton lots, £19 10s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £30; crystals, £31; powdered, £31 10s.; extra fine powder, £32 10s. B.P., crystals, £39; powdered, £39 10s.; extra fine, £40 10s. Borax glass, per ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £77; powdered, £78.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granulated, £52; crystals, £53; powdered, £54; extra fine powder, £56. B.P., crystals, £61; powder, £62; extra fine, £64.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£15 to £16 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5⅝d. per lb.

Chromic Acid.—1s. 7d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Carbonate.—MANCHESTER: £6 10s. to £6 12s. 6d. per cwt. d/d.

Copper Oxide.—Black, powdered, about £100 per ton.

Copper Sulphate.—£32 5s. per ton, f.o.b., less 2%, in 2 cwt. bags.

Cream of Tartar.—100 per cent., per cwt., from £13 17s. 6d. for 10-cwt. lots to £14 1s. per cwt. lots, d/d. Less than 1 cwt., 2s. 5½d. to 2s. 7½d. per lb. d/d.

Formaldehyde.—£27 to £28 10s. per ton in casks, according to quantity, d/d. MANCHESTER: £28.

Formic Acid.—85%, £54 per ton for ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 19s. 6d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d. to 8s. 9d. per carboy d/d, according to purity, strength and locality.

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

Hydrogen Peroxide.—11d. per lb. d/d, carboys extra and returnable.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d per lb., according to quantity.

Lactic Acid.—Pale tech., £60 per ton; dark tech., £53 per ton ex works; barrels returnable.

Lead Acetate.—White, 56s. to 58s. per cwt. according to quantity.

Lead Nitrate.—About £49 per ton d/d in casks. MANCHESTER: £51.

Lead, Red.—Basic prices, per ton: Genuine dry red lead, £54; rutile, £54; orange lead, £66 10s. Ground in oil: Red, £67; orange, £79. Ready-mixed lead paint: Red, £70 10s.; orange, £82 10s.

Lead, White.—Dry English, in 8-cwt. casks, £67 per ton. Ground in oil, English, in 5-cwt. casks, £78 10s. per ton.

Litharge.—1 to 2 tons, £44 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

Magnesium Chloride—Solid (ex wharf), £22 per ton.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., for 2-cwt lots, 8s. 5d.; for 7 to 28-lb. lots, 8s. 11d.

Mercurous Chloride.—10s. 1d. to 10s. 7d. per lb., according to quantity

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

Methylated Spirit.—Industrial 66° O.P. 100 gals., 3s. 1½d. per gal.; pyridinised 64° O.P. 100 gal., 3s. 2½d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£60 to £65 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow. MANCHESTER: £3 2s. 6d. per cwt.

Paraffin Wax.—Nominal.

Phosphorus.—Red, 3s. per lb. d/d; yellow, 1s. 10d. per lb. d/d.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate. — Crystals and granular, 7¾d. per lb.; ground, 8¾d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £57 per ton for 5-ton lots, £57 10s. per ton for 1 to 5-ton lots, all ex store; hydrated, £51 per ton for 5-ton lots, £51 10s. for 1 to 5-ton lots.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 8½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 8d. per lb.; technical, £7 12s. to £8 6s. 3d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

Salicylic Acid.—MANCHESTER: 1s. 7d. to 1s. 11d. per lb. d/d.

Soda, Caustic. — Solid 76/77%; spot, £16 7s. 6d. per ton d/d.

Sodium Acetate.—£42 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 6½d. per lb.; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite. — Powder, 60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

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

Sodium Chlorate.—£36 to £45 per ton, nominal.

Sodium Hyposulphite.—Pea crystals (4-ton lots or more), per cwt. in kegs 24s. 3d., in bags 17s. 9d.; (ton lots) 25s. in kegs, 18s. 6d. in bags; commercial, 5-ton lots, £16 per ton carriage paid. Packing free.

Sodium Iodide.—B.P., for not less than 28 lb., 9s. 11d. per lb., for not less than 7 lb., 13s. 1d. per lb.

Sodium Metaphosphate (Calgon).—11d. per lb. d/d.

Sodium Metasilicate.—£16 10s. per ton, d/d U.K. in ton lots.

Sodium Nitrite.—£20 15s. per ton.

Sodium Percarbonate.—12½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £22 per ton d/d for ton lots. Tri-sodium, £25 per ton d/d for ton lots.

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber Salt).—£4 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 12s. 6d. to £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £19 2s. 6d. per ton, d/d, in drums; crystals, 30/32%, £12 7s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs: commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £14 to £16 5s., according to fineness.

Sulphuric Acid.—168° Tw., £6 2s. 8d. to £7 2s. 8d. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt., for 10 cwt. or more, £15 8s.; 5 to 10 cwt., £15 9s. 6d.; 2 to 5 cwt., £15 11s.; 1 to 2 cwt., £15 13s. Less than 1 cwt., 3s. 1d. to 3s. 3d. per lb. d/d, according to quantity.

Tin Oxide.—Nominal.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d: white seal, £38 15s.; green seal, £37 15s.; red seal, £36 5s.

Zinc Sulphate.—Tech., £20-£21 per ton, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 5d. to 2s. 6d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Bisulphide.—£37 to £41 per ton, according to quality, in free returnable drums.

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

Carbon Tetrachloride.—£44 to £49 per ton, according to quantity.

Chromium Oxide.—Green, 2s ped lb.

India-rubber Substitutes.—White, 6 3/16d to 10¼d. per lb.; dark, 6 3/16d. to 6 15/16d. per lb.

Lithopone.—30%, £26 5s. per ton.

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

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

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

Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate.—Imported material, 11% nitrogen, 48% phosphoric acid, per ton d/d farmer's nearest station, £20 15s.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in February, £10 0s. 6d., in March-June, £10 2s.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton d/d farmer's nearest station, I.C.I. No. 1 grade, in March, £14 18s. 6d.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £15 15s. per ton; granulated, over 98%, £10 14s. per ton.

Coal Tar Products

Benzol.—Per gal. ex works: 90's, 2s. 6d.; pure, 2s. 8½d.; nitration grade, 2s. 10½d.

Carbolic Acid.—Crystals, 11½d. per lb. Crude, 60's, 4s. 3d. MANCHESTER: Crystals, 9½d. to 11½d. per lb., d/d; crude, 4s. 3d., naked, at works.

Creosote.—Home trade, 6½d. to 7d. per gal., f.o.r. maker's works. MANCHESTER, 6½d. to 9¾d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 4d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 10d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £7 4s. to £10 13s. per ton, according to m.p.; hot-pressed, £11 10s. to £12 14s. per ton, in bulk ex works; purified crystals, £25 15s. to £28 15s. per ton. Controlled prices.

Pitch.—Medium, soft, home trade, 70s. per ton f.o.r. suppliers' works; export trade, 95s. per ton f.o.b. suppliers' port. MANCHESTER: 75s. f.o.r.

Pyridine.—90/140°, 18s. per gal.; 90/160°, 13s. MANCHESTER: 14s. 6d. to 18s. 6d. per gal.

Toluol.—Pure, 3s. 0½d. per gal.; 90's, 2s. 4½d. per gal. MANCHESTER: Pure, 3s. 1d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 3½d. to 3s. 6d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £24 to £25 per ton.

Methyl Acetone.—40/50%, £56 per ton.

Wood Creosote.—Unrefined, about 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

Wood Tar.—£5 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p **Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

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

p-**Toluidine.**—2s. 2d. per lb., in casks.

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

Latest Oil Prices

LONDON.—March 27.—For the period ending March 30 (April 27 for refined oils), per ton, naked, ex mill, works or refinery, and subject to additional charges according to package: LINSEED OIL, crude, £65. RAPESEED OIL, crude, £91. COTTONSEED OIL, crude, £52 2s. 6d.; washed, £55 5s.; refined edible, £57; refined deodorised, £58. COCONUT OIL, crude, £49; refined deodorised, £49; refined hardened deodorised, £53. PALM KERNEL OIL, crude, £48 10s.; refined deodorised, £49; refined hardened deodorised, £53. PALM OIL, refined deodorised, £53; refined hardened deodorised, £58. GROUNDNUT OIL, crude, £56 10s.; refined deodorised, £58; refined hardened deodorised, £62. WHALE OIL, crude hardened, 42 deg., £51 10s.; refined hardened, 46/48 deg., £52 10s. ACID OILS: Groundnut, £40; soya, £38; coconut and palm-kernel, £43 10s. ROSIN, 30s. 6d. to 45s. per cwt., ex store, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

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Excellent selection of Steam-Jacketed Boiling Pans, tested and certified before despatch, including the following:—

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ONE—3 ft. dia. by 2 ft. 6 in. deep riveted open top Boiling Pan ⅜ in. plate.
ONE—2 ft. 6 in. dia. by 3 ft. deep riveted open top Boiling Pan ⅜ in. plate.
ONE—2 ft. dia. by 1 ft. 9 in. deep riveted open top Boiling Pan ⅜ in. plate.
ONE—2 ft. dia. by 2 ft. deep riveted open top Boiling Pan ⅜ in. plate.
ONE—2 ft. dia. by 2 ft. 6 in. deep riveted open top Boiling Pan ⅜ in. plate.
All of welded construction.
ONE—2 ft. 6 in. dia. by 1 ft. 9 in. deep copper steam-jacketed Boiling Pan, carried in trunnion bearings and mounted in cradle.
ONE—80-gallon capacity copper-lined steam-jacketed Boiling Pan.

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ONE—Vertical Riveted M.S. Air Receiver, 100 lbs. w.p.; 3 ft. 9 in. dia. by 5 ft. overall height, constructed ¼ in. plate.
ONE—M.S. Air Receiver, 2 ft. 3 in. dia. by 4 ft. high, domed top and dished bottom, 150 lbs. w.p., complete with pressure valve and gauge.

STORAGE TANKS.

ONE—Open top rectangular M.S. Storage Tank 10 ft. 6 in. long by 6 ft. 6 in. wide by 3 ft. 6 in. deep; constructed ¼ in. plate.
ONE—Similar Tank 9 ft. 6 in. long by 7 ft. wide by 3 ft. 4 in. deep, with dished bottom.
ONE—Similar Tank 12 ft. long by 3 ft. wide by 2 ft. 2 in. deep.
TWO—Galvanised Steel Storage Tanks, open top; 7 ft. 6 in. long by 4 ft. wide by 4 ft. deep
ONE—Galvanised Steel Storage Tank, open top; 6 ft. 8 in. by 6 ft. 8 in. by 2 ft. 8 in.
ONE—Vertical enclosed M.S. Storage Tank, 5 ft. high by 3 ft. 6 in. dia., mounted on fabricated supports.
ONE—Rectangular Enclosed M.S. Storage Tank, 3 ft. 3 in. by 3 ft. 3 in. by 3 ft. 6 in. deep; ¼ in. plate with manhole and cover.
"ADAMANT" Heat and Acid-Resisting glazed Fireclay Tanks with white interiors, in the following sizes: 5 ft. 9 in. by 2 ft. 8 in. by 2 ft. 8 in; 4 ft. 8 in. by 2 ft. 9 in. by 2 ft. 9 in.; 4 ft. 8 in. by 2 ft. 9 in. by 3 ft.

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250 and 500 Gall. Aluminium Tanks: 500 Gall. Copper Still and Condenser; Single Effect Evaporator and Condenser; 6 ft. Cast Iron Edge Runner. Vacuum Mixer 4 ft. by 3 ft. by 3 ft. 6 in. C.I. Jacketed Tipping Pan 40 galls.

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