The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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The Chemical Age

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More about Fertilisers

A GREAT deal has been written concerning the value or otherwise of chemical fertilisers and of farmyard manure. We ourselves, on September 22 last, made some comment on the findings reported by Dr. Crowther, of Rothamsted, in a recent pamphlet. As we said at the time, the subject is a well-nigh inexhaustible one; and we make no apology for reverting to a discussion of the problems involved.

Concerning the rivalry between "artificial" and "natural" fertilisers, Dr. Crowther is plainly of the opinion that a good deal of misconception exists. No doubt farmyard manure and similar "natural" constituents were the original fertilisers, and there is a school of thought which maintains that these natural fertilisers give qualities to the produce and to the land which cannot be secured by chemical fertilisers. The subject has become a favourite theme for propagandists of various sectional interests. The fact is, of course, that the best must be made both of the bulky organic manures and of chemical fertilisers. It is necessary to obtain the fullest benefit from whatever farmyard manure can be produced from the current system of management and then to add sufficient chemical fertilisers to make up for any deficiencies. As the amount of farmyard manure available for arable crops on a farm is intimately bound up with the whole system of farming adopted, it is particularly difficult to analyse the part it plays in maintaining soil fertility and feeding crops.

This matter is very complicated and it is only necessary to point out here that analyses of large numbers of samples show that on the average 10 tons of dung contain about 1.0 cwt. nitrogen, 0.5 cwt. phosphoric acid and 1.0 cwt. potash, but it would be quite misleading to regard a 10-ton dressing of dung as equivalent to fertilisers supplying these amounts of plant food, or, as is sometimes done in farm-accounting, to value the dung by the cost of these amounts of plant food in fertilisers. Most of the nitrogen in dung is so firmly locked up in organic forms that it does not become available to crops; some of it is inevitably lost either as gas or in drainage. The phosphate and potash are less available than those in fertilisers. By comparing field experiments with and without farmyard manure, Crowther and Yates found that on dunged

On Other Pages

land phosphate fertilisers gave about one-half, and potash fertilisers about one-third of the crop increases obtained on undunged land. This finding implies that fertiliser dressings should be reduced by about 0.4 cwt. P_2O_5 and 0.6 cwt. K_2O per acre to allow for the amounts of these plant foods furnished by an average dressing of 10 tons farmyard manure per acre. These allowances for the phosphoric acid and potash in farmyard manure should always be borne in mind in drawing up manurial programmes.

A general conclusion from field experiments is that *nitrogen* fertilisers should not be cut down when farmyard manure is used, even though good farmyard manure supplies appreciable amounts of available nitrogen. To explain this result, it must be remembered that farmyard manure supplies other foods and improves the physical condition of the land, thus giving better crops, capable of responding to larger aggregate amounts of each of the plant foods, and especially of nitrogen. Moreover, dung is normally applied at a stage in the rotation where the land is most exhausted and most responsive to additional plant foods. The practical recommendation for using dung and fertilisers to best advantage is to give the dunged fields fertilisers with less phosphate and potash but the same nitrogen.

That is one aspect of the general subject of crop improvement. Quite distinct is the consideration of future development in the production and use of fertilisers. Dr. Crowther concludes that it is perhaps too early to formulate any long-term policy until the post-war pattern of British agriculture has been determined; but some general directions of future progress are fairly clear. The soils of the country have not been exhausted of plant food during the war and the general fertility of the soil has not fallen. Phosphate is needed for much of the permanent grass, especially for dairy cows and young stock, and many soils are short of potash. Apart from developments through fundamental research and new discoveries, it is possible to foresee some of the main directions in which technical investigations will proceed. The first task will be to obtain more knowledge of individual soils, crops, manures and systems of husbandry by surveys and field experiments.

The general trend in manuring is clearly towards more frequent small applications of concentrated materials by improved machines. Some day it may become possible to prepare slowly acting forms of synthetic nitrogen fertilisers to supplement the dwindling supplies of concentrated organic nitrogen fertilisers and the manurial residues from imported feeding-stuffs. It seems unlikely that this country will be able to afford large imports of these materials, or that the poor soils of India, Africa, and South America can be indefinitely "mined" to enrich our soils. These countries will need to process their farm products, so as to retain as much protein and other nutrients for their own people, stock, and land, and to export mainly oils, fibres, and starchy foods.

Considerable developments are expected in the direction of phosphate fertilisers. At sufficiently high temperatures, rock phosphate can be broken up to remove fluorine and leave a true tricalcium phosphate, which proves to be readily available to crops, even though it is not water-soluble. Much work is being undertaken to see whether there is any advantage in mixing superphosphate with various basic materials, *e.g.*, lime, basic slag, or serpentine (a natural magnesium silicate), to produce a phosphate available to crops, but less quickly inactivated in the soil. The problems involved in investigating new methods of making available phosphates are so complicated, and the technical resources required are so elaborate, that they have been attacked systematically only by large chemical corporations, the U.S. Department of Agriculture, and the Tennessee Valley Authority.

The experience of the last few years has shown that there is a great deal of work to be done by the manufacturer of fertilisers in developing new and important forms of his products, by the farmer in applying the products made available to him in the best way, having regard to crop production and economics, and by the research bodies who act as a liaison between the two. Agricultural chemistry was never so active as it is to-day.

NOTES AND COMMENTS

Science Survey

THE affirmative reply given by the Lord President to Sir Wavell Wakefield on Thursday last week, when he asked whether the Government would carry out an early survey of the position in regard to scientific research and development, led up to a full-dress Commons debate on the subject on Friday. Captain Blackburn, the principal speaker, confessed himself pleased with Mr. Morrison's assurance that his committee of six leading scientists would consider the subject, but he offered a more detailed plan of approach, suggesting six specific proposals which a Central Research and Development Council should follow up. Not only should they seek to foster both fundamental and applied research, but also to ensure an adequate supply of skilled scientific personnel, to arrange the proper co-ordination of existing governmental scientific bodies, and to promote international scientific relations. He demanded much greater national expenditure on research—a corollary of the restriction of private enterprise which is envisaged—and also a rapid revision of the question of patents. Sir W. Wakefield, having paid a tribute to the previous work of Sir Edward Salt and Sir George Schuster, urged that manpower and the fulfilment of material needs (notably the building of laboratories) were the first essentials. He had some pertinent things to say about the status of scientific civil servants—not merely on the financial side, but also in regard to the psychological factors of prestige and esteem. Quite certainly, he thought, something bigger than the present D.S.I.R. was required.

Government Intentions

AFTER Mr. Cobb and Mr. Palmer had added some practical hints, the Lord President gave a general picture of what were the Government's intentions in the matter, drawing on his experience as Minister of Home Security in the last Government. His committee of leading scientists, he said, was to make recommendations for the establishment of permanent machinery for carrying out surveys as to the best use of our scientific resources in the national interest. Man-power for the universities was a prime consideration, he stated, and the Government was well aware of the importance of fundamental research. He insisted, however, that there was no need for a Ministry of Science; he did not believe that they ought to try to centralise science in one department. As for the industrial research associations, private enterprise, he thought, should give them more money; if that was done Government money would follow. One definite promise he did make, and that was that something would be done in the field of patents. It may be, in the view of scientists, whether "pure" or "applied," that all this seems rather circumlocutory and ponderous—but that is the way of governments. The salient point is that the subject has been well ventilated in the House, and the machinery is moving. Happily, the question is not being made a party matter; the House appears unanimous that something should be done, and done quickly. The first definite move must be with the six-membered committee, and it is to be hoped that their deliberations will not be unduly protracted.

Secret Weapons

AMONG the more irritating minor legacies of the Nazi régime is the use of the term "secret weapon." Coined originally by the Goebbels propaganda organisation to inspire the enemies of Germany with apprehension about what might happen next, the term could legitimately be applied to the flying bomb and the V-2 rocket; but it has since been worked to death by certain sections of the Press, until it has come to mean nothing more than some new scientific development which has not been previously described in the columns of a newspaper. Every slightly altered gun, every improvement of an electrical device, every newly synthesised drug, is a "secret weapon" against something or other; and we have really had enough of it. There is, indeed, more to it than that: it is all part of a tendency to introduce secrecy illegitimately as a recognised feature in the progress of science. The retiring

president of the Royal Society, Sir Henry Dale, wisely adverted to this subject in his speech at the anniversary meeting last week. His text was, not unnaturally, the question of whether or no secrecy should be applied to the methods of manufacture of the atomic bomb. He very rightly said that scientists must be on guard in view of their experience of the application of secrecy to science for military or industrial advantage. They had to fear that, in default of the international agreement which they must hope and work for, national military secrecy would try to maintain and extend its war-time dominance. This is a real danger to the very spirit of science, apart from the implicit physical danger to humanity, and we heartily support Sir Henry's appeal to scientists to stand together and preserve the integrity of their profession. The patent laws can provide a reasonable modicum of secrecy to industrialists and inventors; the dead hand of censorship imposed for military reasons is another matter altogether.

Pre-Entry Training

CERTAIN remarks in the annual report of the Chief Inspector of Factories (reviewed elsewhere in this issue) give additional point to the lecture delivered to the Institution of Factory Managers at Manchester on November 24 by Mr. J. B. Longmuir, general welfare officer with Newton, Chambers & Company. His subject was "Training for all Levels of Management," but we would draw special attention to his observations on the training of new entrants into industry. As he says, pre-entry training can be carried out by any company, and is the most direct way of getting to know the character and capabilities of the neophytes. Recruits to industry should be equipped to fill the complete range of jobs as well as the executive and administrative positions in the firm; and they should be carefully selected and graded according to the results of their training. Young men should also, as Mr. Longmuir recommends, be encouraged to take full advantage of existing educational facilities and should aim at reaching definite objectives. This all sounds very simple, but, we ask, is it in fact carried out as universally as it should be? Statistics of accidents to workers under 18, as quoted in the Chief Inspector's report, would seem to imply that it is not; too often young workers are impelled simply to copy the practices of workers far more experienced than themselves, with frequently disastrous and sometimes even fatal results. As Mr. Longmuir says: "Man is not born with manual skills, but only the capacity to develop them." It seems to us good business, as well as being sound safety practice, to see that young entrants into industry are given every chance to develop such skills.

Mathematics for Industry

DURING the war mathematics became increasingly harnessed to the needs of industry and research; accordingly, the D.S.I.R. has set up a Mathematics Division in the National Physical Laboratory. Problems presented by the war, both in its operational and industrial aspects, required considerable use of mathematical analysis. On the operational side, for example, the need to know a great deal about the flight of a shell directed towards a moving target necessitated very considerable mathematical work. All the variables which affect the accuracy of firing have to be taken into account, and while the professional mathematician is satisfied with the results of such calculations expressed in terms of a formula involving a number of variables, those who have to use the results in practice have very often neither the time nor the ability to work out such a complicated formula. It becomes necessary either to compute the value of the formula for all likely values of the variables, or to invent a mechanism which, by simply setting in accordance with these values, automatically produces the answer. Industry and research have similar complicated problems whose solutions are extremely laborious. Of recent years, there has been considerable development in mechanical computing and it is to undertake this work for industrial concerns as well as for Government Departments that the new Division has been set up. The Division is organised in three sections dealing respectively with computing, statistics, and the development of calculating machines.

Factories in 1944

Continued Decline in Accidents

LAST week was published the Annual Report of the Chief Inspector of Factories (Cmd. 6698; H.M.S.O., 1s. 6d.), a document which we urge all those who are interested in factories in whatever way to read in full. The price, it is true, has gone up by sixpence since last year; we could wish that every recent increase in price was equally well justified. With this Report, Sir Wilfrid Garrett brings his period of duty as a factory inspector to an end, for he is retiring at the end of the year. He has performed the task with unexampled efficiency and has never forgotten that (to use his own words) "a factory is a place where people spend one-third of their working lives and must, therefore, be so run that the well-being of the worker is secured." The Factory Inspectorate, under his guidance, has proved an eminently human organisation.

The present Report appropriately looks ahead to the problems which will confront the Factory and Welfare Department in the reconstruction period. It calls attention to the great changes which the war has brought about in the conditions of industry and the deterioration of machinery, plant and buildings owing to the absence of upkeep; the scrapping of old machines; and the introduction of new machines and processes on an enormous scale.

A Change of Outlook

"Perhaps greatest of all," Sir Wilfrid says, "is the change of outlook of all interested parties during the war years. Largely through the influx of women into industry, a new standard in regard to the conditions of employment has come into existence. Managements are realising that, if the conditions of full employment are implemented, there will be competition for labour and that the best will go where conditions are good. The older industries will, therefore, be handicapped, and we must face the fact that, with the present priorities for building material and labour, it may take years to get that rebuilding of old factories without which modern conditions cannot be fully obtained. In the meantime, however, much can be done to overcome the deterioration of the war years.

"The new outlook on labour or personnel management is an outcome of this new attitude. Under the influence of Production Committees, many works committees are being established and the workers are claiming and obtaining a greater voice in the control of the conditions of their work. The closer collaboration between management, trade unions, and the workers on the floor of the shop is pointing to a new era when the workers will exercise effective supervision over the conditions of their employment. Can we develop towards the idea that a factory is more than a place to work in?" All this, Sir Wilfrid points out, was said almost in so many words at the end of the last war, and was forgotten in the intervening years, leaving the inspectors with little support in these matters; and he asks all concerned to see that it does not occur again.

There is an impression current to-day, the Report points out, largely based on conditions found in a few factories built specially for war production, that great improvements have been made in amenities generally. In fact, as a whole, a great deal of leeway has to be made up, particularly in the provision of fencing and the overhaul of plant, as well as in the general standard of cleanliness. Bomb damage and war-time neglect of maintenance may well have created dangers from the point of view of structural safety.

Total of Accidents

The number of fatal accidents reported in 1944 was 1003, as compared with 1220 in 1943—a decline of 17.8 per cent. Non-fatal accidents fell by 9.1 per cent.—from 309,924 to 281,578. Allowing for the smaller number of factory workers employed, the accident rate per 1000 also fell. It is noteworthy that for males aged 18 and over the decrease was from 53 to 51 per 1000; for those under 18 the decrease was from 58 to 55. To counteract this tendency towards a higher accident rate among young workers, more and better training schemes for new entrants are advocated.

In examining accidents of various types, it is noted that 204 were due to ignition of inflammable liquids by sparks, flames, etc. Many of these were the result of gross carelessness such as the throwing of tins of inflammable solvents on to fires, or to the boiling of similar liquids over open gas flames. Almost 150 accidents were caused by the faulty manipulation of blowpipes, often through the burning of rubber connecting-tubes. Only six burning accidents appear to have been due to magnesium and only two to have been the result of lack of means of escape.

For the first time in the history of the pottery industry there has not been a single case of lead poisoning—a landmark in Factories Act administration. In 1897 the total number of such cases reported was 432. Much of the credit for this improvement must be given to the detailed code of

regulations formulated against this disease and the way in which these regulations have been accepted; also through the development of low-solubility and leadless glazes.

The point that has been hammered in for so long by the Department, that long hours do not achieve the desired results in production, seems at last to have got home to the majority of managements; and at the same time the opposition of the workers to shorter hours has materially decreased. The Fuel Economy Campaign was an influence also towards the reduction of time worked, and there has been a strong impetus towards the five-day week. In practice these reductions in weekly hours have not led to the reductions in output or the lessening of wages that was expected; and many of the examples of production figures quoted by inspectors are extremely interesting.

Ventilation Problems

War conditions gave rise to many problems of heating and ventilation, with the fuel shortage aggravating the former difficulty. The provision of up-to-date heating systems is urged, for the sake of both economy and amenity. The ventilation problem was greatly eased by the ending of the black-out, but war production led to a great increase in dust- and fume-producing processes, necessitating the installation of many more systems of local exhaust than are normally needed. Design of apparatus often presented great difficulty in such circumstances, and in one case (bad conditions in a metal-pickling department) a proposal was made to place the vats by the outside wall with exhaust fans so arranged above them as to give an air flow away from the vats. It is pointed out that in the coming era of factory modernisation it will be well if trades using fume-producing vats would depart from the old-established practice of placing these vats in the middle of the shop.

Colour in the Factory

The comparatively new movement to introduce colour throughout the factory has made much headway. Natural conservatism having been once overcome, the advantages of the use of colour, both as a cautionary measure and as a decorative element, have been widely accepted; and another grimy legacy of the industrial revolution bids fair to disappear. The thin end of the wedge was inserted when the British Colour Council advised the use of bright colours in canteens; the progress of the movement thence, *via* the drawing-office, to the shops themselves has been continuous, workers in some instances asking to do the painting in their own time.

In the Industrial Health section of the report, Dr. E. R. A. Mereweather emphasises the necessity of applying in the future the lessons learnt in the past. Peace, not war, he says, is the time for attending to the elimination of occupational disease, though in both the recent wars great advances were registered in this field. Though suffering from shortages of all kinds, the Department's industrial health service has been active, and is inspired by the hope derived from the greatly increased public consciousness of the importance of its work. Many public and other educational bodies have co-operated in diverse ways, and large industrial concerns are interesting themselves in research on problems of industrial health. It is hoped that adequate courses of training in the subject for medical men returning from the Forces will not be lacking. With the looked-for programme of re-settlement on the grand scale, the opportunity is not one to be missed.

Unhealthy occupations *must* be made healthy or they will languish and ultimately fade out from lack of labour. Each industry should set itself to tackle its own health problems first, and integrate its finding with a national Industrial Health Service.

Among special problems investigated during the year have been oil dermatitis, methods of protecting the eye from infra-red radiation in welding, and keratitis associated with exposure to *n*-butyl alcohol.

Industrial Diseases

The outstanding feature among cases of notifiable industrial poisoning and disease was the absence of any case of lead-poisoning in the pottery industry, already mentioned. Total lead poisoning cases numbered 41 (5 fatal), the lowest figure yet recorded. Exposures to leaded petrol fumes and to molten lead were the occasion of a number of these cases; investigations have shown that no respirator is an efficacious barrier to lead fumes; mechanical exhaust ventilation is essential.

The one reported case of phosphorus poisoning has led to the institution of a quarterly X-ray dental examination in the yellow-phosphorus plant concerned. Of the seven mercurial poisoning cases, five were women who had been exposed to metallic mercury and fumes. Manganese poisoning was reported in one case—only the third since this disease became notifiable in 1936—the worker concerned having been employed for four years in grinding ores.

The fall in aniline poisoning cases continued (from 79 to 55), no doubt partly because of the falling-off in the manufacture of TNT, and toxic jaundice cases (12, one fatal) were also reduced for the same reason coupled with better supervision in R.O.F.s. Toxic anæmia, however, recorded 12 cases (6 fatal) against 7 (4 fatal), underlining the importance of stringent precautions and close medical supervision where such toxic agents as TNT and benzene are being used.

Epitheliomatous ulceration cases rose

markedly from 160 (15 fatal) to 205 (20 fatal), the majority (160) being due to pitch and tar. Of the fatal cases 17 were attributable to mineral oil, all of them being workers in cotton mills. Emphasis is laid, in the Report, on the importance of early treatment of lesions of the skin due to agents known to be carcinogenetic, in view of the efficacy of modern counter-measures.

Chrome Ulceration

Chrome ulceration, which had a bad record in 1943, showed a marked improvement—121 cases against 226—chiefly due to the decrease among "other industries," *i.e.*, industries outside those long associated with the incidence of this complaint. The manipulation of sodium chromate, for example, was responsible for 31 cases against 131. Three cases were due to the unsuspected use of sodium bichromate to overcome a temporary shortage of natural bauxite. This particular hazard ceased when the bauxite again became available, but it could have been anticipated and was controllable by the usual measures. Shortly afterwards a non-irritating substitute for the bichromate was found. A process which had been responsible, in 1940, for 7 cases due to exposure to a chromium oxide, came into the picture again last year with 8 reported cases. Local exhaust ventilation, introduced to deal with the trouble in 1940, was found to be faulty (partly owing to corrosion) when it had to cope with an increased demand in 1944.

"Gassing" Cases

Gas poisoning cases amounted to 450 (25 fatal) against 695 (27 fatal). Carbon monoxide (209 against 231) was responsible for the largest quantity, but nitrous fumes (55 against 135) showed a welcome decrease, while chlorine poisoning continued to increase slightly—from 58 to 59. The exceptionally high figure for trichlorethylene (87) recorded in 1943 was reduced to the more normal total of 16.

Of the 25 fatal gassing cases, 21 were from carbon monoxide, four of them among a group of men who were overcome, thanks to the breakdown of a ventilation fan belt, while dismantling the interior brickwork of a hot blast stove. Three fatalities were from unlighted gas jets, two from gas escapes from furnaces, and two from the cleaning of pipes and flues.

Damp bleaching powder in a corroded drum was the cause of one chlorine poisoning cases, and two others occurred from accidental contact between sodium hypochlorite and acid. Two of the nitrous fume cases were due to using oxy-acetylene flame in a confined space. Naphtha poisoning, after two blank years, accounted for two cases, one from a varnish-mixing machine, and one from cleaning out a tank recently coated with bitumastic paint. The two deaths among the 8 ammonia poisoning cases were due to an escape of liquid ammonia while the inlet pipe of a compressor on a refrigerating plant was being removed.

Some interesting cases, not technically "gassing accidents" were recorded among operatives manufacturing tracing paper. Exposure to the solvent, a standard coal-tar naphtha, consisting substantially of xylene and its higher homologues with about 20 per cent. paraffins, led to headaches and lassitude, attributable to considerable blood-change. The 37 nickel carbonyl cases were due, as last year, to temporary plant defects in a single factory.

Adverse skin effects from methyl bromide emphasise the need for special footwear where this chemical is employed, as it is believed that its heavy vapour will pass through leather and ordinary clothing, and tends to blanket at floor level and just above. Ethylene glycol, taken under the impression that it is an agreeable alcoholic drink, was again responsible for one death.

Less Dermatitis

Cases of dermatitis reported as due to chemicals fell from 1706 to 1151, but the proportion due to contact with oil appears to be steadily increasing, although the use of a special cleanser in the form of a neutral sulphonated castor oil with a wetting agent appears to be having a good effect. Reliance on a single protective measure, however, such as a barrier cream, is not sufficient, and the importance of the reduction of contact to a minimum and the detection of early cases of skin irritation must not be forgotten.

A special section of the Report deals with the investigation of silicosis and pneumoniosis, and a chapter on Industrial Advisory Committees by Mr. H. R. Rogers has been introduced to give the history of developments during the last 30 years in connection with the approach by the Factory Department to both sides of industry, in order to secure their help on technical matters with a view to the better implementing of various provisions of the Factories Act in the particular industries concerned.

The Pacific Research Organisation, first of its kind on the West Coast, founded as a non-profit organisation to provide independent research facilities for aiding the West's industrial expansion, has been incorporated recently in Los Angeles. The organisation plans to offer services in the fields of chemistry, metallurgy, ceramics, petroleum and mining. It has been organised on the pattern of well-known research organisations available to industries in the Western United States.

German Chemicals

Production in U.S. Zone

PRODUCTION of chemicals in the U.S. zone of Germany is at a very low level, states *Foreign Commerce Weekly*. Factors limiting production are shortages of coal, coke, raw materials, and transport difficulties. Potash awaiting shipment from mines in the U.S. zone is adequate for immediate needs, but insufficient transport is holding up movement. Further production will depend upon coal supplies. The zone is facing a critical shortage of both nitrogen and phosphate fertilisers, which can be alleviated only by shipments of either coal or ammonia from the British or French zones and the import of phosphate rock. In the past, phosphate fertiliser has been produced in Germany from slags to the extent of one-third of total requirements.

Owing to the imminent exhaustion of phosphate stocks, consideration must be given to the import of some 500,000 tons of North African phosphate rock for use during the next 12 months.

Production of soap during July amounted to less than 900 tons, or an average of about 1½ oz. per person in the U.S. zone. Lack of synthetic fatty acids, formerly produced as a by-product of synthetic petrol, has caused the curtailment of soap production. Prospective soap production is less than one-third of estimated requirements.

Penicillin in Germany

Attempts at Manufacture

AT both the Elberfeld and Hoechst plants of I. G. Farben, work had been done during the war on the production of penicillin, states a report on the pharmaceutical activities of this combine, published by the U.S. Department of Commerce. At Elberfeld only very slight success was obtained and unimportant quantities were produced. At Hoechst enough material was made to enable penicillin to be used for clinical purposes. Here also the yields in the broth were very small, while processing losses were high. Little, if any, work was done on submerged fermentation. Surface material was made in amounts of not more than 10 million units per month, and it is doubtful whether more than 50 million units were made altogether.

At Hoechst, using the Czapek-Dox medium with yeast or potato water as supplementary substances, surface fermentation gave yields of about 10 units per c.c. Extraction processes were used to purify the crude penicillin, and butyl acetate was used instead of amyl acetate for extraction. By this method, finished calcium penicillin was prepared, having an activity of about 125 units per c.c. The yield from the broth to the calcium salt was about 50 per cent. No information was gathered regarding the structure or empirical formula, and it is obvious that from 125-unit material no exact information could have been gained.

Investigations were made to test the antibiotic activity of a series of quinones and other substances related to those isolated by Raistrick and others in their work on mould metabolism, but none of these substances showed any promise.

Professor Kuhn, of Heidelberg, was engaged on work on synthetic compounds alleged at one time to have a penicillin-like activity, such as compounds of the salicyl series. It had been reported, in fact, that dibromo- and tetrachlorosalicyl compounds were almost as effective as penicillin. After considerable study by Domagk at Elberfeld and Fussgänger at Hoechst, however, it was found that though these compounds showed some activity *in vitro* against *Streptococcus* and other bacteria, they had no activity *in vivo*. So far as the authors of the report were able to learn, no production of penicillin had been carried on at any other place in Germany and no German scientist had any information regarding the synthesis or structure of penicillin. It is reported that any work connected with penicillin has now practically ceased.

Hyderabad Development

Huge Hydro-Electric Schemes

TWO schemes of industrial development in Hyderabad State, Central India, utilising hydro-electric power on a vast scale, have been launched by the Nizam, and an organisation on TVA lines is being set up to deal with them. The Tungabhadra river is to be harnessed, and its stored waters will be used, mainly for irrigation and to encourage rural development and cottage industries, but also to provide power for gold mines, sugar factories, and oil mills. It is reckoned that 500 million kWh can be developed from the falls on the proposed canal.

Still more ambitious is the project on the Godavari river, which includes a new industrial city, hydro-electric and irrigation development, a balancing thermal power station, and the exploitation of coal, iron, mica, graphite, limestone, and other mineral resources. A dam is to be placed across the river at a point where it drains a catchment area of 35,740 sq. miles, and the falls on the projected canals can generate 750 million kWh of electric energy. A sum of £20 million has been set aside for this development and for a navigational survey of the Godavari, and an order for nearly 50,000 h.p. of thermal plant is being placed in the United Kingdom.

Reports on German Chemical Works

Two Further Lists Released

SINCE the publication in THE CHEMICAL AGE of November 24 (p. 497) of the second list of reports on German chemical works—the first list appeared in our issue of October 27 (p. 392)—two further lists have been released by the Ministry of Supply.

The same arrangements apply as in the case of the previous reports. Appointments can be made to examine these reports on application to the Association of British Chemical Manufacturers (Miss Tippett) at 166 Piccadilly, London, W.1. Only one copy is available and therefore reports cannot be sent through the post. The position regarding reproduction by H.M. Stationery Office is still uncertain, and it is not yet known definitely when copies will be available. The caveat in regard to patents still applies. A list of titles, with a summary of the contents is appended.

XX—9. *Deutsche Gold und Silber Scheide Anstalt, "Degussa," Frankfort-on-Main.*—Sodium and potassium cyanides; other metal cyanides; sodium cyanate; sodamid; sodium metal; potassium metal; beryllium metal; lithium metal; Degesch; carbon black; ceramic materials and refractories; hydrogen peroxide; other peroxygen compounds.

XIX—5. *I.G., Dormagen.*—Cellulose for cuprammonium rayon; preparation of basic copper sulphate; the copper recovery system; ammonia recovery system; staple fibre production; synthetic upholstering material; continuous spinning of rayon from solution to bobbin; cellulose acetate; acetylation of cellulose fibres; phlegmatisation of propellants; polyurethane; miscellaneous research activities.

IV—2. *Report on Visit to Cave used for Storage of Hydrogen Peroxide, near Vaas.*—

XX—11. *I.G., Höchst.*—Fluor-Gesarol and DDT; dye intermediates; chlorination products from methane; chloroform; methyl chloride (for methyl cellulose); monochloracetic acid; chlorobromomethane (fire extinguishing agent, to replace carbon tetrachloride); Frigen (dichlorodifluoromethane or Freon 12). Acetylene compounds. Plastics. Almost all types of colours; textile and water conditioning chemicals. Tanning materials. Fire-fighting chemicals, etc. Glycerine from cheap sugars.

XXII—16. *I.G., Elberfeld and Leverkusen.*—Di-*iso*cyanates and polyurethanes; (Desmodur and Desmosite), polyhydroxy, etc., compounds—1,4-butanediol; Desmophen 900, 1100, and 1200. Linear polymers—Igamid U; Polystal. Cross-linked polymers—paper for protection against mustard gas. Ethyl cellulose. Benzyl cellulose. Cellaprit (cellulose acetate 50 per cent. wet).

XXII—18. *I.G., Leverkusen.*—Production of hydrazine hydrate.

XXIII—12. *I.G., Elberfeld and Leverkusen.*—Pharmaceuticals and Insecticides. Sulphonamides and sulphones; antimalarials; remedies for tropical diseases; remedies for virus diseases; anæsthetics—general and local; antibacterial agents—penicillin, dibromsalicyl; hormones; vitamins; blood substitutes—Periston; Insecticides and insect repellents. Appendices dealing with Santochin, etc., and work on malaria.

XXIII—17. *Bad Lauterberg (Harz)*—Production of Concentrated Hydrogen Peroxide Solutions.

XXIII—19. *Gustave Siegal A.G., Feuerbach, near Stuttgart.*—Production of aluminium hydroxide pigment and silicate catalysts.

XXIII—23. *I.G., Höchst.*—Pharmaceuticals and Insecticides. Chemotherapy of infectious and neoplastic diseases; nitroacridine and rutenol, Congasin and Preparation 7602, Preparation 9659a (bismuth salt of glycolylaminophenyl arsenic acid), penicillin; analgesics; pyramidon; rivanol; vitamins (ascorbic acid and Vitamins E and K); salvarsans; novocaine; analeptics; enteric coatings; suppository base (Postonal); antispasmodics (Aspasan); hypnotics. Appendices—"Nitroacridine Preparation 3582" (article by Dr. Fussgänger), "Rutenol" (article by Dr. Fussgänger).

XXIII—25. *I.G., Elberfeld and Leverkusen.*—Miscellaneous Chemicals. Inorganic, intermediates, and dyestuffs departments (with lists of products). Leverkusen: acrylonitrile; phosgene; Porofor N; chlorobenzene; nitrochlorobenzene; diphenyl, chlorodiphenyl; salicylic acid; sodium salicylate; phenol; tanigans; persistol; Mersolat. Elberfeld: hexemethylenetetramine..

XXV—18. *I.G., Höchst.*—Wehrmacht items: List of war activities. Aluminium chlormethyl (Methyl Stoff); nitrous oxide (GM-1); luminous paints; smoke-screen agent (Nebelsäure); tetranitromethane (X-Stoff); infra-red camouflage (infra-rot Tarnung); cloth-treating agents to resist mustard gas (Selloxine); detection of mustard gas in the dark; fuel for jet propulsion (Sondertreibstoff); bullet-proof glass (Panzerglas); protection of foodstuffs (Lebensmittel-Konservierung); anti-tank mine (Haftmine); landing field defence—self-igniting cushion (Brandkissen); chlorobromomethane (Feuerlöschmittel CB); substitute for black powder in propellants (Treibsätze); explosive intermediate (Weissalz); U-boat programme (Schornsteinfeger.

Alberich and Teppich); oil substitute (Steueröl).

XXV—26. *XXVI*—79. *I.G., Mainkur-Höchst.*—Crude oil demulsifying agents (Dismulgans); miscellaneous chemical products; dyes and colours; textile aids; detergents—textile aids from fatty alcohol base; intermediates for synthetic plastics; synthetic lacquer resins; other high polymer resins; medicinal products, trypaflavin (human), phenothiazin (animal). Manufacturing instructions for: Humectol CX (Dismulgan V); Kaurit MKF; Trypaflavin; Thiodiphenylamin S; Dismulgan IV; Dismulgan VII.

XXV—34. *I.G. Laboratory, Leverkusen.*—Synthetic Rubber and Vulcanising Agents. Discussion of I-Gummi. Use of Buna for cables.

XXV—44. *Hydrogen Peroxide Electro-Chemische Werke, Höllriegelskreuth, Munich.*—Part I: Production of high-test peroxide. Part II: Synthesis of hydrogen peroxide through an electric discharge. Part III: German peroxide production potential.

XXVI—50. *Deutsche Fettsäure-Werke, Witten.*—Production of Synthetic Fatty Acids and Edible Fats.

XXVI—51. *Chemische Werke Hüls, Hüls,*—Synthetic rubber plant using mainly acetylene from natural gas. Details of manufacture of acetylene; costs; sketch of are. Other plants: ethylene oxide; acetophenone; acetylene hydrogenation; ethyl benzene.

XXVI—59. German Anti-Fouling Compositions.—Possible use of plastic "Wofatit" in very early stage of development.

XXVI—73. *I.G., Elberfeld and Leverkusen.*—Insecticides, Insect Repellents, Rodenticides and Fungicides. Insecticides: "NE 1700," "DDD" or 1,1-dichloro-2,2-bis (*p*-chlorophenyl)-etlfane; "ME 1748," "Gix," "Fluorgesarol" or 1-trichloro-2,2-bis (*p*-chlorophenyl)-ethane; "Lausetoneu" or phenylchloromethyl sulphone and *p*-chlorophenylchloromethyl sulphone; compounds prepared by Dr. Meiser showing insecticidal activity; *p*-chlorophenyl trichloromethyl carbinol; "Bladan" or hexaethyl ester of tetraphosphoric acid. Mosquito repellents: Testing at Elberfeld; "Presinol" or "Mipax"; effect of calcium chloride to enhance repellency; simplified "Mipax" formula; esters of phthalic acid, repellent "50/181," or trichloro-acetylchlorethylamide; impregnation of cloth with repellents; comment on repellent testing. Rodenticides: "Castrix," or 2-chloro-4-methyl-6-dimethylamine pyridine; *p*-dimethylaminobenzene diazonium sulphonic acid sodium salt. Fungicides: "P 1238"; 3-chloro-4-hydroxyphenyl diazosulphonic acid, sodium salt. A compound for testing seed germination—triphenyl-tetrazolium chloride. Appendices: 1. "Preparation of 1,1-dichlorophenyl-2, 2-dichloroethane"; 2. "Substances tested against body lice"; 3. Results of testing repellents and mosquitocides. 4. "Preparation of triphenyltetrazolium chloride."

XXVIII—62. Glossary of Some German Names for Chemical Products.—Selection of "I.G. Names" for materials which are of actual or potential industrial importance (including a quarterly record of new compounds and products made, 1935-44).

XXIX—4. *I.G., Wolfen.*—Fodder Yeast Plants. Raw materials and organism used; treatment of sulphite liquor; fermentation; production capacity and costs (in pilot plant). Details of process and plant. Interview with Professor Rieche.

XXIII—8, *XXIX*—5. *Dessauer Werke für Zucker und Chemische Industrie A.G., Dessau.*—Alcohol and allied products from wood; wood-sugar by the Scholler process; details of process and fermentation vessels; capacity. Flow sheet.

XXIX—14. *I.G., Leverkusen.*—Inorganic chemicals: Barium compounds; carbon and chlorinated carbon compounds (carbon monoxide, phosgene, chlorhydrin, hexachloroethane, dichloroethyl-methyl ether); ceramic colours, fluxes and pigments (including cadmium selenide and sulphides); activated charcoals; chlorine, caustic soda, hydrogen; chromium compounds; chromising of steel surfaces (Electro process, Metalldiffusionsgesellschaft process); fluorine and compounds; lithopone; hydrazine hydrate; hydrochloric acid; oxygen; sodium compounds (sulphate, sulphide, bisulphite, thiosulphate); sulphur compounds (thionyl chloride, sulphuryl chloride); titanium compounds; (dioxide, chloride); vanadium pentoxide from blast-furnace slags; zinc sulphide, luminescent; zirconium chloride and oxychloride. Figures for power, coal, steam, etc. Organic chemicals: Phenol (sulphonation and chlorination methods); diphenyl; di-*iso*cyanates (Desmodur "H," "T," and "R"); tanning agents (Tanigan "Extra A," "Extra B"; Gerbstoff NR); amines (beta-naphthylamine; metaphenylenediamine, toluenediamines); chlorinated hydrocarbons: naphthalene derivatives; benzene (mono- and di-chlorobenzenes, trichlorobenzene); piperidine; rubber accelerators; rubber antioxidants; resins; lubricating oil additive; chlorinated rubber.

XXIX—35. Tropical Medicines and other Medical Subjects. Malaria, trench fever, leishmaniasis; dysentery, relapsing fever, typhus fever, vaccine, serum-proteins, etc.

XXX—4. The Preparation of Formamide as an Intermediate for Acrylonitrile. Production of Acrylonitrile from Acetylene.

XXIX—62. Investigation of German Plastic Plants. 1. *Anorgana G.m.b.H. Werke, Gendorf.*—Ethylene; polyethylene (Lupolen H); polyvinyl chloride film (Luvitherm); phenolic resin lacquers (Luphen);

applications of plastics; research on plastics complete set of Ludwigshafen Kunststoff-Kommission ("Kuko") reports (except No. 125), summarising research work on plastics at Ludwigshafen, 1929-43.

2. *Alex. Wacker, Electrochemische Industrie, Burghausen.*—Cellulose acetate; vinyl chloride; polyvinyl chloride; vinyl acetate; polyvinyl acetate ("Vinnapas"); polyvinyl alcohol ("PVA"); polyvinyl acetals; polyvinyl chloride acetate; artificial shellac resins; plasticisers; stabilisers; applications of polyvinyl chloride and polyvinyl alcohol.

3. *Munich area targets*—badly damaged and no indication of present addresses except the following: *Otto Perutz* (film coating plant); *Dr. Alex. Wacker A.G., Prinzregenten Str.* 20 (vinyl resins); and *Verlag E. P. Lehman*, publishers of "Kunststoffe" (complete set of issues January 1942-February, 1945, would be brought to London).

4. *Dr. Otto Jordan, Weinheim (I.G.)*: Polystyrene; polyacrylic esters (Acronal); polyvinyl acetate (Mowilith); polyvinyl-acetals (Mowital); polyvinyl chloride (Igelit); polyamid (Igamid); polyethylene (Lupolen); poly*iso*butylene (Oppanol B); urea-formaldehyde (Plastepals); polyurethanes.

5. *Röhm and Haas, Darmstadt.*—Methyl methacrylate monomer; butyl methacrylate monomer; granular polymers; cast methyl methacrylate (Plexiglas); Rohagit S; emulsion type lacquer resins; solution-type lacquer resins.

6. *Wacker and Doerr, Moulders, Niederramstadt, nr. Darmstadt.*—Undamaged.

7. *I.G., Ludwigshafen.*—Polyethylenes; polyvinyl chloride; styrene; polystyrene; acrylic monomers; polyacrylates; vinyl ether monomers; polyvinyl ethers; vinyl carbazole; polyvinyl carbazole; polyamides; urea-formaldehyde resins (Plastopal); phenol formaldehyde resins (Luphen); Koresin. List of trade names, compositions, production in 1942, cost and selling price per kg. for various I.G. polymers.

8. *Dr. K. Raschig G.m.b.H., Ludwigshafen.*—Cast phenolic resins, lacquer resins and moulding materials made from novolaks and resoles.

XXX—6. Preparation of "Alkazid" M and DIK. Appendix giving detailed operating instructions.

XXX—10. *I.G., Höchst.*—Emulphors STH and STX. Use of metal drawing oil (Saure E); research trends in synthetic emulsifying agents; Bohrmittel H. Appendix: "Concerning the Introduction of the New Boring Medium 'Ho'."

XXX—83. The Arc Process for Acetylene Production.

A number of reports consist primarily of a statement as to the products and the quantities made by the factories in question during the war and contain little, if any, new information of technical value. They are not regarded as worthy of duplication, but they can be consulted in the A.B.C.M. Office.

Among these may be mentioned:

XX—4. Interview with Dr. Engelbertz, of Chemische Fabrik Greisheim Elektron (I.G.), Frankfort-Greisheim.

XX—10. Chemical Institute of Marburg University.

XXV—21. Dr. Alfred Schmid, Konstanz and Nelig Homogenholz Werke G.m.b.H., Baiersbronn.

Sulphuric Acid

Returns for the Third Quarter of 1945

THE following figures, compiled by the National Sulphuric Acid Association, Ltd., give a summary of the monthly returns concerning sulphuric acid for the United Kingdom and Eire, for the period July 1-September 30, 1945. Our intention is, with the co-operation of the Association, to publish parallel figures at quarterly intervals.

1. SULPHURIC ACID AND OLEUM (Tons of 100% H_2SO_4)

	Chamber only	Contact only	Chamber and Contact
Stock, July 1, 1945	34,319	29,329	63,648
Production	148,302	125,787	274,089
Receipts	40,745	18,264	59,009
Oleum Feed	—	2,131	2,131
Adjustments	−30	+1	−29
Use	87,470	68,333	155,803
Despatches	98,796	83,042	181,838
Stock, Sept. 30, 1945	37,070	24,137	61,207
Total capacity represented	222,240	163,230	385,470
Percentage production	66.7%	77.1%	71.1%

II. RAW MATERIALS (Tons)

	Pyrites*	Spent oxide	Sulphur and H_2S	Zinc concentrates
Stock, July 1, 1945	85,802	128,284	38,945	33,004
Receipts	69,622	48,360	36,963	64,557
Adjustments	+155	+1,265	—456	—
Use	62,118	45,852	36,186	36,795
Despatches	422	3,369	60	1,216
	13†	509†		
Stock, Sept. 30, 1945...	93,026	128,179	39,206	59,550

* "Receipts" and "Use" include anhydrite "converted" to pyrites.
† Used at works for purposes other than sulphuric acid manufacture.
NOTE.—The above figures exclude all Government plants, *i.e.* R.O.F.'s., Agency-Factories and other Government-financed plants.

III. CONSUMPTION OF SULPHURIC ACID AND OLEUM.

	Trade Uses	Tons 100% H_2SO_4
60	Accumulators	2,073
61	Agricultural Purposes	3,642
63	Bichromate and Chromic Acid	2,031
*64	Borax and Boracic Acid (*see* 105)	
65	Bromine	3,016
*66	Chlorsulphonic Acid (*see* 105)	
67	Clays (Fullers' Earth, etc.)	1,342
68	Copper Pickling	543
69	Dealers	2,681
70	Drugs and Fine Chemicals	2,425
71	Dyestuffs and Intermediates	10,541
72	Explosives	7,879
73	Export	238
*74	Formic Acid (*see* 105)	
75	Glue, Gelatine and Size	90
76	Hydrochloric Acid	11,586
77	Hydrofluoric Acid	489
78	Iron Pickling (including Tin Plate)	15,278
79	Leather	983
81	Metal Extraction	174
82	Oil (Mineral) Refining	4,425
83	Oil (Vegetable) Refining	1,785
84	Oxalic, Tartaric and Citric Acids	1,638
85 & 80	Paint and Lithopone	10,644
86	Paper, etc.	603
88	Phosphates (Industrial)	1,039
89	Plastics, not otherwise classified	1,569
90	Rare Earths	1,739
91	Rayon and Transparent Paper	20,970
92	Sewage	1,860
93	Soap and Glycerine	942
94	Sugar Refining	107
*95	Sulphate of Alumina (*see* 105)...	
96	Sulphate of Ammonia	56,890
97	Sulphate of Barium	802
98	Sulphate of Copper	5,389
99	Sulphate of Magnesium	1,243
100	Sulphate of Zinc	724
101	Superphosphates	89,505
102 & 62	Tar and Benzol	3,907
103	Textile Uses	3,762
105	Unclassified—*Uses Known	15,266
	Uses Unknown	5,592
	TOTAL	295,412

Parliamentary Topics

Publicity for Penicillin

IN the House of Commons last week, it was asked whether the publicity given in this country to the discovery of penicillin was adequate. Sir Wavell Wakefield asked the Minister of Information whether he was aware that foreign countries, and in particular Norway, were importing penicillin from the U.S.A. under the impression that penicillin is an American invention, produced only in the U.S.A., and what steps were being taken to correct an impression harmful to our export trade.

The Minister of Information: Production of penicillin in this country does not yet allow of export to any considerable extent. Meanwhile, the British discovery and early development of the drug, which gained the award of the Nobel Prize for Medicine, has been widely publicised abroad, both by the Ministry of Information and by the British Council.

Sir W. Wakefield, in a supplementary question, asked what steps the Minister was now taking to give wider publicity and further information abroad to those countries which were improperly informed.

Mr. Williams: I am informed that Professor Florey has recently visited Sweden and Denmark, that Dr. Garrod has visited France and Belgium, and Professor Fleming has visited Moscow. We are circulating a large number of technical journals about the matter.

Questions by Mr. J. Lewis (Is there any truth in the statement made recently that penicillin has been synthesised in this country?) and by Mr. De la Bère (Why hide our light under a bushel?) received no reply.

Oil and Fats for Soap

Lieut. W. Shepherd asked the Minister of Food the total quantity of oils and fats available on November 1, 1939, for soapmaking purposes and the quantities at present available.

Sir B. Smith said it was not possible to give figures in the form requested. In November, 1939, the rate of consumption of fats and resin for soapmaking was approximately 330,000 tons per annum. It would not be possible to give exact current figures until the end of the year, but it was estimated that current consumption was at the rate of about 270,000 tons a year.

Sulphuric Acid Spray

Mr. Henderson Stewart asked whether the Secretary for Scotland was aware of the deaths caused to animal and bird life by the spraying of potatoes with sulphuric acid; and whether he would now forbid the use of this weedkiller. Mr. Fraser replied that he only knew of one instance in which animals and birds had been killed by the spray; in view of its importance in preventing the spread of disease, he could not adopt Mr. Stewart's suggestion.

Czechoslovakia and Unilever

Mr. Robens asked the Secretary of State for Foreign Affairs whether he had any information regarding negotiations between Unilever, Ltd., and the Czechoslovak Government, on compensation for a subsidiary of that company taken over by Czechoslovakia; and what had been the result.

Mr. Noel-Baker: An agent of Unilever, Ltd., is at present engaged in conversations with the Czechoslovak Government about the future of the firm's undertakings in Czechoslovakia. These negotiations are being closely watched by H.M. Government, but no decisions have yet been reached.

Aluminium Houses

In reply to Mr. Bossom, the Minister of Supply said that the following firms are engaged on the assembly of the aluminium house: A. W. Hawkesley, Ltd., Gloucester; Blackburn Aircraft Co., Dumbarton; Bristol Aeroplane Co., Weston-super-Mare; Vickers-Armstrongs, Ltd., Blackpool and Chester.

Pneumoconiosis

Mr. D. J. Williams asked the Minister of Fuel and Power what steps had been taken to implement the recommendations of the advisory committee on the treatment and rehabilitation of miners in the Wales region, suffering from pneumoconiosis.

Mr. Shinwell: The research unit in South Wales under the direction of Dr. C. M. Fletcher, set up as a result of the Committee's report, is now at work, on the cause, treatment and prevention of the disease. Present work of the unit includes an investigation of cases already certified, in order to assess their condition in relation to the type of employment followed since leaving the mining industry, and the establishment of a small rehabilitation and research centre. In addition, dust preventive measures continue to receive unremitting attention by both the industry and the Inspectors of Mines.

Metalliferous Mining

Asked by Commander Agnew whether he would announce the names of the members of the Committee to inquire into the future of the metalliferous mining industry and their terms of reference, Mr. Shinwell said that he was not yet in a position to do so.

Lactose

Replying to Mr. S. Marshall, who asked the President of the Board of Trade whether in view of the fact that producers of lactose who were encouraged to erect plant to double their output to assist in the

manufacture of penicillin, now find their product not required for this purpose, but are unable to dispose of it elsewhere, he would limit imports, Sir S. Cripps stated that no lactose was imported at present.

Bahamas Oil Exploration

Replying to Mr. C. S. Taylor, the Secretary of State for the Colonies said that applications for oil exploration licences in the Bahamas, and in surrounding waters, had been received from nine companies, some of which had applied for more than one area. The companies concerned included subsidiaries of the Anglo-Iranian, the Shell group, the Central Mining and Investment Corporation, the Standard Oil Co. (N.J.), the Superior Oil Co. of California, the Gulf Exploration Co., and the Nassau Oil Mining Co. Applications by the Texas Petroleum Co. and the Bahamas Mining Co., were also under consideration.

Atomic Research Cost

In answer to Mr. Solley, the Prime Minister said that the contribution which this country had made to the discovery of the atomic bomb was the result of scientific research carried out in many different fields over a number of years. It would be very difficult to give an estimate of the cost. As regards future commitments, the initial cost of the research station near Didcot was estimated at about one million pounds and the running cost £500,000. There were other important developments upon which substantial expenditure was likely to arise in future.

Science in Austria

Support for its Restoration

AT a meeting called by the Association of Austrian Engineers, Chemists and Scientific Workers in Great Britain to discuss ways in which British scientists could contribute to the reconstruction of Austrian science, the chief speakers were: Professor P. M. S. Blackett, of Manchester, Professor Lancelot Hogben, of Birmingham, Professor F. G. Donnan, of London, and Professor Karl Przibram, of the Radium Institute, Vienna. As a result, a committee of British scientists was set up to help Austrian science, members of which included Sir Harold Hartley, head of the L.M.S. Research Department, Professor Hogben, Dr. Harriette Chick, of Cambridge, and Dr. H. G. Poole.

Sir D'Arcy Thompson, in the chair, reminded the audience of Austria's great contribution to science—symbolised by such names as Doppler, Lochschmidt, Mendel, and Mach—and of the extent to which Austrian scientific life would require rebuilding after the war and the Nazi occupation.

Professor Hogben stated that what was required was a form of "intellectual lend-lease" by which Britain as much as Austria would be the gainer. Austrian men of science, with their first-hand experience of racialist doctrines, could help Britain in "an unfinished task of intellectual sewage disposal." As a practical step he suggested, in view of the shortage of scientific books in Austria, that leading British scientists should make first editions of their writings available for publication in Austria without royalties. He was sure that American scientists would co-operate in such a scheme.

Paying tribute to science in particular, Professor Donnan singled out the work of Boltzmann—"the first who brought the statistical idea into atomic physics"—of Lise Meitner—the first to split the uranium atom—and of Edwin Schroedinger for special mention. He expressed his confidence that our Russian friends would help in the rebirth of Austrian science.

Professor Blackett was glad to notice that the Association of Austrian Scientific Workers included both pure and practical scientists. The war, he said, had taken many academic scientists out of their isolation and had compelled them to become engineers. In Austria, the reconstruction of pure and applied science must go hand in hand against a background of the balanced development of the country as a whole. Austria, he said, would need books and periodicals, apparatus and laboratory equipment, besides the things needed to restore living conditions. One of the most practical things that could be done to help both British and Austrial science would be an interchange of scientific personnel and periodicals.

Professor Przibram related in a moving speech how he had been overtaken by the Nazis in Belgium. Describing his experience there, he said that what he found the worst was the sense of isolation, of lack of contact with other scientific minds and lack of opportunity for free discussion on scientific subjects. He suggested that Austrian science as a whole must be suffering the same type of isolation. He welcomed the practical suggestions of previous speakers and expressed his confidence in the ability of Austrian science, with such encouragement as he was sure would be forthcoming, to regain its former position.

A new trade agreement between Switzerland and Denmark, signed last month, provides, *inter alia*, for the despatch of Swiss chemicals, dyes and pharmaceuticals, in return for Danish cryolite, technical porcelain, and special machinery. The value of trade to be transacted within the next six months has been fixed at about 33 million francs.

Viscosity and Plasticity

Professor Andrade's Lecture Course

FOR their post-graduate course of lectures this autumn, the Oil and Colour Chemists' Association secured the services of Professor E. N. da C. Andrade, D.Sc., Ph.D., F.R.S., Quain Professor of Physics in the University of London. The three lectures, which were attended by a large and interested audience, were held in the Theatre of the Royal Institution, London, and, in view of their great importance and interest, we append a short summary.

Properties of Liquids

In his first lecture, Professor Andrade dealt with the flow properties of various classes of liquids, pointing out that many substances normally regarded as elastic solids also exhibited flow under suitable conditions. Bodies which at high rates of shear (a) offer a decreased resistance to flow; (b) offer an increased resistance to flow; and (c) pass isothermally and reversibly from a gel to a sol, were termed respectively *anomalous*, *dilatant* and *thixotropic*. Liquids whose flow obeys Newton's hypothesis of proportionality between shearing stress and velocity gradient are known as *Newtonian liquids*, the proportionality constant being the *coefficient of viscosity*. In non-Newtonian liquids, the ratio of stress to rate of shear is *not* a constant, the *apparent* or *differential* viscosity being some function of the rate of shear.

Turbulence and the significance of the Reynolds Numbers were next considered and the transition from normal *laminar* flow to *turbulent* flow was demonstrated with a liquid containing aluminium particles in suspension.

Some theories of viscosity were then discussed. Remarking that a viscous liquid was equivalent to an elastic solid in which the resistance was continually breaking down, the lecturer first outlined Maxwell's theory. Maxwell assumed that, in a viscous body under stress, the rate of decay of stress was proportional at any instant to the stress itself, and called the reciprocal of the proportionality constant the *relaxation time*. It was shown that the latter may be regarded as the time taken for the shear stress to fall to $\frac{1}{e}$ of its original value and that the viscosity of the body is given by the product of the *shear modulus* and the relaxation time. An expression deduced from the kinetic theory led to the idea that the viscosity of a *gas* was almost independent of temperature. Professor Andrade then outlined his own theory of viscosity. From a consideration of the transfer of vibrational energy occurring during the temporary association of groups of molecules in a fluid, he had been able to derive an expression for the absolute viscosity which gave good agreement with experimental results for monomolecular liquids.

Professor E. N. da C. Andrade.

The second lecture began with an account of the various methods popularly used for viscosity determination. Particular attention was given to the capillary apparatus and the importance of applying the "end" and kinetic energy corrections to the Poiseuille equation was emphasised. Several less common methods were also briefly described, notably the "oscillating sphere" method, which was demonstrated, and the recent "blow-off" method of Darjaguin, a Russian worker. This method enables the viscosity of thin films of liquid to be measured and provides a means of distinguishing between Newtonian, non-Newtonian, and Bingham behaviour.

Behaviour of Suspensions

An outline of the rheological behaviour of suspensions followed, the principal differences in the physical properties of *lyophobic* and *lyophilic* systems being enumerated. An elegant demonstration of the phenomenon of *streaming birefringence* was given, using crossed Polaroid glasses and a vanadium pentoxide sol. Reference was made to the Einstein equation for the viscosity of suspensions of rigid, spherical

particles, and attention was drawn to the fact that this applied only to systems exhibiting no viscous anomaly and in which the particles were non-interacting. The corresponding equation for suspensions of ellipsoidal particles, due to Jeffery, was deduced, said Professor Andrade, from a consideration of the precessional motion of the particles occurring during streaming of the suspension, but the theory was not exact, since allowance also needed to be made for the angle of orientation of the particles. This was subsequently done by Eisenschitz, who also evolved an equation taking the Brownian motion of the particles, hitherto ignored, into account. Mention was made of Staudinger's expression relating the specific viscosities of solutions of long-chain polymers to their molecular weights.

Paint Phenomena

The more common rheological phenomena exhibited by paints and similar systems were next described. The distinction between "thixotropy" and Pryce Jones's "false body" was considered to be an arbitrary one by Professor Andrade, who regarded the two types of behaviour as extreme cases of the same general phenomenon. He did not agree with the view that dilatancy was the opposed phenomenon to thixotropy because the changes occurring in a dilatant system were instantaneous, unlike those in a thixotropic system. Demonstrations of both types of behaviour were given. In the lecturer's opinion, the proper scientific method for the study of the flow characteristics of anomalous lyophilic colloids was by means of a capillary type apparatus, specific reference being made to measurements carried out on solutions of the "Cellit" group of cellulose derivatives.

The lecture concluded with a brief discussion on the use of the term "gel," in connection with solutions of lyophilic colloids. While the more orthodox view of a gel requires the existence of a yield value, Eisenschitz regards a system as a gel if it has a high shear modulus compared with that of an ordinary liquid.

Properties of Solids

Professor Andrade's third and last lecture was devoted to an account of the rheological properties of solids. Because the yield value of a solid was often somewhat indefinite, he proposed to consider it broadly as the stress at which much greater deformations occurred than were encountered in normal elastic extension. Of the large number of solids exhibiting flow, Chatterton's compound, glasses and metals were chosen for detailed consideration. Brownbeck found that Chatterton's compound behaved as an anomalous liquid without a yield value at temperatures between 50°C. and 60°C., and as a Newtonian liquid at higher temperatures (130°-140°C.). Upon plotting the logarithm of the viscosity against the reciprocal of the absolute temperature, a continuous line made up of two inclined linear portions was obtained, the "break" indicating that the compound behaved as one substance below, and as another above, the temperature at which is occurred. Except that its viscosity below, as well as above, the "break" temperature region (660°-1000°C.) is Newtonian, glass behaves in a similar manner. Professor Andrade believed that, in this intermediate temperature region, the glass was present simultaneously in both solid and liquid states.

He then dealt with the behaviour of metals under stress, emphasising the difference between "nominal" and actual load. The "necking" and "running away" of metals beyond the elastic limit does not occur when measurements are made at constant stress; in making such measurements, allowance has to be made for the decrease in cross-section resulting from the extension of the test-piece. Two methods whereby such allowances can be made automatically when working with metal wires were described. When making rheological measurements on metals, which generally have structure-sensitive flow-properties, it is necessary to eliminate the previous history influence by pretreating the test-piece.

Single Metal Crystals

Speaking finally of single metal crystals, Professor Andrade said that the mechanical properties which such crystals might be expected to show were very different from those observed in practice. Their theoretical tensile strengths, for example, were many times greater than those obtained experimentally. The large plastic (non-recoverable) deformations and subsequent strain-hardening occurring upon loading a metal wire made up of single crystals were demonstrated and contrasted with the small elastic extension observed with an equally-loaded normal wire. An interesting feature of the single crystal wire was that, initially circular in cross-section, it became a thin, flat strip after extension. The peculiar behaviour of single crystals was accounted for by the fact that, probably owing to the existence of flows in the regular crystal lattices, the crystals *slip* in "packets" (not in single molecules) along well-defined *glide planes* when the wire is stretched, the surface of the wire afterwards showing "slip marks" where the glide has occurred. A demonstration of the mechanism of the slipping process was given with wooden models and a number of slides illustrating actual slipping (notably in single crystals of solid mercury) were shown.

Beeswax Stocks

Disposal of Government Supplies

THE Raw Materials Department and Trade Advisory Committee have considered the liquidation of Government stocks of beeswax and the arrangements for ensuring continuity of supplies. It has been agreed as follows:

(i) Until December 31, the Association of Merchant-Distributors of Beeswax, Ltd., will continue to distribute Government stocks as heretofore, at unchanged prices. Releases will be authorised to enable users, on application, to obtain stocks sufficient to provide for a three months' stock as at December 31. Stocks obtained by way of private import will not be taken into consideration for this purpose. Releases authorised must be taken up within 14 days of allocation; otherwise they will be cancelled.

(ii) The unallocated balance of the Government stock as at January 1 will be disposed of after further consultation with the Trade Advisory Committee.

(iii) Importers obtaining Government stock against purchases made at origin before October 22, 1945, must dispose of it to U.K. users only and at not more than the Government release prices for the grades concerned.

Management Research

Strong Committee Formed

THE appointment of a committee to produce detailed proposals for the formation of a British Institute of Management was announced by the President of the Board of Trade last week. The terms of reference are to advise Sir Stafford Cripps of the steps which should now be taken to form a central institution for all questions of management, and on its form of organisation, functions, constitution, and relationship to Government, industry, existing organisations, and the public. The committee would take into account the work of the Weir Committee, the information which will be communicated to them about the scale of Government support to be expected, the need for the institution to become self-supporting, and the necessity of appointing a strong British representation to next year's International Management Congress at Stockholm.

The chairman is Sir Clive Baillieu, his deputy is Sir Frederick Bain, and among the 24 other members are Mr. S. Courtauld, Sir Wilfrid Garrett (Chief Inspector of Factories), Sir Harold Hartley, Lord Leverhulme and several other economists and business men. The Committee includes only one woman, Miss Caroline Haslett.

Overseas Trade

Slight Rise in Chemical Exports

EXPORTS of chemicals from the U.K. were one-sixth higher in the third quarter of 1945 than in the corresponding period of 1944 or of 1938, according to the latest Board of Trade report, but a fall of one-fifth was recorded in the volume index for manufactured oils, largely because of the smaller relief shipments of soap to Europe. Taking 1938 as equal to 100, the index number of the average value of chemical exports for the first nine months of 1945 was 158 (1944=155); the corresponding index number for volume was 100 (1944=78). Declared values (in £'000) for the nine months were; 1945, 26,615; 1944, 20,422; 1938, 16,710.

Imports of all goods from foreign countries for the third quarter of 1945 fell by £29 million (17 per cent.), in spite of the fact that imports from France and Northern Europe amounted to £33 million, compared with £13 million and £16 million in the two preceding quarters, and that imports from South America rose by £6 million to £25 million. The greater part of this last rise was accounted for by the importation of over £2 million of whale oil, the first from foreign fisheries since November, 1943. Imports from Sweden (largely wood pulp and timber) and Denmark (mainly butter) accounted for the European increase. North American and Indian imports showed the greatest reductions.

New Control Orders

Toilet Preparations

UNDER previous Orders the manufacture and supply of any controlled toilet preparations containing more than one part in 200 of acetone, amyl acetate, butyl acetate, amyl alcohol, butyl alcohol, and ethyl acetate was prohibited.

The Board of Trade has now made the Toilet Preparations (No. 6) Order, 1945 (S. R. & O. 1945, No. 1483), which revokes this prohibition as from December 1. Toilet preparations containing any amount of the substances specified above may now be made and supplied by any licensed manufacturer.

A new special low-carbon ferromanganese has been announced by the Electro Metallurgical Sales Corporation, New York. This special grade is produced in the maximum 0.10 per cent. carbon grade, and the following is a typical analysis: manganese, 90.00 per cent. min.; phosphorus, 0.06 per cent.; carbon, 0.06 per cent. The high ratio of manganese to undesirable elements makes it particularly useful for adding manganese to high-quality steels where purity is essential.

Chemicals in South Africa

DDT Against the Tsetse : Protein Concentrates

EXPERIMENTS with DDT, which, it is hoped, will lead to the opening up of vast tsetse-infested tracts of Africa, are being carried out in Northern Zululand by the Onderstepoort veterinary research laboratories. DDT will be sprayed from the air over a large area in the Mkuzi Reserve, in an attempt to develop an effective method of controlling or even preventing nagana. This large-scale experiment, for which a Defence Department warplane is being specially fitted, follows on laboratory experiments on individual tsetse flies, which have been conducted by the Union Government in co-operation with the Governments of Tanganyika, Uganda, and Kenya. If the experiment is successful, it may banish tsetse-fly diseases, such as sleeping sickness and nagana, from the African continent, and thus make large areas suitable for human settlement.

Dr. P. J. du Toit, Director of South African Veterinary Services, stated that 25 square miles in the Mkuzi Reserve infested with tsetse flies had been chosen as testing ground. A DDT emulsion, which had been prepared at Onderstepoort, will be flown to the Mtubatuba aerodrome, whence the experiment will be carried out under the control of two research experts, Mr. R. du Toit, who has been engaged for some time in DDT research at Onderstepoort, and Mr. E. B. Kluge, who is in charge of tsetse fly and nagana work in Zululand. The plan of action will be to carry out three sprayings at intervals of 14 days on the area. The first spraying will be aimed at the adult flies. Two weeks later, when the pupæ in the ground are hatching, the second spraying will take place. This will be followed by a third a fortnight later, so that no fly in the area will be able to escape contact with the solution. Pupæ hatch within a month, and the second and third sprayings are aimed at these. Dr. du Toit said: "We know from laboratory experiments that DDT is fatal to the individual fly; by these experiments we hope to find out whether flies *en masse* can be brought into sufficiently close contact with DDT over a wide area as to prove fatal to them." This is the first time that an attempt has been made by scientists to destroy tsetse flies over a large area. The results of the experiments will be communicated to research authorities in other territories.

Vermiculite in Soil

Use of vermiculite to retain moisture in cultivated ground, thereby conserving water supplies in the driest areas of the Union, is considered feasible by Dr. A. C. Hoffman, of the National Museum in Bloemfontein. Vermiculite is found in large quantities in the mountains of the Eastern Transvaal, and flaked vermiculite is already being employed on an increasing scale to improve soil in certain areas in South Africa. Dr. Hoffman has carried out experiments in garden soil and has found that vermiculite in no way affects its fertility, but that it alters its structure. Slaked vermiculite takes up water and gives the soil a clay-like quality, preventing the moisture from rising to the surface and evaporating. Dr. Hoffman is now engaged on experiments on a larger scale. If the price of vermiculite is about £5 a ton, it may bring about a considerable change in agriculture in South Africa.

Using cheaply-produced protein concentrates, Dr. B. A. Dormer, chief tuberculosis officer for the Union and superintendent of the King George V Hospital at Springfield, Durban, has obtained encouraging results with twenty tuberculosis patients. At first the patients put on weight and then their outlook changed from dejection to cheerfulness. They began to feel healthy and their temperatures to fall. Dr. Dormer wishes to treat thousands of cases to obtain ultimate proof of success. "We have not reached the end of our experiments," he says, "and want to test the substance under all conditions. The small pilot plant that has been set up in Durban is producing about 21 lb. a day, but we hope to expand it." The treatment has also been tried on between 20 and 30 cases of malnutrition in native children. In every case the children improved more rapidly than by any other method.

Whale Meat for Protein

The originator of the process of producing the protein concentrates is Colonel Watkins-Pitchford, who is carrying out his work with the support of the Red Cross Society. He had perfected a process of digesting meat —the best source of first-class protein—and preparing from it predigested protein concentrates. The process produced the concentrate cheaply from any kind of meat. Whale meat was being used successfully. One pound of the concentrate is equivalent to 10 lb. of completely digested protein. It has the advantage of passing into the blood stream within 20 minutes and can be introduced either orally or intravenously.

It is too early yet to gauge the effect of the relaxing of South African import control upon chemical supplies from America. So far, all that has happened is that buyers overseas now have a free hand to place orders. It remains to be seen to what

extent this will speed up the arrival of chemical supplies. Certain industrial chemicals are expected to remain under tight control for a long time to come; but apart from these items, chemical supplies are expected to start flowing to South Africa in the near future, as there is a general desire to do business with the Union.

The Millspread Corporation, 6 Thorpe Street, Johannesburg, distemper manufacturers, state that they have developed a new type of water distemper which will not rub off on clothing. It leaves no brush marks; it can be painted over with oil paint; the surfaces which it may be required to cover need no previous sizing or preparation. It is manufactured in white, ivory, buff, green, and pink, and is packed in 5-lb. packets for industrial and other users. Another new Johannesburg company, National Glue and Gelatine Corporation, Box 2584, will shortly begin the manufacture of edible gelatine in sheet and powder form and animal glue and meat and meat fertilisers at their factory at Silverton, Transvaal.

Personal Notes

MR. NORMAN NEVILLE, director of the chemical plant and food machinery export groups, arrived back in England on December 2 after a successful trip to India.

MR. J. R. WOMERSLEY has been appointed Superintendent of the Mathematics Division of the National Physical Laboratory, Teddington, Middlesex, which is now open for inquiries.

DR. DAVID S. ANDERSON, formerly principal of the Central Technical College, Birmingham, has been appointed director of the Royal Technical College, Glasgow, from January 1, in succession to Sir Arthur Huddleston.

DR. W. T. H. WILLIAMSON, B.Sc., Ph.D., A.R.I.C., formerly Chief Chemist to the Egyptian Ministry of Agriculture, has been lent by the British Council to accompany a Department of Overseas Trade mission to Egypt.

MR. P. BLUNDELL BOYCOTT, who in 1939 joined the staff of Benn Brothers, Ltd., as London representative on THE CHEMICAL AGE and during the war took on additional duties and responsibilities, has now been appointed manager and publisher of this journal.

MR. C. F. BATSTONE has been appointed Midland branch manager of the British Aluminium Co., Ltd., and has taken up his duties at Lansdowne House, 41 Water Street, Birmingham, 3 (Telephone: Birmingham Central 3053; Telegrams: Britalumin, Birmingham). MR. E. V. PANNELL will be retiring at the end of the year after 34 years' service with the company.

The Managers of the Royal Institution have appointed PROFESSOR E. K. RIDEAL, Professor of Colloid Science in the University of Cambridge, to be Fullerian Professor of Chemistry in the Royal Institution and Director of the Davy-Faraday Research Laboratory. He will succeed Sir Henry Dale, who retires from these posts on September 30, 1946.

MR. W. L. PROCTOR, B.Sc., has been acting as Superintendent of the Scottish Laboratory of the British Cast Iron Research Association, as a result of the illness of Mr. T. Tyrie. Mr. Tyrie suffered a breakdown in health in May, and, after an interim period, Mr. Proctor was transferred from headquarters. We are glad to report that Mr. Tyrie is making a steady if slow recovery.

The following were elected as officers and Council of the Royal Society at the anniversary meeting held on November 30: *President*: SIR ROBERT ROBINSON; *Treasurer*, SIR THOMAS MERTON; *Secretaries*,

Sir Robert Robinson.

SIR ALFRED EGERTON, DR. E. J. SALISBURY; *Foreign Secretary*, PROFESSOR A. V. HILL. *Council*: DR. C. H. ANDREWES, DR. W. T. ASTBURY, PROFESSOR P. M. S. BLACKETT, DR. E. C. BULLARD, PROFESSOR I. DE B. DALY, PROFESSOR R. A. FISHER, DR. C. FORSTER-COOPER, PROFESSOR F. E. FRITSCH, DR. S. GOLDSTEIN, PROFESSOR E. L. HIRST, PROFESSOR W. V. D. HODGE, DR. G. M. HOLMES, PROFESSOR H. W. MELVILLE, PROFESSOR R. A. PETTERS, DR. D. R. PYE, PROFESSOR S. ZUCKERMAN,

DR. W. T. GRIFFITHS, D.Sc., F.Inst.P., F.R.I.C., chairman of the Mond Nickel Co., Ltd., has been appointed vice-president and director of the International Nickel Co. of Canada, Ltd. DR. L. B. PFEIL has been appointed manager of the research and de-

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Science in Agriculture

New National Advisory Council

A NATIONAL Agricultural Advisory Council, as announced on Monday by the Minister of Agriculture and Fisheries, is to be established for England and Wales on October 1 next year. It will take over and co-ordinate the system of providing technical advice to farmers which has been carried out by the War Agricultural Executive Committees and the specialist advice given by provincial advisory centres attached to universities and agricultural colleges. Advice on agricultural economics will continue to be provided by staffs attached to universities and colleges, but the national service will include all those concerned with advisory work for farmers at the provincial centres and in the counties.

The following principal appointments to headquarters staff have been made: chief education and advisory officer, Mr. J. A. Scott Watson; senior advisory officers, Messrs. W. K. Slater, H. V. Taylor, L. G. Troup. England and Wales will be divided into eight provinces, and a provincial advisory officer will be responsible for the organisation of the service in each province. Specialist advisory officers will deal with such subjects as soil chemistry, nutritional chemistry, plant pathology, etc. County and district organisation will be similar to that which has already been successfully in action, and an approximate objective, the appointment of one district officer for every 1000 farmers will be envisaged.

Apart from the provincial advisory officers —at £1200-£1500 per annum—there will be six main salary grades. It is noted that the Institution of Professional Civil Servants and the National Association of Local Government Officers consider the scales of salaries to be unsatisfactory. They contend that the scales are lower than those set out in the recent White Paper, and they deprecate the implied distinction between agricultural science and other branches of science. It it claimed that this differentiation will discourage the best students from engaging in agricultural science.

A CHEMIST'S BOOKSHELF

ELEMENTARY WAVE MECHANICS. By W. Heitler. Oxford University Press: Humphrey Milford. Pp. 134. 7s. 6d.

The application of quantum mechanics to chemistry has now become an accepted part of modern theory. However, the number of chemists who have more than a vague idea of the principles underlying this branch must be very small. This is not altogether the fault of the chemists, but arises mainly from the inherent difficulties of the subject. Quantum mechanics, introducing, as they do, so many revolutionary concepts, and depending largely on involved mathematical reasoning, can never be regarded as light reading.

Chemists, in general, cannot be expected to make direct use of the wave-mechanical methods. But the time has come when they should know more about what the physicists and mathematicians can tell of the behaviour of atoms and molecules. Knowing this, they will then at least realise when they should turn to their brother scientists for help.

The author of this book is one of the foremost names in the development of wave mechanics. He therefore knows his ground and we can be sure that the subject matter of which he treats is sound. To write in a fashion which will be comprehensible to chemists, who must be assumed to have but an elementary ability to deal with mathematical reasoning, however, requires a skill other than purely scientific, and the author shows that he has this ability also. By able simplification, both of ideas and of mathematics, a clear exposition of the principles of the subject, which demands only an elementary knowledge of calculus and classical physics, results.

About two-thirds of the book is devoted to general theory. Chemists will, however, be especially interested in the last portion of the book, which deals with the derivation of the periodic classification and with valency theory. In discussing the former, the atomic states of the lighter elements are described, with a brief account of their derivation. The theory of valency considers the interaction of two hydrogen atoms to form the hydrogen molecule, the simplest example of the covalent lint. From this, the book goes on to deal with the valencies of the lighter elements, in particular that of carbon. The origin of directed valency is included, and finally a brief treatment of activation energy concludes a very sound, and a surprisingly clear and simple introduction to a difficult topic.

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velopment department of the Mond Nickel Co., Ltd., in succession to Dr. Griffiths. The post of assistant manager, previously occupied by Dr. Pfeil, has been filled by MR. F. DICKINSON, B.Sc., F.R.I.C., and MR. H. W. G. HIGNETT, B.Sc., A.R.I.C., has been appointed head of the department's Birmingham laboratories.

Obituary

MR. H. TODD THORNBERY, B.Sc., who died at Bournemouth on December 3, aged 57, was governing director of Griffiths Bros. & Co., London, Ltd., and past president of the National Federation of Associated Paint, Colour and Varnish Manufacturers.

General News

The telephone service with India was re-opened for public business on December 3. It is available between 8.30 a.m. and 12.30 p.m. on weekdays.

Shawinigan, Ltd., announce that on and after December 8, their address will be Marlow House, Lloyds Avenue, London, E.C.3. (Telephone: ROYal 6102/4); telegrams: Iganshawin, Fen, London).

Among Manchester firms affected by the gas strike (though none is at the moment completely closed down) are: Anchor Chemical Co., Metal Box Co., Clayton Aniline Co., I.C.I. (Blackley), as well as the Shirley Institute.

A new private company, entitled Glebe Mines, Ltd., with £100,000 capital, has been formed to acquire the lead and fluor-spar mining business of James Wilkinson & Sons. Mr. A. M. Fenton, of Farnley, near Leeds, is a director.

The sales and export department of Bamag, Ltd., remains at Universal House, 60 Buckingham Palace Road, London, S.W.1 (SLOane 2251), although the other departments are now at Rickett Street, S.W.1. (See THE CHEMICAL AGE, p. 443.)

The Electrodeposition Technical Advisory Committee Memorandum, "Notes on 'Stopping-off' Materials for Use in Electrodeposition," is being released for publication by the Chief Scientific Officer, Ministry of Supply. Copies may be obtained on application to the Secretary, E.T.A. Committee (Armament Research Dept.), c/o S.T.A.M., Room 226, Berkeley Court, Glentworth Street, London, N.W.1.

The Minister of Food announces that the only changes in the existing prices of unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during the four weeks ending December 29, are: Linseed oil, crude, increased by £3 to £65 per ton naked ex works; sperm, crude heads, blubber, carcase, and No. 3, each decreased by £2 per ton, ex store drums included (no quotation naked).

A new Order, the Trading with the Enemy (Specified Persons) (Amendment) (No. 13) Order 1945 (S.R. & O. 1945, No. 1461), price 1s. 8d., effective from November 27, contains the complete statutory list of all persons abroad who are specified as enemy under Section 2 (2) of the Trading with the Enemy Act, 1939, and with whom it is unlawful to have dealings of any kind. The new Order supersedes all previous similar Orders, and makes no additions to the names included therein. Amendment Orders will not in future be published frequently, as hitherto.

From Week to Week

The North of England Institute of Mining and Mechanical Engineers is submitting a resolution, at its annual meeting on December 8, that the future yearly subscription of members and associate members shall be 4 guineas (formerly 3 guineas). It is proposed that the subscription rates for associates and students shall remain unaltered.

The latest Users' Memorandum (U.13) of the Service Rubber Investigations, "The Effect of High-grade Aviation Fuels on Synthetic Rubbers," contains interesting comparisons of the effect of doped and undoped fuels on various rubber-like materials at differing temperatures. The research on which this memorandum is based has been carried out by I.C.I. (Dyestuffs Division) and inquiries in connection with it should be addressed either to Dr. W. J. S. Naunton, Hexagon House, Blackley, Manchester 9, or to M.O.S. (C.R.D. 4b), Berkeley Court, Glentworth Street, London, N.W.1.

Foreign News

In Cyprus, steps are being taken to increase output of copper and asbestos.

Uranium is known to exist in the Northern Transvaal. It occurs in conjunction with other minerals, but no actual mining or production has yet been undertaken.

A new firm is planning to erect a plant at Carretera del Monte, in the city of Palencia, Spain, which is expected to produce, among other products, 700,000 international units daily of vitamin B_1.

Increasing industrial use is being made of natural gas from the Aratu oil fields near Salvador (Baia), Brazil. Gas reserves at the Aratu field are estimated at 6,000,000,000 cubic metres.

The Unión Química del Norte de España, S.A., of Bilbao, proposes to produce 3000 tons of ammonium sulphate yearly. Production of sulphuric acid and of synthetic phenol is to be taken up shortly.

An oil refinery with an estimated yearly capacity of 800,000 tons will be constructed at Abaiji, Iraq, to the order of the Iraq Government. It will meet Iraq's oil requirements, which are now partially met by the Anglo-Iranian refinery.

The Giannelli plant in Rome, which manufactures aluminium ware, heavily damaged by allied bombings, is gradually being restored. Much equipment and machinery hidden from the Nazis remained intact. Employment is approximately 30 per cent. of the pre war level. It is reported that the plant uses a colouring process whereby production of brightly-coloured articles is made possible.

In Hungary, locomotives are to be propelled by natural gas from the Lispe oilfields.

The Moscow Organo-Therapeutic Drug Factory, the largest of its kind in the Soviet Union, started early in 1942, is now producing at least 40 different types of drug.

The use of generator gas for automobile purposes is to continue in Brazil, especially in more remote areas. During the war, 30,000 generator-gas-driven vehicles were on the roads.

Italy's sugar refineries have suffered severe damage by the retreating Germans. Plants at Pontelagoscuro, Ferrara, San Biagio and Fiorenzuola d' Arda have been particularly affected.

Imports into Sweden of aluminium and alloys containing over 50 per cent. (by weight) of that metal are permitted only under licence from the Industrial Commission.

Exports of Palestine potash amounted to approximately 100,000 tons, valued at £P876,000, in 1944, the value increasing from £P774,000 in 1943. Shipments went to the U.K., Australia and Ceylon.

The exchange of Swedish cellulose, rayon and paper for Italian fruit, essential oils, flax and vermouth, is provided for by a new trade agreement, valid for six months, for exchanges up to 50 million kroner.

Following the discovery of iron ore deposits covering 120 square kilometres in the mountains of Jujuy, Argentina, a foundry, authorised by the Directorate of Military Equipment, has recently been inaugurated.

Overseas fairs which have so far been announced for next year include the International Fair at Lyons (April 27-May 5), Valencia Fair (May 10-25), and the International Samples Fair, Barcelona (June 10-24).

Two representatives of Kenya's pyrethrum-growing industry, who have arrived back from the U.S., report that three American firms are interested in the possibility of building plants in East Africa for processing pyrethrum. They are sending experts to go into the matter on the spot.

Stocks of fatty acids in France at the end of September amounted to 2691 tons, compared with 2275 tons at the end of August. Production of glycerine in September was 66 tons, of stearine 64 tons, and of oleine 45 tons.

The Geological Division of the Tanganyika Department of Lands and Mines reports the presence of chromite in the North Ukinga and traces of gold near Igawa; another section deals with plans to locate buried coal in the Rukwa area for use on the Central Railway.

The new Textile Division of the Chemical Institute of Canada is the sixth subject division to be formed. In 1946 the Institute will hold a Conference and Chemical Exhibition in Toronto, under the chairmanship of Mr. W. R. Pomeroy.

Productos Químicos Iberia, S.A., founded in 1944, with a share capital of 2,000,000 pesetas, has an annual output of 250 tons oxalic acid, and 125 tons formic acid and formates. Imports of oxalic acid into Spain fell to about 100 tons in 1944 compared with 110 and 260 tons in the two preceding years.

Two new companies, to engage in the chemical trade, have recently been formed in Spain, *viz.,* Pi Sancho Gratacos, S.L., in Barcelona, with a capital of 750,000 pesetas and the S.E.D.U., S.L., in Badalona (Barcelona), with a capital of 1,600,000 pesetas.

During recent months announcements have been made that several Chilean nitrate plants were about to recommence production. The employment provided should tend partly to neutralise the difficulties caused by the closing down of many mines resulting from the non-renewal of metal contracts.

The Deurag A.G. oil refinery at Miesburg near Hanover has resumed operations, daily output aggregating 1 million litres of liquid fuels, while the Leuna works near Merseburg are reported to employ 15,000 workers, daily output amounting to 200,000 litres motor fuel, 240,000 kg. ammonia and 100.000 kg. ammonium sulphate.

A small plant for the production of 50 tons of caustic soda and an unspecified quantity of chlorine monthly has begun operations at S. Vincente, near Santos, Brazil. The owners, the Cia. Brasileira de Soda Caustica, announce that they intend to erect a plant at Iguape (southern S. Paulo) which will have a productive capacity of 600 tons per month of caustic soda.

Iron-ore production in Spain declined to 596,000 tons during the first half of 1945, compared with 783,000 tons in the corresponding period of 1944, while steel production declined to 285,000 tons from 350,000 tons. These declines were due to shortages of electricity and coal. Output of zinc concentrates, leads, manganese ore, fluorspar, and tungsten ore also declined.

Production of benzol in France continues at a low level, owing to the lack of coal for operating gasworks and coke ovens and to the shortage of coal tar. During the first five months of 1945, 6094 metric tons of benzol were produced, corresponding to an annual rate of about 14,500 tons. In 1938, output was 70,000 tons; production during the occupation period varied from 35,000 to 40,000 tons per annum. Total output for this year is estimated at 16,000 tons.

A fertiliser company has been organised in Colombia with an initial capital of 4,200,000 pesos. The capital has been furnished by the Institute for Industrial Development, the Caja de Crédito Agrario, and the Ministry of National Economy.

A paper pulp industry in British Guiana, based on the Colony's extensive wallaba forests, is now being considered. Investigations would cover plans and estimates for a factory capable of producing 20,000 tons per annum, and comparative costs of production, including cost of chemicals.

Improved shipping conditions and the demand for superphosphates from the Netherlands stimulated the production of Spanish pyrites to about 188,000 tons during the first half of 1945, compared with 138,000 tons for the same period last year. Potash production during the second quarter increased to about 170,000 tons, against 155,000 for 1944.

Pottery and china production in France was hampered during the first six months by fuel difficulties, and it was impossible this year to keep up the monthly average of between 900 and 1000 tons, maintained since the liberation. The plants at Sarreguemines and Niederviller in Alsace have now been recovered by their former proprietors and aré returning to production.

In Argentina, plans have been announced for the erection of two rayon factories, as well as for the expansion of existing rayon plants at Berazátegui. Nylon, not so far produced in Argentina, will be manufactured in one of the factories, and the second will make cellophanes, including a waterproof line. The company also intends to double its output of viscose-rayon fibre.

Switzerland has expressed a desire for the most rapid transport link possible with Scarlino, in Tuscany, where the richest pyrites mines in Italy exist, with an annual output of 250,000 tons. The Italian authorities have given high priority to reconstruction work on the line from Genoa to La Spezia, and direct deliveries of pyrites to Switzerland will be resumed within three months.

According to reports to hand regarding the resumption of chemical production in Germany, the IMO works in Schwerin have been improvised for soap manufacture, said to be taking place in field kitchens. A certain amount of disinfectants is also being produced. The Behring works in Marburg are again making sera and vaccines, 70 per cent. of which are to be sent abroad.

Forthcoming Events

December 10. Institute of Fuel (North-Eastern Section) and **Coke Oven Managers' Association.** Central Station Hotel, Newcastle, 5.30 p.m. Mr. T. C. Finlayson and Mr. A. Taylor: "The Design of Regenerators with special reference to Coke Ovens."

December 10. Institution of the Rubber Industry (London Section). Caxton Hall, Westminster, S.W.1, 6.30 p.m. Mr. G. L. Hammond: "A Survey of German Synthetic Rubber Technology."

December 11. Hull Chemical and Engineering Society. Regal Room, Regal Cinema, Ferensway, Hull. 7.30 p.m. Mr. J. N. Bowtell: "Modern Electric Discharge Lamps."

December 11. Royal Institute of Chemistry (Newcastle and N.E. Coast Section). King's College, Newcastle-upon-Tyne, 6.30 p.m. Dr. H. J. Emeléus: "Some Chemical Aspects of Recent Work on Atomic Fission."

December 11. Society of Chemical Industry (Nutrition Panel) and **Institute of Brewing.** The Horseshoe Hotel, Tottenham Court Road, 6 p.m. Dr. F. W. Norris: "Carbohydrate, Nitrogenous, Mineral and Alcohol Constituents of Beer," and Mr. J. W. Tullo: "Vitamins in Beer."

December 11. Royal Institution of Great Britain. Albemarle Street, London, W.1, 5.15 p.m. Sir Henry Dale, Pres.R.S.: "Recent Developments in Chemical Therapeutics, II—Sulphanilamide and its Derivatives."

December 12. Institute of Fuel (North-Western Section). Engineers' Club, Albert Square, Manchester, 2.30 p.m. Mr. G. N. Critchley: "Recuperators."

December 12. Institution of Factory Managers. Bonnington Hotel, Southampton Row, London, W.C.1, 6.30 p.m. Mr. A. H. Huckle: "Financial Aspects of Management."

December 12. British Association of Chemists (London Section), and **Scientific Film Association.** Cinema of the British Council, 3 Hanover Street, London, W.1, 6.30 p.m. Films on Penicillin, DDT, and the discovery of a new pigment.

December 12. Society of Chemical Industry (Plastics Group) and **Oil and Colour Chemists' Association** (London Section). Chemical Society, Burlington House, Piccadilly, London, W.1, 2.30 p.m. Dr. T. T. Jones: "Some Preliminary Investigations of the Phenol-Formaldehyde Reaction."

December 13. Royal Institute of Chemistry (E. Midlands Section). Leicester College of Art and Technology, 7 p.m. Mr. R. B. Pilcher: "Alchemists in Art and Literature."

December 13. Society of Dyers and Colourists (Loughborough). Great Central Hotel, Loughborough, 7 p.m. Discussion evening.

December 13. Royal Institute of Chemistry (Liverpool and N.W. Section). Municipal Technical College, Widnes, 6.30 p.m. Mr. B. D. W. Luff: "Chemistry in Literature."

December 13. Pharmaceutical Society of Great Britain. Society's House, 17 Bloomsbury Square, London, W.C.1, 7 p.m. Dr. C. J. Blok: "Pharmaceutical Conditions in Holland under the German Occupation."

December 13. Oil and Colour Chemists' Association (Scottish Section). St. Enoch Hotel, Glasgow, 6.30 p.m. Mr. E. Melling: "Ship Paints, with special reference to Anti-Fouling and Anti-Corrosive Compositions."

December 13. Society of Instrument Technology. London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1, 6 p.m. Mr. G. H. Farrington: "Automatic Temperature Control of Jacketed Pans."

December 14. Royal Institute of Chemistry (Edinburgh and East of Scotland Section). North British Station Hotel, Edinburgh. 7.30 p.m. Dr. G. H. Smith: "Shale Oil."

December 14. Oil & Colour Chemists' Association (Manchester Section). Engineer's Club, Albert Square, Manchester, 2 p.m. Mr. T. Raines: "The Chemist's Link with Administration."

December 14. British Association of Chemists (St. Helen's Section). Y.M.C.A. Buildings, 7.30 p.m. Mr. A. V. Harrison: "Technical Education and its Relationship with Industry."

December 15. Society of Chemical Industry (Food Group and Yorkshire Section), and **Hull Chemical and Engineering Society.** Lecture Theatre, Mining Department, University of Leeds, 3 p.m. Mr. J. Pryce Jones: "Honey."

December 17. Institute of Fuel (Scottish Section). Royal Technical College, Glasgow, 5.45 p.m. Dr. V. H. Smith: "District Heating."

December 17. Society of Chemical Industry (Plastics Group and Manchester Section) and **Institution of the Rubber Industry** (Manchester Section). Engineers' Club, Albert Square, Manchester, 6.15 p.m. Dr. S. K. Skinner: "Synthetic Polymers in the War Effort."

December 18. Royal Institution of Great Britain. Albemarle Street, London, W.1, 5.15 p.m. Sir Henry Dale, Pres.R.S.; "Recent Developments in Chemical Therapeutics, III—Penicillin and other Antibiotics."

December 18. S.C.I. (Agriculture Group). Chemistry Lecture Theatre, Imperial College, Imperial Institute Road, London, S.W.7, 2.30 p.m. Rôle of the Chemist in Dairying: Dr. A. L. Provan: "The Chemist and Milk Production": Mr. E. V. Anderson: "The Chemist in Milk Processing and Manufacture."

December 19. Institute of Fuel (Yorkshire Section). Leeds University, Leeds, 2.30 p.m. Mr. J. Crossland: "The Preparation and Use of Fuel."

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.)

ADAM HILGER, LTD., London, E.C., optical and astronomical instrument makers. (M., 8/12/45.) November 9, mortgage and charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 77 and 79 Camden Road, 24 and 37a/47 (odd) Rochester Place, 2 Rochester Mews, and 90/100 (even) St. Pancras Way, N.W., together with machinery, etc., also general charge. *£20,000. October 11, 1945.

BRITISH FERTILISER CO. (BIRKENHEAD), LTD. (M., 8/12/45.) November 9, mortgage, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 7 Canning Street, Birkenhead, and fixtures. *——. December 5, 1944.

RICHGLAZE PLASTICS, LTD., Bath. (M., 8/12/45.) October 26, debenture, to Martins Bank, Ltd., securing all moneys due or to become due to the Bank; general charge.

Application for Discharge

GOTHARD, Henry Alexander Sherwin, company director, 10 Welbeck Street, London, W., described as of "Brooklyn," Bromley Common, Kent. (A.F.D., 8/12/45.) Hearing, December 20, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

Company News

Johnson, Matthey & Co., Ltd., are paying an unchanged interim dividend of 3 per cent.

Titanine, Ltd., report the payment of an interim dividend of 10 per cent. (same).

The American Smelting and Refining Corporation is paying a year-end dividend of 50 cents (25 cents).

Evans, Sons, Lescher & Webb, Ltd., have changed their name to Evans Medical Supplies, Ltd.

Lawes Chemical Co., Ltd., reports a trading profit, for the year to June 30, of £27,397 (£45,493). The dividend was announced last week.

British Tar Products, Ltd., report a net profit, for the year to September 30, of £36,736 (£20,906). A final ordinary dividend of 8 per cent., making 11 per cent. (9 per cent.) has been declared.

Rodmill Chemical Company, Ltd., 49 St. Anne Street, Liverpool, has increased its nominal capital by the addition of £9000 in £1 ordinary shares beyond the registered capital of £1000.

New Companies Registered

Excelda Plating Company (Birmingham), Ltd. (399,494).—Private company. Capital £1000 in £1 shares. Electro, nickel and chromium-platers, bronzers, oxidisers, etc. Directors: E. Pritchett; A. W. C. Lucas. Registered office: 102 Icknield Port Road, Birmingham.

British Quinolin, Ltd. (399,154).—Private company. Capital £100 in £1 shares. Manufacturing chemists, druggists and analytical and research chemists, manufacturers of, and dealers in, chemical and pharmaceutical productions. Subscribers: W. B. Girling; T. W. Spikin. Registered office: 120 Victoria Street, London, S.W.1.

Isotherm, Ltd. (399,137). — Private company. Capital, £2000 in £1 shares. Manufacturers of and dealers in vacuum flasks and other temperature-retaining vessels, glass, bottles, stoppers, etc. Subscribers: P. G. Money and R. Moore. Solicitors: Buckeridge & Braune, 3 Clements Inn, London, W.C.2.

Insecto Manufacturing Co., Ltd. (398,969). —Private company. Capital, £100 in £1 shares. To acquire the business of the Insecto Mfg. Co., and to carry on the business of manufacturers of and dealers in insecticides, etc. Directors: W. A. Marshall; W. K. Marshall. Registered office: 46 Yew Tree Road, Rusholme, Manchester, 14.

Markmaster, Ltd. (399,142).—Private company. Capital, £1000 in £1 shares. Designers, manufacturers, dealers in and operators of machinery and equipment for the engineering and other industries, to initiate or develop technical, chemical or other process. Directors: W. A. Evill; J. E. Lee. Registered office: 18-20 York Buildings, Adelphi, London, W.C.2.

Almin, Ltd. (399,819).—Public company. Capital £100 in 100 £1 shares. To promote the production and use of metals in particular, of aluminium and magnesium, both virgin and secondary, brass, copper and zinc, and other non-ferrous metals, and all alloys and components thereof; smelters, refiners, casters, forgers, stampers, rollers and fabricators of and dealers in all metals. Directors: L. F. A. D'Erlanger, P. Horsfall, W. C. Devereux, S. Sanders. Registered office: 101 Cannon Street, E.C.4.

Chemical and Allied Stocks and Shares

POLITICAL uncertainties have dominated stock markets, and prices reacted sharply owing to falling off in demand. A fair amount of profit-taking was reported, but selling was not heavy. British Funds were helped by the Chancellor's latest cheaper money moves; the disposition in the market is to assume that prices in this section may move higher when the "tap" issues are withdrawn on December 15. Apart from nationalisation and other political factors, sentiment in stock markets has also reflected a continued disposition to await the outcome of the Anglo-U.S. loan negotiations.

Shares of chemical and kindred companies moved closely with the prevailing market trend, although selling appeared to be generally on a moderate scale. Imperial Chemical reacted sharply to 39s. 9d., at which there is a yield of rather more than 4 per cent.; there is general confidence that the dividend will remain on an 8 per cent. basis with expectations that shareholders will benefit more fully from Dominion income tax relief and the abolition of "double taxation." Turner & Newall fell back to 82s., partly on doubts whether the dividend will be increased at this stage, while there was a sharp reaction to 55s. in Courtaulds. On the other hand, British Celanese rallied to 34s., a move attributed to American buying. A wide range of shares continued to be affected by the Government's policy in regard to the building industry; Associated Cement at 59s. lost further ground, as did British Plaster Board at 32s., and Allied Ironfounders at 55s. 6d. Nairn & Greenwich remained steady at 80s. (the results are due in a few weeks), but Barry & Staines receded to 53s. 9d.

Dorman Long went back to 25s. 7½d., Stewarts & Lloyds to 56s. 9d. Tube Investments to £5 9/16, and Staveley to 44s. 9d. but, on the other hand, Shipley at 27s. 6d. were a good feature in the iron-coal group, aided by the resumption of interim dividend payments. Guest Keen were 39s. 6d., Ruston & Hornsby 56s., and Thomas & Baldwins 11s. Among textiles, Calico Printers at 20s. 1½d., Bleachers at 13s. 1½d., and Bradford Dyers at 25s. 10½d. were lower in accordance with the prevailing market trend.

B. Laporte eased to 83s. 9d., while W. J. Bush were 78s. 9d., Cellon 5s. ordinary 27s., and Burt Boulton 27s. British Drug Houses moved back to 48s. 9d. British

Glues 4s. ordinary were little changed at 12s. 6d. and, aided by the higher dividend, British Tar Products 5s. shares were 13s. 6d. Among paint shares, Goodlass Wall eased to 24s. 10½d., British Paints (Holdings) to 46s., and Lewis Berger at 122s. lost part of their recent advance. Gas Light & Coke reacted to 21s. 3d. on talk of a national strike in the industry. Dunlop Rubber fell back to 52s., United Molasses to 44s., Distillers to 116s., and Wall Paper Manufacturers deferred to 39s. 6d., while Triplex Glass were down to 37s. Generally, however, hopeful views of dividend prospects persist, and the assumption is that in many cases where dividends have been reduced in recent years there are reasonable prospects of regaining pre-war levels. This, of course, largely explains why such shares as Turner & Newall, Wall Paper deferred, Triplex Glass, etc., are on a very low yield basis.

Boots Drug receded to 55s. 9d., and Beechams deferred to 21s. 6d., while Sangers at 30s. 6d., and Timothy Whites at 44s. 3d. lost a few pence. Monsanto Chemicals 5½ per cent. preference kept at 23s. Greeff-Chemicals Holdings 5s. ordinary were 9s. 3d. Fisons eased to 57s., and Cooper McDougall & Robertson were 34s. Oil shares lost ground, Shell being 80s., Burmah Oil 75s., and Anglo-Iranian £5 xd, but among smaller-priced shares, Mexican Eagle Oil rose to 12s. 1½d. on talk of the reopening of negotiations with the Mexican Government.

British Chemical Prices

Market Reports

A FAIR volume of inquiry has been circulating in the London general chemicals market during the past week and the movement into consumption has been on steady lines. There has been no apparent easiness in the price position, and in most instances the undertone is very firm. In the soda products section hyposulphite of soda is steady and there is a good inquiry for both the commercial and photographic qualities. Bichromate of soda and yellow prussiate of soda continue in short supply and are finding a ready outlet. A moderate volume of new business is reported in nitrate of soda and acetate of soda, while Glauber salt and salt cake are being taken up in fair quantities. In the potash section permanganate is a strong market and a persistent call for supplies is reported. Acid phosphate of potash is in good demand, and the scarcity of offers of bichromate and yellow prussiate of potash continues. In other directions there is a moderate inquiry for white powdered arsenic and sulphur, while a fair trade is passing in formaldehyde. Acetone is steady and the position of calcium chloride remains unchanged. Supplies of red lead and white lead remain scarce. Scarcity of supplies is also the chief feature of the coal-tar products section. Pitch and naphthalene are in good demand for export trade, while American duty-free cresylic acid is well sold for some months ahead. A fair trade is passing in the pyridines.

MANCHESTER.—Inquiries from shippers have again been a prominent feature of operations on the Manchester chemical market during the past week and some additions to overseas business in a fairly wide range of heavy products have been reported. Home users are specifying for reasonably steady deliveries of the soda compounds, acids, and ammonia and magnesia products, and replacement buying in these and other lines has been on a reasonably satisfactory scale. Taking the market as a whole the price position keeps steady and in a number of sections the undertone is strong. In fertilisers, lime, basic slag, superphosphates and sulphate of ammonia are attracting attention and a steady absorption of potash supplies continues. Home trading conditions in tar products are rather patchy, but a fair number of export inquiries are being dealt with.

GLASGOW.—Business in the Scottish heavy chemical trade during the past week has maintained the recent progress. Prices remain firm and export inquiries are numerous. With the improvement in the dock troubles, the shipping position has likewise been easier.

EDUCATIONAL

SITUATIONS VACANT

None of the situations advertised in these columns relates to a man between the ages of 18 and 50 inclusive or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1945, or the vacancy is for employment excepted from the provisions of that Order.

ASSISTANT Lady Analyst required in Chemical Works, E. London. Must have B.Sc. or A.R.I.C. with industrial experience. Write giving details of training, experience, salary, etc., Box ZL. 934, Deacons Advertising, 36, Leadenhall Street, London, E.C.3.

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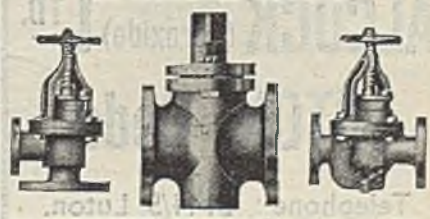

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