

# The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. LI  
No. 1347

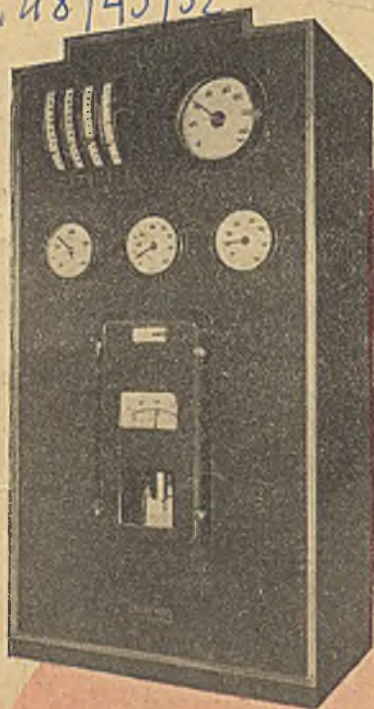
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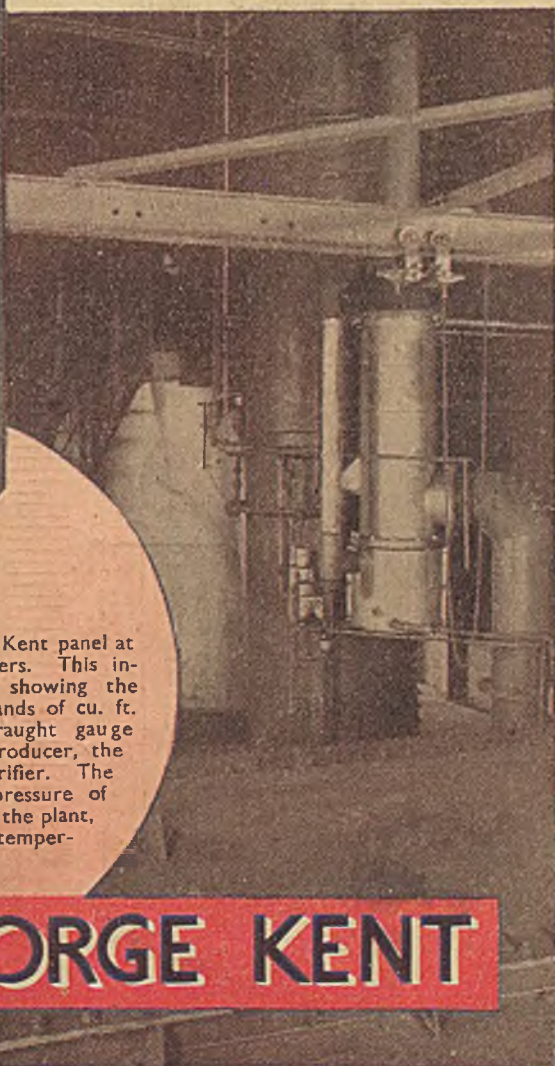


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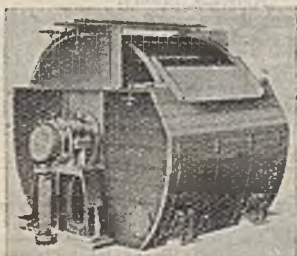


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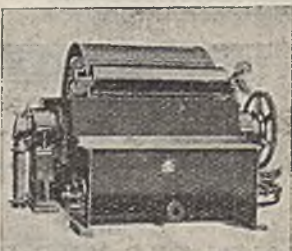
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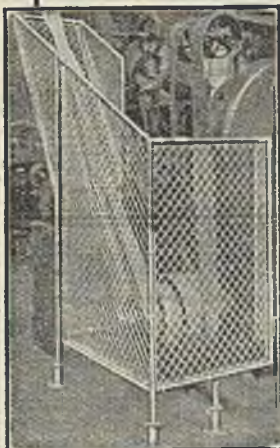
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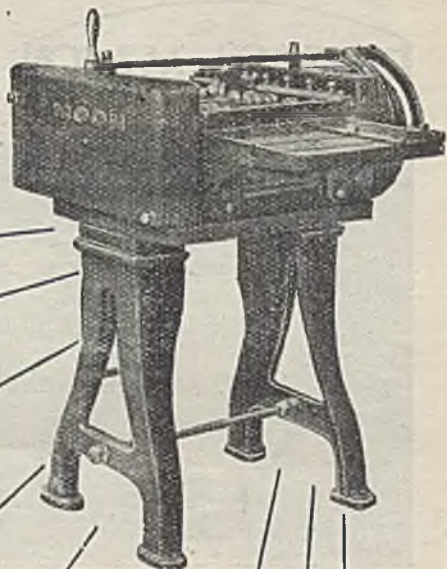
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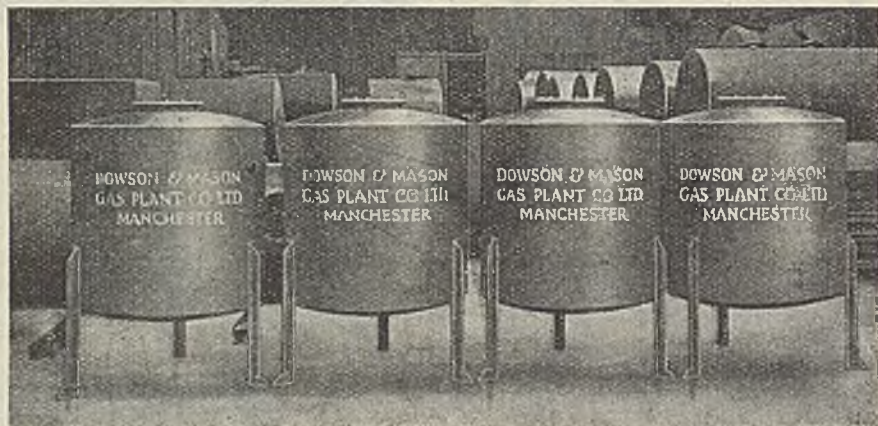
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Page 184

## Chemicals

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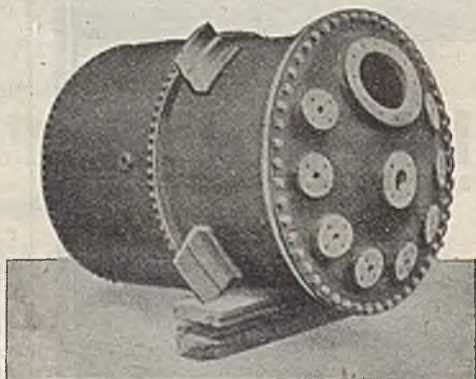
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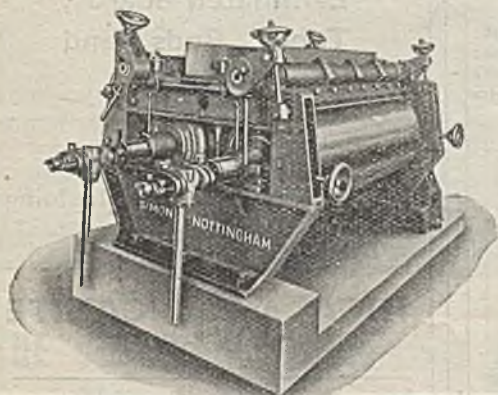
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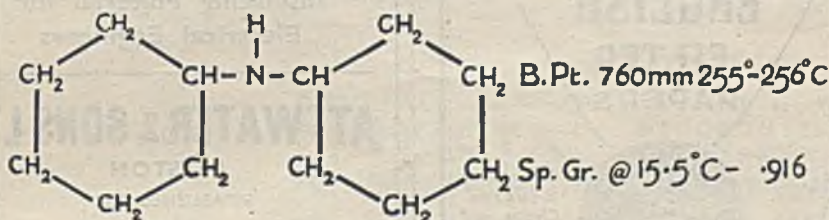
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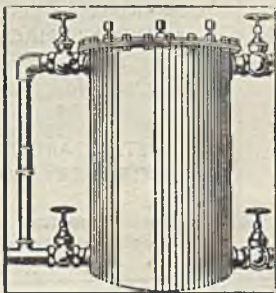
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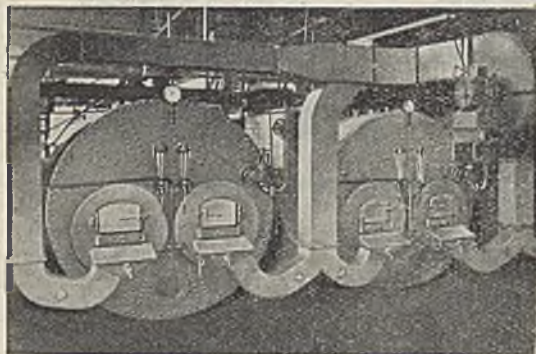
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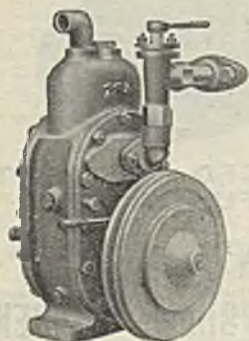
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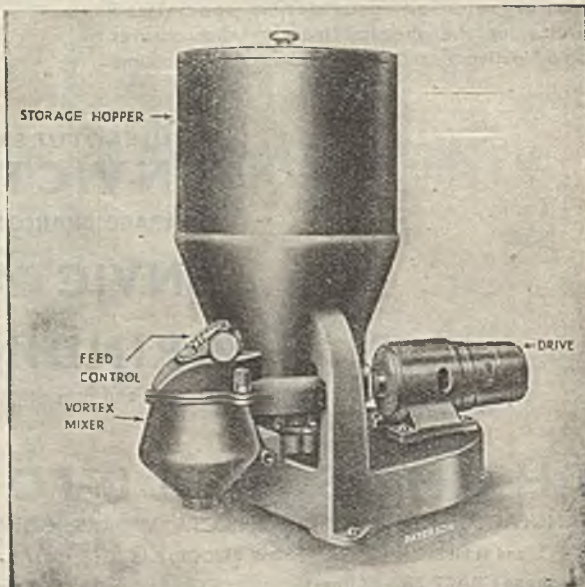
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No. 1347.

April 21, 1945

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## R.O.F. Production Costs

ONE aspect of Government activity during this war which has not received a great deal of publicity is the working of the Royal Ordnance Factories. Employing close on half a million people, these factories have proved one of the most important factors in the remarkable munitions production capacity developed in Britain during the past six years. Broadly speaking, the Royal Ordnance Factories are concerned mainly in the light engineering and heavy chemical industries, where they produce weapons and munitions identical with those turned out by private enterprise in the same industries.

Varied reports have been received and opinions expressed regarding the activities of the Royal Ordnance Factories. From the advocates of private enterprise and rugged individualism we hear complaints of the expensive nature of Government work, of the abnormally high earnings of the workpeople, of over-staffing of factories, and of costly auxiliary services such as welfare, medical, dental, and even tonorial! On the other hand, sober and responsible executives of the R.O.F. organisation give us circumstantial reports of abnormally low cost figures achieved

in production in these factories. We hear of weapons produced at prices varying from one-half to one-third of those charged by commercial firms. Processes have been introduced in these factories by which production costs have been cut to a fraction of those previously charged by private enterprise. All R.O.F. executives agree that production cost figures are not complete as they do not include any allowance for interest on capital and depreciation of plant. In turn, however, they point out that similar conditions apply in many of the commercial firms whose factory extensions were built and plant installed at the Government's expense.

If these claims for low production costs are incorrect, they are doing a disservice to British light engineering

trades and to the heavy chemical industry. If the claims are true, on the other hand, they constitute a grave criticism of two different branches of our industry which must give us seriously to think. If the Royal Ordnance Factories engaged in the light engineering branches are, in fact, capable of turning out weapons identical in design and finish with those from parallel trade organisations, but at a price substantially

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lower—considerably lower than the difference between profit and non-profit—what deductions follow? Has British light engineering failed to progress with the times, have our industrialists not possessed the drive and initiative needed for progress and advancement, have the latest types of machines and the newest methods of mass production not been adopted? Or has this industry failed to attract the necessary capital to effect these improvements? The plea that high labour costs and the obligation to provide canteen, welfare, and recreational facilities have imposed needless burdens, which will disappear with abnormal war-time conditions, will not bear a moment's examination.

In the Royal Ordnance Factories wages have been high, although to admit this is not to support some of the fantastic figures so freely bandied about. Canteen provisions have been on a very extensive scale. Welfare has been extended in all directions and includes the provision of medical, dental, and chiropody facilities. Centres in the countryside have been secured for the rest and convalescence of workpeople who have fallen ill. Such services cost money—a lot of money—yet while admitting all this our friends in the Royal Ordnance Factories still maintain their claims for low cost of production. Is there a nigger in the wood-pile? If so, he must be discovered. Or is it that British industry has some lessons to learn? In the search for world markets for our exports in the post-war years the light engineering industry must be well to the fore. Too long have we gone on putting all our eggs in the one basket of heavy industry. Other outlets must be found. Have the Royal Ordnance Factories shown some of the ways in which this difficult task may be done?

We suggest that at this stage of the war no harm and almost certainly a great deal of good can be done through an investigation by an independent body charged to discover the truth of these conflicting claims. The Select Committee on National Expenditure has done valuable service in the past by bringing to the public notice the truth about the cost and necessity for the production of various essential commodities. On the recommendations of this Committee certain inefficient and uneconomic processes

have been shut down and production concentrated in the more efficient and economic plants. Is there any reason why this committee should not be given the task of investigating production costs of—say—four typical guns, *e.g.*, the well-known 6-pounder tank and anti-tank gun, the heavier 17-pounder for the same purposes, a light anti-aircraft gun, and a heavy calibre machine gun? Let the Royal Ordnance Factories be judged on an economic basis by the findings of this Committee. Little blame and a great deal of praise must be meted out to the Royal Ordnance Factories for the actual production job they did at a very grim hour in our history. Now is the time to assess their performance, from a strict economic point of view, alongside their competitors in private enterprise. If it can be proved that these factories are in general more efficient and consequently more economic than those of private enterprise, then the nation is in possession of a most valuable industrial asset which it must not lightly let go, and from which British industry has many lessons to learn.

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## Parliamentary Topics

### Patents Extension

**I**N the House of Commons last week, Sir W. Davison asked the President of the Board of Trade whether his attention had been drawn to the hardships suffered by patentees in having the period for which the patent was granted curtailed by the war; and whether steps would be taken to extend patents taken out during the war for the period during which the war had made them inoperative.

Mr. Dalton: Under Section 18 of the Patents and Designs Act, a patentee who has suffered loss or damage by reason of hostilities may apply to the Court for an extension of the term of his patent. The Patents Committee, which I appointed last year, has made an interim report dealing with this point.

### Monopoly Legislation

Sir Geoffrey Mander, who asked what action the Government propose to take to carry out Section 54 of the White Paper on Employment pertaining to the activities of monopolies, was referred, by Mr. Dalton, to a reply he gave on March 27 (*see THE CHEMICAL AGE*, April 7).

### Hydrocarbons Committee

Replying to Sir Stanley Reed, the Chancellor said that the recommendations of the Ayre Committee were under consideration,



## NOTES AND COMMENTS

### More Science in the House

**I**NDEPENDENCE seems to be paying. The return of Sir John Boyd Orr as M.P. for the Scottish Universities with a handsome majority of 12,000 is significant in more ways than one. In the first place the small band of eminent scientists in Parliament will be vastly strengthened by the reinforcement of a professor of agriculture and an expert in nutrition; second, and even more important, is the fact that Sir John has been returned as an Independent. He is not confessedly a Scottish Nationalist, like the winner of the Motherwell by-election, but he has stated that "the people at Westminster do not realise the extent to which Scotland is suffering a sense of injustice and frustration." Electors of the Scottish Universities had been urged by Mr. Churchill to vote for the Liberal National candidate; that most of them did not do so is not a blow directed at Mr. Churchill, since Sir John Orr has never expressed the slightest hostility to the Prime Minister. What it appears to us to indicate is that electors are not going to be bound by any party confines. They are perhaps actuated by the motive which Sir John mentions: "to encourage . . . Independent candidates to give expression in the House to the great contribution which science and learning can make to the solution of the tremendous political and social problems which face us." We suggest that it need not be only in the University constituencies that such candidates should stand.

### Hydrocarbon Oil Duties

**N**OTHING less than the establishment of a new chemical industry in this country is envisaged by the report of the Ayre Committee on Hydrocarbon Oil Duties, which was published last week and is extensively reviewed further on in the columns of this issue. If the recommendations of the committee are adhered to, domestic producers of light and heavy oils from coal and allied materials will be safeguarded by the payment to chemical manufacturers of 9d. a gallon for light oil and 1d. per gallon for heavy oil used as raw materials in chemical synthesis. If the actual oil producers are chemical manufacturers as well, they

also would receive these allowances. A perusal of the list of witnesses from whom evidence was taken will convince the reader that the conclusions of the committee have not been lightly arrived at; not only have the chemical and oil industries been consulted, but also a number of interested associations, including the A.B.C.M., and several individual consultants. Far though the recommendations of the committee go, they do not go all the way towards the establishment of a complete organic chemical industry based on petroleum chemicals; no general survey has yet been made of a chemical industry based on crude-oil refining in this country. In this respect it is perhaps better not to be impatient—it is well that the first step has been taken.

### Tar Distillers' Interests

**U**SE of indigenous oils presents a different problem, and the committee saw that it would be in accordance neither with the national interest nor with the guarantee of preference already given to require domestic oil producers to supply raw materials to the chemical industry at a reduced price and to bear the cost of this reduction themselves. Hence the allowance to chemical manufacturers using indigenous oils in chemical synthesis; it is important that the manufacture of the purer grades of benzol required by the chemical industry should continue in this country. Commenting on the possible loss of revenue to the tar distiller consequent upon the reduction in the price of benzol, and the resultant fall in the price of synthetic chemical products, including non-hydrocarbon products derived directly from tar, the committee states that the interests of the tar distillers have been kept in mind, and that the price reductions in synthetic materials should not inflict serious injury on the tar distillation industry. It is noted that our export trade has suffered from the high cost of raw materials, and though the annual cost, from the duties, to the chemical industry is put at the relatively low figure of £375,000, it is pointed out that such a figure could well have a detrimental effect in a competitive export

market. The cost of exempting oils from duty would probably be counterbalanced by an increased demand from the chemical industry for oils, and should this demand be met by greater domestic output, then the whole of the oil-producing industry would have been helped in all its stages.

### Wool Research

HIGH interest attaches to some of the facts revealed in the 1944 report of Mr. B. H. Wilsdon, Director of Research of the Wool Industries Research Association, issued privately to members from the Association's station at Torridon, Leeds 6. Especially topical is the solution of problems involved by the adoption, on the part of the Ministry of Supply, of a standard shade of chrome-dyed green for tropical wool clothing. The specification required not only a suitable degree of resistance to bacterial attack, for which abnormally high concentrations of chrome had to be used, but also a safe control of the dermatitis hazard. Simple methods of works control were suggested, and assistance was given in the speedy confirmation of analytical results. Another problem investigated is a physiological one in the use of wool next the skin—namely "tickle." The reaction can be moderated when the wool is given a chemical treatment with, e.g., papain, but no claim for the production of "non-tickle" wool will be made until a statistical study, including specially sensitive subjects, has been completed.

### Treatment of Yarn

THE "Perzyme" process, a combined peroxide and enzyme treatment, has found favour for the commercial treatment of hand-knitting yarn. Since the original application of enzyme treatment after peroxide bleaching, a further step forward has been taken, by using more drastic conditions for peroxide bleaching, viz.: pH 10.5 in the presence of sodium silicate, instead of pH 8.0-9.0. After the wool has been bleached under these more drastic conditions, it becomes non-felting much more rapidly under the action of the papain, and at the same time is less easily damaged by it. An interesting illustration of the way in which the chemical components into which wool can be split up may be visually demon-

strated, is provided by a photograph of a chromatogram on a sheet of filter-paper. In this the amino-acid constituents of the wool are clearly shown, giving an excellent idea of the complexity of the material with which Mr. Wilsdon and his team have to deal.

### The Shellac Bureau

ALTHOUGH its laboratory, under the care of Dr. B. S. Gidvani, has been transferred to Edinburgh, the London Shellac Research Bureau has continued its good work throughout the war. Generally speaking, lack of space has precluded our reviewing, in really adequate manner, the publications of undoubted value and considerable scientific interest—and, it may be said, always well and distinctively produced—that have emanated with commendable frequency from the portals of the Bureau, but that is far from implying that our opinion of their usefulness has in any way altered. We sincerely hope that it will not be long before a reasonable supply of paper will allow us once more to give the attention they deserve to special research pamphlets of this kind. Meanwhile it does not seem out of place to recall to our readers the amount of good work in this direction that has been maintained. The month of March, 1945, has produced a particularly good crop: technical papers entitled "A Process for the Manufacture of Dewaxed Lac" (No. 26), and "Lac-Ethyl Cellulose Lacquers" (No. 27) have appeared under that date, together with Bulletin No. 7, "Determination of Volatile Matter in Lac," all of them under the authorship of Dr. Gidvani and Mr. N. R. Kamath. The Bureau has also produced its useful annual list of abstracts, for 1944, reprinted from the Paint Research Station's *Review of Current Literature*, and this, like the others, is obtainable from the Bureau's offices at India House, Aldwych, London, W.C.2.

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A comprehensive report on the great deposit of manganese and iron ore at Morro do Urucum, Mato Grosso, Brazil, is the latest product of co-operative studies of mineral resources in Latin America. The report was prepared by Mr. J. V. N. Dorr II, for the U.S. Geological Survey and the Brazilian Department of National Production.



# Hydrocarbon Oil Duties

## Ayre Committee's Proposals for the Chemical Industry

**H**OPES for the development of a new branch of the chemical industry in this country—based on the derivatives of crude oil—are raised by the report of the Hydrocarbon Oil Duties Committee published last week (H.M.S.O.; 3d.). It will be remembered that the committee was formed jointly by the Treasury and the Ministry of Supply (see THE CHEMICAL AGE, 1944, 51, 141, 219) under the chairmanship of Sir Amos Ayre, with Sir John Fox, Mr. A. S. Macharg, and Sir Robert Robinson as members. Dr. C. M. Cawley, of the Fuel Research Station, D.S.I.R., and Mr. G. Imms, H.M. Customs and Excise, served throughout as secretaries, and Dr. W. A. Macfarlane acted as liaison officer with the Ministry of Fuel and Power. The committee has expressed great gratitude to these officers, especially for their expert technical assistance. The committee was robbed by death of the services of Sir John Fox in November last, but the work was so well advanced that it was not thought necessary to ask for a replacement, especially as Sir John Fox's views were fully in accord with those of the other members.

### Terms of Reference

The Terms of Reference were as follows: "To consider and report upon:

(a) the effect of the hydrocarbon oil duties on the supply of raw materials to, and the development of, the chemical industry in this country so far as the use of hydrocarbons and their derivatives is concerned;

(b) the extent to which any change in those duties would affect industries engaged in the production of similar products from coal.

The comment is made that these terms were not extensive enough, as they do not embrace a general survey of the chemical industry based on oil refining. In this connection the committee states:

"Two types of refining may be distinguished: 'general,' where the whole range of products, including petrol, is produced from crude oil, and 'speciality' refining, where one or more products are produced from selected fractions of petroleum. This latter type is already extensively employed in this country for the production of lubricating oil and bitumen. If general refining . . . were carried out, the raw materials for a synthetic chemical industry would be made readily available. The question of home refining involves considerations which lie far outside the . . . terms of reference."

Dealing with the effects of the duties on

the chemical industry and its development, the committee states:

It is difficult to assess the past inhibitory effects of the duties on imported hydrocarbon oils. There is, however, little doubt that the existence of those duties, and the fear that they might at some future time be raised to a still higher level, have prevented the development in this country of new processes using those oils as raw materials. Certainly, there has been no parallel in this country to the extremely rapid development which has taken place in the United States of America, although it is not suggested that fiscal considerations alone are responsible.

The visible direct effect of the hydrocarbon oil duties on the chemical industry has hitherto not been large. There are, however, two cases where evidence has been brought forward of the powerful and adverse effect of the duties on processes already operated in this country. These are the use of petroleum oils for the manufacture of such products as wetting-agents and detergents, and of turpentine for the manufacture of so-called "synthetic" camphor. Certain oil companies have developed processes for the manufacture of wetting-agents and detergents from by-products of the refining of lubricating oil, or from long-chain olefines produced by the cracking of petroleum oils. In both cases duty is levied on the oil so used, even though, in the case of the by-products, the process utilises material which would otherwise be waste.

Turpentine, and pinene which is its main constituent, are, despite their vegetable origin, dutiable at 9d. per gallon as light hydrocarbon oils. Pinene is the essential raw material for the manufacture of synthetic camphor and for this purpose there is no indigenous substitute. The effect of the duty has, in broad terms, been to offset the protection given to the British manufacturer in the home market by the duty of 10 per cent. *ad valorem* on imported camphor. At the same time the absence until 1939 of any drawback on exported camphor or celluloid considerably handicapped the manufacturer in his efforts to obtain export markets.

### Indirect Effect of Duties

The indirect effect of the hydrocarbon oil duties on the chemical industry has unquestionably been considerable. This indirect, or repercussive, effect is due to the protection of indigenous oils and to the fact that benzol, one of the main hydrocarbon raw materials to the existing chemical industry

in this country is in demand as a blending constituent in the motor-fuel market, where its value is regulated by that of imported duty-paid spirit. It follows that the chemical industry must pay for its raw material a price enhanced by approximately the amount of the duty on such spirit.

After reference to the process necessary to separate the constituents of crude benzol for use in the chemical industry, it is noted that, out of the 84 million gallons of crude benzol refined in 1938, some 10 million gallons of refined aromatic hydrocarbons were used in the chemical industry. There is no reason to suppose that the post-war demand of the chemical industry will be less than 10 million gallons per annum, and it may well be more.

The annual cost to the chemical industry of the repercussive effect of the duty has thus been of the order of £375,000, approximately equivalent to 1d. per lb. on benzol. The consequent effect on the cost of chemicals derived from benzol depends on the yield and on the number of steps in the chemical synthesis which separate the original raw material from the final product, and may be more or less than 1d. per lb. on the primary intermediates, although at that stage the average is still about 1d. per lb. The effect is less on products further removed from benzol. Nevertheless, the increase is significant and often serious in the export market, particularly in the case of primary intermediates, since most foreign manufacturers do not have to bear the burden of high raw-material costs. Competition is extremely keen; the margin of profit is often small and diminishes as the manufacturer tends to seek his reward in increased output rather than high prices. The existing drawback provisions are not of great value to the chemical industry since (a) there can be no question of drawback on indigenous benzol which has not borne duty, and (b) the hydrocarbons used as raw materials in the industry undergo a chemical transformation during synthesis and are not therefore present in the exported article in the form in which the duty (if any) was paid. The committee has received evidence of cases in which the output of certain dye intermediates has been curtailed owing to the almost complete loss of the export trade resulting from this position.

### Expansion of the Chemical Industry

The synthetic organic chemical industry of the world stands at the opening of a period of great expansion. From their earlier position as adjuncts to industry, chemicals are forming increasingly the basic raw materials of many major industries. As the chemical industry develops, increasing technical efficiency and productivity may be expected to bring about price reduction in materials often hitherto regarded as rare

chemicals, and lead to their use in ever-widening fields of application.

Since Britain possesses neither large supplies of hydrocarbons in the form of natural petroleum, nor large numbers of scientific and technical personnel trained and experienced in development work, a great effort will be called for if she is to play a considerable part in the new industry. It is accordingly imperative that the basic and intermediate raw materials should be made abundantly available and that the industry should be free to choose the best material for each particular process or synthesis, guided only by scientific and technical considerations.

Many of the new processes utilise materials derived in part from oil and in part from coal, and it may well be therefore that the continued growth of the chemical industry based on petroleum will result in an increase in the demand for raw materials derived from coal. Recent statistics indicate that the large increase in the production of non-coal-tar chemicals has been accompanied in the United States by a related increase in the production of coal-tar chemicals.

The use of hydrocarbon oils as solvents is outside the committee's terms of reference, but the committee was impressed by some of the evidence incidentally brought to its attention concerning the extensive use which is made of the solvent property of hydrocarbon oils in extraction processes in the chemical industry.

### Chemicals from Petroleum

The duty of 1d. a gallon on heavy oil has not had any clearly recognisable effect on the development up to the present of processes for producing chemicals from petroleum. On the other hand, the effect of the duty at 9d. a gallon on light oil has already been felt, notwithstanding the small scale of operations, and the committee has had evidence that the manufacturer has in certain instances distorted his process to use heavy oil, although light oil would yield superior products. Thus, there is a real danger that, if the present position is maintained, fiscal rather than technical considerations will dictate the future course of development, even possibly to the extent of stifling entirely certain lines of development.

A further consideration which has greatly impressed the committee is that the free growth of new industries producing and using the hydrocarbon raw materials will result in the development of new alloys, apparatus, equipment and technique which will benefit industry generally. Equally, it will provide a field for the training of chemical engineers and metallurgists, the benefit of whose experience is likely to be widely felt in many industries.

Production of petroleum and natural gas



in this country, although it has increased appreciably during the war, is still only a very small fraction of total requirements. But, as already pointed out, the quantity of oil required by the chemical industry is likewise very small in proportion to total oil requirements and there is, therefore, no reason why home-produced oil should not play its due part in the new developments, provided the manufacturer is free to use, unaffected by duties or their repercussions, the material most suitable for his purpose. The same is true of the oil produced from indigenous shale.

### Chemicals from Coal

Following a discussion of the principal processes for the treatment of coal and its by-products which yield raw materials for the organic chemical industry, the committee points out that in 1938 light oils manufactured from indigenous coal, shale, or peat, and indigenous heavy oils used as road fuel, enjoyed a preference of 9d. per gallon, while other heavy oils, except those competing directly with petroleum bitumen produced in this country and exempt from hydrocarbon oil duty, enjoyed a preference of 1d. per gallon.

The committee has considered whether the carbonising industry could be required to forgo the benefit of the preference on such materials, but this would apparently constitute a breach of the guarantee given in 1938, and would involve some form of compulsion to supply, since the distributor would otherwise confine himself to the more attractive motor-fuel market. They have therefore concluded that the producer of indigenous hydrocarbons should not be called upon to bear the cost of the reduction in price of his products to the chemical industry.

Separate treatment of imported and home-produced oils is called for in order to relieve the chemical industry of the direct and repercussive influence of the hydrocarbon oil duties on its prospective expansion. Chemical manufacturers should be allowed to receive free of duty, under appropriate safeguards, any imported hydrocarbon oil for use as raw material in chemical synthesis, and this relief should be extended to cover any hydrocarbon oil used in a refinery in the production of chemicals or chemical raw materials.

The case of indigenous oils is more difficult. The importance of coal and the allied industries to this country can hardly be over-estimated, and the national interest would not be served if the chemical industry were to be developed entirely on imported oils. The committee therefore recommends the payment to chemical manufacturers of an allowance of 9d. per gallon in respect of indigenous light hydrocarbon oils, and of 1d. per gallon in respect of indigenous

heavy hydrocarbon oils, used by them as raw materials in chemical synthesis. Any oil producer who manufactures chemicals from his own hydrocarbon oils should also be eligible for this allowance.

The implementation of this proposal would encourage the development of the new chemical industry without seriously altering the relative competitive position of other industries which supply hydrocarbon oils as raw materials for chemical manufacture. The attention of the committee has, however, been drawn to the fact that a reduction in the price of benzol to the chemical manufacturer would result in a fall in the cost of synthetic products; these would include the non-hydrocarbon compounds also derived directly from tar, and the tar distiller would thus suffer a loss of revenue. An outstanding example is phenol, where the price reduction, corresponding to the proposed allowance of 9d. a gallon on benzol, would amount to about 1d. per lb. The committee is alive to the importance of fostering the tar distillation industry, which provides the chemical industry with so many valuable products, but after careful consideration has come to the conclusion that the price reductions in synthetic materials, consequent upon the implementation of the committee's proposal, should not inflict serious injury on the tar distillation industry.

### Cost of the Proposed Scheme

It is not possible to forecast the probable cost of exempting from duty imported oils used by the chemical industry. On the basis of the pre-war consumption of indigenous hydrocarbon oils by the chemical industry, the total cost of implementing the committee's recommendations would be something under £400,000 per annum. Any increase in the consumption of similar oils as a result of the chemical industry increasing its demands on indigenous production would be met by a corresponding increased demand for imported oil for fuel use, on which the duty would be paid. Moreover, should the increased demand be met by greater output on the part of the home industry, then the allowance would have helped that industry throughout its stages right down to coal-mining. In the long run there should be a gain in revenue due to the prosperity of an important section of industry.

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Argentina's imports of chemicals, oils and paints in 1944 and the preceding year amounted to 111,913 (201,098) tons worth pesos 87,186,000 (106,770,000). In 1944, the United Kingdom retained the leading position as Argentina's best customer (37 per cent. of the exports), but supplied only 5 per cent. of her imports.

# Institution of Chemical Engineers

## Annual Meeting : New Officers Elected

THE 23rd annual corporate meeting of the Institution of Chemical Engineers was held on April 13 at the Connaught Rooms, London, W.C.2, with Mr. F. A. Greene, the retiring president, in the chair.

The annual report of the Council for 1944 records that the Institution has continued its steady progress, membership having increased from 1449 to 1571. A fresh item of expenditure in the year's account covers the cost of the inauguration of the North-Western branch with a grant towards its expenses for the latter part of the year. The subscription to the Parliamentary and Scientific Committee was increased, in order to obtain additional representation on the executive committee. It has also been considered advisable to increase the provision for post-war activities. Steps are being taken to bring the Institution's "Scheme for a Degree Course in Chemical Engineering" as widely as possible to the notice of those interested. There was a record entry of 45 candidates, 25 of whom satisfied the examiners, for the 19th annual examination for admission to associate membership.

### The New Officers

The following were elected for the ensuing year: *President*, MR. HUGH GRIFFITHS; *vice-presidents*, DR. C. J. T. CRONSHAW, SIR ALFRED EGERTON, MR. S. ROBSON, MR. D. F. SANDY'S WUNSCH; *joint hon. secretaries*, MR. M. B. DONALD, MR. L. O. NEWTON; *hon. treasurer*, MR. H. W. CREMER; *members of Council*, MESSRS. K. FRAER, R. F. STEWART, N. SWINDIN; *asso-*

Mr. F. A. Greene.



ciate member of Council, MR. S. B. WATKINS.

### The Year's Medallists

Presentation of medals for 1944 (with certificates) followed the election. The Osborne Reynolds Medal was awarded to MR. JOHN MCKILLOR for his valuable services, particularly in connection with the formation of the North-Western branch, which was inaugurated in Manchester on October 7. The Moulton Medal went to MR. NORMAN SWINDIN for his paper on "Treatment of Spent Pickle Liquor," while the Junior Moulton Medal and prize of books was awarded to DR. J. M. PRIE for his paper on "Glass-Enamelled Steel Equipment for the Chemical Industry." The William Macnab Medal for the best answers submitted in the Associate Membership Examination was awarded to MR. K. A. SHERWIN, while the work of MR. W. G. DAROUX was highly commended. MR. D. M. YUILL received the Hinchley Medal as the year's best student in chemical engineering at the Imperial College of Science and Technology.

## "A Byway of Chemical Engineering"

### Points from the President's Address

THIS year I propose to deal with one of the many byways into which war can lead a chemical engineer. Among the many unusual jobs with which I have been associated has been to act in conjunction with an eminent firm of consulting engineers in the planning and equipping of several underground factories, and it is of the largest of these installations that I propose to give a few details.

This factory has been placed in the disused workings of a mine which covered an area of some 80 acres, divided into a number of sections with communicating tunnels.

In the greater part of the cleared areas precision tools have been installed, some of them virtually irreplaceable. There are also extensive plating, polishing, grinding, and heat-treatment departments, so that, in addition to the supply of normal ventilation and heating, it was necessary to provide special equipment for the removal of fumes, dust, and noxious vapours. The heat-treatment department had also to be supplied with sufficient air and extract ventilation to render the conditions satisfactory to the operatives.

The factory contains all the essential



features, services, and amenities of a first-class modern surface building. Its water is filtered, aerated, and chlorinated, and then passed to a 1½-million gallon reservoir. To provide the 1½ million cu. ft. of gas per day which was estimated to be necessary, 22 miles of mains connected to a ring main were installed. Compressed air is obtained from five separate compressor houses, each provided with radial type, water-cooled, high-speed machines and air receivers, and each delivering into a ring main. Special arrangements were made also for emergency lighting.

To deal with the effluent from plating and etching an acid neutralising plant has been provided. The acid wastes are first dosed with soda and then mixed with the non-acid wastes in an averaging tank. The water is pumped to mixed effluent tanks where the scum and oil are decanted off and elevated to tanks on the surface. The remainder is pumped through an oil separator to sedimentation and flocculation tanks, receiving a dose of coagulant on the way. The clear effluent from the tanks is discharged to the foul sewer and the sludge drawn off from time to time to drying beds on the surface. Plant has been provided to deal with sewage, storm water, and normal domestic hot water requirements.

### The Ventilation System

The most interesting problem has been the ventilation system, for without an efficient means of providing air movement and fume removal the whole project would have been impracticable. An underground factory, like a surface factory (and unlike a mine), requires fairly large open spaces, while temperature conditions must be maintained at a reasonable level. There is also a greater heat rise than in a mine, owing to the installation of machine tools, heat-treatment furnaces, etc. The main consideration in the design of the ventilation system has been to produce a scheme involving as little constructional work as possible. The aim was to provide an internal temperature of 65°F. with a relative humidity not exceeding 70 per cent. The conditions obtaining in the mine before work was started were 48°F. and 100 per cent. relative humidity.

Mechanical refrigeration, first considered, had to be discarded owing to the time required for the delivery of the plant and the high capital cost involved. Consideration was then given to the advisability of drawing outside air from an adjacent disused mine, which would cool the air to a selected dew-point, and then reheating. This method also had to be abandoned because the civil engineers could not justify the expensive tunnelling which would be required.

The only remaining practicable method was to draw fresh air from the atmosphere

and distribute it throughout the works without the use of mechanical refrigeration or other means of cooling. The excellent tables issued by the Meteorological Office revealed that maximum temperatures of over 70°F. have been experienced on an average of only 80 hours per year when conditions of high humidity do not normally prevail. The average shade temperature during these periods has not exceeded 62°F. It thus appeared that it was only necessary to provide sufficient air to produce a 10°F. rise when all machines and personnel were in operation. This resolved itself into providing about 120 million cu. ft./hr., which allowed five complete air changes per hour. In the final scheme adopted, fresh air is drawn in through five concrete-lined shafts and distributed through a system of underground ducts by means of axial flow fans, each fan delivering 300,000 cu. ft./min. of air. To prevent excessive temperatures in the middle of the factory, certain of the sub-floor ducts have been extended to terminate approximately around that point.

Extract ventilation has been provided around the perimeter of the mine and large tapered air ducts have been constructed, connected also to axial flow fans. The extract fans are provided with adjustable openings at high level for the extracting of vitiated air. In the main extract duct a fan has been installed which is 200 in. in diameter, has a duty of 400,000 cu. ft./min., and carries the discharge from all cyclones, polishing machines, grinders, acid vats, etc. Other than for emergency purposes it is not associated with the general extraction system. All acid and plating vats have been provided with side slot ventilation and separate fans, while all polishing and grinding machines have been equipped with hoods and washers for the entrainment of the various industrial impurities. Hoods and ductwork have been provided for the purpose of exhausting fumes from nitriding, carburising and cyanide furnaces, shot-blast cabinets, etc. The total volume of air exhausted from all these processes is approximately 340,000 cu. ft./min.

A standards room has been provided with a completely self-contained air-conditioning plant, comprising ductwork, methyl chloride compressors having direct expansion coils, air heaters, filters, etc., all being under thermostatic control.

### Control of Humidity

The fairly high humidity conditions naturally experienced at first, owing to large evaporation of moisture through concrete floors, brickwork, and rock surface, have now been reduced to a maximum of 70 per cent. in summer and autumn and 50-55 per cent. in the winter. During the summer months the fans must be run at full speed,



During autumn and winter, control of humidity can be obtained by heating the air and operating at reduced fan speeds. The surface of the rock is gradually approaching the mine air temperature, but evaporation of moisture, though slight, is still taking place. There can be little doubt that over a period of time the rock columns will absorb heat and gradually approach the normal temperature of the mine air.

To provide steam for the canteens, process and air-heater batteries, two large boiler houses employing Lancashire boilers have been installed in the mine, each delivering into a ring main with service branches. All condense water is collected in condense tanks, pumped into a condense main and delivered into the feed tanks. For the disposal of ashes electrically operated hoists have been installed.

Factories such as I have described may seem to be somewhat removed from chemical engineering, but it is my belief that we should endeavour to cover as wide a field as possible in the realms of engineering. There must be many of you managing or owning factories in which some of these problems arise, and I trust that the brief description I have given will be of some use to those who are, or who contemplate the setting up of factories and plant either on the surface or underground. In view of the tendency in some quarters to construct windowless factories, the urgency of these problems may not be so remote as one may imagine. It is a fact that the conditions underground in all factories with which I have been associated have proved to be more satisfactory than those of similar overground factories, and are much appreciated by those who work there.

I wish to acknowledge my indebtedness to Mr. B. H. Colquhoun, late Director-General of Aircraft Production (Factories), and to Mr. T. A. L. Paton, of Sir Alexander Gibb & Partners; also to my own chief assistant in London, Mr. L. A. Johnson, and to Capt. R. E. McDonald who was resident on the site, and responsible to me for all mechanical and process services.

### The Annual Luncheon

Mr. F. A. Greene took the chair at the luncheon which followed the annual meeting and the presidential address. After the loyal toasts, Sir Charles Bruce-Gardner, M.I.Mech.E., chief executive for industrial reconversion at the Board of Trade, proposed the health of the Institute coupled with the name of the President.

Sir Charles spoke of the necessity for high technical qualifications in the years ahead and congratulated the Committee of the Institution on the good work they had done in setting up high standards for young chemical engineers. He referred to the

good example set by the gift made to the University of Cambridge by the Shell Oil organisation, and hoped that others would follow this example. Speaking of the work of the Institution, he made particular reference to the value of the informative discussions which followed the technical papers that had been read. As to the work of chemical engineers in general, Sir Charles said that many of us had lately been in closer connection with this than we liked. He referred to the "very expensive noises" that we had heard around us all over London and to those noises which were now being made in Germany on an even larger scale.

### The Board of Trade's Task

The Board of Trade, he said, were conscious of the value and importance of the chemical industry and would do everything they could to assist it. They were striving to create a position from which a return to peace-time industrial conditions could be easily planned. He was glad to say that they were now able to grant bulk licences to manufacturers of machinery; this was an important step and a great aid to planned production. As for export licences, 20,000 of these a week were being dealt with, but restrictions would become less and less, and the Board's policy was that all controls should be done away with at the earliest possible moment as soon as military requirements and supply allowed. The chief pity was that machinery must be reversed in order to direct back into industry the effort now used in military production. The shortage of technicians and key men would be remedied as soon as possible.

Mr. Greene, having thanked Sir Charles, invited a toast to the continued prosperity of the new North-Western branch of the Institute. Mr. J. McKillop, chairman of the branch, returned thanks with a few words about the activities in Manchester and hoped that they might soon have a small gathering on the lines of the present one in that city.

Among those present at the luncheon, which was attended by over 350 members and guests, were: Sir Frederick Bain, Mr. Horatio Ballantyne, Sir Vyvyan Board, Air Marshal Sir John Bradley, Dr. W. T. K. Brauholtz, Dr. R. T. Colgate, Mr. Brian Colquhoun, Major G. Courtauld, Mr. E. G. Couzens, Mr. H. W. Cremer, Dr. C. J. T. Cronshaw, Dr. W. Cullen, Sir Charles Darwin, Mr. M. B. Donald, Sir Alfred Egerton, Professor Alexander Findlay, Sir Arthur Fleming, Dr. G. E. Foxwell, Mr. Keith Fraser, Mr. C. S. Garland, Sir Alexander Gibb, Dr. B. S. Gidvani, Mr. Hugh Griffiths, Mr. Geoffrey Heyworth, Sir Hubert Houldsworth, Dr. P. C. C. Isherwood, Dr. L. A. Jordan, Dr. L. H. Lampitt,



Mr. Julian Leonard, Dr. R. Lessing, Dr. H. Levinstein, Mr. L. A. Mitchell, Sir George Nelson, Mr. Norman Neville, Professor D. M. Newitt, Professor R. G. W. Norrish, Sir William Palmer, Mr. L. R. B. Pearce, Mr. W. C. Peck, Mr. P. C. Pope, Mr. H. V. Potter, Mr. J. Davidson Pratt, Lord Rayleigh, Mr. Brian Reavell, Mr. J. Arthur Reavell, Professor E. K. Rideal, Mr. C. S. Robinson, Mr. Stanley Robson, Mr. F. Heron Rogers, Dr. E. W. Smith,

Sir William Stanier, Mr. R. F. Stewart, Mr. Norman Swindin, Mr. A. E. Sylvester, Mr. H. Talbot, Sir Frank Tribe, Mr. S. J. Tungay, Sir Wavell Wakefield, Vice-Admiral Sir Frederick Ware-Walker.

After the luncheon Mr. H. W. Cremer and Mr. R. L. Fitt delivered a lecture on "The Siting and Lay-out of Industrial Works." Extracts from this will be published in THE CHEMICAL AGE at the earliest opportunity.

## SAFETY FIRST

# Some Warnings from the 18th Century

by JOHN CREEVEY

**D**ANGER, whether in the operation of plant or in the mere handling, perhaps the storage, of chemicals, comes sometimes unexpectedly. In the case of plant, it is rarely a matter of bad construction, for present-day chemical plant is not only designed with great care, but construction and testing are likewise a matter of concern to the maker, who does not wish to suffer in reputation by some disastrous consequences. So, too, with handling and storage; compensation for personal injuries may go hard with either employee or employer, according to circumstances, apart from which, in the case of storage dangers, there may be heavy losses of material, as well as property, from an unexpected outbreak of fire. This has been brought to mind by my recent reading of some accumulated family papers, some reference to which may well show that necessary care in chemical matters has been brought to the experience of others long before there was any real chemical industry, apart from the manufacturing efforts of individuals.

In 1779, George Dixon, of Cockfield, co. Durham, established a coal-tar works, where he made about six barrels a week, besides "coal oil." He abandoned this business in 1783 in consequence of the heavy cost of carriage of the tar to Sunderland, where it was used by the shipbuilders. Dixon was one of the first persons to use coal gas for illuminating purposes, an application which he did not push to any practical result. It was not until 1792 that William Murdoch lighted his own house and offices at Redruth, Cornwall, with coal gas, whereas George Dixon was busy experimenting as early as 1760 or perhaps before that. One John Bailey, who subsequently became a writer on agriculture, as a small boy had often watched Dixon engaged in his experiments, in remembering which he records the occurrence of an unforeseen accident. It was then a common amuse-

ment of Dixon to fill an old tea-kettle half full of coal and set it upon the fire, luting a tobacco-pipe to the spout with clay, and to this again connecting several other pipes placed round the room. After a while he would apply a lighted candle to the ends of these pipes, when flames would result, all of which were improved by sealing the pipe heads with more clay and providing tiny pinholes for the more economical escape of the coal gas. Dixon had really thought of using such a method for lighting collieries, and it was the accident which chiefly made him to abandon that project.

Wanting to know the quantity of tar produced by a ton of coal, he erected a furnace with a large cast-iron boiler, to which were fixed two cast-iron barrels of the pumps commonly used in the mines at that date. One of these iron pipes passed through water to aid in condensing the oil and the tar, and the end was closed with a wooden plug provided with a small hole to let out the condensate. Towards the end of this experiment, as Bailey relates, Dixon placed the flame of a candle to this hole in the improvised condenser, and the issuing gas began to burn with a bright flame. But not wanting to observe this flame any longer, Dixon struck at it with his hat in hopes of extinguishing it. Then it was that the accident occurred, for the flame was driven back into the apparatus and there the gas ignited in bulk, aided by air which was being drawn in at various leaky points, and there was an explosion, which drove the wooden plug to a distance, simultaneously disturbing the whole apparatus and rupturing portions of the iron pipes. All that Dixon seemed to have concluded was that his coal gas was undoubtedly a dangerous material with which to contemplate lighting collieries.

In 1764 it was reported in the usual newsletters of those days that the recent burning of the Custom House at Lisbon seemed to have been occasioned "by some of the

goods lodged there having spontaneously taken fire, in the same manner as often happens to the hayricks in England." Such was the news, at a day when this spontaneous combustion was commencing to be investigated. Already in 1757, du Hamel had contributed, to the transactions of the Royal Academy of Sciences in Paris, a paper "upon the circumstances that may occasion a spontaneous conflagration," in which he tells us that at Brest in 1741 they put a large quantity of coal into a closed dry building instead of putting it in a place exposed to air and rain. This coal was twice found to have taken fire spontaneously. But at Brest in 1757 other things apart from coal were causing trouble. A large quantity of a coarse sort of sail cloth, which had been, as usual, first wetted and then "done over on one side only with oker bruised in oil," being suddenly taken in on the coming of heavy rain, was folded up in bales laid one upon the other and placed on a wood grating in the store. Five days later, when a sailor lay down upon these bales to sleep, he found them hot, and when they were opened, the centre part of each bale was found to be burning. Thus, coal, by being kept dry, and sail cloth, by being kept wet, were both found to give rise to spontaneous fires. Get-

ting on for two hundred years ago came these warnings, yet spontaneous fires still occur, not because we do not know what causes them, but because we are sometimes a little negligent in storage conditions.

"I remember, when I was a little school-boy," wrote John Houghton, F.R.S., in 1692, "one of my companions rubbed a brass nail with a broad head upon a deal board till it was very hot, and then clapt it suddenly upon the back of my hand, where it raised a great blister troublesome to me for a great while." Friction has been the cause of more than a few fires in modern industry, which have sometimes been attributed to spontaneous combustion, or perhaps to the fusing of an electric cable. It is fairly easy for a bearing to get overheated, if it lacked due maintenance, and heat once produced has a way of flowing to other material in contact, which may be combustible material. If you want to see how quickly heat will sometimes flow, take hold of an iron heated at one end in the fire but which can still be held at the other end, and then put the hot end in contact with cold water. Like Houghton's school-boy experience, this will also teach a lesson which has its own bearing on safety matters.

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## Industrial Safety Gleanings

### Extinguishing Phosphorus Fires

THE generally accepted method of putting out fires caused by white phosphorus, by the use of solutions of a copper salt, is in some ways not altogether satisfactory; and the increasing use of this dangerous material due to its employment for warlike purposes, e.g., as a smoke-producing agent and in incendiary bombs, has led to further investigations of safety methods. In *Chem. Eng. News*, January 10, 1945, p. 40, Howard S. Mason gives some details of work done in the Industrial Hygiene Division, Bureau of State Services, Bethesda, Maryland.

During an investigation of other phases of the chemistry of white phosphorus, experiments on the extinction of phosphorus blazes were carried out as a matter of laboratory precaution. In these, the quenching power of a number of dilutions of copper sulphate in water was observed by igniting pellets of approximately the same size (0.1 gm.) and inundating them with equal volumes (20 cc.) of solution. It was found that the quenching power of these solutions was low, and independent of the concentration of copper sulphate up to 20 per cent. (which was the highest studied). When the solution came in contact with the burning substance, explosions occurred, presumably the result of the rapid generation of

steam, and burning particles were scattered from the original source. In addition, many pieces continued to burn briskly on the surface of the liquid. This failure to extinguish the flames was interpreted as a result of the inability of the aqueous solution to wet the surface of the phosphorus, which is known to behave like a fat with respect to solvents.

On this basis, therefore, the surface tension and wetting power of the copper sulphate solutions were modified by the addition of wetting agents, and the quenching power was again studied. It was found that if a wetting agent was present in the solution (or even in pure water) the fires were quenched immediately and completely, without explosion or scattering of phosphorus particles. A large-scale test of this effect, controlled with an unmodified solution, produced the same result.

It is therefore recommended that for emergency quenching of phosphorus fires a 1:5 solution of liquid soap in water be employed. The phosphorus becomes combustible as the solution dries off. For more permanent quenching, a solution of a wetting agent in a 5 per cent. copper sulphate solution is advocated. One part of Aerosol OT (25 per cent. aqueous) to 100 parts of 5 per cent. copper sulphate was found effective.



tive. This mixture should be shaken before use.

### The Industrial Museum

Now that plans for the construction of new factories for after the war are much in the industrial mind, it is well to remember that this country has always taken the lead in the application of industrial safety measures, and firms who are contemplating the erection of new industrial premises will not find it a waste of time to pay a visit to the Home Office Industrial Museum in Horseferry Road, London, S.W.1, in order to study the exhibits there, as these embody the accumulated experience of the Factory Inspectorate in the provision of safety for workers. An article on the subject of the Museum is included in the April issue of *Production and Engineering Bulletin*, and readers may be reminded that the Museum is open from 10 to 4 (Saturday, 10-12), and that prearranged visits are preferable (the telephone number is VICTORIA 3688).

### An Unexpected Explosion

One of the subjects to which the Museum gives particular attention is exhaust ventilation, and the following incident, the description of which is extracted from the article mentioned above, gives an idea of one way in which the Museum can be of service. The incident occurred in a small London factory, and arose during a visit of a factory inspector to the premises. The inspector was perturbed at the possibility of an explosion, because he found that a fine, white dust was being created by one of the processes, and there was no exhaust ventilation. The works manager pool-poohed the idea of that particular powder being a possible explosive—he simply did not believe in the necessity for further ventilation.

It happened that this factory inspector had recently been attached to the Museum in the course of his duties, and he remembered the case with which the matter could be put to proof. "Would you like us to take a small bag of that dust along to Horseferry Road and have it tested?" he asked. This was agreed, as it was quite a short distance; and soon the sceptical works manager watched his bag of dust being used to charge a machine in which a spark can be created in a dust-laden atmosphere. He was quite interested, but extremely doubtful.

A few moments later the sparking key was duly depressed and the dust exploded—but before the echoes of the explosion had subsided, the works manager had gone! "He didn't even say good-bye." The surprised curator who had conducted the experiment looked inquiringly at the factory inspector who had brought the vanished visitor: "I think we convinced him," said the curator. "I think we scared him,"

said the factory inspector. It transpired that both were right, for the works manager's one idea had been to get back to his factory before it, too, went up with a bang!

## Fluorspar Meeting

### The Year's Progress

AT the annual meeting of the British Fluorspar Producers' Association, held at Matlock on April 11, the chairman, Mr. Frederick Franks, welcomed the presence of Mr. A. G. Bennett, from the Fluorspar Control, Ministry of Supply, and representatives of Durham producers. In reviewing the year's work, mention was made of the close co-operation which existed between the Association and the Fluorspar Controller, Mr. W. T. Vizer-Harmer, who had expressed his appreciation of the Association's work. Fixed prices and grades, introduced for the first time, had been in operation for over six months with general approval. The home market had almost monopolised production, but a start had been made with export.

Serious attention had been given to acquiring a central plant in Derbyshire for processing fluorspar up to the higher grades. The proposal had been considered in conjunction with the Raw Materials Development Board, but the scheme had not matured, and it would be necessary to make inquiries in other directions.

The chairman stressed the necessity for continuing to improve qualities and giving attention to research. Without this, the industry would lapse to its pre-war chaotic state, and instead of British fluorspar being exported, we should have imports of the mineral.

Mr. Bennett said the Association deserved the fullest support and he hoped they would consider the question of a Marketing Board. In the early stages of the Control, they had had great anxieties, and there had been danger that steel works would go out of production for lack of fluorspar. This had been remedied, but at one time the margin of supplies had caused real anxiety.

### Association Officials

Mr. Frederick Franks and Mr. Charles A. Jones were re-elected chairman and deputy-chairman respectively. The executive consists of one representative from each of the following firms: *Derbyshire*: G. E. Bacon; Constables (Matlock Quarries), Ltd.; Blanchland Fluorspar Mines, Ltd.; Clay Cross Co., Ltd.; Ernest Hinchliffe, Ltd.; *W. Smith* (Fluorspar), Ltd.; *R. C. Conway*; *James Wilkinson & Sons* (Glebe Mine), Ltd. *Durham*: Weardale Lead Co., Ltd.; Fluorspar, Ltd. The secretary is Mr. H. Hebblethwaite, Hutton's Buildings, West Street, Sheffield, 1.

## Personal Notes

MR. W. J. DRUMMOND, COLONEL W. MONCRIEFF CARR, DR. E. S. GRUMELL, and SIR JOHNSTONE WRIGHT have been appointed members of the Fuel Research Board.

DR. W. H. TAYLOR, head of the physics department in the College of Technology, Manchester, has been appointed to the newly-established readership in crystallography in the University of Cambridge.

MR. A. H. P. MOLINE, general manager of the Mount Lyell Mining and Railway Co., Ltd., has been elected president of the Australasian Institute of Mining and Metallurgy for 1945.

MAJOR E. F. CAMPBELL, who rejoined his old regiment, the Royal Tank Regiment, early in the war, has now been released from the Services and will shortly resume his normal duties on the board of Baird & Tatlock (London), Ltd.

The engagement is announced, and the marriage will take place in July, of ALBERT E. L. MASH, of The Weald, Betchworth, Surrey, and JULIA, younger daughter of SIR ERNEST BENX (chief proprietor of THE CHEMICAL AGE) and LADY BENX, of Morven, Oxted.

SIR DAVID MILNE-WATSON has relinquished, owing to ill-health, the governorship of the Gas Light and Coke Company, which he has held for 26 years. He will, however, continue to be a director. His successor is MR. A. E. SYLVESTER, the concern's managing director.

DR. W. T. WILLIAMSON, a former honorary secretary of the Edinburgh section of the S.C.I., who has had experience in Egypt as chief chemist to the Ministry of Agriculture, has been appointed director of the newly-created Department of Agriculture in the British Council, and will be stationed in London.

SIR CLIVE BAILLIEU, who was elected president of the Federation of British Industries at the annual meeting on Wednesday last week, replaced SIR GEORGE NELSON, who has retired after two years' service. Sir Clive Baillieu is a director of several companies, including the British Metal Corporation, the Imperial Smelting Corporation, the Dunlop Rubber Company, and the Midland Bank.

## Obituary

MR. JOHN JAMES LATHAM, who died at Bold, Widnes, Lancs, on April 10, aged 84, was the son of the first blacksmith to settle in Widnes, who came there when there were only nine houses in the place. Educated at Farnworth Grammar School, Mr. Latham began a long and honourable career in the chemical industry in the laboratory of the British Alkali Works, owned by Sullivans,

becoming later assistant manager, and, in 1905, manager. When the Pilkington and the Sullivan works of the United Alkali Co. were combined in 1915 he was appointed manager of the joint concern, and played an active part in its vital war work. When I.C.I. was formed, Mr. Latham had completed 50 years in the chemical industry, but he continued in harness for 2½ years more, until his retirement in 1929.

## Widnes T.U. Resolution

### Air Pollution

WIDNES Trades Union Council decided, at its meeting last week, to support the following resolution, for submission to the annual conference of Trades Councils: "This conference is profoundly disturbed by the intention of the Government, as recently announced in Parliament, to dispose of Government-owned factories at the end of the war either by lease or sale. In the view of this conference the direct operation of the factories by the Government on behalf of the community should play an important part in the economic reconstruction of Britain by liquidating the sphere of private enterprise in the manufacture of arms and maintaining the production in this sphere and by converting other factories to the production of fertilisers and chemical products, prefabricated houses and domestic appliances, etc. It demands that the Government prepare plans at once to transfer Government factories from munitions to the production of peace-time products as an alternative to redundancy, believing that with very little alteration many of the factories could be adapted to production of mining, farming, motor or wireless machinery, internal housing needs, etc."

A complaint was raised by Mr. R. Jeffries (Chemical Workers' Union) that the residents of certain areas in the district had cause to complain that air, streets, and houses were polluted by dust coming from the I.C.I. power-house, and that the excuse given was that the trouble was caused by bad fuel. He moved that a letter on the matter be sent to the town council. It was stated that other firms besides I.C.I. were at fault. Mr. W. L. Dutton, speaking as a scientific worker, said there was no need for the emission of dust, grit, etc., and quoted Battersea as an instance of how the trouble had been obviated by the installation of suitable equipment. He favoured a strong protest, but was afraid that until an Act of Parliament forced the installation of such equipment, there would be no great improvement. The atmosphere of Widnes could be as pure as that of any seaside town, but, he alleged, "it was a question of cash, and of course there was no return on those things."



## General News

Personnel of the Ministry of Supply have contributed over £12,000 in pennies to the Red Cross Penny-a-Week Fund.

The Distillation and Carbonisation Co., Ltd., announces that it has transferred its offices to Langham House, 302 Regent Street, London, W.1.

The number of Statutory Rules and Orders issued during the war up to March 31, 1945, is 11,902. The highest yearly amount was reached in 1942, with 2937.

Duncraig Castle, its grounds, and a farm in Lochalsh, are to be handed over by Lady Hamilton of Balmacara, as a free gift, to Ross-shire Education Committee to be used as a school for technical education.

The National Society of Pottery Workers decided at a conference held at Hanley on April 14, to break away from the National Council of the Pottery Industry—the first Whitley Council to be formed.

"Water Treatment" is the title of Fuel Efficiency Bulletin No. 39, issued by the M. F. & P. It can be obtained free on application to the Ministry, at 2 Little Smith Street, London, S.W.1, or from its Regional Offices.

With the approval of H.M. Government and the French Government, the Federation of British Industries has extended an invitation to a small party of French industrialists to visit this country in order to resume the friendly contacts between French and British industry. This invitation has been accepted and the representatives in question will arrive in this country in the near future.

An explosion followed by a fire occurred on Wednesday last week at the Evans Bacteriological Institute, the newest part of the works of Evans, Sons, Lescher & Webb, Ltd., at Runcorn, Cheshire. Happily there were no fatal casualties among the 400 workers, but 19 girls were detained in hospital. An Italian prisoner of war who was delivering goods to the works aided pluckily in the rescue work.

The March wholesale prices showed more movement than for some time past, according to the Board of Trade returns. The fall in chemicals and oils continues, with a drop of 0.2 per cent. from 150.8 to 150.5 (1930 = 100), showing the final effects of the decrease in the price of lubricating oils. Iron and steel, however, under the influence of the advance of 15s. per ton in the price of pig iron, showed a 1.3 per cent. rise from 185.5 to 187.9, while the reduction in the price of aluminium was wholly responsible for the fall of 1.5 per cent. in the non-ferrous metals group, from 128.0 to 126.1.

## From Week to Week

Lime production in Lincolnshire is now concentrated at Grasley and at Welton-le-Marsh. Output at the former has been stepped up, during the war, from some 3,500 tons to about 100,000 tons yearly. Other quarries have been developed at Caistor, Tetford, and Blankney.

The Aluminium Development Association has been formed by the leading British elements in the aluminium alloy producing and fabricating industry. The development of new and the expansion of existing uses, the encouragement of research and the undertaking of publicity are its main objectives. Membership is open to users of the metal, who should apply to the Association's offices at Union Chambers, 63 Temple Row, Birmingham, 2.

The Treasury has given notice that it is proposed to make an Order under Section 20 of the Finance Act, 1940, removing Purchase Tax from certain essential drugs and medicines of an exceptionally costly character. In view of the restricted space at our disposal it is not possible to publish the extremely long and complicated list in full; to publish extracts would not fulfil the purpose of the notice, which is to give these likely to be affected by it the opportunity to make representations regarding the Order.

"All these chemicals are made from petroleum, but none of them in this country," said Sir Frank Smith, pointing at several dozen bottles on his desk, when delivering the first in a series of three Cantor Lectures before the Royal Society of Arts. Sir Frank sees a great future for natural gas as a source of chemicals and expects that greater quantities of acetylene will be derived from petroleum. The Fischer-Tropsch process has undergone vast improvements in Germany during the war.

Nominations are invited for members of the committee of the Plastics Group of the Society of Chemical Industry for the 1945/46 session. Under Rule 7, four members retire at the annual meeting on May 30. In the present instance these are: Mr. E. G. Couzens, the immediate past chairman (eligible for re-election as an ordinary committee member), and Messrs. C. Chapman, C. Diamond, and L. M. Read, who retire on the basis of long service and are ineligible for re-election. Two of the three necessary replacements are to be made by election at the annual meeting; the third appointment is made by the committee. Nominations for the two elective vacancies, signed by at least two members, must reach the hon. secretary, Dr. S. H. Bell, Paint Research Station, Teddington, Middlesex, by April 28.

## Foreign News

The aluminium plant which is being installed in Ouro Preto (Minas Geraes), Brazil, is to start production this year. Its capacity will be 2500 tons per annum.

Production of native sulphur in the U.S.A. in 1944 was 3,218,156 long tons, as compared with 2,538,786 in 1943 and 3,460,686 in 1942. Stocks at the end of the year were 360,000 tons lower, at 4,100,000 tons.

The bulk of Brazil's mica production for 1945 has been purchased by the United States. Brazil's production of this mineral, which has been greatly stimulated by the war, is estimated at about 20,000 tons a year.

A Damodar Valley Authority, modelled, as far as possible, on the TVA, has been discussed in India at a conference of representatives of the Central, Bengal and Bihar Governments.

A detailed survey of the nitre caves, near Rangalla, Ceylon, from which the ancient Sinhalese kings obtained supplies of saltpetre, is to be made by L.A.C. Geoffrey Peete, R.A.F., who before the war was editor of *Caving News*, a journal devoted to spelology. L.A.C. Peete has visited the caves and reports that they appear never to have been properly explored.

The Association of Consulting Chemists and Chemical Engineers, New York, has issued a new (9th) edition of its classified directory, in an improved form. "Key Sheets" listing about 100 chemical and engineering fields give references to the members who are qualified to deal with the various subjects. A copy of this work of reference may be obtained on application to the Association, at 50 East 41st Street, New York, 17, by any reader of THE CHEMICAL AGE.

Several industrial panels will be created shortly by the Indian Department of Planning and Development for the iron and steel, sugar, alcohol and food, heavy chemical, light chemical, and electro-chemical industries. The main task of each panel will be to report on development and capital required, where new plant should be worked, whether foreign technical advice should be sought, and to what extent Government assistance may be needed.

To administer penicillin by mouth, the Lederle Laboratories Inc., a branch of the American Cyanamid Co., has perfected a method by which a suspension of penicillin in cottonseed oil is placed in a gelatine capsule. In this protective oil coating, penicillin passes to the small intestine for absorption by the blood-stream. The same concern, *Chem. and Eng. News* of March 10 reports, also succeeded in separating from penicillin mixtures the most potent type, known as penicillin X, the other two being F and G.

The Natural Gas and Oil Corporation, Ltd., which operates in the Balmain colliery near Sydney, produced 50,000 cu. ft. of natural gas by the end of September last, as compared with 5000-6000 cu. ft. a year ago.

## Forthcoming Events

**April 21. British Association of Chemists** (St. Helens Section). Y.M.C.A. Buildings, St. Helens, 7.30 p.m. Dr. N. Thorley: "Chemical Aspects of X-ray Crystallography."

**April 23. Royal Society of Arts.** John Adam Street, Adelphi, W.C.2, 1.45 p.m. Cantor Lecture. Sir Frank Smith: "Synthetic Chemicals from Petroleum.—II."

**April 23. Association of Austrian Engineers, Chemists & Scientific Workers** in Great Britain. Austrian Centre, 69 Eton Avenue, London, N.W.3, 7.30 p.m. Mr. P. Motz: "Some Interesting Facts on Sex-determining Compounds."

**April 25. The Institute of Fuel.** James Watt Memorial Institute, Birmingham, 2.30 p.m. Mr. Cooke: "Process Control."

**April 25. British Association of Chemists.** Chamber of Commerce, Birmingham, 6 p.m. Annual general meeting.

**April 25. Society of Chemical Industry** (Newcastle-upon-Tyne Section). King's Hall, King's College, Newcastle-upon-Tyne, 5 p.m. Dr. M. P. Appleby: "The Chemist and the Air." (First Dunn Memorial Lecture).

**April 25. Society of Chemical Industry** (Food Group). Society's Rooms, Burlington House, Piccadilly, London, W.1, 2.30 p.m. Annual general meeting. Mr. A. N. Duckham: "Food Management and the Chemist."

**April 26. Chemical Society** (St. Andrews and Dundee Sections). Chemistry Department, University College, Dundee, 4.30 p.m. Professor G. D. Preston: "The Structure and Chemistry of Metallic Crystals."

**April 27. Royal Institute of Chemistry** (South Wales Section). Mackworth Hotel, High Street, Swansea, 6.30 p.m. Annual general meeting.

**April 27. Royal Institute of Chemistry.** London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, 5 p.m. Dr. J. H. Quastel, F.R.S.: "Soil Metabolism."

**April 28. The Institution of Chemical Engineers** (North-Western Branch). The College of Technology, Manchester, 3 p.m. Messrs. W. S. Norman and C. H. G. Hands: "The Dehydration of Ethyl and Allyl Alcohols by Azetropic Distillation."



**April 28.** The Institution of Factory Managers. Midland Hotel, Manchester, 11.30 a.m.: Council meeting; 3 p.m., North-Western branch meeting.

**April 28.** The Institute of Physics and the Institute's Midland Branch. Birmingham University, Edmund Street, 2.30 p.m. Dr. H. Kuhn: "Atomic and Molecular Beams."

**April 28.** The Institution of Chemical Engineers (North-Western Branch). Reynolds Hall, College of Technology, Manchester, 3 p.m. Mr. W. S. Norman: "Vapour-Liquid Equilibrium Data for the System Ethanol-Benzene-Water."

**April 29.** Association of Austrian Engineers, Chemists and Scientific Workers in Great Britain. Austrian Centre, 69 Eton Avenue, London, N.W.3, 11.30 a.m. Dr. B. Burzlyn: "On Recent Applications of Thermo-setting Resins on Paper and Textiles."

**April 30.** Royal Society of Arts. John Adam Street, Adelphi, W.C.2, 1.45 p.m. Cantor Lecture. Sir Frank Smith: "Synthetic Chemicals from Petroleum.—III."

**May 2.** Society of Public Analysts and other Analytical Chemists. Chemical Society's Rooms, Burlington House, Piccadilly, London, W.1, 5 p.m. Mr. G. W. Osborn: "A Rapid and Simple Method for the Determination of Calcium in Presence of Strontium and Barium"; Mr. W. B. Wragge: "Lead Printing of Ferrous and Non-ferrous Metals"; Mr. E. Collins: "Reaction of Diazotised *p*-Nitraniline with Phenols: Detection of Tricresyl Phosphate in Edible Oil"; and Dr. A. J. Henry: "A Simple Apparatus for Handling Standard Solutions of Bromine in Potassium Bromide."

## Company News

**The Molybdenum Corporation of America** reports a net profit of \$358,350 (\$468,111).

**Petrocarbon, Ltd.**, 8 Staple Inn, W.C.1, have changed their name to Chemical Patents, Ltd.

**The Allied Chemical and Dye Corporation** has made a net profit of \$18,025,075 (\$19,023,679) and earned per share \$8.11 (\$8.59).

**Trinidad Petroleum Development Co., Ltd.**, are repeating the interim dividend of 5 per cent., less income tax at 5s., on account of the year to July 31.

**Associated Clay Industries, Ltd.**, report a trading profit for 1944 of £14,135 (£50,804), and a net profit of £5649 (£42,470). A meeting of preference shareholders has been called to approve the creation of mortgages on assets, not exceeding £300,000.

**The Dominion Tar & Chemical Co., Ltd.**, reports a net operating profit for 1944 of \$2,458,237. Net profit totals \$671,512 (\$672,724).

**Bryant & May, Ltd.**, have again declared a final ordinary dividend of 10½ per cent., making 18½ per cent. (same) for the year ended March 31. Net profit was £399,706 (£404,910).

**The Zinc Corporation, Ltd.**, again announce, for the year 1944, a dividend of 30 per cent. on preference shares and of 20 per cent. on the ordinaries. Preliminary net profit figures are £104,934 (£105,716).

**Sternol, Ltd.**, reports a net profit for last year of £9,333 (£6,885). A payment of 4 per cent. on account of arrears on the 8 per cent. cumulative part-preferential ordinaries will be made.

**The Atlantic Refining Co.** reports a gross operating income of \$273,134,177 (\$212,605,998). Net income totals \$14,712,290 (\$10,687,828). Earned per common share \$5.30 (\$3.679).

**Imperial Chemical Industries, Ltd.**, announce a final ordinary dividend of 5 per cent., making 8 per cent. for 1944 (same), and a net income for 1944 of £6,972,988 (£6,685,345). The directors have appropriated £172,145 (£774,210) to the war contingency reserve, and made a special addition of £1,000,000 to the central obsolescence and depreciation fund.

## New Companies Registered

**African General Research Company, Ltd.** (394,543).—Private company. Capital £600 in £1 shares. Consultants and designers to engineers, metallurgists, chemists, etc. Directors: J. E. Benham, L. H. Manderstam, J. A. Dunn, G. W. V. Dermody, R. D. W. Dermody. Registered office: 38 Grosvenor Gardens, S.W.1.

## Chemical and Allied Stocks and Shares

**E**ARLIER in the week stock markets eased owing to the disposition to await Mr. Churchill's war statement. Later, business tended to be restricted in front of the pending Budget statement. Nevertheless, under the lead of British Funds, the undertone has been firm, and leading industrial shares were inclined to move higher on investment buying. The City is not expecting taxation to be further increased and is hopeful that the Chancellor will be able to indicate that as soon as possible E.P.T. will be considerably reduced or abolished. These hopes account for the

firmness prevailing in iron and steel shares and in shares of many other companies which have an unfavourable standard in regard to E.P.T. Even if there were an early abolition of the latter, it is unlikely there would be any general improvement in dividend payments. E.P.T. bears so heavily in many cases that it prevents the building up of reserves adequate to post-war needs.

Shares of chemical and kindred companies have been well maintained. Sentiment was assisted by the increased income shown by the Imperial Chemical preliminary figures, and although "ex" the final dividend, which maintains the total at 8 per cent. for the seventh successive year, the £1 units at 39s. 6d. were unchanged on balance. B. Laporte held at 87s. W. J. Bush were 75s., and British Drug Houses 31s. In the case of the last-named company, E.P.T. bears so heavily that recent dividends have been below pre-war. British Glues & Chemicals 4s. ordinary units again attracted rather more attention and firmed up further at 10s. Burt Boulton changed hands around 27s., and Fisons at 49s. 6d., while Cooper McDougall were 33s. 9d., and Lawes Chemical 10s. shares kept at 13s. Paint shares showed firmness, with Goodlass Wall 20s. 3d., International Paint 123s. 1½d., and Lewis Berger 112s. 6d. Blythe Colour 4s. ordinary were 20s., nearly double the price ruling a few weeks ago before declaration of the big increase in dividend. Greeff-Chemicals were 9s. 6d., and Morgan Crucible first preference 27s. Monsanto Chemicals 5½ per cent. preference were maintained at 23s. Sanitas 9 per cent. preference transferred around 35s., and Sanitas Trust 10 per cent. preference around 34s. Further consideration of the results and higher distribution were reflected by activity around 11s. 6d. in William Blythe 3s. shares.

Courtaulds were firm at 57s. 4½d., with British Celanese 34s., and, among other textiles, Calico Printers strengthened to 18s. 10½d. In iron and steels, Colvilles at 24s. 6d., and Stewarts & Lloyds at 58s., were steady on the maintained dividends. Dorman Long eased to 27s. 6d., while Babcock & Wilcox were more active around 55s. 3d. International Combustion shares were at £8, Radiations also better at 62s. 3d., and Cannon Iron Foundries 10s. ordinary quoted 18s. 6d. British Plaster Board changed hands around 39s., with Associated Cement steady at 62s., Murex £5, and Metal Box 90s., while Amalgamated Metal at 19s. and Imperial Smelting at 14s. 7½d. became firmer. Barry & Staines eased slightly at 54s., and Nairn & Green-wich were 76s. 3d.

The units of the Distillers Co. were prominent, rising over 2s. to 115s. on market talk of the results, due next month, showing further improvement in dividend towards pre-war levels. United Molasses were

38s. 6d., and British Aluminium steady at 45s. 3d. British Oxygen were 89s. with the new preference shares 1s. 6d. premium. In other directions, Boots Drug receded to 55s. 9d. Sangers kept steady at 31s. 6d., and Timothy Whites at 41s. 6d. Birimid Industries have risen further to 95s. Gas Light & Coke ordinary were 24s. Oil shares strengthened, Shell being 84s. 4½d., Anglo-Iranian £5½, and Burmah Oil 87s. 6d.

## British Chemical Prices

### Market Reports

**N**ORMAL trading conditions are once again in evidence in the London general chemicals market and a fair amount of fresh inquiry is reported. There have been no changes in the supply position, and the flow of contract deliveries to the main consuming industries has been on a steady scale. The price position throughout the market remains steady. Among the soda products, hyposulphite of soda and chlorate of soda are firm and in strong request, while Glauber salt and salt cake are a good market. In the potash section, offers of yellow prussiate of potash are very scarce, while supplies of bichromate and permanganate of potash are on the tight side. A moderate amount of fresh inquiry is reported for acid phosphate of potash. The position of the acids remains unaltered, with supplies of oxalic below current requirements. Among the coal-tar products there is a good demand for creosote oil and carbolic acid, and values are well held. A quiet trade is passing in the pyridines, and the benzols and toluols are a steady market.

**MANCHESTER.**—Reasonably steady trading conditions have been reported on the Manchester chemical market during the past week. Inquiries have resulted in moderate new bookings over a wide range of "heavies," including the soda compounds, borax, alum, the light and heavy acids, and the ammonia and magnesia products. On the whole, materials already ordered are being taken up fairly satisfactorily. With an odd exception, the fertilisers continue to move steadily, transport facilities being the chief restricting influence. Among the by-products, there is a fair home trade demand for pitch, while crude tar, creosote oil, carbolic acid, toluol, and benzol are being taken up in good quantities. Xylol has been described this week as about the "stickiest" of the light materials and only a quiet trade in this has been reported.

**GLASGOW.**—There is no change in the Scottish heavy chemical trade during the past week, home business maintaining its steady day-to-day transactions, with prices remaining firm at previous levels. There is also no change in the export business, where inquiries are still on the increase.



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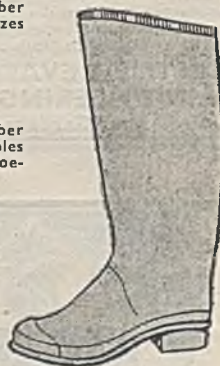
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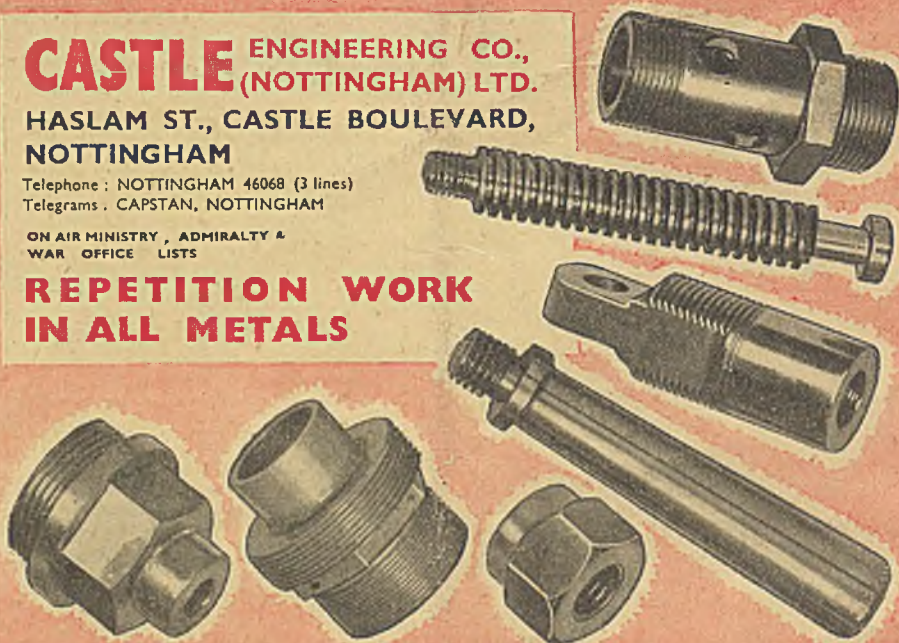
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