THE Chemical Age

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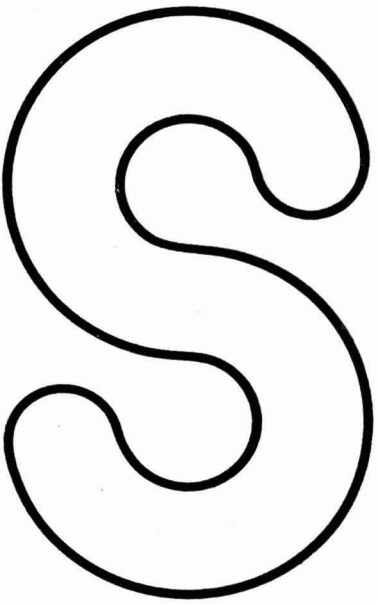

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The Chemical Age

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All for One...

DURING a recent visit to Canada we were shocked to find how little respect people had for the British chemical and chemical plant industries. Everyone knew something of Britain's great classical chemists and everyone knew that I.C.I. was one of the world's greatest chemical producers. On the other hand, while most people knew about Dacron, few had heard much about Terylene. Nearly everybody thought that polythene was an American invention. To our surprise and horror many of our other discoveries were also thought to have originated in either Germany or the US.

A vice-president of one company told us that American, German and Japanese competition was becoming serious. The British, he said, were 'fading out of the picture.' Later, he told us that he would like to buy British plant for some of his company's new factories and that he had just purchased a complete German plant. The reason he gave for not ordering from the UK was that she did not produce good chemical engineers; they had not introduced one new design or process since the early 1930s. When we assured him that he was very badly informed he retorted: 'Well they sure have kept it (blank) secret.' To prove to us that he had no anti-British bias he took us around the laboratories to see that it was equipped throughout with new 'Made in Britain' furniture and apparatus and then took us out to see his new Jaguar. Another Canadian told us that there was only one British chemical manufacturer whose products he would buy, although he regularly dealt with several European and American companies. The reason he gave was that only this one firm had modern research facilities.

The associate editor of one of the largest American chemical journals once told us that British industry suffered from being too secretive and modest. In the US the chemical Press could get all the information it asked for from chemical manufacturers as the firms felt it good publicity to have their plants, processes and methods described. It brought them not only customers, but the skilled technicians which were in short supply. They argued that no competitor could gain from such frankness because by the time anyone could make use of the information, they would have introduced improvements. The superintendent of a smallish American company, a chemical engineer, said that during the past year he had visited no fewer than 14 rival plants in neighbouring states. He had found that this exchange of ideas was unknown in Britain. 'It's not surprising,' he said, 'that many British factories are out of date. How the heck can you prevent obsolescence and inefficiency when you don't know what the other guy is doing?'

We could not argue with these people. In some weeks we get two news reports from the US for every one we get from British firms. We are better acquainted with the organisation and activities of certain American chemical manufacturers and chemical engineering companies than with many British firms. We are kept better informed about the activities of the Manufacturing Chemists' Association of New York—and Dechema—than about either the Association of British Chemical Manufacturers or the British

Chemical Plant Manufacturers' Association. This is not a criticism, merely a statement of fact. Recently we asked the publicity manager of a large British chemical engineering company (a man we have known personally for nine years) why he didn't send us more news about what his company was doing. He replied that they never had anything which seemed worthwhile. Yet this firm has several orders on its books worth more than £1,000,000 each.

The recent announcement that a Chemical & Petroleum Engineering Exhibition will be held in London in 1958 and at four-yearly intervals thereafter (THE CHEMICAL AGE, 1954, **71**, 716), was a great disappointment. Is our engineering industry so unprogressive that new improvements can only be expected every four years ? If this were true it would not be surprising if Germany and the US pushed us completely out of overseas markets. But as it is not true, why cannot something be done to persuade the less enlightened firms that exhibitions are important for prestige purposes ? A visit to Achema XI might be the answer. Even more disappointing was the announcement that the ABCM was once more to support the BIF at two-year intervals. We have nothing against this exhibition, but surely we can do better than this. Britain, at the moment, is the second largest exporter of chemicals in the world and our chemical industry is one of the UK's most important. Do the French, Germans, Americans, etc., content themselves with a small corner at a general trade fair every two years?

The chairman of the Council of British Manufacturers of Petroleum Equipment, Mr. Douglas Wilson, recently spoke of the importance of having 'an international shop-window' (THE CHEMICAL AGE, 1954, **71**, 773). He said that British built equipment was second to none, was competitive in price and he was confident that manufacturers could give reasonably quick delivery. The same applies to British chemicals and chemical plant. We can make the goods at a reasonable price and there should be no unreasonable delivery delays. The big weakness appears to be in selling.

We have often thought that our two industries would be stronger if there was more frankness and unity among members of our trade associations and more co-operation with the trade Press. The Germans unite to invade foreign markets, so why cannot we? Both Americans and Germans use their trade exhibitions and trade Press as international shop-windows, so why not the British ?

At the recent dinner of the ABCM Mr. W. J. Worboys appealed to members to interchange experience more freely and suggested that the industry was too alergic to publicity. (THE CHEMCAL AGE, 1954, **71**, 875). Last week Mr. W. J. Hooton said that British chemical plant manufacturers had hidden their light under a bushel for too long (see page 1135 this issue). He urged members to encourage their young men to write articles for publication in technical journals. An industry got the technical Press it deserved and they had an excellent one. He added, however, that plant manufacturers would like to see British journals circulating more widely overseas. We realise that no British journal has the circulation (either at home or abroad) that the leading American and German journals have. The reasons for this are obvious. American and German firms are publicity conscious. They realise fully the necessity of both advertising and exchanging information and firms compete with one another in supplying articles by their technical staff to the Press. They do not expect to get orders from every single insertion of an advert. any more than they expect to fill order books at exhibitions. They realise that it takes time to build up a reputation either at home or abroad and that this applies to trade and technical journals as well as to manufacturers. They also realise that by the exchange of information—by giving their Press news and technical articles—they are helping each other, the industry as a whole and their own Press. The value of trade and technical journals is entirely dependent upon the co-operation it receives from its industry.

Just one thing more. We sincerely hope that no one will misunderstand us. The above remarks are not meant as an attack on any trade body, firm or individual.

Notes & Comments

Reagent Packaging

A NEW American development in reagent packs is reported in *Chemical & Engineering News*, (1954, **32**, 4422). The container is a three-ply envelope; the innermost ply is of polyethylene, the middle ply is aluminium foil, the outer ply is an acetate layer, and the three surfaces are laminated together. The envelopes are tough, impervious to moisture and resistant to light, and can be thrown away after emptying. Coupled with this new container idea is pre-weighing; the envelopes will contain, according to the cheapness or expensiveness of the reagent, stated weights in grams, e.g. 25 grams for cheaper reagents, 5 or 10 grams for dearer ones. It is said that they will be machine-packed 'to tolerances of a few tenths of a gram.' Thus, in place of the conventional glass bottle holding, say, 1 lb. of reagent, there will be a box of envelopes. The new development is considered particularly timely in view of the wide introduction of micro- or semi-micro-analytical methods, for one box of the envelopes enables a number of different chemists in a research centre to be provided with individual quantities of reagents. The trade-name chosen for the envelopes is 'Gram-Pacs.'

A *Doubtful Blessing?*

IT seems doubtful whether the method of packing is cheaper than bottle-packing. The costs of the envelopes and of machine-filling and weighing must be very low if the comparable costs of packing, say, a quarter-pound bottle is not considerably exceeded. Advantages would appear to be gained during use—easier distribution of supplies by the central stores in a university or research station, better protection of reagents in stock so far as moisture and contamination are concerned, simpler provision of small quantities for school experiments. It must be hoped, however, that when these packs are used in schools, the fact that they are approximately pre-weighed is ignored. In the first few years of gaining laboratory experience students should be taught above all to take nothing for granted. Not every chemist can become an analytical chemist, but every chemist should have passed through a stage in his education when he has had to be his own analyst.

Father of Margarine

THE French appropriately commemorated the centenary of Paul Sabatier's birth with meetings at Toulouse. Sabatier spent 60 years of a long and active chemical career at Toulouse; there, even in his long retirement, he was a popular lecturer until almost the last months of his life. Not even the chance of following Moissan at the Sorbonne tempted Sabatier to leave Toulouse, where he began as the assistant professor of physics (1881) and became professor of chemistry three years later. All Sabatier's earlier research was in the inorganic and physico-chemical field—metallic sulphides, the discovery of metallic nitrides, and thermo-chemical determinations. This might seem an unlikely prelude to great contributions in organic chemistry, but Sabatier's unique field—catalysis in organic chemical reactions—was approached by way of the inorganic catalysts. He entered the organic domain through a side-door and at a time when new blood was badly needed. Before Sabatier, the influence of catalysts in organic chemistry was almost totally ignored; yet Sabatier quickly demonstrated that different reactions could be made to occur by using different metallic catalysts. His name has long been particularly associated with catalytic hydrogenation. Many people regard him as the 'inventor' of margarine. Although his work made the margarine process possible, Sabatier did not develop his technique to cover liquid phase reactions. The revolution in the edible fats industry was brought about by others who extended the ideas Sabatier had first enunciated.

A Great Chemist

PUPIL of the famous Berthelot, a Nobel prize-winner in 1912 and a Royal Society Davy Medallist in the same year, Paul Sabatier kept the true ring of greatness in French chemistry for an exceptionally long period. He died at the age of 87 when France was occupied and preoccupied (1941), a poor enough time for Europe to take much note of the passing of great men. Time has not out-dated his work; indeed, contemporary trends of opinion on the mechanism of catalysis are confirming the theories that Sabatier put forward in the early years of this century. It is said that Sabatier's invasion of organic chemistry was inspired by Mond's research work on nickel carbonyl; if so, Sabatier certainly repaid his debt to the element for by now a huge tonnage of nickel must have been used in the hydrogenation industry.

Drying Oils

Reactive Hydrocarbon Adducts

THE meeting of the London Section of the Oil & Colour Chemists' Association on Wednesday, 17 November, at 26 Portland Place, W.1, was held jointly with the Oils and Fats Group of the Society of Chemical Industry.

Mr. R. F. G. Holness (chairman of the London Section of OCCA) presided, and he invited Dr. Williams (chairman of the Oils and Fats Group and a member of OCCA) to join him on the platform. Another distinguished member who was present was Professor Hilditch. The lecturer was Mr. C. W. A. Mundy (president-elect of OCCA), and his subject was 'Drying Oil-Reactive Hydrocarbon Adducts; the Impact of Petroleum Chemicals upon the Balance of Power in the Surface Coating Field.'

Introducing the lecturer, the chairman said Mr. Mundy had been very largely instrumental in blazing the trail of science in the technology of handling drying oils in particular. It was not enough for him to deal with the rule-of-thumb methods, improving them by such means; he wanted to know how they worked and by that means to develop the greater knowledge and insight which would lead to improved products.

Mr. Mundy said that his paper constituted a preliminary report on a programme of research on the reaction between unsaturated petroleum hydrocarbons and drying oils. He discussed first our thinking on the drying oil situation five to seven years ago and reviewed the present position to show how it had changed with the passing of the years.

From that background he went on to deal with the availability of drying oils and their interchangeability and inherent excess of unsaturation with consequent resinificaton and chemical extension potential; the discovery of the gas/liquid phase reaction; drying oils of use in the reaction of unsaturated hydrocarbon/drying oils; hydrocarbons of use in the reaction; the chemistry of the reaction; the technique of manufacture; properties of adducts and polymers; and their place as components of film-forming materials.

In the discussion which followed, the chairman described Mr. Mundy's lecture as a fascinating discussion of what was a new branch of drying oil technology which very aptly illustrated a statement which had been made on several occasions recently, that drying oils were now to be considered more and more the raw materials of a synthetic process rather than as media in their own right. He asked if he were right in understanding that the reactions which were described continued without a catalyst at all.

Mr. Mundy agreed that no catalyst was required, nor should a catalyst be required if the reactions were of the kind they were believed to be.

The Wonders of Plastics

An innovation in Christmas lectures this year is one for young people, organised by the Plastics Institute, on 'The Wonders of Plastics', to be given by J. C. Swallow, B.Sc., Ph.D., F.R.I.C., A.M.I.Chem.E., F.P.I. (chairman of the Plastics Division, Imperial Chemical Industries Ltd.). It will be given in the auditorium of the Wellcome Research Institution, 183-193 Euston Road, London, N.W.1, at 2.30 p.m. on Thursday, 30 December. The lecture will be illustrated with a film and supported by practical demonstrations. The chair will be taken by the president of the Plastics Institute, V. E. Yarsley, D.Sc., M.Sc., F.R.I.C., M.I.Chem.E., F.P.I.

The BCPMA Annual Dinner

Chairman Outlines Notable Progress Made Since War

AT the annual dinner of the British Chemical Plant Manufacturers' Association, the chairman, Mr. W. J. Hooton, said that steady progress had been made during the past 10 years. The British industry could now compete in delivery times and the many fine new plants which had been built by member firms could stand comparison with anything else in the world. The dinner was held at Grosvenor House, London, on Wednesday, 17 November.

Mr. Hooton welcomed all the official guests and the guests of members. They were too numerous to mention, he said, but they fell into well-defined categories indicative of the scope of the Association's activities. Among those present were representatives from various Government Departments, from associations with whom the BCPMA co-operated, from the qualifying institutions, the learned societies and the technical Press. The principal guest was Mr. Kenneth Gordon, Director-General of Ordnance Factories, Ministry of Supply.

The steady removal of controls, for which everyone was heartily thankful, had resulted in a change in the nature of the contacts of the Association with Government departments. There had been a time when it was not simply daily contacts, but contacts many times daily in an endeavour to neutralise those negatives which could not be separated from any system of controls.

Friendly Industrial Relations

In those difficult days, however, there had been built up between trade associations and Government departments a spirit of mutual confidence and friendly relations. Now that the Government could concentrate on its proper task of endeavouring to create conditions under which industry could thrive and prosper, it was good to know that that mutual confidence was present and the door to consultation in either direction was always open.

Among trade associations there was always scope at some time and in some way for co-operation designed to help industry. It had been the experience of BCPMA that nothing but good could come from co-operation designed to make a contribution to industrial well-being and completely divorced from anything savouring of restrictive practice. Today, in the face of increasing world competition, there was clear need for increased co-operation between the chemical plant manufacturers and the chemical industry in the best interests of both and of the nation.

Support for Trade Press Urged

He said that they had a good technical Press and he would like to see far greater use made of it. The industry had for too long hidden its light under a bushel, with the result that the world did not know as much as it should of these two industries. He urged members to encourage their young men to write articles and publish all they could within the bounds of commercial sense, and not to imagine that the taking of advertising space alone was their full contribution. That was his message to industry.

To the editors who were present, he said he would like them to take back to their managing directors the message that he would like to see a greater circulation of British trade journals overseas and would welcome anything that could be done to achieve this.

Speaking about the BCPMA and the industry which it served, Mr. Hooton pointed out that over the last six years the Association had more than doubled its membership, which now numbered 215 firms.

Since the last war, the chemical industry had grown in an unprecedented manner and had made severe demands on the chemical plant industry, which had made a major contribution to its growth. This the Association always regarded as its first responsibility. In spite of this, the BCPMA had received quite a few kicks, some of them understandable and some of them unfair. But the picture had now completely changed, and the plant industry could compete in delivery times.

Too often it had been overlooked that in the immediate post-war years, when the chemical industry was anxious to expand, the chemical plant industry had been

shackled with the chains of building licences, permits and other horrors of control. Now, however, those difficult times had been overcome, and the many fine new engineering works which had been built by members would stand comparison with anything in the world.

The steady progress which the industry had made could be seen in proper perspective by looking back ten years. The most significant developments in the chemical plant industry, he thought, were the increasing size of project which its constituent firms were capable of engineering, the quality of its plant fabrication, the size of units fabricated, and the increase in the range of materials of construction and the ability of the plant manufacturer to handle them.

The Next Exhibition

The progress made by the industry was to some extent shown at the British Chemical Plant Exhibition in September, 1953, but the great regret was that due to shortage of space this successful exhibition had proved to be far too small. Far more would be shown in June, 1958, when in the Grand Hall, Olympia, would be staged the Association's greatest endeavour in the exhibition field—the Chemical & Petroleum Engineering Exhibition, sponsored jointly by the Council of British Manufacturers of Petroleum Equipment and BCPMA.

In presenting the principal guest, Mr. Kenneth Gordon, he said that although ordnance covered a multitude of sins, one aspect of it—the production of explosives—was of great interest to the industry, not only because such processes used a lot of chemical plant but because in World War I the real need for chemical engineers was brought home to the country for the first time. There were many chemical engineers who had served their apprenticeship in the ordnance factories under the late K. G. Quinan, and it was gratifying that the present Director-General of Ordnance Factories should be a chemical engineer.

Mr. Gordon thanked the hosts on behalf of all guests for a very pleasant evening.

The definition of a 'chemical plant manufacturer,' he said, involved all sorts of questions—what was a chemical, and what was a plant. But nearly everything that one made nowadays involved some sort of chemicals, and every chemical apparatus involved every possible sort of plant, so that nearly everybody was involved in some way.

He had hoped that somebody would have mentioned the abominable word 'petrochemicals.' It was a very common word, but he had never had a chance of having a smash at it in public. 'Petroleum' was in itself a hybrid word, derived partly from Greek and partly from Latin, the two halves together meaning oil got from rock, and oil got from coal. Therefore, if the word 'petrochemicals' meant anything, it meant a chemical got out of rock. Under this category it could mean anything made out of coal, of salt, and of limestone—anything at all except a chemical made out of oil! As there were present a very large number of influential and learned people connected with the chemical industry in every direction, he asked them to take any chance which they had to kick this abominable expression 'petrochemicals' into the gutter where it belonged.

Since leaving the academic walls which at one time in their various ways both Sir Harold Hartley and himself had adorned, he had spent 31 of the 32 years as a consumer of the goods made by the firms represented by the Association and approximately one year as 'a member of your gang.' He would, therefore, like to offer his heartfelt and deepest sympathy, and for this reason. If a new chemical plant costing, say, £1,000,000 was to be built and a chemical or oil company spent £1,000,000 on building a plant, it was a very poor show if it did not make £1,000,000 or £2,000,000 a year for life out of it. It was not necessary for the plant to be of the slightest use whatever for the purpose for which it was originally built!

Profits & Luck

Anyone in the chemical plant manufacturing business who had to build a plant costing £1,000,000 would be lucky to make £100,000 out of it—and only once! If the client pinned the manufacturer down to the fixed price, as he was going to do, it would be even more difficult.

The explosives industry was the oldest branch of the chemical industry. It was the most archaic, the most deeply steeped in tradition, the most difficult to move, the most conservative and the most old-fashioned industry in the country.

After referring to the first use of instruments and the marvels of instrumentation in chemical plants, Mr. Gordon said that

the second stage of the chemical industry, after explosives, was the acid age. Salt was boiled with sulphuric acid in plants made of lead, which was one of the earliest plastics used in chemical manufacture; dense volumes of gas were emitted and desecrated the countryside.

The third stage was the alkaline age, headed by Dr. Ludwig Mond, Mr. Brunner and other people, when everything was made of cast iron.

The next stage was the high-pressure age, into which he himself had taken his first flights. That was the first time, he liked to think, when real engineering was brought into the chemical business. The high-pressure age brought in ammonia, methanol, and goodness knew what else.

Then followed what some people would call the oil age, and in Britain there was a great burst of building oil refineries—which was a 'new look' for a great many people in this country, because oil refineries had stolen a march on the chemical industry proper in a great many of its techniques. A great deal of profit was to be made by those who saw the light quickly enough, and since the war there had been a great urge to build oil refineries, no doubt to the great profit of many of those present.

Horrible & Difficult Problems

The next age was the atomic age, with all sorts of horrible and difficult problems, but there was no doubt that this was the great field in which chemical engineers and the like would work. To those who were not already in it, his advice was they should get into it.

After the war he had been one of the group who, at the instigation of Sir Harold Hartley, visited Germany to study what the Germans had done during the war in making oil from coal and any other materials. The answer was that they had done nothing at all from the point of view of technical progress. Yet when writing his report, he had had the greatest difficulty in keeping out an undue note of optimism as to what might be done by up-to-date modifications of the Fischer process. Even some of his own colleagues were entirely carried away and insisted on putting in little bits about what a very good thing it would be.

The chemical engineering plant industry had a very difficult task to face. It had to sell something, generally to a customer who did not know his own mind! Chemical plant involved an immense number of problems, and to take on the task of building it for somebody else who did not know what it was, and on a narrow profit margin, was great heroism which he admired very much indeed. There was no doubt that there was today great need for very high skill in such affairs.

Firm Changes Name

FENWOOD Products Limited announce that they have changed their name to Jacobson Van Den Berg & Co. (UK) Ltd., following their recapitalisation and reorganisation. They are now a branch of Jacobson Van Den Berg & Co. of The Hague, Holland, and moved on 12 November to 73 Cheapside, London E.C.2. Tel.: CITy 3641/2.

They continue as sole agents of the Gesellschaft fur Teerwerwertung, Duisburg, Germany, for: acenaphthene, anthracene, benzpyrene, chrysene, dicyclopentadiene, dimethylnaphthalenes, diphenyl, fluoranthene, fluorene, indene, 1-methylnaphthalene, 2-methylnaphthalene, phenanthrene, pseudocumene, pyrene, trimethylnaphthalene, xylenes, 2:2′-dihydroxydiphenyl, diphenylene oxide, trimethylphenyl, *m*-methyl-ethyl-phenol, 2-hydroxydiphenyl, xylenols, acridine, quinaldine, quinoline, collidine, dimethylpyridines, indole, isoquinoline, lepidine, 2-methyl-indole, α-picoline, γ-picoline.

The firm are also sole agents of the Selecto-Chimica Lautenberg SA, Locarno, Switzerland, for: acridines, including acriflavine, aminacrine, lacto-acridine, mepacrine and proflavine; camphosulphonic acid and salts; choline compounds, including acetylcholines, and carbachol; arsenicals, including bismuth glycolarsanilates, stibophen and neoarsphenamine; intermediates, including thiosemicarbazide, xanthene, xanthone and xanthanoic acid; and other pharmaceuticals, including aluminium aminoacetate, methylamphetamine and methyl thiouracil.

Nickel Price Raised

The Mond Nickel Company has announced that, following the announcement in Canada by the International Nickel Company of Canada of an increase in the price of nickel, it has from 24 November raised its price for refined nickel in the United Kingdom to £519 a ton delivered works with appropriate increases for other countries.

Pakistan Development

PERFORMING the opening ceremony of the 1st Pakistan Pharmaceutical Exhibition in Karachi on 5 November, Dr. A. M. Malik, Central Minister for Health and Works, gave details of the Pakistan Government's plans for the development of the chemical and pharmaceutical industries.

He said: 'The projects relating to the chemical industry were mainly concerned with the production of basic chemicals and the simpler pharmaceutical products, the manufacture of synthetic drugs, dyestuffs and other consumer goods being left to a later stage. . . . Subsequent experience has shown, however, that any serious effort directed toward the development of the chemical industry, which in turn is recognised as a key to the overall development of a country, has to treat the various sectors of production as an integrated whole.

'In the western countries this development has been a gradual process extending over a century and more, through competitive private enterprise. For the underdeveloped countries, however, the growth of the chemical industry must be achieved at a greatly accelerated pace, and this can only be made possible through a centrally coordinated and implemented plan.'

The Minister declared that several foreign manufacturers of chemicals and pharmaceuticals were showing considerable interest in the industry in association with Pakistani enterprise. In order to give further incentive to the project, the matter had been entrusted to the Pakistan Industrial Development Corporation.

Royal Honorary Member

THE Autumn Dinner of the Institute of Fuel was held in London on 18 November, and was the occasion of the presentation of a scroll of honorary membership to HRH the Duke of Edinburgh. The president, Dr. W. Idris Jones, C.B.E., said that His Royal Highness was the first honorary corporate member to be elected since conferment on the Institute of a Royal Charter in 1946, and the eighth since its foundation 27 years ago.

Accepting the scroll, the Duke of Edinburgh said that the proper use of fuel and the prevention of waste were essential to our economy, and could do a great deal in 'cleaning up much of the muck which passes for fresh air in most of our cities.' So far as he could make out, it was essential, if one wished to draw attention to a given problem in this country, to start a row or controversy about it. He did not wish to start a row—but the Institute might possibly take a hint.

Nowadays a lot was heard about encouraging miners to produce more coal. It seemed to him that the best encouragement that the miners could be given was to let them see that fuel was not wasted.

Catalytic Oil Gas Plant

BRITAIN'S first catalytic oil gas plant was opened at Stafford on 19 November by Major Hugh Fraser, MP, deputising for the Minister of Fuel and Power. Major Fraser said the gas industry intended to build a further 16 plants, with an estimated annual saving of 500,000 tons of coal by 1956.

The Stafford plant, based on a French design, incorporates a catalyst of unstated composition; the gas is formed by passing oil and steam through the catalyst bed. It will save about 10,500 tons of coal a year.

The system does not compete against the coke oven or normal coal carbonisation technique in large modern works, but it does show that oils available in this country can be gasified successfully and more cheaply than carburetted water gas. The gas industry is negotiating with the oil refining industry to try to buy oil at lower prices and is also inquiring about the chances of a reduction in the Excise duties, so as to make the catalytic process fully competitive.

Staff College for I.C.I.

AN I.C.I. staff college, where future company training courses will be accommodated, is to be opened in the spring at Kingston Hill, Surrey. The purchase of a large Victorian mansion there, Warren House, was completed on 29 September, when the former owner, Lady Leila Paget, G.B.E., handed over the keys to Mr. F. H. Perkins, I.C.I. Education Officer.

Warren House is described in the November issue of *I.C.I. Magazine*. It stands in 14 acres of ground adjoining Richmond Park, and when conversion work is completed will accommodate about 34 people. A warden for the day-to-day administration of the college has already been appointed. He is Cdr. C. T. Collett, O.B.E., R.N. (retd.).

New Rubber Research Laboratories Opened

The Duke of Edinburgh at Shawbury

THE new laboratories of the Research Association of British Rubber Manufacturers at Shawbury, near Shrewsbury, were officially opened by The Duke of Edinburgh on 23 November. Before the opening, which was followed by a tour of the laboratories, His Royal Highness was the guest of honour at a luncheon.

In his speech of welcome the president, Lord Baillieu, said that the Duke of Edinburgh had busy and laborious days and had shown during the past week his interest in the industry they all served.

The Research Association of British Rubber Manufacturers was essentially a co-operative enterprise between private firms and the Government which assisted to the extent of one-third of the Association's income. The main burden of research would continue to rest on the larger rubber companies but, as before, there would be an important field for the RABRM such as the work done by the library, the technical information, chemical and physical divisions.

The Duke of Edinburgh said that he was present to encourage the technicians and laboratory workers, for their efforts were vital to the nation. The industry itself was only contributing £32,500 per year for the maintenance of the research laboratories, and yet it had an annual turnover of £120,000,000 per year. The DSIR grant was to be increased to £25,000 in 1956 if the industry agreed to raise £50,000 per year.

Founded in 1919

The Research Association of British Rubber Manufacturers was founded in 1919 to promote advancement of the British rubber manufacturing industry by applying scientific knowledge and methods. The association is a cooperative body; subscriptions from its member firms, supplemented by a Government grant, are pooled to enable costly investigations to be made for the benefit of all. For 35 years RABRM has kept the British industry supplied with new ideas and facts, with new and better testing instruments, and with an information service based on the world's biggest rubber library. Member firms send in thousands of inquiries each year. To deal with these the association has extensive laboratories for fundamental chemical and physical researches, a miniature rubber factory, where rubber can be put through production processes, and a mechanical testing laboratory where rubber is subjected to searching tests.

Steady Expansion

The history of RABRM is one of a steady expansion, from 15 member firms in 1919 to some 300 today, and from a staff of three to over 90. From the original two rooms in University College, London, the Association moved in 1922 to more spacious premises in Lansdowne Road, Croydon. By 1939 these were more than full, but nothing could be done until after the war. Eventually an excellent building was acquired at Shawbury, near Shrewsbury. This building has been converted into an attractive and splendidly equipped research station.

For over 30 years the RABRM has been helping the British rubber industry to make the best use of both existing and new raw materials. Research has helped to introduce new materials that now play an essential part in rubber manufacture, such as synthetic rubbers, organic accelerators of vulcanisation, and anti-oxidants, as well as materials produced in the United Kingdom, especially carbon blacks and other fillers. During the war the Association solved many urgent problems arising from shortages of raw materials, and helped keep the industry going when its most important raw material —natural rubber—virtually disappeared.

To find why rubber ages and how to prevent it has been an important aim of RABRM research. It was established that one frequent cause was the minute trace of ozone (less than one part in a million) present in outdoor air and the association devised laboratory tests that tell how well a rubber will resist ozone, sunlight, and other harmful influences. Its research chemists discovered sequestering agents that protect rubber against impurities like copper and manganese which seriously aggravate ageing.

To ensure that rubber products will perform satisfactorily under the varied and often gruelling conditions of use, searching tests have to be applied during and after

manufacture. RABRM has developed test methods and instruments that are now helping rubber manufacturers to control processes, and which enable both manufacturers and important users to ensure that rubber products have just the right properties. Among these properties the most important is hardness; the hardness test devised by RABRM is now nationally recognised as a British Standard and is already recommended as an international standard. RABRM work has resulted in hundreds of instruments of British manufacture being used in place of those formerly imported.

Exceptionally Profitable

The Council of RABRM recently estimated that the results of the main lines of research now in progress in the Association's laboratories would be worth some £750,000 annually if fully used. As these researches cost the industry some £15,000 per annum, the return is about 50 to 1. This remarkable result is achieved by the co-operative system, whereby contributions from 300 member firms are pooled for the benefit of all, and by the substantial grant of money from the Government.

On the day of the opening, an exhibition was staged to show something of this work. In the analytical laboratory, for instance, two important techniques were demonstrated. The first of these was a means of identifying the constituents of vulcanised rubber. A chromatographic column first separates the constituents which are then examined in an infra-red spectrometer. The other technique was for determining the nature of the rubber by measuring how much it swells when immersed in various liquids.

In one of the physics laboratories visitors were shown applications of a method developed by RABRM for making rubber adhere firmly to synthetic fibres by giving them a hairy surface either by brushing or abrading or by incorporating staple fibres in the weave. In the same room an exhibit showed electrically conducting rubbers and explained their practical applications.

An especially interesting exhibit was the one of 'ageing' in the chemical laboratory. A substance which counters oxidation by atmospheric oxygen owing to traces of copper compounds, 'Ra-plex I,' was shown to visitors and its action explained and demonstrated. The serious damage caused by ozone was also shown and the RABRM Ozone Testing Cabinet was displayed.

In one of the three mill rooms an exhibit showed how the RABRM has helped produce new high-styrene resin and rubber blends suitable for soling shoes. In one of the mechanical testing laboratories examples of how causes of failure in rubber products are traced were shown as well as testing apparatus devised by the RABRM.

Finally, a wide selection of products of the rubber industry was displayed in the general office. This illustrated four important fields in which rubber contributes to industrial efficiency or enjoyment of life by the individual: transport, agriculture, the home and sport.

Duke Visits Fort Dunlop

DUNLOP'S contribution to the founding of a British synthetic rubber industry was explained to the Duke of Edinburgh during a 50 minutes' inspection of their research centre when he visited Fort Dunlop on 17 November. He was shown a chart and samples of the proposed range of synthetic rubber and the raw materials from which they are made, with sample products of typical applications. He also saw a small-scale pilot plant which makes 50 lb. of synthetic rubber a day and the model of a synthetic rubber production unit typical of the one being erected at Fort Dunlop.

The Duke inquired at length into the comparative costs of synthetic and natural rubber. He was shown how the measurement of a minute impurity in rubber latex can lead to a marked improvement in many important manufacturing processes. Other exhibits at the centre included rubbers for unusual service conditions (electrically conducting rubber, oil resistant rubbers, low-temperature resistant rubbers, heat-resistant rubbers); the study of tyre behaviour on vehicles; new developments in synthetic textiles; and rubber compounding research.

The research centre divisions visited were Physical Department, General Development (Mr. H. L. Jenkins, manager); Physical Research (Mr. E. F. Powell, manager); Textile Research (Mr. R. S. Goy); Compounding Research (Dr. D. Parkinson, manager); Chemical Research (Dr. W. C. Davey, manager); Polymer Plant (Mr. C. D. Mitchell).

High Polymers

Molecular Structure & Properties Discussed

AT a meeting of the London Section of the Royal Institute of Chemistry held on 26 October at Hatfield Technical College, C. W. Bunn gave an address entitled 'Molecular Structure and Properties of High Polymers.' This dealt mainly with the molecular characteristics which determine whether a chain polymer is a rubber-like, a fibre-forming or a glass-like substance at room temperature.

Both rubber-like and glass-like polymers are amorphous, but fibre-forming polymers are usually partly crystalline at room temperature. There is a two-phase texture in which any one molecule passes through both crystalline and amorphous regions in the course of its length. Crystal growth usually occurs in spherulitic units (clusters or aggregates of individual crystallites).

Regular & Irregular Molecules

All chain polymers become rubber like at high temperatures if the molecules are sufficiently long (*circa.* 10,000 chain atoms), or viscous liquids if they are only of the order of 1,000 atoms long. On cooling, those with molecules which are chemically and geometrically regular form partly crystalline solids, while those with irregular molecules set to glasses. The typical glass-like polymers are those which have two very different-sized substituents attached to the same chain atom, substituents which are likely to be indiscriminately placed in left- and right-hand stereopositions so that the molecule is irregular. The crystalline polymers are those in which this stereochemical irregularity is not possible.

Regular polymers with melting points below room temperature may be used as rubbers, those with melting points above 200°C may be used as fibres. Irregular polymers in which the rubber-glass transition ('relaxation transition,' or, less appropriately, 'second-order transition') is well below room temperature may be used as rubbers, those in which this transition lies less above room temperature may be used as glasses. Both crystalline and glassy polymers may be used for mouldings.

Softening points (the melting points of the regular polymers and the glass-rubber transitions of the irregular ones) depend on two main factors, the strength of the forces between the molecules, and the flexibility of the molecules. The high melting points of the polyamides are due to strong forces (hydrogen bonds) between the molecules. The low melting points of aliphatic polyesters, in spite of fairly strong attractions between polar groups, are due to the presence of $O\text{-}CH_2$ bonds in the chain; rotation round these bonds is much easier than round C-C bonds in a saturated chain, and gives molecular flexibility, which is responsible for the low melting points.

Rubber owes its low melting point (as compared with polythene) to the fact that rotation round single C-C bonds which are adjacent to double bonds requires less energy than in a saturated chain. The rubber-like properties of butadiene co-polymers, GR-S and Neoprene are attributed to the flexibility of single bonds adjacent to double bonds.

The intermediate position of PVC, which is somewhat rubbery, somewhat glassy, and capable of forming fibres, fits in with what is known of its molecular structure. It crystallises to a small extent, owing to the fact that the chlorine atoms are not entirely randomly placed in left and right positions, but tend to alternate over short lengths of chain. All the well-known polymers can be arranged, in a qualitative way, in a diagram having as horizontal axis increasing regularity of molecular structure and as vertical axis, increasing intermolecular forces and/or molecular stiffness; softening point increases diagonally. PVC falls in the centre of this diagram. Plasticisers appear to get between the chain molecules and allow increased scope to the 'thermal wriggling' of the chains.

Steel Exports

Exports of iron and steel products during September amounted to 205,600 tons, worth £11,217,700. This compares with the August figure of 159,500 tons, worth £9,610,900, and is also higher than the export total for September of last year. Imports of iron and steel products in September this year were 54,800 tons, worth £2,449,600.

Pulsed Columns

Study of Their Hydrodynamics

A MEETING of the North-Western Branch of the Institution of Chemical Engineers was held at Chester on 10 November when J. A. Williams and D. J. Little presented a paper on 'The Hydrodynamics of Pulsed Columns.'

The efficiency of columns for liquid-liquid extractions is improved by agitation of the liquids in the column. If the liquids are given a reciprocating movement the column is known as a pulsed column. The first pulsed column was without packing, but had a number of plates which could be moved up and down in the liquids with a reciprocating movement to agitate the liquids.

The liquids may be agitated by a piston and cylinder external to a packed or plate column. There is an optimum amplitude of pulsation for a given frequency but greater efficiency of extraction is obtained at high than at low frequencies. At high frequencies, cavitation or bubble formation may occur in the liquid in the pipe between the column and the piston and the column will not be operable. If the pressure drop between the column and the piston is high, the absolute pressure at the piston may be less than the vapour pressure of the liquid and cavitation may occur; another cause of cavitation is the liberation of air by the solvent when the pressure in the pipe is reduced suddenly.

The authors presented a method for the prediction of the cavitation point from the calculation of pressures in a packed column. The pulsing of the column produces a pressure wave which is the resultant of the frictional and the inertial resistances of the system. The pressure drop due to friction is proportional to the square of the velocity and the pressure imposed on a liquid under acceleration is equal to the rate of change of momentum, and the addition of static and atmospheric pressures to these pressures gives the total pressure exerted by the piston on the liquid.

The theory of cavitation was developed from a consideration of the vapour pressure and pressures in the liquid. The point of cavitation was determined from a graph of liquid velocity and friction factor. Practical results and calculations were included in the paper.

New Sulphuric Acid Plant

THERE are three new production units at present under construction in this country for manufacturing sulphuric acid and cement from anhydrite. The Whitehaven plant of Solway Chemicals, which will have an annual capacity of 90,000 tons of acid and 90,000 tons of cement, has made satisfactory progress in spite of unusually bad weather conditions throughout the year.

Solway Chemicals are to mine their own anhydrite on the site; two drifts which are being driven into the massive deposits under St. Bees Head have already been pushed forward for more than half a mile, and the first anhydrite is expected to become available before the end of the year. Construction of the plant is in the final stages, and the first of the pair of 240 ft. kilns should be in production in the spring.

Among the development work which has been carried out on the new industrial site on which the factory stands is a new railway grid connecting the works with the main line system over a mile away. The acid/cement plant will supply cement for the local market, and probably Solway Chemicals' most important customer for sulphuric acid will be its associated company Marchon Products, which has become a major user of sulphuric acid in the production of phosphoric acid and complex phosphates for use as detergent raw materials, and in the manufacture of anionic surface active chemicals. The formal opening of the sulphuric acid plant will take place next year.

Discussion on Aluminium

THE December meeting of the Midlands Society for Analytical Chemistry will be held on 8 December in the Mason Theatre, The University, Edmund Street, Birmingham, at 6.30 p.m. The meeting will take the form of a discussion on 'The Analytical Chemistry of Aluminium and its Alloys.'

The discussion will be started by Mr. J. H. G. Thomson, B.Sc., of the Research Laboratories of the British Aluminium Co. Ltd., who will talk about the application of some of the newer techniques, the application of vacuum distillation to the determination of zinc, magnesium and sodium and recent work on the determination of small traces of some of the less commonly determined impurities, e.g., boron, carbon, gallium, phosphorus, potassium and vanadium.

The Export Situation

Strikes Made October A Disappointing Month

NO doubt the recent strikes of dock workers were responsible for the poor exports of British chemicals in October. The total of £16,815,325 compares most unfavourably with that of £18,799,420 for July, and it is to be hoped that November's figures will show a compensating increase. The only noteworthy rise is lead tetraethyl, which reaches a record figure. Alkalis remain good, but the acids have fallen again.

Coal tar chemicals continue to fluctuate. Benzole appears to be suffering a seasonal decline, but the year's figures will be below those for last year. The synthetic organics, which have recently increased from month to month, have received a setback, even plastics being less than in September.

Business with NATO countries varies from country to country, but maintains a fairly steady average. Business with the Far East improves. The falling-off in exports to Venezuela is disappointing, but is offset by the continuing improvement in trade with Argentina. This month's sensation is the jump in exports of chemicals to the Netherlands Antilles.

TABLE 1

VALUE OF EXPORTS IN £ : PRINCIPAL CUSTOMERS

	Oct. 1954	Sept. 1954	Oct. 1953
Gold Coast	343,197	307,278	271,178
Nigeria	306,543	261,380	327,001
South Africa	713,623	614,784	818,224
India	1,251,147	1,133,010	1,477,743
Pakistan	338,940	304,189	316,287
Singapore	216,949	330,749	287,697
Malaya	242,710	243,600	283,339
Ceylon	266,397	289,990	208,274
Hong Kong	308,427	269,946	234,245
Australia	1,413,347	1,832,565	1,202,490
New Zealand	568,777	642,636	467,154
Canada	532,866	418,577	657,095
Eire	536,784	495,463	542,106
Finland	306,496	208,446	117,844
Sweden	566,507	441,229	467,844
Norway	207,896	290,633	292,974
Denmark	352,130	293,496	413,728
Western Germany	309,178	391,642	253,189
Netherlands	546,859	595,127	567,063
Belgium	290,950	357,540	352,170
France	537,417	443,797	407,765
Switzerland	178,117	224,791	222,532
Portugal	220,812	178,890	189,394
Italy	321,935	377,945	378,712
Netherlands Antilles	537,033	164,155	52,958
Egypt	185,429	239,684	127,105
Burma	149,290	204,359	108,562
US	582,722	558,887	665,319
Venezuela	113,164	223,056	99,675
Argentina	761,088	325,876	386,256
Total value of chemical exports	**16,815,325**	**16,511,697**	**15,924,409**

TABLE 2

VALUE OF EXPORTS IN £ : PRINCIPAL COMMODITIES

	Oct. 1954	Sept. 1954	Oct. 1953
Acids, inorganic	44,638	69,025	51,646
Copper sulphate	106,876	47,052	142,755
Sodium hydroxide	447,864	387,470	343,402
Sodium carbonate	267,958	226,976	167,361
Aluminium oxide, anhydrous	10,418	42,497	3
Aluminium sulphate	56,249	36,845	24,751
Ammonia	36,174	30,960	22,048
Ammonium chloride	41,313	35,407	29,517
Bismuth compounds	31,347	16,782	19,133
Bleaching powder	30,710	46,185	18,158
Hydrosulphite	72,050	56,991	39,842
Calcium compounds, inorganic	45,574	59,381	55,539
Lead compounds, inorganic	31,864	32,513	33,884
Magnesium compounds	46,719	73,933	75,251
Nickel salts	83,629	36,149	53,215
Ethyl, methyl, etc. alcohols	96,428	132,745	129,721
Acetone	34,228	38,825	107,774
Glycerine	12,995	20,222	66,093
Lead tetra-ethyl	1,048,566	869,295	130,695
Total for chemical elements and compounds	**5,171,023**	**4,769,771**	**4,310,748**
Coal tar	124,443	158,449	28,873
Cresylic acids	65,611	37,328	60,529
Benzole	130	215	222
Creosote oil	105,294	59,674	152,420
Total from coal tar, etc.	**354,629**	**309,134**	**238,693**
Indigo, synthetic	92,380	64,863	79,072
Total for synthetic dyestuffs	**751,123**	**683,654**	**1,049,288**
Medicinal and pharmaceutical products, total	**3,753,312**	**2,759,881**	**2,624,849**
Essential oils:			
Natural	33,198	37,274	36,259
Synthetic	61,819	74,503	83,080
Flavouring essences, etc.	62,291	87,162	77,949
Total for essential oils, perfumes, etc.	**1,476,939**	**1,742,367**	**1,622,053**
Ammonium nitrate	13,904	34,115	67,244
Ammonium sulphate	714,694	494,451	540,257
Total for all fertilisers	**752,563**	**554,854**	**664,430**
Paints, pigments and tannins, total	**1,346,727**	**1,386,409**	**1,537,417**
Plastics materials, total	**2,015,277**	**2,044,626**	**1,879,641**

BISRA Displays Its Work

New Corrosion Advice Bureau Proves Its Worth

SINCE its formation in September, the Corrosion Advice Bureau of the British Iron and Steel Research Association has aroused considerable interest, and it is hoped that it will be the means of achieving rapid practical application of the results of research. The Bureau's services are free for members and investigations are undertaken for non-members on a fee-paying basis.

Research into corrosion was one of the aspects of the association's work on view on 'Open Days' at the Battersea, London, laboratories on 18 and 19 November. This research is carried out not only into protective coatings, but also points to the importance of design in creating conditions under which steel is likely to corrode and studies the effect of inhibitors.

Tests carried out at the laboratories have shown that of metallic coatings, aluminium and zinc show the best results in resisting atmospheric corrosion. The value of low-alloy steels in resisting rust attack has been proved by exposure tests extending over a number of years, although this applies to air exposure only. Low-alloy steels in sea water or soil seem to have no substantially greater resistance than ordinary steels.

Importance of Surface Preparation

One conclusion that has emerged from the association's research work is the importance of correct surface preparation before the application of any protective coating. In particular, steelwork to be exposed to atmospheric attack should be completely descaled by pickling or grit-blasting before being painted.

Another aspect of the problem is illustrated by an apparatus designed to reproduce the effect of a ship's hull passing through water. Evolved by the association, this laboratory rotor test has been in operation for about 18 months and is used for testing the efficiency of protective coatings.

Some of the problems connected with the physical chemistry of ferrous metallurgy were demonstrated by the Physical Chemistry Section. These include the influence of sulphur on the properties of solid steel, reduction of chromium loss during the manufacture of alloy steels, the precipitation of nitrides and the thermodynamics of carbon in iron alloys.

Laboratory experimental work on samples of metals has been made considerably easier by the use of the vacuum fusion apparatus, which enables the oxygen content to be determined with an exceptionally high degree of accuracy. The apparatus, of which few samples are to be found in this country, was designed and built in the Battersea laboratories.

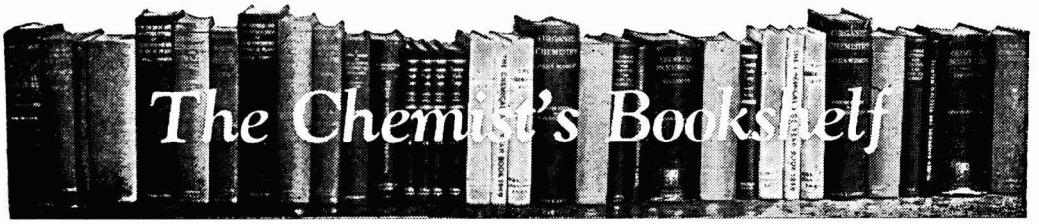
Refractories Research

The Refractories Section displayed a series of investigations aimed at improving the performance of surface linings. Resistance to attack by iron oxides, dimensional changes under operational conditions and mechanical tests on a series of samples were all demonstrated.

Fundamental research into the causes of wear by slag attack, mechanical stresses or thermal conditions is being pursued in this section. The effect of refractory wear on total production costs can be substantial, so improvements in performance are important.

Reduction of costs is also a factor behind the research in the Fuel Technology section of the Physics Department. Here was exhibited the BISRA burner, a design based on theoretical conclusions suggesting that the true function of furnace burners was basically as 'jet-thrust' producers rather than fuel atomisers. Design improvement has led to a marked accelerating effect of the steam blast on the fuel stream. Laboratory tests and practical experience have shown substantial improvements in furnace economy, not only in reduced fuel consumption but also in increased furnace life.

A valuable research tool which the association have recently developed is a water-cooled open-hearth furnace periscope. This instrument has already been in practical use in the plant of a member-firm. It gives a view of the whole of the inside of the furnace, with the exception of a small zone immediately round the viewing hole, in three alternative viewing zones. The instrument makes the study of flame and temperature distribution or refractory behaviour much more effective.



DUST IS DANGEROUS. By C. N. Davies. Faber & Faber Ltd., London. 1954. Pp. 116. 21s.

This book has been published at a time when the attention of the layman as well as that of the scientist is being directed more and more to the dangers and problems of atmospheric pollution. Although 'Dust is Dangerous' is concerned mainly with the state of the atmosphere inside buildings, the more general problems of atmospheric pollution must be borne in mind while studying the text. As an introduction to the problems of industrial hygiene it is in every way satisfactory, and in view of the public interest which is being aroused, most timely.

After a short introduction there is a brief discussion of the effects of various dusts upon the skin, eyes, teeth and lungs. This chapter is important because it emphasises a fact which is not generally known to the technologist, namely, that the toxicity of a dust passes through a maximum with decreasing particle size, this maximum being due to the comparative failure of two complementary body defence mechanisms at particle sizes around 0.3 microns. The second chapter deals with the vexed question of sampling. Since a hazard may pass undetected because of a defect in the method of sampling, accuracy both of operation and interpretation is vital. The various methods of sampling are examined and their shortcomings or advantages assessed.

The third chapter is concerned with the problem of dust prevention and lists the procedures which can be adopted in order of decreasing effectiveness. In view of the high efficiency of electrostatic precipitators it may be felt that a disproportionately small amount of space has been devoted to a description of their design and application. In addition, one of the most effective methods of smoke prevention, sonic precipitation, is not mentioned. These are important because although the value of the local exhaust hood in the protection of workers from dust cannot be denied, the air must frequently be cleaned before it can safely be discharged into the atmosphere. Radioactive dusts provide exceptional hazards and these are discussed very briefly in chapter four. There follows a chapter devoted to dusts which are seldom considered by those in contact with them to be more than a nuisance. The dusts to which the housewife is exposed every day, for instance, may have painful allergic effects.

The final chapter consists of an excellent exposition of the nature of dust explosions and contains tables of concentration limits for several industrial dusts. The book has been constructed in a logical straightforward manner and gives a clear non-mathematical picture of the subject despite the extreme sophistication of the sentence construction in some sections. Of the greatest value to the reader is the extensive list of references given at the end of the text. There are, also, many explanatory diagrams and photographs. It is therefore unfortunate that the proof reading has not been of a very high standard; there are misspellings, displaced punctuation and use of alternatives.

The preface recommends the book to the works manager and engineer; it should also be read by all those who design or manage plants in which dust is manufactured or stored.—J.R.M.

THE STRUCTURAL CHEMISTRY OF PROTEINS. By H. D. Springall. Butterworth's Scientific Publications, London; Academic Press Inc., New York. 1954. Pp. x + 376. 45s.

This excellent little book packs an astonishing amount of information into a small compass, and is one of the best introductions to the field of protein structure that has yet been written. In spite of the exclusion of any consideration of the immunological or biological properties of proteins, it covers a very large field; and very few people would have the knowledge of both

organic and physical chemistry necessary to write such a book.

The first two chapters deal with the history of the isolation of the natural amino acids, with early theories of protein structure, and with methods for synthesising peptides. Then follows a discussion in two chapters of the structures of the fibrous and globular proteins, as deduced from studies with X-ray diffraction, the ultracentrifuge, electrophoresis, and other physical methods. The treatment is admirably clear but in places rather sketchy; however, the abundance of references here and elsewhere in the book enables one to follow up items of particular interest.

The last and longest chapter deals with the analysis of proteins for amino acid residues, with the various methods for determining the sequence of amino acid residues in polypeptides, and with the determination of protein structure by the investigation of the products of partial hydrolysis. Logically, it would seem that the description of structure as deduced by these chemical methods should precede the descriptions of the more gross structure as revealed by physical methods. However, historically, the latter field has developed more quickly and our information from it is more extensive. Proteins in this respect are unique among chemical compounds, although possibly in the future this order of development may be more common with natural products.

Some criticisms can be made: the review of methods for synthesising peptides could be made more critical and less compendious (there is no mention of the dangers of racemisation with certain methods); too much attention is paid to methods of amino acid analysis now obsolete; the work of Sanger is described in insufficient detail. However, the book should be most useful to anyone wanting to find out quickly what is known about the structure of proteins at the present moment.—J. T. EDWARD.

MOLECULAR THEORY OF GASES & LIQUIDS. By Joseph O. Hirschfelder, Charles F. Curtis and R. Byron Bird. John Wiley & Sons Inc., New York; Chapman & Hall, London. 1954. Pp. 1219. 160s.

'The book describes the properties of gases and liquids from a "molecular" viewpoint,' and is an attempt to survey the theoretical and experimental developments which have been made during the last 20 years in the study of the properties of gases and liquids. The book is divided into three parts. Part I (Chapters 2-6) deals with equilibrium properties and in particular with the prediction of P-V-T properties of gases and liquids and the use of experimental equation of state data to obtain information concerning intermolecular forces. Part II (7-11) deals with non-equilibrium properties and in particular with transport phenomena in dilute gases and in dense gases and liquids with an account of some hydrodynamic applications of the equations of charge. Part III (12-14) deals with the electromagnetic and quantum mechanical theory of the forces between molecules, atoms, ions and free radicals. The authors are working in the University of Wisconsin Naval Research Laboratory and this book is largely the result of their work on the properties of propellant gases.

While the book is of importance to physical chemists and perhaps mathematical physicists the authors also hope that industrial engineers will find the chapters on the calculations of properties of gases and liquids of value in design work. These chapters (2, 4 and 5) deal respectively with the equation of state of gases at low and moderate densities, the equation of state for dense gases and liquids, and vapour liquid equilibria and critical phenomena. They provide a detailed discussion on the Virial Equation of State and on the calculation of the Virial coefficients for various molecules. Considerable experimental data are given in table form, particularly in comparison of the various empirical equations of state, although in the case of table 4.2-2 which gives the values of the constants in the Beattie Bridgeman equation of state for several gases it might have been worthwhile to point out that the experimental data upon which the constants are based are in several cases those of Amagat, and that a redetermination of some of these constants is now desirable.

Despite the highly mathematical treatment necessary for a book of this nature the text remains readable and much use is made of graphical representation. For research workers who are not mathematical physicists, but whose work requires a fundamental knowledge of the molecular theory of liquids and gases, the book is highly recommended.—F.M.

HOME

Factory to be Sold

The Broughton, Manchester, factory of Imperial Chemical Industries Ltd., closed at the end of last month, is to be sold, probably by public auction, in the New Year. Previously the factory, which was a non-ferrous metal works mainly devoted to copper tubing, employed some 700 people.

Eliminating Smells

Latest experiments in eliminating smells coming from Courtaulds Ltd. rayon factory at Greenfield, Flintshire, have had promising results, the firm have told Birkenhead Chamber of Commerce. The problem has had the full-time attention of their research chemists for some years.

Indian Contract

Lodge Cottrell Ltd., of Birmingham, have secured an Indian contract worth more than £600,000 for electrostatic gas cleaning plant for new furnaces at the Indian Iron & Steel Co.'s works in Bengal.

Coke Oven Plants for S. Africa

The Woodall-Duckham Construction Co. Ltd., of London, announced on 18 November that they have received from the South African Iron & Steel Industrial Corporation two orders for coke oven plants, totalling £1,750,000. 'Both these contracts have been obtained in keen world-wide competition, especially with German firms,' said the company.

I.C.I. Buy Fertiliser Factory

Imperial Chemical Industries Ltd. have purchased from the Board of Trade the factory at Prudhoe-on-Tyne which hitherto I.C.I. have operated as agents for Her Majesty's Government. The transfer took place on 22 November. It is not intended that there shall be any change in the present production of fertiliser in the factory following the change of ownership. Provided no unforeseen circumstances arise, output should be maintained at the present level and there should be no change in the present number employed as a result of the transfer. All conditions of pay and employment will continue, as previously, to be governed by the relevant agreements between Imperial Chemical Industries Ltd. and trade unions concerned.

Explosion & Fire

Fire broke out after an explosion in the oil works at I.C.I., Billingham, on 17 November, and two workmen received burns. The outbreak, it was stated, was confined mainly to instruments and electrical fittings.

October Steel Production

Steel production in October averaged 374,500 tons a week. This equals the output for May of this year which was the previous highest rate achieved and compares with a weekly average of 355,000 tons for October, 1953. Pig iron production in October averaged 230,700 tons a week. This is an increase of 9,200 tons a week over October, 1953.

Opportunities for Britain

Among export opportunities, etc., for British firms listed in the issue of the *Board of Trade Journal* for 13 November are a Canadian inquiry for machinery and equipment for a cement factory; an inquiry from Cuba for refuse disposal and chemical plant; tenders procedure for Pakistan fertiliser factory; and a Pakistan inquiry for spare parts for a starch factory. Further details from Export Services Branch of the Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

Petroleum Equipment

Total value of orders placed by the British petroleum industry with British manufacturers of equipment in 1954 will be about £80,000,000. Orders from foreign petroleum companies will raise the total value of business to more than £100,000,000. These figures were given at a meeting of the Midland Region of the Council of British Manufacturers of Petroleum Equipment in Birmingham last week, when a steady increase of 6 or 7 per cent in the yearly consumption of petroleum products in Britain was forecast. Figures issued later by the Council on behalf of the Oil Companies Materials Secretariat show that orders received during the third quarter of the year for oil equipment and materials were valued at £17,721,600. The largest single item (£3,916,000) was bulk chemicals.

• OVERSEAS •

Sulphuric Acid in Israel

The production of sulphuric acid by the Fertilizers & Chemicals Company in Israel amounted to 14,632 tons between 1 July and 30 September, against 2,875 tons during the corresponding period last year. The equipment for producing sulphuric acid was used for experimental purposes during 12 consecutive days during August and produced a daily average of 235 tons, an amount greater than was planned.

Alberta H_2SO_4 Plant

A contract has been awarded for erection of a $1,000,000 plant that will use southern Alberta sulphur in producing 100 tons of sulphuric acid a day. The plant, to be built adjacent to the $20,000,000 Sherritt-Gordon ore-processing plant at Fort Saskatchewan, 25 miles east of Edmonton, is being erected for Inland Chemicals (Canada) Ltd. by Lummus Canada Ltd.

Soda Ash Plant in Brazil

It is expected that the two principal groups of the Cabo Frio soda ash plant being built by the National Alkali Company in the State of Rio de Janeiro, Brazil, will be operating within 20 months. The whole plant may be in operation in just over two years. Total value of equipment to be purchased and imported from abroad will amount to $15,000,000, and according to the company's 1953 report orders for $4,000,000 worth of equipment were placed and further equipment valued at $7,000,000 has been selected.

1955 Chemical Progress Week

The second Chemical Progress Week has been scheduled for 16-21 May 1955, it has been announced in Washington, USA, by the Manufacturing Chemists' Association, sponsors of the event. "The purpose of the week,' said Mr. William C. Foster, MCA president, 'is to bring home to the American people the significance of the chemical industry in terms of their daily life. Last year we feel we got off to a good start. This year we hope to do even better.' The programme will be national in scope with emphasis on local level activities, particularly in chemical industry plant communities.

Dutch Rayon Plant Expansion

Nyma, rayon manufacturers of Nijmegen, Holland, are to start on an expansion and modernisation programme costing the equivalent of £2,300,000.

Toronto Company Expands

Fine Chemicals of Canada Ltd., Toronto, will occupy an addition to its plant early next year, which will give it a total floor area of 30,000 sq. ft. with room for further expansion on its five-acre site. Fine Chemicals of Canada manufactures a variety of organic chemicals, biological products and botanical extracts for the ethical drug trade. New process machinery to be installed will broaden its production range.

Imports to Spain

The Spanish authorities have announced that they will shortly authorise the issue of licences for imports from the UK, Belgium and Switzerland of unspecified amounts of aniline dyes and intermediate products for their manufacture and for the import of auxiliary products for the textile industry from Switzerland and the UK.

US Copper Sulphate Output

Copper sulphate production and shipments in September were 25 per cent and 29 per cent respectively higher than in August, and both were larger than in other months since May, according to the Bureau of Mines, United States Department of the Interior. September production approximated and shipments exceeded by 6 per cent the average monthly rates for 1953. Producers' inventories at the end of September were smaller than at any time since February 1952, being about three weeks' requirements at the September rate of shipments.

Italy to Produce Synthetic Rubber

Work has started on a synthetic rubber plant at Ravenna, Italy, which will turn out 30,000 tons of synthetic rubber and 350,000 tons of nitrogenous fertiliser a year when it is completed in three years' time. The rubber will be produced from natural gas, and the plant will be fed from a gas field which is almost on the site. At present Italy is importing about 10,000 tons of synthetic rubber annually, but demand is expected to increase considerably.

• PERSONAL •

Honorary Fellowship, the highest honour the Textile Institute can bestow, is to be conferred on MR. J. R. WHINFIELD, C.B.E., M.A., F.R.I.C., for his outstanding contribution to the science and technology of man-made fibres. The award will take place at Institute headquarters on the occasion of the Spring Convocation on 25 March, 1955. Mr. Whinfield is the twelfth recipient of this award, made only in recognition of major advances in textile technology or science achieved by an individual as a result of many years of ingenuity and application. For many years with the Calico Printers' Association Ltd., of Manchester, Mr. Whinfield is at present a member of the Terylene Council of Imperial Chemical Industries Ltd., at Harrogate. He received the C.B.E. in the last Birthday Honours List for his services in the discovery of Terylene.

MR. SIDNEY SHARP, B.Sc., F.R.I.C., has resigned his position as chief chemist of Hangers Paints Ltd., Hull, to be technical manager of Permoglaze Ltd., Birmingham. After graduating in 1943, Mr. Sharp worked for some time with I.C.I. at Billingham. He joined Hangers in 1946 and became chief chemist two years later. He served on the committee of the Hull Section of the Oil and Colour Chemists' Association and for four years was hon. publication secretary. In the 1953-54 session Mr. Sharp was also hon. secretary to the Hull and District Section of the Royal Institute of Chemistry.

WALTER R. ANDERSON has been appointed by DuPont Company of Canada, Limited, as superintendent of the DuPont plant being built at Maitland, Ontario, to manufacture 'Freon' fluorinated hydrocarbons. Mr. Anderson joined the company in 1946.

The Perkin Medal of the American section of the Society of Chemical Industry is to be awarded on 14 January to MR. ROGER WILLIAMS, vice-president of DuPont. Mr. Williams has been with DuPont since 1918, when he began as a research chemist; in 1943 he was made assistant general manager of the company's explosives department and was in charge of the plutonium project. Included in the citation are important contributions to the development of synthetic ammonia and synthetic methanol industries.

John Thompson Ltd. have opened a new branch office in Newcastle at Ravenswood, Westfield Lane, Ryton - on - Tyne, Co. Durham. Tel.: Ryton (Co. Durham) 482. It is announced that MR. S. A. H. ROBINSON is to be in charge of this office. Mr. Robinson joined the John Thompson Group early in 1937 and has since then been associated both with the works in Wolverhampton and the London office. Since 1946 until this present appointment, he was assistant to MR. C. J. HOWARD, the Group's London managing director.

L. F. C. NORTHCOTT, Ph.D., D.Sc. (Birm.), F.I.M., F.R.I.C., has been promoted to deputy chief scientific officer and appointed senior superintendent of applied research at the Armament Research Establishment, Fort Halstead. Dr. Northcott has been superintendent of metallurgical research since 1947.

The following promotions in the plant organisation of Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, have been announced: At the South Charleston, W. Va., plant, ROLAND D. GLENN has been appointed general superintendent. FREDERICK H. BELDEN has been appointed superintendent in charge of gaseous raw materials, gas production, utilities, and office, and ARTHUR P. MOSS has been appointed superintendent in charge of resins and chemicals. C. N. RECKER has been appointed plant superintendent of the Torrance, Calif. plant. HENRY B. COONS and L. N. DICKINSON have become assistant superintendents in charge of chemicals production at the plant at Institute, W. Va., and at the Texas City, Texas, plant. R. C. HIERONYMUS has been appointed assistant superintendent in charge of all gas production and related units.

MR. J. A. COCHRANE and MR. W. J. LLOYD have been elected to the board of Aspro Ltd.

Her Majesty the Queen has been graciously pleased to approve recommendations made by the Council of the Royal Society for the award of the two Royal Medals for the current year as follows: to SIR JOHN COCKCROFT, K.C.B., C.B.E., M.A., Ph.D., M.Sc., D.Sc., Hon.Ll.D., M.I.E.E., F.R.S., for his distinguished work on nuclear and atomic physics; to PROFESSOR H. A. KREBS, M.D., M.A., F.R.S., for his distinguished contributions to biochemistry.

MR. P. F. BENTON JONES, general manager of the United Coke and Chemicals Company, has been elected to the board of the United Steel Companies.

MR. J. LILLIE-COSTELLO has been appointed public relations manager of Shell-Mex and BP. He will head a newly-formed public relations department which will extend the services hitherto given by the Press and information section of the company's trade relations department.

E. J. HOLMYARD, M.A., M.Sc., D.Litt., F.R.I.C., who recently retired from the editorship of *Endeavour*, I.C.I.'s international scientific review, is continuing his work as a joint editor of I.C.I.'s *History of Technology*, the first volume of which is to be published shortly. Dr. Holmyard, who was one of the architects of *Endeavour*, first published in 1942, has been succeeded by T. I. WILLIAMS, M.A., B.Sc., D.Phil., F.R.I.C., former deputy editor.

MR. M. DUFAYE, export sales manager of Marchon Products Limited, manufacturers of detergents and detergent raw materials, will set out in January on a three months' tour of markets in which interest appears to be increasing in his firm's products. He will visit Iraq, Persia, Pakistan, India, Burma, Thailand, Australia, New Zealand, Singapore, Hong Kong, Japan and Western Canada. Marchon Products have developed in recent years a large export business, especially with Western Europe and the Commonwealth.

F. PERRY WILSON has been appointed president of the Bakelite Company, a division of Union Carbide Canada Limited. Mr. Wilson graduated in 1936 from North Carolina State College with a degree in chemical engineering. He joined the Bakelite organisation in 1941 and was made sales manager in 1950. In 1953 he was appointed vice-president in charge of sales. A member of the Society of Plastic Engineers, Mr. Wilson is also a member of the Society of the Plastics Industries. He will continue to make his headquarters at the company's general offices and plant at Belleville, Ontario.

H. P. GRACE, B.S., of E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has been named as recipient of the 1954 Junior Award in chemical engineering, granted by the American Institute of Chemical Engineers. Mr. Grace will receive his award on 14 December, at a banquet of the Institute at the Hotel Statler in New York City. Mr. Chalmer G. Kirkbride, President of the Institute and President of the Houdry Process Corp., will make the formal presentation. The committee making the selection was headed by Professor R. H. Wilhelm, Princeton University. The award is given annually for 'the paper judged most outstanding of those published by junior members of the Institute during the last three years,' and Mr. Grace was cited for two papers written by him, 'What Type Filter and Why,' and 'Resistance and Compressibility of Filter Cakes.'

Obituary

The sudden death occurred on 20 November of MR. ARTHUR JAMES LAMB, aged 54. He joined the Paterson Engineering Co. Ltd. 25 years ago, and for many years he was in charge of the firm's industrial water purification department.

Economics of Cloth Structure

Addressing a one-day conference on quality control, organised in Bradford on 10 November by the Textile Institute, Mr. F. Padgett, a director of the Bradford Dyers' Association, referred to a cloth which had been sent for dyeing. It contained wool, Ardil, Fibro, cotton and nylon, and Mr. Padgett was so interested in the unusual fibre constitution of this cloth that he asked the manufacturer for an explanation. He was told: 15 per cent wool to conform to the designation of a wool cloth; 35 per cent Ardil to extend the wool-like handle; 20 per cent Fibro to cut down cost; 20 per cent cotton to use up some old stock; and 10 per cent nylon to increase the strength of the material. The customer wanted the cloth dyed solid, but the BDA refused to do this and dyed only the protein fibres.

Publications & Announcements

RATHER tautologically described as 'Auto Self Set Zero' are the new micro-pipettes being manufactured by H. J. Elliott Ltd., E-Mil Works, Treforest, Glam. These pipettes eliminate all operator errors, since they are self-adjusting and emptying, yet they have a tolerance of no more than 5 per cent in the case of the 0.01 and 0.02 ml. delivery patterns, and of 2-3 per cent in content patterns. Principle of the design is a constriction halfway up the tube; the pipette is filled to just above this, and then, with the tip of the jet just touching the surface of the liquid, excess is drawn back. Delivery is begun by placing the tip against the side of the receiving vessel in the usual way, and completed by blowing out. Delivery and content pipettes are available in capacities from 0.01 to 0.25 ml.

* * *

ISOTOPE Developments Ltd., Beenham Grange, Aldermaston Wharf, Berks, have now increased their range of scintillation phosphors to include a new high-activity scintillator, 'Pamelon'. This is a plastic material which gives a good light response and provides an overall phosphor which is comparable with many of the present crystalline materials, which are difficult to grow and fabricate. It is available in bulk or suitably sized sections, and can be machined to special dimensions at nominal cost. The energy yield and rapid decay time of Pamelon, and its relatively low cost, make it an extremely versatile scintillator for use in connection with α, β, and γ-radiation.

* * *

SOLDERING at speed is possible with the 'Superspeed' soldering iron made by Enthoven Solders Ltd., 89 Upper Thames Street, London E.C.4. This iron heats up in 6 seconds, is automatically switched off when not in use, and weighs only 3½ oz. It operates on 4 volts, and can be used from a car battery. Copies of a pamphlet describing this tool, and of a catalogue of solder products, may be obtained from the manufacturers.

* * *

THE 1955 edition of the booklet *Physical Properties of Synthetic Organic Chemicals* has just been issued by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. In 24 pages, this edition presents the latest data on more than 350 organic chemicals. It features 46 new products available from Carbide and Carbon. The booklet is prepared annually as a handy guide for chemists, engineers, purchasing agents and laboratory workers. For easy reference, the chemicals are arranged by family groups with condensed application data. Physical properties are given in tabular form, and an alphabetical index is included for the convenience of the user. Copies of this booklet (F-6136) are available without charge from Carbide and Carbon Chemicals Company, 30 East 42nd Street, New York 17, New York.

* * *

SOLUTION to many industrial bulk storage problems is provided by Marley storage walls, made by Marley Concrete Products, Peasmarsh, Guildford, Surrey. They can treble the capacity of a site considered inadequate or alternatively save valuable space by concentrating storage in a smaller area, it is claimed. The walls are made from high-grade reinforced concrete. They are supplied in standard size units 7 ft. high by 2 ft. wide, and two types are available. One is designed to hold materials reposing at an angle of 35° at maximum loading pressure up to 50 lb. per cu. ft. These include coal, coke, solid fuels, slag and ashes. The second type—also suitable for use as retaining walls and loading platforms—is intended for pressures up to 100 lb. per cu. ft. Materials in this category are sand, gravel, granite, chips, lime, crushed stone, cement and minerals. Pressure on the wall units is governed by the density of materials and the degree to which they are self-supporting, factors to be considered when choosing the type to use. Special units with metal straps to give additional support at the corners can be supplied for 90° angles and intersections. Radius units with a 10° mitre are available for curved stress. The walls are adequately holed for lifting purposes and for the attachment of any special metal fittings, such as angle-iron extensions, carrying lines of barbed wire or gate post brackets.

A 'strange series of events which began one cold, wet day in the Spring of 1907' led to the founding of the American Cyanamid Company. In its publication *Cyanamid and its Products,* the company describe how a civil engineer called Frank Sherman Washburn travelled to Norway to investigate a new arc process for nitrogen fixation, found it impracticable for American conditions, then learned of the German Frank-Caron cyanamide process and obtained the right to produce calcium cyanamide in America. The brochure, which is illustrated, goes on to describe the growth of the firm and the enormous increase in the products it manufactures. The company's subsidiary in this country is Cyanamid Products Ltd., of Bush House, Aldwych, London W.C.2.

* * *

ISSUED by the National Bureau of Standards, US Department of Commerce, Washington 25, DC, *Precision Laboratory Standards of Mass and Laboratory Weights,* by T. W. Lashof and L. B. Macurdy, presents the specifications of the Bureau for precision laboratory standards and other laboratory weights. It also discusses the regulations governing the submission of these weights to the Bureau for test and outlines the weight-calibration service of the Bureau. The publication supersedes in part NBS Circular 3, which has been a basic reference on mass standards and weighing since its publication in 1918. It is the first of a series of publications covering the whole subject matter of Circular 3, each of which is to be issued as it is completed.

* * *

TWO new leaflets (PM 47 and PM 48) issued by Electromagnets Ltd., of Bond Street, Birmingham 19, give illustrations, dimensions and net prices of their standard range of permanent magnetic separators. Several new types are introduced, such as the Uniband and Unifeeder, which, it is claimed, possess a magnetic intensity greatly in advance of any permanent magnetic separators previously available.

* * *

PUBLICATION claimed to be one of the most comprehensive catalogues ever issued by a specialist manufacturer of gland packings in this country is 'Gland Packings for General Purposes,' produced by Crane Packing Ltd., Slough, Bucks. The contents include gland packings for applications ranging from pumps handling water or light oils at low temperatures, to those designed for services in which highly corrosive fluids and gases are handled at high temperatures and pressures. Large numbers of these latter styles of gland packings are supplied to the chemical, oil and allied industries. So that the character of each gland packing may be clearly understood by reference to this catalogue, a description is provided both of the material used in its manufacture (which includes PTFE) and the actual method by means of which each packing is constructed. In referring to the applications for which each packing is designed, examples are given of balanced combination assemblies of die-formed rings of gland packings, now widely used, especially for difficult services. Copies of this catalogue may be obtained from Crane Packing Ltd., of Slough, Bucks.

Dutch BP Company Jubilee

CELEBRATIONS were held in Amsterdam recently to mark the 50th anniversary of the foundation of Anglo-Iranian's Dutch subsidiary, Benzine en Petroleum Handel Maatschappij. Many senior officials from the company and associated companies on the Continent were present, including Mr. N. A. Gass, a Managing Director of Anglo-Iranian.

The Dutch BP Company was founded in October 1904. After having traded as a private undertaking for about ten years, the company came under the control of the European Petroleum Union. After a further ten years, it became the property of the Olex Company of Berlin, which had then become a subsidiary of Anglo-Iranian. In 1937, Anglo-Iranian became the sole shareholder of the Dutch Company.

At a reception held for the staff, speeches were made by Mr. A. T. Crighton, managing director, Mr. A. van Eldert, general manager, and Sir Guy Cooper, general manager of Anglo-Iranian's Marketing Division.

A reception was also held for business associates of the company and was attended by the Head of the Petroleum Division of the Ministry of Economic Affairs, the Burgomaster of Amsterdam and representatives of leading Dutch companies.

British Chemical Prices

(These prices are checked with the manufacturers, but it must be pointed out that in many cases there are variations according to quantity, quality, place of delivery, etc.)

LONDON.—Active trading conditions have been reported from most sections of the industrial chemicals market, and delivery specifications for textile chemicals are well up to schedule even though new business in this direction is on a moderate scale. There has been a good seasonal demand for fertilisers and the movement of the soda products and the barium chemicals remains good. Prices generally are unchanged. Among the coal tar products, pitch is in good demand for home and export account, and for most other items there is a steady movement against contracts.

MANCHESTER.—Most leading users of heavy chemicals in the Lancashire area are taking good deliveries under contracts, including the soda and potash compounds and a wide range of miscellaneous products. Inquiries and actual fresh bookings during the past week have been on a fair scale, though the usual year-end dullness is expected to make itself felt within the next week or two. Prices generally are maintained on a steady to firm basis. Moderate buying interest has been reported in the fertiliser market, with a continued steady business passing in most of the light and heavy by-products.

GLASGOW.—A certain disruption is still being experienced as a result of the recent dock strike, but it is to be hoped that the coming week will see a more settled state of affairs. Despite these considerable drawbacks, business during the latter half of the week has been extremely good and considerable tonnages have been booked for forward delivery. Prices have on the whole been steady, and it is gratifying to observe that the upward trend experienced a few months ago, throughout practically the whole of the consuming industry, is being maintained. Export has also been extremely lively with very interesting inquiries and some good orders booked for spot and forward delivery.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 10 tons, £86. 80% pure, 10 tons, £92 ; commercial glacial 10 tons, £94 ; delivered buyers' premises in returnable barrels ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £130 per ton.

Alum.—Ground, about £23 per ton, f.o.r. MANCHESTER : Ground, £25.

Aluminium Sulphate.—Ex works, £14 15s. per ton d/d. MANCHESTER : £14 10s. to £17 15s.

Ammonia, Anhydrous.—1s. 1d. to 1s. 3½d. per lb.

Ammonium Bicarbonate.—2 cwt. non-returnable drums : 1-ton lots, £49 per ton.

Ammonium Chloride.—Per ton lot, in non-returnable packaging, £27 17s. 6d.

Ammonium Nitrate.—D/d, £33 per ton.

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

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £97 and £94 10s. per ton.

Antimony Sulphide.—Crimson, 4s. 4d. to 4s. 9½d. ; golden, 2s. 7½d. to 4s. 0¾d. ; all per lb., delivered UK in minimum 1-ton lots.

Arsenic.—Per ton, £45 to £50 ex store.

Barium Carbonate.—Precip., d/d : 4-ton lots, £39 per ton ; 2-ton lots, £39 10s. per ton, bag packing.

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

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £42 10s. per ton d/d ; 2-ton lots, £43 per ton d/d.

Bleaching Powder.—£27 17s. 6d. per ton in returnable casks, carriage paid station, in 4-ton lots.

Borax.—Per ton for ton lots, in free 140-lb. bags, carriage paid : Anhydrous, £58 10s.; in 1-cwt. bags ; commercial, granular, £38 10s. ; crystal, £41 ; powder, £42 ; extra fine powder, £43 ; BP, granular, £47 10s. ; crystal, £50 ; powder, £51 ; extra fine powder, £52.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid : Commercial, granular, £67 ; crystal, £75 ; powder, £72 10s. ; extra fine powder, £74 10s. ; BP, granular, £80 ; crystal, £84 10s. ; powder, £87 ; extra fine powder, £86 10s.

Calcium Chloride.—Per ton lot, in non-returnable packaging: solid, £15; flake, £16 4s.

Chlorine, Liquid.—£36 7s. 6d. per ton, in returnable 16-17-cwt. drums, delivered address in 3-drum lots.

Chromic Acid.—2s. 0⅝d. per lb., less 2½%, d/d UK, in 1-ton lots.

Chromium Sulphate, Basic.—Crystals, 7½d. per lb. delivered (£70 per ton).

Citric Acid.—1-cwt. lots, £10 5s. cwt.; 5-cwt. lots, £10 cwt.

Cobalt Oxide.—Black, delivered, bulk quantities, 13s. 2d. per lb.

Copper Carbonate.—2s. 6d. per lb.

Copper Sulphate.—£88 17s. 6d. per ton f.o.b., less 2% in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £9 12s.

Formaldehyde.—£37 5s. per ton in casks, d/d.

Formic Acid.—85%, £86 10s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G., £13 3s. 6d. to £13 14s. 6d. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hydrochloric Acid.—Spot, about 12s. per carboy d/d, according to purity, strength and locality.

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

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

Iodine.—Resublimed B.P., 17s. 7d. per lb., in 28-lb. lots.

Iodoform.—£1 6s. 7d. per lb., in 28-lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight £122 per ton; dark tech., 44 per cent by weight £73 per ton ex works 1-ton lots; dark chemical quality 44 per cent by weight £109 per ton, ex works; usual container terms.

Lead Acetate.—White: About £147 to £149 per ton.

Lead Nitrate.—About £120-£125, 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red lead, £137; orange lead, £149. Ground in oil: red, £153 10s. orange, £165 10s.

Lead, White.—Basis prices: Dry English in 5-cwt. casks, £141 15s. per ton. Ground in oil: English, 1-cwt. lots, 178s. per cwt.

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

Litharge.—£139 per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex works, about £28 per ton.

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

Magnesium Chloride.—Solid (ex wharf), £14 10s. per ton.

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

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

Mercuric Chloride.—Technical Powder, £1 8s. 9d. per lb., in 5-cwt. lots; smaller quantities dearer.

Mercury Sulphide, Red.—£1 11s. 3d. per lb., for 5-cwt. lots.

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

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

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, about £131 per ton, carriage paid.

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £92 per ton; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.

Potash, Caustic.—Solid, £94 10s. per ton for 1-ton lots; Liquid, £37 5s.

Potassium Carbonate. — Calcined, 96/98%, about £63 per ton for 1-ton lots, ex-store.

Potassium Chloride.—Industrial, 96%, 1-ton lots, about £22 per ton.

Potassium Dichromate.—Crystals and granular, 11⅞d. per lb., in 1-ton lots, d/d UK.

Potassium Iodide. B.P., 14s. 1d. per lb. in 28-lb. lots; 13s. 7d. in cwt. lots.

Potassium Nitrate.—Per ton lot, in non-returnable packaging, paid address, £66.

Potassium Permanganate.—B.P., 1-cwt. lots, 1s. 8½d. per lb.; 3-cwt. lots, 1s. 8d. per lb.; 5-cwt. packed in 1-cwt. drums, £8 12s. 6d. per cwt.; packed in 1 drum, £8 11s. 6d. per cwt.; 1-ton packed in 5-cwt. drums, £8 7s.

Salammoniac.—Per ton lot, in non-returnable packaging, £45 10s.

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

Soda Ash.—58% ex-depot or d/d, London station, about £15 5s. 6d. per ton, 1-ton lots.

Soda, Caustic.—Solid 76/77%; spot, £26 to £28 per ton d/d. (4 ton lots).

Sodium Acetate.—Commercial crystals, £80 to £85 per ton d/d.

Sodium Bicarbonate.—Per ton lot, in non-returnable packaging, £15 15s.

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

Sodium Carbonate Monohydrate.—Per ton lot, in non-returnable packaging, paid address, £53 5s.

Sodium Chlorate.—£75 per ton in free 1-cwt. drums, carriage paid station, in 4-ton lots.

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

Sodium Dichromate.—Crystals, cake and powder, 10d. lb. Net d/d UK, minimum 1-ton lots ; anhydrous, 11½d. lb. Net del. d/d UK, minimum 1-ton lots.

Sodium Fluoride.—Delivered, 1-ton lots and over, £4 10s. per cwt. ; 1-cwt. lots, £5 per cwt.

Sodium Hyposulphite.—Pea crystals £34 a ton ; commercial, 1-ton lots, £28 per ton carriage paid.

Sodium Iodide.—BP, 17s. 1d. per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £127 per ton.

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

Sodium Nitrate.—Chilean Industrial, over 98% 6-ton lots, d/d station, £27 10s.

Sodium Nitrite.—£32 per ton (4-ton lots).

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

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £81 ; tri-sodium, crystalline, £39 10s., anhydrous, £79.

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

Sodium Silicate.—75-84 TW. Zoned. Drums delivered station. Lancashire and Cheshire, 4-ton lots, carriage paid station, £10 10s. per ton. ; Dorset, Somerset and Devon, £3 17s. 6d. per ton extra ; Scotland and S. Wales, £3 per ton extra. Elsewhere in England, excluding Cornwall and Wales, £1 12s. 6d. per ton extra.

Sodium Sulphate (Glauber's Salt).—About £8 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER : £6 10s. per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot, £32 2s. 6d. per ton, d/d, in drums ; broken, £33 2s. 6d. per ton, d/d, in drums.

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

Sulphur.—Per ton for 4 tons or more, ground, £23 11s. to £26, according to fineness.

Tartaric Acid.—Per cwt. : 10 cwt. or more, £11 10s.

Titanium Oxide.—Standard grade comm., with rutile structure, £155 per ton ; standard grade comm., £135 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d : white seal, £98 10s. ; green seal, £97 10s. ; red seal, £96.

Solvents and Plasticisers

Acetone.—Small lots : 5-gal. drums, £129 per ton ; 10-gal. drums, £119 per ton. In 40/45-gal. drums less than 1 ton, £94 per ton ; 1 to 9 tons, £91 per ton ; 10 to 49 tons, £89 per ton ; 50 tons and over, £88 per ton. All per ton d/d.

Butyl Acetate BSS.—£173 per ton, in 1-ton lots ; £171 per ton, in 10-ton lots.

***n*-Butyl alcohol, BSS.**—10 tons, in drums, £161 10s. per ton d/d.

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

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

Diacetone Alcohol.—Small lots : 5 gal. drums, £177 per ton ; 10 gal. drums, £167 per ton. In 40/45 gal. drums ; less than 1 ton, £142 per ton ; 1 to 9 tons, £141 per ton ; 10 to 50 tons, £140 per ton ; 50 to 100 tons, £139 per ton ; 100 tons and over, £138 per ton.

Dibutyl Phthalate.—In drums, 10 tons, 2s. per lb. d/d ; 45 gal. drums, 2s. ¾d. per lb. d/d.

Diethyl Phthalate.—In drums, 10 tons, 1s. 10¼d. per lb. d/d ; 45 gal. drums, 1s. 11¼d. per lb. d/d.

Dimethyl Phthalate.—In drums, 10 tons, 1s. 7¼d. per lb. d/d ; 45 gal. drums, 1s. 8¾d. per lb. d/d.

Dioctyl Phthalate.—In drums, 10 tons, 2s. 8d. per lb. d/d ; 45 gal. drums, 2s. 9½d. per lb. d/d.

Ether BSS.—In 1 ton lots, 1s. 11d. per lb ; drums extra.

Ethyl Acetate.—10 tons lots, d/d, £135 per ton.

Ethyl Alcohol (PBS 66 o.p.).—Over 300,000 p. gal., 2s. 9d. ; 2,500-10,000 p. gal., 2s. 11½d. per p. gal., d/d in tankers. D/d in 40/45-gal. drums, 1d. p.p.g. extra. Absolute alcohol (75.2 o.p.) 5d. p.p.g. extra.

Methanol.—Pure synthetic, d/d, £43 15s. per ton.

Methylated Spirit.—Industrial 66° o.p. : 500 gal. and over in tankers, 4s. 10d. per gal. d/d ; 100-499 gal. in drums, 5s. 2½d. per gal. d/d. Pyridinised 64 o.p. : 500 gal. and over in tankers, 5s. 0d. per gal. d/d ; 100-499 gal. in drums, 5s. 4½d. per gal. d/d.

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

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

***iso*Propyl Acetate.**—In drums, 10 tons, £130 per ton d/d ; 45 gal. drums, £135 per ton d/d.

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

Rubber Chemicals

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

Carbon Bisulphide.—£61 to £67 per ton, according to quality.

Carbon Black.—8d. to 1s. per lb., according to packing.

Carbon Tetrachloride.—Ton lots, £76 10s. per ton.

India-rubber Substitutes.—White, 1s. 6¾d. to 1s. 10½d. per lb. ; dark, 1s. 4½d. to 1s. 8d. per lb.

Lithopone.—30%, about £54 per ton.

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

Sulphur Chloride.—British, about £50 per ton.

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

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

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton, in 6-ton lots, d/d farmer's nearest station : November, £17 10s. ; December, £17 12s. 6d.

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

'Nitro-Chalk.'—£15 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots, d/d nearest station : December to February, £26 5s.

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals. delivered in bulk, 90's, 5s. ; pure, 5s. 4d.

Carbolic Acid.—Crystals, 1s. 4d. to 1s. 6½d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 4½d. to 1s. 6½d. per lb., d/d crude, 8s. naked, at works.

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

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

Naphtha.—Solvent, 90/160°, 5s. per gal. for 1000-gal. lots ; heavy, 90/190°, 3s. 9½d. per gal. for 1000-gal. lots, d/d. Drums extra ; higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in sellers bags, £15 1s. 9d. to £22 per ton, according to m.p. ; hot pressed, £34 10s. per ton in bulk ex-works ; purified crystals, £58 per ton d/d.

Pitch.—Medium, soft, home trade, £9 per ton f.o.r. suppliers' works ; export trade about £11 10s. per ton f.o.b. suppliers' port.

Pyridine.—90/160°, £1 5s. to £2 per gal.

Toluol.—Pure, 5s. 7d. ; 90's, 4s. 10d. per gal., d/d. MANCHESTER : Pure, 5s. 8d. per gal. naked.

Xylol.—For 1000-gal. lots, 5s. 8d. to 5s. 10d. per gal., according to grade, d/d.

Intermediates and Dyes (Prices Nominal)

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

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

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

Dichloraniline.—3s. 6d. per lb.

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

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

***p*-Nitraniline.**—4s. 7d. per lb.

Nitrobenzene.—Spot, 9½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—2s. per lb.

***o*-Toluidine.**—1s. 9d. per lb., in 8/10-cwt. drums, drums extra.

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

Dimethylaniline.—3s. 1d. per lb., drums extra, carriage paid.

Law & Company News

New Registrations

Cutting Fluids & Lubricants Ltd.

Private company. (539,227). Capital £1,000. To carry on the business of refining, blending and manufacturing oils and chemicals, etc. The subscribers (each with one share) are: Jean Herbert and Claire Moore. The first directors are to be appointed by the subscribers.

E & N Products Ltd.

Private company. (539,201). Capital £1,000. Manufacturers of and workers and dealers in and importers and exporters of chemicals of all kinds, synthetic syrups, resins, condensation products, gums, lacquers, varnishes, paints, etc. The subscribers (each with one share) are: Eileen M. Tew and George N. Lee. The first directors are to be appointed by the subscribers. Reg. office: 203 Regent Street, London W.1.

Company News

International Paints (Holdings) Ltd.

The directors of International Paints (Holdings) Ltd. announce an interim dividend of 6 per cent on account of the year ending 31 December. This is the same as last year, but is payable on the increased ordinary capital resulting from the one-for-three scrip issue last June. It is equivalent to 8 per cent on the former capital.

British Chrome & Chemicals Ltd.

A meeting is to be held at Eaglescliffe, Stockton-on-Tees, on 14 December to consider proposals to combine a group of wholly-owned operating subsidiaries, comprising John & James White Ltd., Eaglescliffe Chemical Co. Ltd., and E. P. Potter & Co. Ltd. The proposals, announced by the parent company, British Chrome & Chemicals Ltd., envisage a new company, to be known at first as British Chrome & Chemicals (Manufacturing) Ltd. (the trading company), which will acquire the whole of the issued share capital of Eaglescliffe, White's and Potter's from the parent company in exchange for shares in the trading company; the three concerns will then transfer their undertakings and assets to the trading company. The parent company would have one wholly-owned operating subsidiary, the trading company. It is considered that this company should be known as British Chrome & Chemicals Ltd. Accordingly, it is proposed that the name of the parent company should be changed to British Chrome & Chemicals (Holdings) Ltd.

F. Steiner & Co. Ltd.

An 'extremely unsatisfactory year' was reported by Mr. R. A. L. Hartman, chairman of Steiner & Co. Ltd., dyers and calico printers, at the annual meeting on 18 November. He said that efforts to make good shortcomings on the technical side had proved disappointing, although lately they had become more successful. Other difficulties included the heavy cost of re-equipment, shortage of labour and 'punitive' taxation. The firm had enlisted the services of industrial consultants with a view to improving efficiency. Loss for the year, before allowing for taxation, but allowing £20,638 for depreciation, was £1,448, to which income tax had to be added, making a total loss of £2,562. After deducting this sum from the profit of £62,886 brought forward from the previous year, a carry-forward to next year remains of £60,324.

Benzol & By-Products Ltd.

The directors of Benzol & By-Products Ltd. announce that notice has been received that the company's application for direction for the adjustment of the respective interests of shareholders of the cumulative preference shares and holders of the ordinary shares will be heard by the tribunal established under Section 25 of the Coal Industry Nationalisation Act, on 21 February 1955.

Natal Chemical Syndicate

After providing for taxation (£59,873) and minority interest, the net profit of the Natal Chemical Syndicate Ltd. and subsidiary was £103,308, compared with £124,515 for the previous year. Unchanged dividends, making 1s. 6d. for the year, were provided, and £50,000 (£93,000 in the previous year) were added to the reserve.

South African Carbide & By-Products Co.

Net profit, after tax and administration expenses, etc., of South African Carbide and By-Products Company for the year ended 31 August was £15,807, against £921. Revenue was £25,558 (£18,157). The meeting will be on 9 December.

Chemical & Allied Stocks & Shares

A LARGE amount of business has again been reported in stock markets, where buyers predominated, though selling was more in evidence than recently. It is not surprising there has been a tendency to take part of the big profits represented by the very large rise in share values in the past few months. Prices went back in a fairly general reaction at one time, but this has now been followed by renewed demand, buyers having been attracted by the rather lower prices. In fact, demand has put a number of shares up to new high levels. The revival of buying was stimulated a good deal by the larger Conservative majority at the West Derby by-election. This incidentally resulted in the big rush for Dorman Long shares, which was the most successful issue of denationalised steel shares so far, applications for the 15,000,000 shares offered at 22s. 6d. amounting to nearly £85,000,000. Consequently allotments had to be scaled down severely.

Best Levels Not Held

Chemical and allied shares were active again, but in line with the general trend of markets have not held best levels. Imperial Chemical were 41s., compared with 43s. 6d. a month ago, although City estimates of the year's dividend continue to range up to 10 per cent. Albright & Wilson 5s. shares at 28s. were a firm feature, being within 3d. of the price a month ago. Laporte 5s. shares reacted from 19s. 9d. to 17s. xd., while Monsanto 5s. shares, after advancing to the new high level of 36s., came back to 32s. 9d., which, however, compares with 28s. 9d. a month ago.

Fisons have not held best levels, despite the excellent impression created by the financial results and chairman's annual statement, the price coming back to 56s. 3d., compared with 59s. 6d. a month ago. Reichhold 5s. shares held firm, being 14s. 6d. or only 3d. lower on balance. In other directions, Lawes Chemical 10s. shares were 16s. 1½d. and British Chrome Chemicals 5s. shares 13s. 6d. Hickson & Welch 10s. shares were 18s. 6d. and British Glues & Chemicals 4s. shares 13s. 7½d. There was considerable activity in Glaxo 10s. shares which, however, reacted to 63s. 9d., although the financial results and chairman's annual statement emphasise the progressive policy followed by the group.

Borax Consolidated shares remained an erratic market, fluctuating sharply from day to day, but the current price of 83s. 3d. is within a few pence of that a month ago. Reason for the continued fluctuations in the shares is uncertainty whether the company's pending statement will disclose that the Treasury would allow a take-over bid to be made if it meant control of this important dollar-earning company going across the Atlantic. There was still a very large business in William Blythe 3s. shares around 21s. because of revived take-over talk in the market, though these rumours are entirely without confirmation.

Boots Drug 5s. shares eased to 28s. 6d., which compares with 29s. 10½d. a month ago. Shares of plastics companies were active with British Xylonite 45s. 3d. xd., compared with 46s. a month ago, while Bakelite moved up from 28s. 6d. to 30s. 9d. Erinoid 5s. shares were 5s. 1½d. and British Industrial Plastics 2s. shares 5s. 9d. The 4s. units of the Distillers Co. were around 26s. Coalite & Chemical 2s. shares changed hands around 3s. 9d.

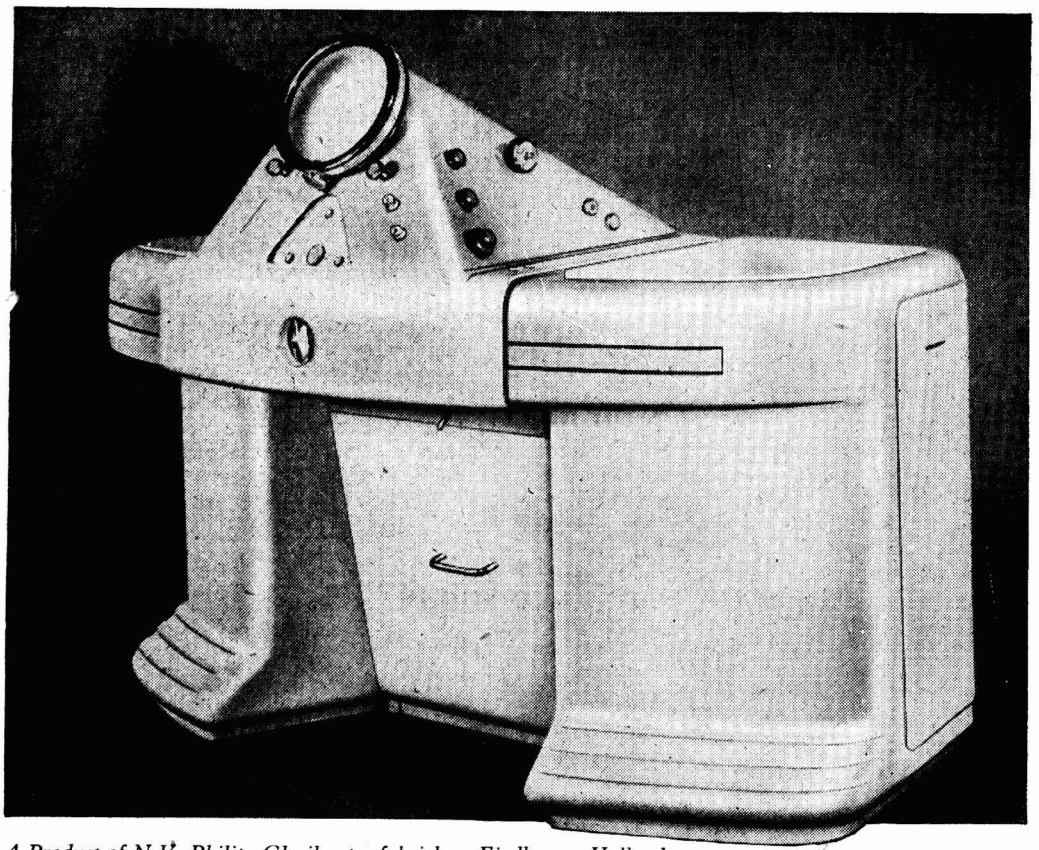
There was a very large business in Unilever and Unilever NV shares on the share bonus proposals and the expected quotation of Unilever NV at New York. Compared with a month ago, Unilever have risen from 97s. to 99s. and Unilever NV reached the new peak of 105s. Triplex Glass shares have been active up to the new record level of 36s. 3d. United Glass Bottle on the scrip bonus news advanced strongly to 81s. which is the highest level reached this year. United Molasses changed hands around 36s. 9d. Oils were active, but did not keep best levels. Anglo-Iranian, however, were £18⅛ xd., compared with £17⅞ a month ago.

KID Exemptions

THE Treasury has made an order exempting the following articles from Key Industry Duty for the period beginning 19 November to 15 February:

4:4′-diaminodiphenylmethane; glyoxal; *n*-hexoic acid; *p*-nitrobenzoic acid; phenyl isocyanate; phthalic anhydride.

PHILIPS Electron Microscope



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Next Week's Events

MONDAY 29 NOVEMBER

Chemical Society

Durham: Science Laboratories, The University, 5.15 p.m. 'Some Aspects of the Chemistry of the Amino-sugars' by Professor M. Stacey.

Society of Chemical Industry

Bradford: Technical College, 7 p.m. 'The Physics and Chemistry of Melt Spinning' by Dr. R. F. Tuckett (joint meeting with Bradford Chemical Society).

TUESDAY 30 NOVEMBER

Royal Institute of Chemistry

London: Sir John Cass College, Jewry Street, E.C.3, 6.30 p.m. 'Synthetic Organic Chemicals in Agriculture' by Dr. M. A. Phillips (with the Sir John Cass College Chemical Society).

Society for Analytical Chemistry

London: Chemical Society Meeting Room, Burlington House, W.1, 6.30 p.m. Physical Methods Group. Annual general meeting followed by a discussion meeting on 'Possibilities in the Establishment of Standard Samples for the Determination of Some Trace Elements.'

WEDNESDAY 1 DECEMBER

Royal Institute of Chemistry

Walthamstow: South-West Essex Technical College, Forest Road, E.17, 7 p.m. 'Germanium—its Extractions and Uses' by A. R. Powell (with the South-West Essex Technical College Chemical Society).

Institution of Chemical Engineers

Cardiff: University College of South Wales and Monmouthshire, Cathays Park, 7 p.m. Graduates and Students Section. 'Some Observations on the Design and Commissioning of Chemical Plants' by B. L. Budd.

Society for Analytical Chemistry

London: Chemical Society Meeting Room, Burlington House, W.1, 7 p.m. 'Determination of Vitamin A' (joint meeting with the Oil and Fats Group, SCI).

THURSDAY 2 DECEMBER

Chemical Society

London: Society's Rooms, Burlington House, W.1, 7.30 p.m. Meeting for the reading of original papers.

Bristol: Department of Chemistry, The University, 7 p.m. 'The Thermochemistry of Alloys' by A. R. Harding (joint meeting with the RIC, SCI Chemical Engineering Group and the Institute of Metals).

Liverpool: Chemistry Lecture Theatre, The University, 5 p.m. 'Macrozamin and the Aliphatic Azoxy-compounds' by Professor B. Lythgoe (joint meeting with the University Chemical Society, RIC, SCI and British Association of Chemists).

Manchester: Chemistry Lecture Theatre, The University, 6.30 p.m. 'Configuration and Properties of Polymer Molecules in Dilute Solution' by Professor P. J. Flory (joint meeting with the Institute of Physics).

Institute of Metal Finishing

Manchester: The Engineers' Club, Albert Square, 7.30 p.m. Film on spray painting and talk on recent developments by R. A. W. Ottley.

Society for Analytical Chemistry

Glasgow: The Central Hotel, 7.30 p.m. Ramsay Chemical Dinner.

FRIDAY 3 DECEMBER

Chemical Society

Birmingham: Chemistry Department, The University, 4.30 p.m. 'Some Aspects of the Organic Chemistry of Phosphorus' by Professor H. N. Rydon (joint meeting with Birmingham University Chemical Society).

Cambridge: Chemical Laboratory, The University, 8.30 p.m. 'The Polymerisation of Vinyl Ethers' by Professor D. D. Eley (joint meeting with the University Chemical Society).

Institution of Chemical Engineers

Newcastle-on-Tyne: Department of Chemical Engineering, Stephenson Building, Claremont Road, 6.15 p.m. 'Crystallisation from Organic Melts' by J. S. Forsyth.

Institute of Fuel

Cardiff: South Wales Institute of Engineers, Park Place, 6 p.m. 'Sulphur Removal and Recovery from Fuels' by Dr. J. G. King. Conclusions from opening conference of the special study.

SATURDAY 4 DECEMBER

Society of Leather Trades' Chemists

Manchester: Reynolds Hall, Manchester College of Technology, 2 p.m. 'The Interesting Story of Oils and Fats' by G. S. Robertshaw and 'Ion Exchange Resins' by Dr. K. W. Pepper.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive, or a woman aged* 18-59 *inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order,* 1952.

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APPLICATIONS are invited from men between 25 and 40 years of age, with the above qualifications, for service in the **CALTEX GROUP** of Oil Companies now expanding their engineering staff in U.K. and overseas. Present openings are for service initially in this country on work connected with projects for new overseas refineries and for expansions to others. Design experience preferred, salaries being in accordance with qualifications and experience.

Apply, with full particulars, to **BOX No. C.A. 3369, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4,** marking letter and envelope **" B.Q."**

ELECTRICITY Supply Commission (South Africa) require **POWER STATION CHEMIST** for Johannesburg. Minimum academic qualification, B.Sc. with Chemistry as one major subject; preferably aged over 30 with at least six years' experience Power Industry, particularly treatment feed water for high-pressure boiler plant and cooling tower and condenser problems. Basic salary dependent on qualifications and experience, but not less than £850 per annum, plus cost-of-living allowance (about £22 month married, £11 single). Appointment will be under contract providing for free passage to South Africa. Pension Fund and favourable leave privileges apply. Applications, stating age, whether married or single, experience and qualifications, should be addressed to **THE LONDON REPRESENTATIVE, ELECTRICITY SUPPLY COMMISSION (SOUTH AFRICA), 535-546, THE ADELPHI, LONDON, W.C.2.**

PHYSICAL CHEMIST (or Physicist, with knowledge of Analytical methods) for production/development work on Fine Powders at Works near St. Albans, Herts. Excellent prospects, Pension Fund. Profits Sharing Scheme. Write full details age, qualifications, experience to date, Salary required to **STAFF MANAGER (REF. M.), F.W. BERK & CO. LTD., HEAVY CHEMICAL MANUFACTURERS, P.O. BOX 193, 1-19 NEW OXFORD STREET, LONDON, W.C.1.**

THE POWER-GAS COROPORATION, LIMITED, STOCKTON-ON-TEES, require **PHYSICAL** or **INORGANIC CHEMIST** for their Research Laboratories. Candidates should hold a good Honours Degree in Chemistry and preferably be under 30 years of age. Salary dependent on qualifications and experience. Permanent position. Pension Scheme. Accommodation available. Apply **STAFF PERSONNEL OFFICER.**

SALAMON & CO., LTD., have a vacancy for a man with some Chemical Engineering knowledge, to supervise production of chemical processes. Previous experience of ammonia and tar distillation desirable, but not essential. 30-40 years of age, and salary fully commensurate with applicants attainments is visualised. Apply, in confidence, to **THE GENERAL MANAGER, SALAMON & CO., LTD., RAINHAM, ESSEX.**

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THE BOARD OF TRADE have for disposal about 222 tons of Crude Liquid Rosin of Scandinavian origin packed in 40-45 gallon metal drums weighing approximatly 4½ cwt. gross.

The material is offered as it stands loaded to rail wagon or buyers vehicle ex. Board of Trade Depot, Leadburn, by West Linton, Peeblesshire. The material is open to inspection and arrangements for inspection will be made on application to the Board of Trade, I.M.7, Room 315, Lacon House, Theobalds Road, London, W.C.1. (Telephone: Chancery 4411, Ext: 326).

Offers are invited for part or all of this material, and should be made in writing to the Board of Trade not later than 9th December, 1954. Full particulars may be obtained on application to the address given above.

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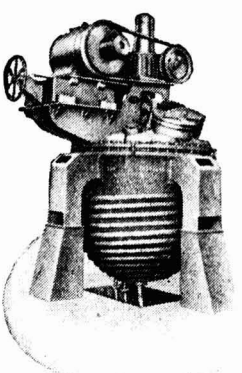

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