The Chemical Age

VOL LXVIII | 2 MAY 1953 | No 1764

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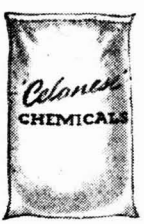
'Celanese'

FOR FINE CHEMICALS

All over the world, major industrial concerns are using 'Celanese' chemicals. Continuous research in the 'Celanese' laboratories produces a wide range of chemicals and allied products, famous for their consistency and reliability. The Company's technical staff will be pleased to discuss or offer advice on problems relating to 'Celanese' chemical and allied products, which include

Acetamide Tech.
Acetic Acid
Acetic Anhydride
Acetone
Cellulose Acetate
Diethyl Sulphate
Ethyl Acetate
Ethylene Dichloride
Ethyl Ether
Ethyl Methyl Cellulose ('Celacol EM')
Isopropyl Ether
Methyl Cellulose ('Celacol M' and 'Celacol MM' in various viscosity grades)
Monomethylamine (free from di- and tri-methylamines)
Trichlorethyl-phosphate



SMALL QUANTITIES

The resources of the 'Celanese' company are keyed to handle bulk supplies, yet a feature of 'Celanese' service is that small orders are handled with the same promptness and efficiency.

British Celanese Limited are proprietors of the Trade Marks 'Celanese' and 'Celacol'

BRITISH CELANESE LIMITED

CHEMICAL SALES DEPARTMENT, CELANESE HOUSE, HANOVER SQUARE, LONDON, W.1

The
Chemical Age

Established 1919

The Weekly Journal of Chemical Engineering and Industrial Chemistry

BOUVERIE HOUSE 154 FLEET STREET LONDON E.C.4.
Telegrams: ALLANGAS FLEET LONDON · Telephone: CENTRAL 3212 (26 lines)

Volume LXVIII 2 May 1953 Number 1764

Safety Measurements

IN 1951 there were 828 fatal factory accidents, 29 more than in the preceding year. On the other hand, non-fatal accidents were 5 per cent fewer; their number fell from 192,260 to 182,616, the lowest annual toll since 1938. As the number of persons engaged in manufacturing industries rose by 150,000, the decline is real and not merely a reflection of lessened hours or activity. Oddly, the fall in non-fatal accidents was accounted for almost entirely by men. The fall for women and young persons was almost negligible. These facts emerge from the Annual Report of the Chief Inspector of Factories for 1951, which has been recently published (HMSO, 232 pp., 6s. 6d.). This, we suspect, is a document that attracts much too little attention, like the work of the factory inspectorate itself. The very word 'accident' suggests the unpredictable and incalculable, but when accidents are studied in the mass the element of chance is not as dominant. There are distinct trends in industrial accidents.

For various industries accident frequency rates are calculated from information that is voluntarily supplied by various firms. It is inevitable, therefore, that the figures come from factories where special attention is paid to accident prevention. If fully comprehensive figures were available, they would certainly be rather higher. Bearing this limitation in mind, we can, however, compare the chemical industry with others. For fine chemicals, the rate has fallen from 1.30 in 1948 to 1.15 in 1951; for heavy chemicals, from 1.75 to 1.41. The average frequency rates for all industry are 2.24 (1948) and 1.70 (1951). Not many industries have better records than the fine chemical industry; only printing, light engineering, and aircraft manufacture had lower rates in 1951. As for heavy chemicals, only a few more industries have to be added to the list above to provide the total number of industries whose accident-rate is lower. When the wider range of hazards is considered (toxicity, corrosive or explosive nature, and inflammability of many materials handled) the record of both branches of the chemical industry is commendably high. At the same time, it must be appreciated that in a number of other industries—saw-mills, tinplate, metal extraction and conversion, etc.—

the nature of the equipment used and in some cases the sheer weight of materials handled create greater risks.

Accidents in factories where chemicals are used are almost as much the concern of the chemical industry as accidents inside the industry. After all, the proud claim that we produce so many vital materials for other industries carries responsibilities with it. To ensure that users of chemicals are well aware of hazards is both a moral duty and commercial common sense. Though the new Report provides data copiously, it is not easy to obtain or deduce any measure for accidents caused through handling chemical intermediates. If toxicity is taken as a representative hazard, it can certainly be said that the record is highly satisfactory. The number of cases of poisoning in industry is not great; indeed, having regard to the expansion of the chemical industry itself and to the many new chemical processes operated in and outside the industry, it is remarkably small. Fumes and gassing caused 228 accidents in 1951 of which only 17 had fatal results; in the war years annual figures ranged between 400 and nearly 800. The accident record now would seem to be much the same as in pre-war years, but with greater industrial activity the exposure to risk is higher. There has been a notable fall in cases of poisoning by trichlorethylene, 24 cases in 1950 being reduced to only 6 in 1951; similarly, poisoning by nickel carbonyl has been appreciably reduced.

One section of the Report pays particular attention to fume removal. Very often the necessary ventilation is in direct conflict with the aims of fuel economy: this general dilemma is frankly admitted in the Report. The introduction of new solvents without prior attention to adequate ventilation is criticised. A case is cited where a number of cases of carbon tetrachloride poisoning occurred on a chemical plant 'so badly designed' that all means of applying safeguards eventually proved ineffective; in the end a less dangerous solvent had to be substituted, and it may perhaps be surmised that the alternative solvent was more costly. With the steady increase in industrial uses of organic substances, especially those of a volatile nature, it is obvious that the possibility of absorption of fumes has greatly increased. The fact that so few accidents actually occurred is gratifying enough, but it should not be allowed to encourage an attitude of complacency. Nothing is more insidious than gassing or fume absorption as any one who has had to deal with factory accidents of that type knows only too well. Nevertheless, the record of safety in British industry is good and perhaps excellent; and dangerous chemicals both inside and outside the chemical industry have been prudently handled.

On Other Pages

The annual subscription to THE CHEMICAL AGE is 42s. Single copies, 1s.; post paid, 1s. 3d. SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3954/5). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784/5). LEEDS OFFICE: Martins Bank Chambers, Park Row, Leeds, 1 (Leeds 22601). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited.

Notes & Comments

Bitter Sweet

'WHAT would you consider to be one of our most abundant, inexpensive and versatile chemical raw materials?' asks *Industrial & Engineering Chemistry* in a recent report (**45**, 4, 18A). British readers will be forgiven if they cannot give the answer to the million-dollar question. It is sugar. In the Britain of today, where we are still impatiently awaiting the derationing of sugar, it is a little painful to be reminded that '. . . the current sugar supply is ample. Total U.S. production is 8,000,000 tons a year, and Cuba, which supplies 6,000,000 tons a year, can quickly increase its output to 9,000,000. Production elsewhere in the world could also be expanded.' We almost have the classic situation of between-the-wars, guaranteed once to inflame the eye of every soap-box politician, when food in one country was left to rot, or cast into the fiery furnace, or the sea, while next-door neighbours went without.

Outre Temps

NOWADAYS, however, these matters are ordered better. The result of the recent great advances in technology is that almost anything can be utilised as the raw material for something, and nothing need go to waste. Sugar, for instance, is used (in America) as an 'inexpensive additive' which lowers the freezing point of dynamite. Sugar nitrate has been employed in detonators, sugar octa-acetate for denaturing alcohol; sugar is used in glue making, in metallic coating, in insecticides and adhesives. It is used as a defoliating agent for cotton, and to fortify young tomato plants; it is commonly used to bind foundry sand moulds. The recent boom in sorbitol in North America owes its success to unlimited supplies of sugar and so, as *Canadian Chemical Processing* says (March 1953, 72), '. . . it is not affected by factors that tend to limit the supply of other members of the polyol family.' Sugar is plentiful; sugar is cheap; sugar is 6 to 8 cents a pound. Dare you have just one more lump in your tea?

'Photo-Analysis'?

A NEW sunlight-activated chemical reaction is being studied at the Massachusetts Institute of Technology. Water can be split into hydrogen and oxygen by a process described as having a 'see-saw' action, and it is said that all the energy is derived from light. The chemical substance that is the agent of this new type of photo-reaction is cerous perchlorate. In aqueous solution cerous perchlorate makes use of energy absorbed from sunlight to combine with oxygen and form ceric perchlorate. The evolution of hydrogen has been detected, thus showing that the oxygen has been derived from water. At the same time, ceric perchlorate can be reduced to the cerous compound when sunlight is absorbed, and these two photo-reactions can proceed side by side in the same solution. The result is a see-saw series of reactions, the first movement liberating hydrogen and the second, oxygen. It remains to be seen whether these changes occur only in trace amounts or whether they can be quantitatively developed. Inorganic photo-reactions are not new, of course. The chemical changes upon which photography is founded can be readily instanced. However, the perchlorates of cerium would seem to be the first substances found capable of reversible photochemical reactions.

'Big Bangers' to Remain

ALTHOUGH this is the atomic age and terrific explosions (whether real or imaginary) are becoming almost commonplace, there has not come our way any evidence that the boys of today show any diminution of enthusiasm for the more modest fireworks 'touched off' every Guy Fawkes night with just as big a thrill as we ourselves experienced in our own youth. We vividly recall that the older we grew the weaker we became

in our allegiance to the 'Roman candles' and other fireworks producing wonderful colour effects with little noise, and the stronger we became in our support of the 'big bangers.' We welcome all the more, therefore, the announcement that the Home Office has firmly said 'No' to a proposal by Smethwick Council that the explosive content of fireworks should be reduced to make them safer. The Home Office has replied: 'The explosive content of the noisier fireworks has already been reduced, by a long-standing agreement with the manufacturers, to the minimum consistent with their making any noise at all. The Home Secretary has no evidence that any manufacturers have been exceeding this limit, or that fireworks are being made which would be dangerous in the hands of the public. With every confidence, therefore, boys may continue to save their sixpences or shillings from soft-hearted relatives to buy more and more 'big bangers.'

Marchon Products' Progress

ONE of the more important of the recent developments of Marchon Products Limited is the installation of a phosphoric acid plant, now nearing completion, that will embody the first Prayon filter to be erected in this country. Initial production will be 10 tons of P_2O_5 per day and it will be stepped up rapidly to 45/50 tons per day to match requirements for phosphoric acid and phosphatic salts. The most interesting product in the first stages will be sodium tripolyphosphate.

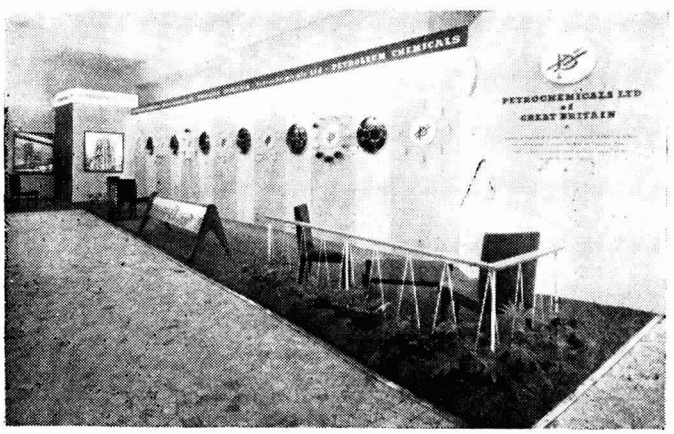
Their associated company, Solway Chemicals Limited, are making good progress with their project for the production of sulphuric acid and cement from their deposits of anhydrite and they hope to start, early in 1955, with an output perhaps in excess of an original estimate of 75,000 tons of acid annually.

Their staff has recently been joined by Mr. R. D. Cribb, formerly of the Ministry of Materials, with the object of his becoming commercial manager of Solway Chemicals Limited when they are in production.

Metallurgical Consultant

The appointment of DR. R. GENDERS, of London, as metallurgical consultant to Vanadium Corporation of America was announced recently by WILLIAM C. KEELEY, president. Dr. Genders is deputy director of metallurgical research at the Royal Ordnance Factory, Woolwich, which deals with metallurgical problems of Britain's Army, Navy and Air Force.

Dr. Genders commenced his career in the development and manufacture of alloy and tool steels in Sheffield, later taking up a post in the research department, Woolwich. His published work has covered a diverse field of metallurgy, including the constitutions of the iron-tantalum, iron-columbium and copper-zinc alloys.



This year the Milan Fair opened on 12 April and closed on 28 April. Among the British exhibitors was Petrochemicals Ltd., who had a large stand in the Chemicals and Pharmaceuticals Pavilion. All the chemicals now being produced at the firm's works at Partington Industrial Estate, near Manchester, were shown, including propylene oxide, propylene glycol and dipropylene glycol

Symposium on Effluent Disposal

Younger Chemical Engineers Hold One-day Discussion

THE Graduates' and Students' Section of the Institution of Chemical Engineers held a one-day symposium on effluent disposal at University College, London, on 17 April, when experts from several interested quarters expressed their views and answered questions from more than 150 members and visitors.

The symposium was divided into two sections. The first part, entitled 'The National Problem,' lasting from 10 a.m. to 12.30. This was presided over by Mr. H. W. Cremer, C.B.E., M.Sc., F.R.I.C., M.I.Chem.E., a past-president of the Institution of Chemical Engineers.

The first speaker was Dr. B. A. Southgate, B.A., Ph.D., D.Sc., F.R.I.C., Director, Water Pollution Research, DSIR, who discussed 'Statutory Obligations and the Nature of the Problem.'

Dr. Southgate first mentioned the methods available for effluent disposal—*viz.* (1) evaporation, (2) soaking away in the ground, (3) discharge to the sewers of the local authority, and (4) discharge into surface waters.

The problems to be overcome when effluent was disposed by discharging into the local sewers depended upon what the local authority did with their sewage and this varied from nothing to a full treatment. The first consideration was whether the industrial waste would damage the sewers and Dr. Southgate enumerated some of the possibilities in this connection—e.g., corrosion, blocking by sedimentation, explosive vapours, toxic volatile substances, etc. A number of slides were shown by the speaker as he discussed the dangers of overloading the sewage treatment plants of the local authority or of interfering with the oxidation process.

The Legal Side

Turning to the legal side of the problem Dr. Southgate briefly outlined the history and present position and quoted from the pertinent Acts.

If industrial liquors were not discharged into public sewers they must go to surface waters, the speaker said. The local authority was responsible for the quality of effluent and they had first to consider the uses made of the water. Particular care had to be taken if water was being used for domestic supply purposes. The discharge of certain nutrients into a source of supply for drinking water would increase growths and these might create taste problems. The discharge of other substances might increase the amount of treatment necessary before consumption and this would involve the local authority in extra expense. The corrosive properties of the water, its hardness and the possible interference with disinfection (e.g., ammonia interferes with chlorination) had also to be considered.

Special Considerations

There were also special considerations in the case of water which was to be used for industrial and agricultural purposes and the possible effects upon shipping and water transport had to be studied.

As far as fish were concerned there were two main points. The first of these was that certain substances if discharged into surface waters might poison the fish and that others might affect the migratory habits of the fish. Apart from direct poisons there were some substances which could reduce the oxygen content of water to such an extent that the fish would be asphyxiated. In some cases it had been found that through reducing the oxygen content of water the effect of direct poisons was accelerated. A slide showed that pollution of the Thames Estuary was so heavy that there was a nil oxygen content until a point 30 miles past Tower Bridge was reached. Pollution could also reduce sulphates to sulphides and this could be a great nuisance.

The legal problem so far as discharge into surface waters was concerned was even more complex than in the case of discharge into a sewage system, and Dr. Southgate discussed the Rivers (Prevention of Pollution Act) of 1951.

Mr. H. Cary Gibson, Director, Freshwater Biological Association, Windermere Laboratory, explained how intricate the problem was, in so far as animal and plant life was concerned, in his talk 'Life in Rivers.' From the biologists point of view, he said, a river was a living organism. A very wide range

of different types of processes were taking place and there was an unknown number of micro-organisms present. These formed the food of the next link in the food chain, e.g., snails fed on algae. Finally there were the fish. In order to provide food for the fish there must be a great deal of plant material available. Each link in the chain depended directly upon its own food but this, in turn, depended on other foods. If one link was destroyed the whole chain could be broken. Anything which altered the conditions in a river could have a great effect on life therein.

Population Strange

Unfortunately very little was known about the population of a river and so it was very difficult if not impossible to predict what would happen to fauna and flora if any given chemical were to be added to a river. No river, even if not interfered with by man, remained constant. It was always changing slowly. It was a very complex system which was the result of a large number of opposing forces more or less kept in balance. To lay down standards regarding pollution required a great deal of thought as to what went on in rivers. The biologist would need a great deal of help, particularly from the chemist.

Speaking on 'The Work of the Anglers' Co-operative Association,' Mr. C. D. Mulvey, secretary of the ACA, said that his association regarded the majority of industrialists as friends and were always prepared to meet them and discuss the problem. It was not their intention to embarrass any particular industry and they did not want to interfere with national production. Nevertheless, they did feel that there was a great deal of needless pollution and a great waste of fish and they were prepared to fight it. During the five years of their existence they had been interested in 250 legal actions in England and Wales and many in Scotland.

The use of synthetic detergents had created new problems and the ACA had recently instituted research into the effect of these upon fish. It had been found that 1 p.p. 100,000 was sufficient to kill fish. Laboratory tests had been made and a possible solution through the use of activated carbon filters had been found and one of the largest manufacturers of synthetic detergents was now undertaking tests on a large scale.

Mr. J. I. Spicer, Chief Pollution and Fisheries Officer, Trent River Board, spoke 'As a River Board Sees It.' River Boards, he said, had to look after the interests of the users of their water. Industry, fisheries, domestic water suppliers, agriculture, and transport and transportation had all to be considered. Co-operation was the key word and they had made close contacts with industry.

One of their main problems was to pinpoint the real source of pollution of a river. Fish were regarded as an index and they tried to restore rivers to the point where all fish could live in them.

They were prepared to concede to industry the job of setting a standard for pollution but they expected them to be reasonable and practical. Generalisations regarding loss of markets and possible unemployment were put out only by the less reasonable industries.

During the discussion period which preceded the lunch-time break Mr. Spicer said that he did not want anyone to think that they were going to have seven years' grace as mentioned in the Act of 1951 for the River Boards were going to get byelaw standards passed.

A member of the audience, who said he was interested in the Severn River Board, wondered whether it was realised that the most important question as far as pollution was concerned, was the matter of drinking water. Everyone drank and everyone used water and yet many towns and cities drew their supplies from sources into which other communities had discharged their sewage. It was literally true that 'One man's sewage was another man's water.' There was also the problem of accidental discharge. During the past few days he had been concerned with a case where cyanide had been found to be present in water at the intake point of a domestic water supply system in sufficient quantities to kill fish. He was of the opinion that many people used cyanide quite lightheartedly.

Not Just for Sport

When industrialists were being asked to spend a lot of money to prevent pollution they should realise that they were not being asked to do so merely to keep alive a weekend sport for a few people.

Another member of the audience said that the problem could not be divorced from economics. No one wanted to pollute rivers but one had to watch heavy expenses if they were to sell their products.

In reply to another questioner, Mr. Spicer said that the general policy was to have

several industrial undertakings served by one efficient sewage plant and it was preferred to have industrial effluent treated with public sewage, perhaps after local treatment. The real bottleneck at present was the lack of adequate sewage plant by local authorities. There was a serious delay in providing sufficient facilities.

Editor's note : Our report of the afternoon session of the symposium will appear next week.

Gallic Acid Plastic

Chemical Industry in Red China

GALLNUT, which grows in abundance in parts of China, is now being used as the basic raw material for a new plastic, according to a Peking radio broadcast. A new factory has been set up in Chungking to produce the plastic and is scheduled to begin full-scale operations at the beginning of May. Chungking, Chiang Kai-shek's wartime capital is the principal city of Southwest China, an area in which gallnut is specially plentiful.

Plastics made from gallic acid, derived from the gallnut, are said to be particularly suited to the electrical and a number of other industries. They are acid and alkali-resistant and non-conductors of heat and electricity. The Chungking factory is the first plastics undertaking established in the southwest. The plant is state-owned and was started last September after research into the problems of producing gallic acid in quantity had been successfully solved.

As part of the country's present five-year plan for industrialisation, the Chinese chemical industry is said to be undergoing considerable expansion and research work is reported to be going ahead on a far bigger scale than ever before. Fertiliser output, it is claimed, has been greatly increased in the course of the past three years and the big Yungli chemical works in Nanking, one of the largest in China, recently reported a new record—one third of it output for the first quarter of this year was up to 'top Soviet standard.' The plant, owned jointly by the state and private capital, is also a large producer of sulphuric acid and liquid ammonia. A new sulphuric acid plant is at present under construction at the works and is due to begin production in July. A machine workshop attached to the enterprise was recently given a contract to supply over 100 tons of machine parts made of acid resistant iron, etc. Even if these claims are probably exaggerated, it is likely that China is making some progress.

Faraday Society's Jubilee

THE 50th anniversary of the Faraday Society was celebrated by a special three-day meeting at the Royal Institution, London, on 17, 18 and 19 April. Among the gathering of 300 on the opening day were two founder members, Sir James Swinburne, F.R.S., first chairman of the society, and Professor F. G. Donnan, F.R.S.

In his presidential address, Professor H. S. Taylor, F.R.S., dean of the Graduate School, Princeton University, said that while the society's province was the borderland between chemistry and physics and more lately biology, he thought that its future interests would lie particularly in all aspects of radiation and solid state physics.

Faraday's remarkable conception and his influence on the development of electrochemistry were referred to by Sir Harold Hartley, F.R.S., in his paper on 'Michael Faraday as a Physical Chemist.'

In spite of his many contributions to chemistry, said Sir Harold, Faraday was by nature a physicist. But thanks to his early training with Davy his wide acquaintance with the properties of many substances and his unrivalled knowledge of chemical technique, there was always a chemist's background to his experiences. It was this dual outlook that made him a key figure in the early history of physical chemistry.

After the conclusion of the first day's discussions a dinner was held at the Dorchester Hotel at which the guests of honour were Lord Samuel and Professor E. D. Adrian.

Columbite Contract

Advances up to a maximum of £250,000 for the development of the columbite producing areas in Northern Nigeria are to be made by the Defence Materials Procurement Agency of the U.S. Government to the Gold and Base Metal Mines of Nigeria, Ltd., and advances may be drawn up to 30 June 1954, and repayments beginning after that date and ending in 1956, will be made in columbite concentrates.

OCCA London Section

AGM & Lecture on Engraving

THE 15th annual general meeting of the London Section was held on Wednesday, 15 April, 1953, at the Criterion Restaurant, Piccadilly Circus, London, W.1. Mr. F. W. Stoyle, Ph.D., B.Sc. (Oxon), F.R.I.C., was in the chair. The minutes of the 14th annual general meeting were approved and signed. In the election of three members to the committee, those elected were Messrs. C. F. Jones, J. B. G. Lewin and C. R. Pye.

The adoption of the annual report, which was taken as read, was proposed by Mr. A. Pass, who coupled with it a vote of thanks to the officers of the committee and particularly to Mr. H. C. Worsdall. The proposal was seconded by Mr. R. N. Wheeler and carried *nem. con.* The adoption of the financial report was proposed by Mr. B. R. Jenkins, seconded by Mr. J. B. G. Lewin and carried *nem. con.*

The following officers were unanimously re-elected: Hon. secretary: Mr. H. C. Worsdall; hon. treasurer: Mr. H. A. Newnham; hon. auditor: Mr. A. Sosne.

Mr. J. A. Hawkey was unanimously elected hon. publications secretary.

It was proposed by Mr. G. F. Jones, seconded by Mr. W. Campbell and unanimously agreed that Mr. R. F. G. Holness be elected chairman for the coming year. In reply, Mr. Holness said he was deeply conscious of the work done by his predecessor for the section and he would do his best to carry on that tradition, and to hold the scales fairly.

'Rapier-like Wit'

Mr. L. O. Kekwick, B.c., F.R.I.C., president of the association, proposing a vote of thanks to the retiring chairman, said that apart from the excellent service which he had rendered to the section Dr. Stoyle would be remembered for his rapier-like wit which had so frequently transformed a serious situation into a gay one.

The vote of thanks was carried with acclamation and Dr. Stoyle in reply, said he had enjoyed his term of office immensely, having received considerable help from the committee, with whom he had got along remarkably well. He was happy to think that he had been able to serve the association, and was ready to drop back into the ranks although he would still do his best to assist them. There being no other business the proceedings then terminated.

The meeting was followed by a lecture entitled 'The Art of Copperplate Etching and Engraving,' giving by Malcolm Osborne. C.B.E., R.A., P.R.E., president of the Royal Society of Etchers and Engravers.

New Welsh Coking Plant

THE Steel Company of Wales have placed with Simon-Carves Ltd., a contract exceeding £2,250,000 for new coke ovens in connection with their £40,000,000 steelworks extension programme at Margam, South Wales. The new plant will comprise 90 compound regenerative ovens with a throughput of 1,650 tons of coal per day, together with associated coal and coke handling equipment and a new by-product plant to produce crude tar, crude benzole and sulphate of ammonia. The new oven battery will be built parallel to the present line of Simon-Carves coke-oven batteries, but on the opposite side of the present by-product plant. Clearing of the area has already begun.

Cyanides for Electroplating

THE British Standards Institution have just issued a revision of B.S.662 'Cyanides for Electroplating.' It differs from the original (published in 1935) by the omission of specifications for grey potassium cyanide salts and sodium salts of KCN value 98/100 per cent and the cyanide double salt (sodium and potassium) as no longer being of sufficient importance for inclusion in a British Standard.

The document specifies the composition as well as giving limits for impurities and up-to-date methods of test have been included. Copies of the standard (B.S. 622: 1953) may be obtained from the British Standards Institution, Sales Branch, 24 Victoria Street. London, S.W.1 (2s. 6d.).

Export Control Consolidated Order

The Board of Trade has announced that all amendments to the Export of Goods (Control) Order, 1952, have now been incorporated in a new consolidation order. The order, the Export of Goods (Control) (Consolidation) Order, 1953 (S.I. 1953 No. 671) came into operation on 27 April and copies can be obtained from H.M. Stationary Office.

Chemical & Dyestuffs Traders

Annual Meeting of Association

THE annual meeting of the British Chemical and Dyestuffs Traders' Association was recently held at the Savoy Hotel, London.

The chairman, Mr. Charles H. Wilson, in presenting the 30th annual report of the association, referred to the retirement from the council of Mr. A. Nash and Mr. C. M. Bell, both of whom had rendered many years' service.

The association's membership, he said, was estimated to represent more than 90 per cent of the trade handled by chemical merchants. Observing that chemical products were in a more plentiful supply, following the removal of controls and the restoration of free enterprise, Mr. Wilson, said that the restrictions on international trade by licensing regulations and currency permits were constant reminders that the actions of governments could have far-reaching consequences for the merchant.

He pointed out that the growth of the modern trade association as a representative and negotiating body was a development necessitated by present-day conditions which had brought industry and commerce into a closer relationship with Government policy. He felt it necessary to stress the point that while all traders in chemicals received the benefit of the work of the association, its support rested on a voluntary membership, although in principle all should be members.

The Annual Report

The annual report covered many subjects, from which the following have been extracted:

Cordial relationships were maintained with H.M. Ministries and Administrative Departments. In connection with the International Convention on Customs Tariff Nomenclature, the association is one of the bodies invited by the Board of Trade to assist in the drafting of the new Customs Tariff, in so far as it effects chemical and allied products. The object of the scheme is to avoid confusion on questions of classification, but it will be a considerable time before it will come into operation.

The Carriage of Dangerous Goods in Ships, now governed by the Statutory Rules which became law in November 1952, was the subject of many questions raised by members concerning the extent to which the 1951 Report would apply under the Statutory Rules.

Key Industry Duty

The facilities for the exemption from Key Industry Duty of products unobtainable or not available in adequate quantities in the United Kingdom were frequently used for the benefit of home consumers, and the Board of Trade removed from the exemption list items for which there had been an improvement in supplies from U.K. sources. Members had been notified of all these changes in the association bulletins, which also included amendments to the Export and Import Licensing Regulations.

The question of the assessment to duty *ad valorem* of landing charges on imported goods has been resolved by the introduction by H.M. Customs of an optional scheme at half the rate previously proposed. While this represented a concession to the viewpoint of the association, it was felt that the logical solution would be the fixing of a statutory point of valuation for duty purposes.

The need for a careful examination of existing insurance cover against third party risks arose during the year out of a personal injury sustained while loading drums of cresylic acid on board vessel, and much useful information was exchanged between members.

The general routine work of the association remained much the same as in past years and the association had dealt with inquiries from overseas' buyers, as well as from the U.K., for sources of supply.

The annual luncheon was held at the Savoy Hotel on Tuesday when the chairman, Mr. Charles H. Wilson, presided and welcomed the many distinguished guests. These included The Right Hon. Lord Mancroft, M.B.E., T.D., Lord in Waiting to Her Majesty the Queen; Mr. W. F. Deedes, M.C., M.P.; Dr. G. M. Bennett, C.B., M.A., D.Sc., F.R.I.C., Government Chemist; and several members of various government

departments and other trade associations.

Replying to the toast 'The Guests' Lord Mancroft said that in these days it was very difficult for those industries which did not have a trade organisation and he congratulated chemical and dyestuffs' traders on the efficiency of their association, and on the work it had done in the past and for what it would undoubtedly achieve in the future.

Proposing the toast 'The Association' Mr. Deedes said that The British Chemical & Dyestuffs Traders' Association represented a very great industry and its work (like his) was to help convince the country that it was upon such trades the future of the country ultimately depended. Unfortunately, there were a great number of people who did not see the obviousness of this. The great tragedy of the post-war period was that so many people looked upon wealth as merely what the state distributed of other people's money.

Mr. Deedes thought that the time had come when the traders and merchants of Britain should be restored to their rightful place. It was absolutely essential that they be permitted to resume their normal activities, for this country had been founded by traders and depended upon trade for its very existence. A new climate of opinion regarding this would have to be created.

In his opinion one great difference between this country and the U.S.A. was that in America everyone believed—above all else—in the American way of life, but here there was always the tendency for one-half of the country to be working against the other half.

Higher Production Needed

The root of all Britain's difficulties lay in the need for higher production and this was hampered by the anxiety of every man doing a job that there might not be another job waiting for him when he had finished the one in hand. We must regain our old mood and go all out to produce the goods the world wanted at the price it was willing to pay. In the long run the future of Britain depended upon the quality of the goods and services which she could supply to the world.

Replying, Mr. G. S. Bache, president of the association, said that all industry had suffered a good deal from business recession during 1952. The chemical and dyetuffs traders had overcome many types of difficulties although they had seemed insurmountable at the time. At last, however, a Chancellor of the Exchequer had introduced 'an incentive budget' and if they all carried out what the Chancellor expected when giving them the budget they might once again be able to use their experience and initiative; they might be permitted to use their overseas contacts and help build up their trade to what it once was.

Mr. Bache urged members faced with difficulties connected with their trade to speak with an united voice and to make full use of their association. He advised them to reflect carefully upon what they had to face in the future—not as individuals but as members of an united trade.

RIC Summer Visits

DETAILS have been issued of 12 summer visits arranged by the Royal Institute of Chemistry for Fellows, Associates and Registered Students. The visits will be as follows:—

8 June—Beecham Research Laboratories Ltd., Betchworth

10 June—W. T. Henley's Telegraph Works Company, Ltd., Gravesend.

12 June—Building Research Station, DSIR, Garston.

15 June—Ford Motor Company, Dagenham.

19 June—Esso Refinery, Fawley, Southampton.

20 June—East Malling Research Station, near Maidstone.

24 June—J. Lyons and Company, Ltd., laboratories, Hammersmith.

26 June—Laporte Chemicals Ltd., Luton.

1 July—Glaxo Laboratories Ltd., Greenford.

7 July—British Oil and Cake Mills Ltd., Erith.

9 July—Anglo-Iranian Oil Company Ltd., Sunbury-on-Thames.

15 July—Cotswold Publishing Company Ltd., Wootton-under-Edge.

Brazilian Subsidiary

The plant of Companhia Quimica Meyer do Brasil, a subsidiary of Meyer Chemical Company Inc., of Detroit, will be under construction in July or August this year in the Sao Paulo area. The Brazilian firm has been granted the use of Meyer patents.

The Institution of Chemical Engineers

Mr. Stanley Robson Re-elected President

AT the thirty-first annual corporate meeting of the Institution of Chemical Engineers held at the May Fair Hotel, London, on Thursday, 23 April, Mr. Stanley Robson was elected president for a second year. Professor F. H. Garner, Mr. A. G. Grant, Mr. Julian M. Leonard and Dr. B. Segal were elected vice-presidents and the joint hon. secretaries are to be Professor M. B. Donald and Mr. F. E. Warner. Mr. F. A. Greene was elected hon. treasurer. Mr. E. le Q. Herbert, Dr. W. Idris Jones and Mr. E. F. Mactaggart (members), and Dr. S. R. M. Ellis and Dr. J. S. Hunter (Associate Members) were elected to the council.

Following the formal business of the meeting, Mr. Robson delivered an address on 'Changes in Roasting Practice and Furnace Design.'

Many distinguished guests attended the Institution's dinner on the same evening, again in the May Fair Hotel.

The toast of the Institution was proposed by the Rt. Hon. Lord Percy of Newcastle. The Institution was engaged, he said, in the adventurous task of creating something like a new profession, new at least in this country. Perhaps that statement was not quite right, because even here the novelty ought to have worn off by this time. It was 66 years ago, in 1887, that Davis of Manchester, had first started in this country what might be called chemical engineering teaching. The Institution was rather younger, being founded 33 years ago. One rather felt, therefore, that it was not creating a new profession so much as bringing up a child which was a deplorably late development.

A Young Infant

It was worth while considering why development had been so slow. It was not only a late development, but a 'very young and mixed infant,' somewhere half way between the chemist and the engineer. It had not always been very clear how much of the chemist and how much of the engineer was required in that combination. Some people had rather doubted whether the third person in the trinity of the chemist, engineer and chemical engineer was really essential in a country such as ours, which at any rate today was suffering from a serious shortage of the potential man-power. The American problem had always been different, for in that case there was ample man-power. There had been perhaps a doubt as to whether we could afford, in terms of man-power, more than a carriage and pair and whether it was not rather extravagant to go in for a three-in-hand for this mixture we were bringing up. It had been suggested that the chemical engineer was only an intermediary between the chemist and the engineer, replacing neither of them.

Future Chemical Engineers

However, we were emerging from that doubtful stage. The impulse which was given to the creation of the profession of chemical engineering in the first world war had died out or had faded away between the wars; but the impulse given by the last war showed signs of being a good deal more permanent and we might perhaps feel now that the profession was fairly launched, that everyone realised the necessity for the third person in the technological partnership and that we were beginning to evolve training and education which would produce the chemical engineer of the future.

On the educational side we were up against a number of difficult problems, of which perhaps the first was the perpetual one in such cases of where do we find the teachers? We started a school of chemical engineering, and it was extremely difficult to find a professor or even enough lecturers who could deal with the subject. The provincial universities of this country had grown up in the days when they could always rely upon Oxford or Cambridge to produce a sufficient number of young men who would become professors in the provincial universities; that had worked in the arts side and indeed on the pure science side. But Lord Percy was afraid that the University of London, on the technological side, did not show any similar tendency to pioneering in the provinces.

Another problem was just how much extension of university courses was justifiable in proportion to the value which industry placed upon the new product. If we adopted

a system of post-graduate courses in chemical engineering we should be extending by two years or so the period of education, and very often it would be difficult to tempt a man, in these days when opportunities of employment were on the whole very favourable, to spend the extra time at the university to equip himself more fully for a career in industry. Indeed, it would be quite impossible to persuade him to do so if the result of creating the profession of chemical engineering was that the chemist who was beginning in industry would, by reason of his post-graduate training, be paid as an engineer. Compared with the chemist, the young engineer was an entirely inferior marketable product.

Further, Lord Percy felt that we were apt to regard our technological education too much as a 'single unit operation,' to use chemical engineering language. A number of specialist institutions during the last couple of generations had died out or had been abolished, leaving everything to the universities. The phrase 'the graduate technician' was becoming more and more common today, and that applied not only to industry, but to everything. Every other grade, every grade of what was called on the Continent of Europe, 'the polytechnique,' was depreciated. Lord Percy was sure we were running great risks by that one idea of unit operation; we had to throw our net wider and look for our technologists in technical colleges and in our schemes of training, and not entirely in the universities.

He hoped the Institution would find in the future more than in the past that it commanded the fullest co-operation of the universities in creating the new profession.

President's Reply

The president, in his response, said it was true that the profession was young. But the science of chemical industry was not young. There were chemical engineers many years ago; and looking at his friend Mr. Frank Curtis, the president of the Society of Chemical Industry, also an eminent chemical engineer, Mr. Robson was reminded that that Society was nearly called the Institution of Chemical Engineers in its day, in the 1870's.

Chemical engineers rightly claimed that their Institution was one of the main engineering societies, just as much as the institutions of electrical, civil or mechanical engineers, because the study of chemical engineering was the study of fundamental principles in engineering. Therefore, whereas the Institution might be young, whereas we had taught chemical engineering for only a limited number of years, nevertheless we were dealing with fundamental principles. It was very important to realise that the fundamental study of the principles involved in the unit process was of first importance.

Speaking of the growth of the Institution in the last few years, he said that in the coronation year 1937, the total membership was 900; today, in this coronation year of Her Majesty Queen Elizabeth II, the membership had risen to 2,900, made up of 510 members, 1,070 associate members, 670 graduates and 650 students. That was a big and a significant growth; but what was more significant was the strength of the junior membership. He knew of no other Institution which could rejoice so much in the quality of its young recruits.

Degrees & Diplomas

A measure of the firm establishment of a profession was given by the extent to which education was provided for that profession. Degrees in chemical engineering in this country were awarded by the universities of London (five colleges), Birmingham, Cambridge, Durham, Glasgow, Leeds and Manchester. That was a creditable performance, remembering that progress in this country was of slower tempo than in some of the newer countries. There were also diploma courses, chiefly post-graduate, in London (King's College, Imperial College, University College, Battersea Polytechnic and West Ham College of Technology), in the Universities of Durham and Leeds, Manchester College of Technology, Royal Technical College Glasgow, Loughborough Institute of Technology, the College of Technology Birmingham and Bradford and Glamorgan Technical Colleges.

The Institution's scheme for recognition, under which certain exemptions were given for the Institution's examination, had encouraged the establishment of adequate standards and the equipment of laboratories at a number of centres. The advice and help given by individual members to authorities responsible for the provision of courses had been most valuable.

A new type of chemical engineer might shortly be expected to join the ranks of that

growing profession. Schemes for the award of Higher National Certificates in Chemical Engineering had recently been agreed with the Ministry of Education and with the Scottish Education Department. Chemical engineers trained in the hard school of practical works experienced from an early age, who had had the ability and will power to qualify for the Higher National Certificate by part-time study, should prove a valuable addition to the force of technically qualified men, especially in the field of plant operation.

Should there be any young chemist who was hesitating to take the Institution's examination this year or to wait until a later date, Mr. Robson advised him seriously to consider putting in an application to sit for the examination without delay.

The council had before it proposals for a completely revised examination, and study was also being given to conditions for entrance to the Institution. He believed the proposals would result in an examination no less rigorous than at present, and that the study of conditions of entrance would result in a published detailed guide to the council's requirements for entrance.

The Institution was most tenacious in the maintenance of a high standard in the profession; it was vital in a new profession that standards be pitched high and not relaxed. In the establishment of its branches overseas it had insisted on that maintenance of standards and he was proud to say that that had been appreciated as much by entrants from other countries of the Commonwealth as was the case here.

Osborne Reynolds Medal

The president then presented the Institution's Osborne Reynolds Medal to Mr. John A. Oriel, a member of great distinction whose services had rebounded to his credit and to that of the Institution. He was a Member of Council during 1941-43, and again in 1946, a vice-president in 1949-50, and chairman of the Education Committee from 1945 to 1952. He was at present chairman of the Nominations Committee, and was responsible for the direction of the study of conditions of admission. It was a particular pleasure, said the president, to present the Medal to one who had done so much for the country and for the Institution.

Mr. John A. Oriel, C.B.E., M.C., expressing his deep appreciation, said he received the medal with humility and with pride. As a boy, he said, he was filled with awe at the omniscience of the chemist, but now he was a man he was overawed with the omnipotence of the chemical engineer. The presentation of the medal was a source of great gratification to him, for he felt that the future of this country was intimately wrapped up in the application of the development of our sciences.

Pride of Profession

In the course of his proposal of the health of the guests, Mr. Oriel said that chemical engineers were proud of their profession; as applied scientists they were proud of the place they were called upon to take in the conservation of the world's resources and in the building up of our country's wealth. Those who were in the industry were heartened by the pride of place which was now being given to the industry. He made the point that, if we really believed that increased productivity, which in fact meant nothing more than improvement in technique, was something on which our country depended, let us say so and give credit where it was due. It was only in that way that we should convince the youth of the country that life in industry was well worth while. There was nothing inconsistent in making a good career, by which he meant a financially good career, and at the same time serving the nation. We must make our first priority the encouragement of commercial enterprise and the re-building of the nation's wealth. We must show those who were responsible for the choice of careers (schoolmasters, and particularly headmasters, and the parents of boys) the scope and opportunity which industry offered for talent and energy and for idealism, and must convince them of the truth of the claim that a career in industry represented service of a very high order.

After a tribute to Lord Percy and all the guests of the Institution, he coupled with the toast the name of Mr. C. G. Hayman, the Chairman of the Association of British Chemical Manufacturers, and Chairman of the Executive Board of the Distillers' Company, one of our greatest chemical manufacturers. The fact, he added jocularly, that the Distillers' Company had decided that there was no future in alcohol, but, in common with the medical profession, that

penicillin was the future cure for all the ills of mankind, went to show how resilient was the industry!

Mr. Hayman, in his response to the toast, said chemical engineering was one of the main themes of scientific development, and without it scientific development could not find its logical significance. All would recognise the extensive service the chemical engineers represented in this country. It was never more necessary than now that we should reinforce our army of chemical engineers. He hoped the Institution would be the national instrument to achieve that purpose for industry as a whole.

Visiting Food Expert

PROFESSOR F. H. REUTER, Head of the Department of Food Technology in New South Wales University of Technology, is visiting the United Kingdom for three weeks from 24 April to 22 May to study recent British developments in food technology under arrangements made by the British Council.

Professor Reuter, who was born in Vienna, went to Australia in 1936 with a Carnegie Research Fellowship. After two years at Sydney University, he was appointed lecturer in organic chemistry at Sydney Technical College and became Head of the Organic Chemistry Department of New South Wales University of Technology in 1951. He was appointed to his present post in 1952. Last year he visited Massachusetts Institute of Technology under the Smith-Munt-Fulbright Fellowship scheme.

Professor Reuter is a Fellow of the Royal Institute of Chemistry, London, of the Royal Australian Chemical Institute and of the Australian and New Zealand Association for the Advancement of Science.

New IM Fellow

The Council of the Institute of Metals has elected SIR ARTHUR SMOUT, J.P., (Past-president) a Fellow, in recognition of his long and distinguished services to the Institute. Sir Arthur was for many years with the Elliott Group and thereafter with Imperial Chemical Industries, being elected to the Main Board, from which he retired earlier this year. He was knighted for his services as Director-general of Ammunition Production at the Ministry of Supply. He is chairman of the BIF Management Committee, vice-president of the Institution of Mining and Metallurgy, and a member of the Council of the British Non-Ferrous Metals Research Association, and the Copper Development Association.

Visit to Auchincruive

Francis J. Curtis, vice-president of the Monsanto Chemical Corporation Inc. of America, and president of the British Society of Chemical Industry, paid a visit to the West of Scotland College at Auchincruive, Ayrshire, on 20 April, when he was welcomed by Professor Hugh Nicol, Professor of Agricultural Chemistry, and Mr. James Kirkwood, Director of Practical Dairying. The visit covered the work now being done at Auchincruive on agricultural chemistry.

Pharmaceutical Conference

Delegates from Australia, Canada, Belgium, Denmark, France, Germany, Holland, Italy and New Zealand are among the 800 attending the British Pharmaceutical Conference which opens at Grosvenor House, Park Lane, London, on 31 August for five days' discussion of some 30 papers giving the results of recent research work in pharmaceutical industrial establishments and schools of pharmacy.

New Shell Plant

First production in Canada of two basic industrial chemicals—isopropyl alcohol and acetone—began on 14 April at Shell Oil Company of Canada's new petrochemical plant in Montreal East. The isopropyl alcohol produced at the new petrochemical plant will be 99 per cent pure, the acetone 99.5 per cent. The plant will produce 12,000,000 pounds (1,500,000 gallons) of isopropyl each year, and 8,000,000 pounds (1,000,000 gallons) of acetone.

Petrochemicals in Angola

A contract has been signed between the Government and the Companhia de Combustiveis do Lobito granting this company a monopoly for the prospecting and exploitation in Angola of solid, liquid and gaseous hydrocarbons, as well as sulphur, helium, carbon dioxide and saline substances.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

A CAUSTIC soda plant, said to be the biggest single unit in India, with a daily capacity of 20 tons, went into production recently at Alwaye (Travancore).

Established by Travancore Cochin Chemicals, Ltd., with Rs. 7,500,000 capital, the factory is located near the monazite factory. It will produce caustic soda of rayon quality and will meet the needs of the existing rayon industry in the country. Hydrochloric acid will also be produced. The company has been formed by the Travancore-Cochin Government, Travancore Fertilisers and the Mettur Chemicals and Industrial Corporation Ltd., by subscribing four, two and a half and one million rupees respectively.

* * *

A pilot project to mine lignite at Neiveli (Madras State) has been inaugurated by the Madras State Government. Nearly 2,000,000,000 tons of brown coal lies in an area of approximately 100 sq. miles, as has been revealed by investigations covering a period of nearly ten year. The project is estimated to cost about Rs. 7,900,000 and is scheduled to be completed by the end of this year.

Open cut method will be used to mine the lignite lying at about an average depth of 180 ft. The project is expected to yield initially about 16,000 tons of lignite, which will be briquetted for use as fuel. Attention will be paid to the recovery of by-products. It may be remarked that this project is being hailed as a great venture as this will yield a vital fuel for the rapid industrialisation of the State, which is otherwise deficient in coal resources.

* * *

The Government of Travancore-Cochin are to take over as soon as possible all the mineral factories working on beach sands. Travancore is the biggest producer in India of beach minerals like monazite, ilmenite, rutile, sillimanite and garnet. Some time ago the Government took over two factories mainly producing ilmenite. Others will be taken over shortly. Negotiations are still in progress, however, in respect of a few.

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The discovery of an antibiotic—Pristimerin—was announced a few days ago from Bombay, at a symposium on antibacterial substances, held under the auspices of the Council of Scientific and Industrial Research. Sir Alexander Fleming took part in the symposium. Pristimerin, discovered from an Indian plant, *Pristimera Indica,* is claimed to be effective against the Viridans group of streptococcus, 'not affected by other antibiotics known so far.' Clinical trials over a period of two years have produced evidence that this antibiotic could be employed satisfactorily in controlling infection of tonsils. Experiments are under way to assess its effectiveness in influenza and common colds. The new antibiotic is a result of work at the Antibiotic Research Centre, St. Xaviers College, Bombay, led by Colonel Bhatnagar.

* * *

The management of the Oorgaum Gold Mines Ltd., have announced that the mines will be closed from the end of May. Financial loss and technical difficulties have been given as the reasons for this decision. The Oorgaum mines is one of the four gold mining companies operating in the Kolar District of Mysore State, which account for nearly the entire production of gold in India. The Oorgaum mine has one of the deepest shafts in the world. The following recent returns are of interest:—

	Gold (fine oz.)		
	Jan. '53	Feb. '53	Mar. '53
Mysore	6,252	5,450	5,600
Champion Reef ..	3,791	4,025	3,617
Oorgaum	2,388	2,093	2,579
Nandydroog	5,985	5,699	5,782

The closure will affect about 3,500 workers. The Government of India has appointed a high-ranking committee, jointly set up with the Government of Mysore, to go into the question of the proposed closure of the Oorgaum mines, which are in the Kolar Gold Fields.

Rust & Scale Prevention

At a recent regional meeting of the American Chemical Society, Dr. V. H. Ryan described the use of mixtures of metallic phosphates to inhibit rusting and remove scale in water systems. The materials are also useful in the control of algae and slimes and in breaking up emulsions of oil and water.

Gas Storage of Bananas

Pilot Plant Experiments in Jamaica

HALF of the bananas imported into the United Kingdom since the war have come from Jamaica. Most of the Jamaican fruit has been of the *Gros Michel* variety, a variety which is susceptible to attack by 'Leaf Spot' disease. One of the results of the disease is that the bunches of fruit produced by infected plants are small in size so that they appear to be less mature than they really are. When bunches of these fruits are included in a cargo they tend to commence to ripen during the voyage and to encourage, by the production of ethylene, the premature ripening of the rest of the cargo.

Pilot plant experiments carried out in Jamaica in laboratories made available by the Department of Commerce and Industries are described in Food Investigation Technical Paper No. 3. 'The Refrigerated Gas-Storage of *Gros Michel* Bananas,' published for the Department of Scientific and Industrial Research (H.M.S.O. 2s. 1½d.).

The unit used for these experiments was 20-25 bunches (approximately 800 lb.). During two years 24 tests were carried out.

Each experimental storage period was from 12 to 18 days, the former being about the time bananas normally take on the voyage to the U.K. The control of carbon dioxide and oxygen was effected by restricted ventilation.

Rate of CO_2 Production

During the first series of experiments the rate of carbon dioxide production began to rise at once, showing that gas storage conditions encouraged ripening to begin. But the conditions also retarded the completion of the ripening process, so much that after the 'voyage period' it was found impossible to ripen gas-stored bananas to good quality. It was concluded that when no means of removing any accumulation of ethylene is provided most of the fruit starts to ripen almost at once under the conditions of restricted ventilation used for gas storage.

A new series of experiments was started to determine whether the concentration of ethylene could be reduced by introducing low concentrations of ozone. The results showed that ozone would reduce the ethylene content without injuring the fruit. By the use of ozone it was found possible to hold fruit stowed as cargo for 20 days without ripening starting. After treatment with ethylene the fruit then ripened normally.

The best conditions for gas storage are not yet known and further work on a pilot scale is necessary before the use of ozone in refrigerated gas storage or refrigerated air storage can be seriously considered. Ozone is an additional variable and if the concentration is too high the fruit can be harmed. If it is too low ripening is not stopped.

Doubts about the extent and effects of 'Leaf Spot' infection still exist. There probably was some infection of the fruit but it will be necessary to carry out further work on gas storage with infection-free fruit or to find methods of diagnosing the effects of slight 'Leaf Spot' infection.

Refinery Nearing Completion

WORK is nearing completion on a 28,300 BPD catalytic refinery in the Argentine, according to an announcement by the designers, The M. W. Kellogg Company, New Jersey, N.J.A., subsidiary of Pullman Incorporated. The new plant is being erected for Yacimientos Petroliferos Fiscales at Eva Peron (formerly La Plata) and will be called the Presidente Peron Refinery.

Constructed by YPF under the supervision of Kellogg Pan American Corporation, the refinery will include a fluid catalytic cracking unit, alkylation plant and what is claimed to be one of the world's largest delayed coking units. In addition, there will be two crude units, one of 21,000 b.p.d. capacity and the other charging 7,300 b.p.d.

Physical Metallurgy

PLANS for a special summer programme in the Fundamentals of Physical Metallurgy to be held from 16-26 June at the Massachusetts Institute of Technology have been announced. The programme has been conceived as an educational course rather than a research conference. Among guest lecturers will be Professor Paul A. Beck, of the University of Illinois, on recrystallisation and grain growth; Professor Robert Maddin, of the Johns Hopkins University, on plastic deformation; and Professor R. F. Mehl, of the Carnegie Institute of Technology, on diffusion.

Chemicals at the B.I.F.

All Sections of the Industry Represented at Olympia

CHEMICAL and allied products are well represented at Olympia, London, in the Coronation exhibition of the British Industries Fair. In the chemicals group there are 57 exhibitors occuping 17,736 sq. ft., and 21 occupying 7,908 sq. ft. in the adjacent area devoted to chemists' supplies.

In the section covering scientific and optical instruments a large part is again occupied by chemical and analytical apparatus, recording and controlling instruments, and other laboratory and industrial equipment.

General information concerning British manufacturers of heavy and fine chemicals, disinfectants, insecticides, pharmaceuticals, photographic and other chemicals, coal tar products, dyestuffs and intermediates is obtainable from the **Association of British Chemical Manufacturers** which does such valuable liaison work between the industry, the trade associations and the Press.

An efficient and trouble-free catalytic method of removing unwanted oxygen from hydrogen is demonstrated in its 'Deoxo' gas purifier by **Baker Platinum Ltd.**, of London. The purifier can also be used for the removal of either of these gases from nitrogen, argon, helium, neon, carbon dioxide, and saturated hydrocarbons. Other products of the company include precious metal chemicals and catalysts and platinum laboratory apparatus.

THE CHEMICAL AGE is represented on the stand of its proprietors, **Benn Brothers Ltd.**, and extends a welcome to its readers and contributors and all interested in the chemical and allied trades.

A representative collection of its wide variety of products is to be seen on the stand of **A. Boake, Roberts & Co., Ltd.**, of London, manufacturers of solvents, plasticisers, metallic soaps, chemicals, essential oils, flavourings, preservatives, phosphates, sulphates, sulphur dioxide and intermediates.

A new linseed oil, highly conjugated and of particular interest to the paint and varnish trade 'Illinoil' is being demonstrated by **British Oil and Cake Mills Ltd.**, London. Also on the stand will be 'Synthawax,' a new hydrogenated product with wax-like properties. Prompt deliveries are assured.

Showing for the first time at the B.I.F. is a vastly improved rutile type of titanium dioxide exhibited by **British Titan Products Ltd.**, of York. This type of TiO_2, formerly only available from the U.S.A., is the result of development with plant recently installed by the company, and is now in free supply. The exhibit illustrates the properties of the pigment and samples of its wide range of applications.

Heavy and fine chemicals and dyestuffs for the textile and leather industries are shown by **Brotherton & Co., Ltd.**, Leeds. The firm's products are stated to be generally competitive with others of the same nature made overseas and prompt deliveries can be guaranteed

Agricultural and horticultural insecticides, fungicides, and industrial smokes are being shown by **Bugges Insecticides** Ltd., of Sittingbourne, Kent. The firm specialises in DDT, B.H.C., Toxaphene, derris and pyrethrum.

A variety of essences, essential oils and isolates is displayed by **W. J. Bush & Co., Ltd.**, London. Other products include synthetic, fine and pharmaceutical chemicals, food colours and insecticides.

Polythene lie-flat moisture-proof bags, flexible polythene bottles and transparent acetate boxes are shown by **Cascelloid Ltd.**, of Leicester. The company is manufacturer of all types of plastic packaging and specialised packaging of all descriptions.

By means of low temperature carbonisation many hundreds of chemicals are obtained as by-products in its refinery at Bolsover, near Chesterfield, by **Coalite and Chemical Products Ltd.** A full range of these products which have applications in plastics, disinfectants, rubber, paints, agricultural chemicals, and so on, is on view.

Anti-corrosive chemicals and their important industrial applications are a feature of the display by **Croda Ltd.**, of Goole, Yorkshire. The company also produces surface agents, fatty chemicals, oils, fats and waxes.

Once again this year **The Distillers Company Ltd.**, London, occupies two stands which are shared by the members and

associates of the group to demonstrate the widespread activities of the company. The following are represented in the chemicals section: *chemicals*, British Industrial Solvents Ltd.; British Petroleum Chemicals Ltd.; The Carbon Dioxide Co. Ltd.; the D.C.L. Industrial Alcohol Department; the Methylating Co. Ltd.; *plastics*: British Geon Ltd.; British Resin Products Ltd.; *antibiotics*: The Distillers Company (Biochemicals) Ltd.; *yeast, etc.*: the D.C.L. Yeast and Malt Extract Department.

Latest developments in its high-speed vacuum process for coating of metals on glass, plastics, cloth and wood is being demonstrated for the first time at the BIF by **The Dohm Group of Companies,** London. The firm claims to have the only high vacuum plant in Europe capable of dealing with mass production.

The use of activated fullers' earth, especially 'Fulmont,' for bleaching all types of oils, fats and waxes, can be seen on the stand of **The Fullers' Earth Union Ltd.,** of Redhill, Surrey. The method of using activated earths for bleaching glyceride oils and de-colorising mineral oils is illustrated. A similar process can be used for the adsorption treatment of many organic liquids or molten solids.

A new conception in analytical balance is exemplified in the 'Nivoc' automatic aperiodic balance shown by **W. & J. George & Becker Ltd.,** of London and Birmingham. Weighings of up to 200 gms. and accurate to 0.1 mg. are obtained by simple manipulation of the balance controls, the weight being read directly on easily visible scales. Other exhibits include the 'Nivoc' anti-vibration balance table and the 'Kemiframe' system of laboratory scaffolding which is being increasingly used in industrial laboratories.

The latest 'Michrome' brand reagents, the result of much research in his East Sheen laboratories, are shown by **Edward Gurr Ltd.** These reagents for microscopic staining of bacteria, for medical research and for control of disease are claimed to be as cheap as those obtainable from Germany, and considerably more so than those from the U.S.A., while delivery is quicker.

Stains, reagents and requisites for microscopy in small or large quantities are supplied by **George T. Gurr Ltd.,** London, which displays a selection of its products including indicators, immersion oils, bacteriological sugars and media.

Ultra-violet ray radiation for fluorescent crack detection is being demonstrated by **Hanovia Ltd.,** of Slough, Bucks. Other adaptations include chromotography, microscopy and fluorescence analysis, detecting mercury vapour and so on.

An impressive range of intermediates for the colour trade is offered by **Hickson & Welch Ltd.,** of Castleford, Yorkshire. These include B acid, 2B acid, 4B acid, Tobias acid, RMT acid, *m*-nitro-*p*-toluidine, 4-nitro-*o*-toluidine, 5-nitro-*o*-toluidine, 2:5-dichloroaniline and 2:4-dinitroaniline. Primaries such as *o*-chloroaniline, *o*-toluidine and *m*-4-xylidine are also available. It is also offering other products to the dyer and the textile finisher which include Red GLH base, Red RLH base, Scarlet GH base, Scarlet GGH base, Scarlet GGSH base and Yellow GCH base. Among its insecticide intermediates in addition to DDT the company now has the following technical grades in regular production: 3:5-dinitro-*o*-cresol (DNC) diphenyl sulphone, hexachlorobenzene, and pentachloronitrobenzene.

Rare earth chemicals form a prominent feature on the stand of **Hemingway & Co. Ltd.,** London. The company also serves crop protection with the production of insecticides, fungicides, herbicides, lead arsenate, copper sprays and dusts, and sodium arsenite.

The evolution of chemistry during the four centuries separating the reigns of Queen Elizabeth I and our present sovereign is the feature of a mural on the stand of **Imperial Chemical Industries Ltd.** The company manufactures more than 12,000 products essential to industries throughout the world.

In charge of the stand of **James A. Jobling & Co. Ltd.,** of Sunderland, is Mr. J. Andrews, 75. One of the main showpieces for Pyrex this season is an Oldershaw Column, specially constructed for the Shell Organisation, which will be exhibited as a complete working unit. Also on display for the first time will be the new Split-Sieve Buchner Funnel, designed to aid rapid filtering.

Photographic chemicals, apparatus and accessories are displayed by **Johnsons of Hendon Ltd.,** which specialises in this type of chemical for industrial, X-ray, commercial and amateur use.

A wide range research, fine and industrial chemicals, analytical and organic reagents, antacids, adsorbents, antipyretics, camphor derivatives and so on is shown by **Kaylene Ltd.**, of London.

Chemicals for use in a wide range of industries including food, textiles, paint, glass, plastics, leather, rubber and ceramics are to be seen on the stand of **Laporte Chemicals Ltd.**, of Luton, Bedfordshire. The company specialises in hydrogen peroxide, peroxygen compounds and barium compounds.

Specialised organic chemicals for the cosmetic, textile, leather and food industries are prominent among the products of **Marchon Products Ltd.**, Whitehaven, Cumberland, manufacturers of sulphated fatty alcohols, synthetic detergents, emulsifiers and so on.

A new super adhesive or cold solder known as 'Metalfix' which dries hard and solid on exposure to the air is introduced by the **Mercantile Marketing Co.**, London. The new adhesive is said to be acid, water and heat proof, and may be used for repairing aluminium and other metals, china, glass, tiles, plastics, wood, leather, and so on, or will join any two of these materials.

Newton Chambers & Co., Ltd., Thorncliffe, near Sheffield, manufacturers of 'Lithcote' lined vessels for a variety of industries, also exhibits specimens of its chemical products for use in hygiene, insecticidal fluids and powders, liquid soaps and cleansers.

The latest methods of reclaiming metal containers ranging from five to 90 gallons are being demonstrated by the Yorkshire firm of **H. Noble (Coopers) Ltd.**, Bradford.

Increasing demands of industry for water of extreme purity lend interest to the exhibits of the **Permutit Company Ltd.**, London, manufacturers of ion exchange materials for treating water and other liquids. The company also produces emergency sea-water desalting kit.

Prices lower than a year ago are offered by **Rubber Latex Ltd.**, of Manchester, while firm deliveries of latex compounds within a few days of the order are assured. Exhibits include rubber latex compounds, prevulcanised latex, latex adhesives, can sealing compounds, and reclaim rubber dispersions.

A 25 ft. high replica of Hortonsphere, used for the storage of petroleum gases under high pressure, dominates the stand of **Shell Chemicals, Ltd.**, London. The general display demonstrates the growth and importance of petroleum chemicals in a variety of fields, while a broad range of product applications is portrayed on four panels entitled 'Industry,' 'Agriculture,' 'Home,' and 'Public Health.' In addition a coloured and illuminated globe pictures the world wide responsibilities of the organisation, and as a background to these displays a 14 ft. high photographic montage will show the prominent features of the Shell chemical plant at Stanlow, Cheshire.

Primary products and intermediates derived from the carbonisation of coal are the theme of the display by **United Coke & Chemicals Co. Ltd.**, of Sheffield (associated with the United Steel Companies Ltd.). Products include benzoles, toluoles, xylols, resins, solvents, penol, orthocresols, phthalic anhydride, and so on.

Emulsions and solutions for washable water paints, polymer solutions based on polymethylacrylates for heat and chemically resistant finishes are shown by **Vinyl Products Ltd.**, Carshalton, Surrey. A new series of low melting point flexible moulds —'Vinamold' hot melt compound—for the casting of plaster and concrete is also shown.

Details of various chemicals being investigated by its research department are to be seen in the research exhibit of the **Watford Chemical Co. Ltd.**, London, which is also showing a new type of vanilla flavour, certain quarternary ammonium compounds and bentones. Other features will display uses of the company's 'Estax' emulsifiers and oil additives and draw attention to lists of products of a general chemical nature available in England or from associates in other parts of the world.

Its entire series of woolgrease derivatives, technical and commercial lanolins, and ancillary woolgrease products is exhibited by the **Westbrook Lanolin Company**, Bradford, Yorkshire, while dyestuffs for all industrial needs, and colours for foodstuff purposes comprise the main features of the display by **Williams (Hounslow) Ltd.**, Middlesex.

Examples of white distilled fatty acids, guaranteed 99 per cent saponifiable matter, manufactured in modern high-vacuum steam distillation plant are to be seen on the stand of **Victor Wolf Ltd.**, of Manchester, which also manufactures refined glycerine, stearine pitch, esters, and laundry detergents.

Montecatini Company

Increased Production in All Fields Reported

THE general ordinary and extraordinary meeting of the Montecatini Company took place in Milan on 18 March, when the president made his report.

The Italian production of pyrites has reached a record figure of 1,126,000 metric tons, to which the Montecatini Company has contributed 971,000. The company has continued the modernisation of its technical equipment and has moreover allocated large sums to the search for new deposits in several regions. The Montecatini-owned sulphur mines have attained a production of about 71,000 metric tons, despite the progressive exhaustion of the Cabernardi mine and there are good hopes for the future.

Search for Methane

Particular interest has centred in the search for methane in Calabria; the company has come to an agreement with an important American group (Gulf Oil Corporation) about the hydrocarbon resources in two promising zones of Marche and Abruzzi, and the Petrosud Company has been constituted in which the Montecatini Company and the Gulf Oil Corporation hold an equal number of shares.

During last year the production of sulphuric acid was 1,014,100 metric tons; the productive capacity of some establishments has been increased. In the field of phosphate fertilisers both the national and the Montecatini production have maintained the level of the preceding year.

The modernisation of plants has been continued in 1952, particularly for the grinding of phospherites for the granulation of superphosphate. The success of the centralised mechanical bagging and loading installations has led to the establishment of further installations at Porto Marghera, Spinetta, Casterguelfo, etc. The construction of plant at Porto Empedocle is well advanced.

Primary Nitrogen

The Montecatini production of primary nitrogen reached 133,000 metric tons in 1952 as against 119,000 in the preceding year, an increase of 12 per cent. The total production of nitrogen realised by the Montecatini group was 142,500 metric tons, which has been almost entirely transformed into fertilisers. During the last financial period the greatest effort has been concentrated on the new establishments at Ferrara and Novara. The latter has been completed and the Ferrara factory will be completed within a very short time. With the additional plant the productive capacity of the Montecatini group in synthetic nitrogen will be increased by 80,000 metric tons a year, which should satisfy increasing demands for a considerable time.

Hydrocarbons & Derivatives

In the field of hydrocarbons and their derivatives, there are good hopes for the future. The first stage in the pyrolysis of mineral oil at Ferrara is now ready. Styrene production has exceeded by 22 per cent the 1951 output, while the production of polystyrene represents a 25 per cent increase on the preceding year. A new high-strength polystyrene will shortly be put on the market; considerable progress has been made in the production of alcohols and plasticisers. The production of divinylbenzenes has begun and a large plant for the production of polythene, destined to attain within a short time a yearly output of 4,000 metric tons has been put into operation. Among various projects are ethylenic derivatives, ethylene oxide and acrylic nitrile. The production of melamine has been commenced and progress in the preparation of polyester resins continues.

Polyvinylchloride Fibre

During the last financial period the large plant of the associated Polymer Company in Terni for the production of PVC has been put into operation with a yearly capacity of 7,000 metric tons. Plant for the elaboration of 'Movil' PVC fibre as yarn or staple is also in operation.

The president also reviewed the other branches of chemical industry, mentioning the activities of the Farmitalia, Cokitalia, Cokapuania and Rhodiatoce associated companies, and mentioned developments in the electric and metallurgical industry, especially the Società Lavorazione Leghe Leggere, Metallurgica Feltrina and Montevecchio.

The Analysis of Zirconium

Part III—Organic Reagents

by T. O. PORTCASTLE, Ph.D.

ARNOLD and Chandlee[35] obtained a white precipitate which yielded zirconia on ignition, when they added a 5 per cent solution of propylarsonic acid to a boiling solution of zirconium tetrachloride in 1.2N hydrochloric acid. A satisfactory separation was obtained from Sn, Th, Ti, Mn, Ni, Fe, Al, Ce, V, Cr, U, Cu, Mg, Zn, Mo, Co, Be, Cd, but not from Sb and Bi. Allylarsonic acid was also applicable to some of these separations, but not to all of them. A later paper by Geist and Chandlee[36] deal with the application of the propylarsonic acid method to steel analysis.

Steel Analysis

Steels containing Al, Ti, Cr, Co, Ni, Cu, U, V, Th, Mo, W were successfully analysed for as little as 0.1 per cent zirconium by the following procedure. The sample was dissolved in hydrochloric acid containing a little nitric acid and the solution was evaporated to dryness. The residue was extracted with concentrated hydrochloric acid. The filtrate containing some of the zirconium was set aside while the residue was freed from silica by treatment with hydrofluoric acid and then fused with sodium carbonate. The melt was leached with water in the usual manner and the insoluble residue fused with potassium bisulphate and extracted with sulphuric acid to bring the zirconium into solution. This solution was combined with the solution obtained from the original acid treatment, diluted and treated with 5 per cent aqueous propylarsonic acid. The precipitate was filtered, washed with hot water, dissolved in hydrochloric acid and re-precipitated. Finally it was ignited to the oxide and weighed. The zirconia was usually contaminated with stannic oxide when tin was present, but the stannic oxide was removed in the usual manner by treatment with ammonium iodide.

Use of Arrhenal

Chandelle[37] has proposed the use of arrhenal—the disodium salt of methylarsonic acid—for the determination of zirconium. The reagent precipitated zirconium from hydrochloric acid solution as $Zr(CH_3AsO_3)_2$. This precipitate was heated in hydrogen and afterwards in air whereby it was converted to ZrO_2 or alternatively was weighed as such after drying at 50°C. The latter method was not generally recommended. Yet another finish was worked-out in which the arsenic part of the precipitate was determined. This was done by heating the latter in a Kjeldahl flask with sulphuric acid and potassium permanganate, adding perhydrol to dissolve precipitated manganese dioxide and distilling the arsenic as its trichloride by heating with hydrochloric acid. The determination was finished by bromometric titration of the arsenic using potassium bromate with methyl red as indicator.

The precipitation of zirconium with arrhenal was shown to take place with best results in a solution of hydrochloric acid not in excess of 0.75N. For about 0.05 g. zirconium, 1 g. of reagent was added to the cold solution which was then heated to boiling before filtering off the precipitate. Al, Cr, Ni, Co, Mn, Zn, Ca and Mg did not interfere with the determination, but iron was best removed by ether separation before the precipitation.

In applying the arrhenal method to the analysis of ferrozirconium,[38] a 0.3 g. sample was opened out with a peroxide fusion and the melt was extracted with 300-400 ml. of hot water. After addition of perhydrol to remove permanganate and ferrate colours, the solution was filtered and the residue washed with hot water till the washings were neutral to litmus. The mixed oxides on the paper were dissolved by alternate treatment with hot 5N hydrochloric acid and hot water using concentrated acid to dissolve the last traces. The filtrate from this process was evaporated to dryness and taken up in 50-60 ml. of 6N hydrochloric acid, removing ferric iron by an ether extraction. The solution was then diluted and the zirconium precipitated in the normal manner with the arrhenal reagent. In the following year, Chandelle[39] published another paper on the same method, studying the effect exerted by titanium on the determination. A positive error was caused by retention of titanium on the $Zr(CH_3AsO_3)_2$ precipitate, and a negative error by incomplete precipitation of the

zirconium. In the presence of small amounts of titanium the errors were found to equate so that no serious divergence resulted. To reduce the amount of titanium in the precipitation solution, the zirconium was brought down by addition of ammonia to a hydrochloric acid solution of the metals, keeping the titanium in solution with hydrogen peroxide. This precipitation was repeated till only a faint red colour was obtained on adding peroxide to the hydrochloric acid solution. In sulphuric acid medium, the same troubles arose, but the above separation became untrustworthy. Satisfactory results were obtained by the arrhenal method in the analysis of Cu/Zr and Al/Zr alloys, but not for Zr/Sn alloys. In the last case, considerable amounts of tin co-precipitated with the zirconium.

Precipitation with Phenylarsonic Acid

The first organic derivative of arsenic acid to be proposed for the determination of zirconium was phenylarsonic acid. Rice, Fogg and James[40] found that the compound formed with zirconium came down even in the presence of large amounts of mineral acid. The corresponding thorium salt was soluble in acetic acid. The reagent allowed of a separation of zirconium from Fe, Al, Ti, Th, U, Bi, Co, Mn, Ni, Zn, the cerite earths and the alkali metals. Klinger[41] re-examined the method in 1935, finding that the precipitate corresponded to the formula $Zr(C_6H_5AsO_3)_2$. In applying the methods to steels, Klinger recommended that the solution be freed from silicon and tungsten in the normal way before carrying out the precipitation, and also that iron be removed by ether extraction. The final precipitate was ignited in a platinum vessel with sulphuric acid and hydrofluoric acid to remove arsenic as well as silica. The zirconium was weighed as the dioxide.

Other Derivatives

Several derivatives of phenylarsonic acid have been used similarly. Among these is *p*-aminophenylarsonic acid, better known perhaps as Atoxyl. Chandelle[42] found that a voluminous white precipitate was obtained when the reagent was added to a solution of zirconium in 0.5N hydrochloric acid. The precipitate was washed with 0.5N hydrochloric acid and water, then dried and ignited firstly in air, then hydrogen, then air again and finally weighed as zirconia. 1 g. of reagent was required for about 0.04 g. of ZrO_2. Most other ions did not interfere, but a preliminary ether extraction of iron and ammonia/peroxide separation from titanium was recommended. A later paper[43] by the same author described the application of the reagent to zirconium in sulphuric acid solutions. The main difference from the previous method was that the solution was brought to the boil after adding the reagent and subsequently allowed to stand for several hours before filtration. The results were satisfactory for acidities up to 4N sulphuric acid at which acidity Ni, Co, Al, Cr, Zn, Mn, Cu and Mg did not cause trouble. Chandelle claimed that the method was suitable for zirconium in the presence of small amounts of iron and titanium, provided these were determined colorimetrically in the ZrO_2 and deducted from the analysis figure.

Kolthoff and Johnson[44] used the *m*-nitro derivative of the Rice, Fogg and James reagent for the amperometric titration of UO_2(II), Th(IV), Zr(IV) and Sn(IV) ions. The excess reagent provided a good titration line since the nitro group became involved in a two-step reduction involving four electrons. Very close control of the hydrochloric acid concentration was necessary.

p-Hydroxyphenylarsonic acid was used by Simpson and Chandlee[45] for the precipitation of zirconium from aqueous solutions containing not more than 0.5 equivalent of mineral acid per titre. Tin and titanium also came down, and the reagent was specially recommended for the last named. Claassen[46] found that zirconium was completely precipitated by this reagent in solutions containing not more than 3N hydrochloric acid or 1.5N sulphuric acid, but in the latter medium the precipitate was very finely divided. A single precipitation sufficed to separate zirconium from Cu, Cd, V, Mo, U, Ce, Fe, Al, Cr, Ni, Co, Zn, Mg, Ca, Ba, Sr and Be. Small amounts of Bi and Ti could be tolerated, but W and Sn were co-precipitated when small amounts were present. A re-precipitation was necessary in the presence of thorium.

Colorimetric Determinations

Unlike the other arsonic acids, *p*-dimethylaminoazobenzenearsonic acid forms a soluble product with zirconium salts. The compound thus formed, $[(CH_3)_2N.C_6H_4AsO_3]_2$ Zr, was reported to be insoluble in acid solutions, but was readily attacked by alkalis with the formation of insoluble zirconium hydroxide and a water soluble form of the

organic dyestuff. This permitted an indirect colorimetric determination of zirconium in amounts ranging from 0.02-1.0 mg. in the presence of Ti, Th, Ce, Fe and U. Nazarenko[47] developed the quantitative method on the basis of the qualitative method of Feigl, and Hayes and Jones[48] applied it to steel analysis. The steel was opened out in the usual way with hydrochloric acid, extracting zirconium from the insoluble residue by potassium bisulphate fusion. An aliquot of the zirconium containing solution was treated at the boiling point with 15 ml. of a solution of 0.25 g. dye in 10 ml. of concentrated hydrochloric acid plus alcohol to 250 ml. The solution was allowed to stand for 30 minutes and was then filtered, washing the excess dye out of the precipitate with hydrochloric acid. When the washings were free from uncombined dyestuff, the precipitate was washed with dilute ammonia and the alkaline washings were collected. The solution of dyestuff thus obtained was aliquotted, and its absorption was measured. The entire analysis required less than 2 hours. The results were claimed to be within 0.005 per cent of those obtained by the selenite method. When not more than ten times as much titanium as zirconium was present, interference from the former was eliminated by addition of perhydrol to the solution before precipitating the zirconium. Very recently Telford[49] has compared the *p*-dimethylaminoazobenzenearsonic acid method with the alizarin method which is perhaps the most common colorimetric method for determining zirconium, and concluded that although the latter was easier to use, the arsonic acid method was more sensitive.

Alizarin Method

De Boer showed in 1925 that while many metals formed coloured products with alizarin-sulphonic acid, these colours all were destroyed on acidification with hydrochloric acid except the red-violet colour formed with zirconium, which persisted even in concentrated acid.[50] The colour was shown to follow Beer's law for quantities of zirconium up to 4 p.p.m. The lake eventually settled-out, but was readily re-dispersed by shaking. The final acidity of the solution was found to affect the colour intensity considerably. Sandell[51] found that under the conditions used, the minimum transmittancy at 5,600 A from 50 μg. of zirconium was obtained with 0.05 ml. of 12N hydrochloric acid or perchloric acid in excess. With no acid, or 0.5 ml. in excess, a negative error of 4.2 μg. resulted. With 1 ml. in excess the error was −11.6 μg. Fluoride, sulphate, phosphate, hydroxy carboxylic acids and molybdate and tungstate ions destroyed the colour. Iron, chromium and cobalt caused positive errors and cadmium, copper, lead and aluminium caused negative errors. The effect was more pronounced in hydrochloric acid than perchloric acid. Titanium interfered even in strongly acid solutions.

Spectrophotometric Determination

Green[52] recently used the alizarin method for the spectrophotometric determination of zirconium in clays and minerals. The sample was fused with caustic soda and the residue left from aqueous extraction was dissolved in strong hydrochloric acid. The acidity was adjusted to 0.05N and the solution was passed through a silver reductor. The *p*H of the solution was thereafter adjusted to 1.1 and 2 ml. of 0.05 per cent sodium alizarin sulphonate added per 100 ml. of solution. The colour was allowed to develop for 20 hours. The optical density was then measured at 5,200 A and compared with standards brought through the same procedure. The colour system followed Beer's law and was stable for a period of four hours, after full development. Green determined as much as 255 μg. of zirconium in this way with an accuracy of 3 μg. Mayer and Bradshaw[53] (1952) used the alizarin method for the analysis of several magnesium alloys containing as much as 1 per cent of zirconium. From 3.5 to 4.15 g. of the alloy were dissolved in dilute hydrochloric acid. The solution was diluted to 500 ml. and a 10 ml. aliquot was treated with 2.5 ml. of concentrated hydrochloric acid and 10 ml. of a reagent solution containing 1.5 g. of sodium alizarin sulphonate in 1 litre of water. The development of the colour was assisted by heating the solution on a water-bath for 2½-3½ minutes. It was then cooled, diluted to 100 ml. and its extinction was measured at 5,600 A.

Titration of Zr in Solution

Titrimetric methods have also been employed to determine zirconium by the alizarin reagent. These methods usually depend on the masking of the zirconium/alizarin colour by fluoride ions, as in the De Boer method. The unknown solution con-

taining from 0.05-0.2 g. of zirconium as the oxide was treated by De Boer, with 15 ml. of strong hydrochloric acid and 1 ml. of a solution of the alizarin reagent. The solution was titrated with 1 per cent sodium fluoride till the colour changed to yellow. A known zirconium solution was next titrated in the same way and the titrations were repeated till the known and unknown titres were not more than 0.5 ml. apart. This was done because the amount of sodium fluoride required depended on the concentration of hydrochloric acid. Ti, Ce, Mn and Al did not interfere, but it was necessary to reduce ferric iron with stannous chloride. Naturally this method has not found favour because it is rather cumbersome. A more attractive titrimetric method has been published by Uspenskaya, Zverkova and Gul'dina[54] for zirconium in alloy steels. The alloy was opened out by hydrochloric acid and peroxide treatment, and the solution taken down to dryness and brought up again in 25 ml. of 2.5N hydrochloric acid. Ferric iron in this solution was reduced by boiling with tin and the solution was transferred to a cylinder and diluted to 70 ml. 1.5 ml. of 0.03 per cent sodium alizarin sulphonate were added and the solution was then titrated, after standing for five minutes, with 0.1 m. sodium fluoride to a pink-yellow colour. 20 ml. of 2.5N hydrochloric acid in a similar cylinder were diluted to 50 ml. and treated with the same amount of sodium fluoride as used above. This solution was then titrated with a solution, containing 7 g. of zirconium oxychloride octa-hydrate in 1 litre of water, till the same colour was obtained.

Cupferron & Tannin Methods

Tannin and cupferron have been used for the precipitation of zirconium, but of course, they are reagents of very wide application and can by no means be termed even selective. In view of the existence of many other reagents for zirconium which are much more selective, these methods have been receiving much less attention recently, and the introduction of mandelic acid and its halogenated derivatives for the determination of zirconium tends to push them even further into the background. However, a brief outline of the uses of these methods is not inappropriate.

Schroeder[55] (1911) observed that zirconium was completely precipitated by cupferron in acid solutions, and Thornton and Hayden[56-58] showed that the determination of zirconium using cupferron was possible in solutions containing as much as 5-7.5 per cent of sulphuric acid. Later Lundell and Knowles[59] found quantitative precipitation from solutions containing as much as 40 per cent V/V sulphuric acid. In applying the method to steels containing titanium,[60] the zirconium and titanium were brought down simultaneously and weighed as the mixed oxides after ignition. The TiO_2 was then determined colorimetrically and deducted. Thornton and Hayden originally reported that the separation of zirconium from phosphate using cupferron was impossible, but Lundell and Knowles obtained fair separations by maintaining the acidity at 10 per cent sulphuric acid (V/V) and the P_2O_5 concentration below 50 mg. per litre. Angeletti[61] separated zirconium from uranium by precipitating the former with cupferron in acid solution and he recovered the uranium in the filtrate by making it ammoniacal. A preliminary purification of the zirconium solution from the ions of most other heavy metals is necessary before using cupferron for zirconium.

Tannin Less Used

Tannin has been much less used, and references to two papers are sufficient at this stage. Powell and Schoeller[62] used tannin for the separation of zirconium and titanium in the presence of oxalic acid and ammonium chloride. Under these conditions, zirconium remained in solution while the titanium precipitated. The filtrate was boiled with excess nitric acid and sulphuric acid to remove ammonium chloride, oxalate and tannin. The excess nitric acid was removed by fuming, and on cooling, the solution was diluted and neutralised with sodium carbonate. The solution was then filtered and the zirconium in the filtrate was brought down by boiling with sodium thiosulphate. The precipitate was ignited and weighed as the dioxide.

Minerals & Refractories

Holness and Kear[63] have applied the tannin method to the determination of zirconium in minerals and refractories. A sample of 0.2-0.3 g. was fused with 3-5 g. of sodium carbonate. The cold melt was treated with 20 ml. of concentrated sulphuric acid in 100 ml. of water and carbon dioxide was removed from the resulting solution by boiling. Silica was removed and determined in the usual way by fuming, diluting and filter-

ing. etc. The residue from the hydrofluoric acid treatment was fused with potassium bisulphate to bring all the zirconium into solution and the extract of the melt was added to the main filtrate. Group II metals in the solution were removed by precipitation, and after removal of the hydrogen sulphide, ammonium chloride was added and the solution was made basic to methyl orange. The precipitate thus obtained was dissolved in hydrochloric acid, and the solution was diluted to 200 ml. 5 g. of ammonium chloride were added and the boiling solution was treated with 20 ml. of boiling water containing 1 g. of tannin. The precipitate thus obtained contained all the zirconium and some titanium. It was filtered with the aid of paper pulp, washed with hot 2 per cent ammonium chloride, ashed and weighed. The filtrate and washings were treated with tannin as before and made neutral to methyl orange by addition of ammonia. The precipitate was washed as before, ashed and weighed. Lastly the two weighed precipitates were fused with potassium bi-sulphate and the titanium was determined colorimetrically with perhydrol. The weight of contaminating TiO_2 was calculated and deducted from the apparent weight of ZrO_2.

Oxine Method

Oxine has been used for the determination of very many metals, including zirconium. It has little to recommend it for this purpose, however, as it is non-selective and as with most organic reagents for zirconium, it is necessary to ignite the precipitated compound to the oxide before weighing,[64] although Japanese workers[65] claimed that the zirconium oxinate could be weighed after drying at 115°-150°C. The compound brought down from acid solutions of zirconium by 8-hydroxyquinoline (oxine) is voluminous and varies in composition from $2ZrO_2.3C_9H_7ON$ to $Zr(C_9H_6ON)_4$. Balanescu found that this variation in composition was due not to chemical factors, but to the degree of dispersion of the aggregates.[66] In a solution free from other metallic ions, the following procedure was recommended for amounts of zirconium from 300-30 g. 10 ml. of 6N nitric acid were added to the solution which was then diluted to 50 ml. and evaporated to small volume on a waterbath. Another 5 ml. of nitric acid were added and the solution was evaporated once more. Finally it was diluted to 50 ml. and 5-10 ml. of 3 per cent alcoholic oxine and 50-70 ml. of 2M sodium or ammonium acetate were added. The precipitate was filtered off after the solution had been allowed to stand for several hours, and was washed with boiling water containing a little sodium acetate, till the washings were colourless. Balanescu dried the oxinate at 130-140°C., and weighed it as $Zr(C_9H_6ON)_4$ but preferred to ignite and weigh as zirconia. He also devised a bromometric titration of the oxine part of the precipitate, but this must be regarded as suspect.

Tartaric Acid Used

Sue and Wetroff[67] preferred to bring down the oxinate of zirconium from hydrochloric acid solution containing sufficient tartaric acid to complex all the zirconium. A solution of oxine in acetic acid was used as the precipitant, and twice the theoretical amount was added. The solution was boiled gently and cooled before filtering. Sue and Wetroff made the observation that the slight solubility of the zirconium precipitate caused an error of as much as 1-3 per cent in the gravimetric determination. The same authors also studied bromoxine (5,7-dibromo-8-hydroxyquinoline in this connection,[68] but they concluded that there was no special advantage in this reagent, because it was very difficult to separate zirconium from the reagent.

(To be concluded)

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German Chemicals Need Capital

Potash Industry's Expansion

DIFFICULTY of attracting outside investment capital into the industry was described as the problem causing the greatest anxiety to German chemical manufacturers by W. A. Menne, President of the German Federation of the Chemical Industry, when he addressed the annual meeting of the Federation's Westphalian section. He said that nearly 90 per cent of the total amount of DM 2,500,000,000 spent on new plant and plant extensions in the West German chemical industry since the currency reform came from the companies' own financial resources.

West Germans Handicapped ?

West German firms, he claimed, were handicapped as compared with foreign competitors who enjoyed the advantage of strong capital markets and favourable tax systems. As a remedy, he urged that dividends up to six per cent should be treated as tax-free expenses on the part of the industrial companies distributing them and the Export Promotion Act should be revised. The chairman of the regional organisation, speaking at the same meeting, urged special consideration for the capital needs of smaller firms.

The price index for chemical products in February declined further to 189 (1938 = 100) and was thus one-third below that for industrial products in general. German manufacturers claim that any further increase in producing costs would necessitate higher prices. The high cost of transport, absorbing in one case 10 per cent of total proceeds, has caused several chemical firms in Bavaria to consider moving productions to more favourable localities. Thus Süd-Chemie AG has opened a new superphosphate works at Kelheim on Danube and closed its old ones at Heufeld. Elektroschmelzwerk Kempten AG has opened a silicon carbide factory at Grefrath near Cologne. Wackerchemie GmbH (the former Dr. Alexander Wacker Gesellschaft für elektrochemische Industrie mbH) may have to curtail operations at its Burghausen/Obb works.

Some of the I.G. Farbenindustrie successor companies now released from Allied control have published 'provisional' balance sheets for 1 January, 1952

Two typical companies—Badische Anilin- & Soda-Fabrik AG and Farbwerke Höchst AG—are in a strong position to meet competitive conditions. The latter in its report speaks of its 'hope to make use, free of hindrance by Allied supervision, of the wide range of its production programme for free competition with the other I.G. Farben successors.' At the same time, however, it is stated that 'the former I.G. Farben works are closely linked and mutually dependent as regards the supply of basic and intermediate materials as well as the complementing of assortments in sales.' At least some degree of cooperation in buying and selling thus seems to be envisaged by the segregated companies from the outset. The setback in the export markets last year is at least partly attributed by BASF to the fact that its selling organisation had gone into action at a comparatively late date.

A branch of the German chemical industry which fared comparatively well last year abroad as well as at home is potash production. Following a 15 per cent increase in production in 1952, the leading companies continue to press forward their plant expansion programmes. Wintershall AG is preparing to resume production at the Neuhof potash works in the Fula district which have been idle for the past 25 years: £900,000 will have to be spent to bring the works up to date. The company's Herfa-Neurode works is to raise its output before the end of this year, and Burbach AG also intends to increase its production substantially, following the completion of extensive work at its Königshall-Hindenburg and Riedel works.

Potash Stocks Reduced

Potash stocks, accumulated before the end of last year because of inclement weather, have been greatly reduced in the first few months of this year when deliveries were half as large again as in early 1952, and production which is now back to the highest figure of last autumn is confidently expected to rise further in the 1953/54 fertiliser year.

Gelatine & Glue

First Residential Conference of BGGRA

THE first residential conference of the British Gelatine & Glue Research Association was held at Hulme Hall, Manchester, on 8-11 April and was attended by some 70 persons, representing gelatine and glue manufacturers, firms using these products, university departments, research associations and government laboratories. Among those present were Prof. F. J. W. Roughton, F.R.S., Department of Colloid Science, Cambridge University (DSIR, visitor to the association), Prof. W. T. Astbury, F.R.S., Department of Biomolecular Structure, Leeds University, and Prof. D. Burton, Leather Industries Department, Leeds University.

The first paper of the conference was by Dr. G. Stainsby on 'The Fractionation of Gelatine.' A new method for preparing gelatine fractions was described, based on the solubility of the complex formed between gelatine and sodium dodecyl sulphate. Dilute solution viscosity was used as an indication of molecular weight differences, and it was demonstrated that different gelatines could have widely different molecular weight distributions. Mr. P. R. Saunders in his paper 'Anomalies in the Mechanical Properties of Gelatine Solutions and Gels,' gave the results of measurements on the fractions prepared by Dr. Stainsby. After maturing at 0°C. and 10°C., the rigidity of 5.5 per cent gels of the gelatine fractions of any one gelatine proved independent of molecular weight. This result shows that some unknown factor which, to a greater or less extent, is broken down in making gelatine and glue, is responsible for giving the rigidity of 'jelly strength' of gels. The viscosity of solutions, on the other hand, depends largely on the molecular weight.

Molecular Weight Breakdown

The cause of molecular weight breakdown was described by Dr. A. Courts in his paper 'Degradation and Molecular Weight Studies of Gelatine Using the N-terminal Residue Technique.' In this work, the methods developed by F. Sanger and used so successfully by him in finding the structure of insulin, have been applied to gelatine. Extending the scope provided by the normal manufactured products, Mr. A. W. Kenchington in his paper 'The Study of the Reactivity of the Side Groups of Gelatine,' outlined methods to be used in modifying gelatine. The approach was illustrated by results obtained by methylating gelatine.

Composition of Bone

Dr. J. E. Eastoe in his paper 'The Composition of Bone' showed how the organic constituents of compact bone tissue may be divided into collagen (from which gelatine and bone glue are derived,) a protein resisting solution in boiling water, and a mucopolysaccharide. The component sugars and amino sugars of the last substance have been identified. Mr. D. Fysh gave an account, in his paper 'Empirical Studies on Bone Glue," of the equipment being used by the association for research on bone glue manufacture. Preliminary results were also presented.

Miss M. E. Adams described the many problems whose solution would shed light on difficulties experienced in more than one consumer industry. The field of work least understood in the use of gelatine and glue, was where the surface properties were involved — adsorption, protective colloid action, crystal growth modification, emulsion and foam formation. The determination of total bacterial count for edible gelatines is complicated by very large sampling errors. Mrs. E. Courtman, in her paper 'The Distribution of Bacteria in Air-dry Gelatine' set out procedures to enable limits of error to be assigned for the determination.

Dr. G. R. Tristram's Conference Lecture 'Review of Progress in Protein Research' was concerned particularly with the amino-acid composition and sequence in proteins. The advances which improved analytical techniques have made possible during the last twenty years were described. A vote of thanks to Dr. Tristram was moved by Dr. W. M. Ames of Messrs. J. & G. Cox Ltd., and seconded by Dr. J. H. Bowes of the British Leather Manufacturers' Research Association.

In the final session of the conference the Director of Research, Mr. A. G. Ward,

summarised present knowledge of gelatine and glue, and in particular the relation of properties of structure. The next few years would also provide opportunities for development work and a considerable expansion of investigations of direct value to users.

A general vote of thanks to those concerned in arranging the conference was moved by Prof. D. Burton and seconded by Mr. R. B. Drew (Messrs. British Glues & Chemical, Ltd.). The chairman, Mr. S. G. Hudson, in his concluding remarks emphasised the value of the technical co-operation made possible through the existence of the association and looked forward with confidence to the future development of the work.

New Diaphragm Compressor

A NEW diaphragm-type compressor built to provide small quantities of low-pressure air completely free from oil and other impurities, has been manufactured by The Hymatic Engineering Company Ltd., Redditch. Designated the DP4, it is intended for such duties as food processing, raising consumable liquids, pressurising instruments or special equipment and for many special processes in medical or industrial laboratories.

A three-ply diaphragm takes the place of the usual cylinder and piston, thus avoiding the need for oil in the compression chamber. An activated carbon air intake filter safeguards purity. A pressure switch is available as an extra, adjustable to between 0 and 30 p.s.i. and for the differential between cut in and cut out. Maximum working pressure is 30 p.s.i. at 1,450 r.p.m. Delivery is 2 cfm of free air at 10 p.s.i.—the equivalent of 200 gal. an hour liquid displacement. The air outlet connection is ¼ in. B.S.P.

A feature of the new compressor is its silent operation. There is no perceptible vibration as both crankshaft and connecting rod are carefully balanced. Servicing is rarely necessary since no lubrication is required at any point and there are no moving parts in rubbing contact.

Hostel's Dinner a Success

Tribute Paid to London Youths

'DESPITE what one hears about the 'falling off of youth' today, we in the Navy find that all youth is good, but the Londoner has that little bit extra which puts him on top. My experience shows that the sparrow-like qualities of the Londoner in getting there first and then staying there is a great asset.' That was the tribute paid by Vice Admiral J. A. S. Eccles, C.B. C.B.E., proposing the toast of the 'London Boy' at the annual dinner at the May Fair Hotel of the John Benn Boys Hostels Association.

Viscount Leverhulme, who has continued his late father's great interest in the association, was the chairman at the dinner attended by a large and distinguished gathering representative of industry, commerce and the arts.

Sir Theobald Mathew, Director of Public Prosecutions, proposing the toast of the 'John Benn Boys Hostels Association,' reminded the company that throughout the years London had regarded youth as its special care and pride. It was because London realised that its greatness depended not only on one generation, but to each generation handing on the great traditions on which the country must ultimately depend.

The object of the association, said Mr. Glanvill Benn, chairman of the committee that had arranged the dinner, was to turn out good citizens, and the cost of those good citizens was £150 each. Since the association had been in operation it had turned out some 1,750 good citizens.

Residue Taken From Capital

The running of King George's House last year had cost £24,000, said Mr. Benn. Of this the boys themselves had paid £15,000. Of the £9,000 remaining, £5,000 had been raised from last year's appeal, but the residue of £4,000 had to be taken from capital.

The object of the dinner was to raise funds for the Association and Mr. Benn made an appeal for the guests to give generously.

The result of the collection at the dinner was £1,783, more than £160 better than last year's collection, announced Mr. A. ('Pop') Townshend, Warden of the hostel, who thanked the company for their generosity.

HOME

Chemical Exports

Exports of chemicals, drugs, dyes and colours from the United Kingdom in March were valued at £10 884,359, which was £2,675,980 less than the same month of last year, but £999,777 better than March 1951. For the first three months of this year the value of exports in this group was £31,465,348, a decrease of just over £9,000,000 compared with the first quarter of 1952, but an increase of nearly £1,500,000 over the same period of 1951.

Misplaced Report

On page 628 of our issue of 25 April there appeared in our report of the British Industries Fair a description of what was purported to be the stand of J. W. Towers & Co., Ltd., at Castle Bromwich. In fact, this was a description of the company's display at the Physical Society's Exhibition which was held at Imperial College from 13-17 April and which was reported on in the same issue. J. W. Towers & Co., Ltd., are not showing at the BIF this year.

New Lubricant

English Steel Corporation, Ltd., Sheffield, report good results from an experimental lubricant for machines working at high pressures and temperatures. It consists of a 'jam' of corn syrup or molasses, mixed with powdered molybdenum disulphide. Chiefly used so far on new machines and replaced parts, the lubricant has not needed renewing for months, while the machines have been running at full pressure.

Smokeless Zone Proposals

Manchester Health Department are on the point of completing their survey of a second smokeless zone, establishment of which will more than double the area of the city freed from smoke pollution. Set up on 1 May last year, Manchester's first smokeless zone in the commercial centre of the city has proved immensely successful. Results of the survey are to be placed before the city's Health Committee for a decision as to whether the extension should be carried out, and will then go to the city council for final approval. The survey has taken more than two-and-a-half months.

Workman's £1,000 Award

An idea relating to the recovery of oil for soap making, which he thought might increase efficiency and save his employers money, has brought an award of £1,000 to Mr. William Gray, a charge hand employed by Lever Brothers at Port Sunlight. His idea, written in 50 words and put forward two years ago, was developed experimentally and then put into operation. He received an interim award of £100 and the additional award came to him as a complete surprise.

Workers to see Coronation

A number of workers at the Stone (Staffs.) factory of Quickfit & Quartz, Ltd., industrial and laboratory chemical glassware manufacturers are among the 157 members of the 21 Club of the Triplex Safety Glass Co., Ltd., the parent company, who have received a personal invitation from the directors to view the Coronation procession from the firm's head office in Piccadilly, W. The Club consists of employees and directors with 21 or more years' service. A married member is invited to bring his wife or her husband.

Battle of the Floods

Thirty thousand tons of gypsum have been offered by Imperial Chemical Industries, Limited, to combat salt in the soil of large areas of valuable farm land in Eastern England which were flooded earlier in the year. While the salt remains the land will be unproductive. Three train loads of gypsum have been despatched from Billingham.

Changes of Address

The Morgan Crucible Co., Ltd., announce that as from 27 April all correspondence, inquiries and orders for refractories should be addressed to the Refractories Group, Neston, Wirral, Cheshire. The telephone number is Neston 1406, and the telegraphic address: 'Hightem,' Neston. The new address of Expandite, Ltd., is Chase Road, London, N.W.10. The telephone number is Elgar 4321 (10 lines) and the telegraphic address: 'Expanjoint,' Harles, London. Harold Wood & Sons, Ltd., bulk liquid transporters, are now located at Wormald Street, Heckmondwike. The telephone number is Heckmondwike 1011/5.

• OVERSEAS •

New German Company

The Farbenfabriken Bayer A.G.—another successor company of I.G. Farben—has been constituted with a nominal capital of DM. 387.1 mil. (£32,500,000). This new chemical combine, the largest constituent of which is the works at Leverkusen, has 30,700 employees. Last year its turnover was DM. 825.6 mil., including exports value DM. 246 million.

Dutch Soda Works

It is reported from Amsterdam that a big soda industry is to be established at Delfzyl. The factory will be set up with assistance from the United States of America and will probably be complete in about four years. Financing will be done partly by Royal Netherlands Salt Industries (a private concern) and partly by the Government. Production is to be based on a minimum of 450-500 tons a day.

U.S. Meets Competition

Chemical & Engineering News (**31**, 1264) reports that export markets for U.S. chemical companies are tightening up as foreign industry develops. Vitamin manufacturers are meeting increased competition not only in Europe, but on their home ground, as British, German and Japanese suppliers force the price down. In the field of insecticides also an increase in foreign output has affected American manufacturers: Brazil, for instance, will grant no further import permits.

Petrochemicals in Canada

Sales of Dominion Tar & Chemical Co., Ltd., in the first quarter of 1953 are 'slightly ahead of the same period last year.' Indications are that sales will be maintained at their present level through the second quarter. Construction is 'practically complete' at the new petrochemical plant in Montreal East, and it should be able to commence production in May. Capacity of the chlorine plant at Beauharnois has been enlarged and the new facilities are ready to go into production simultaneously with the Beauharnois unit. Output is 'running smoothly' at the enlarged anhydride plant at Toronto.

Canadian Ammonium Sulphate

Sherritt Gordon Mines, Limited, announces that it has made arrangements for Harrisons & Crosfield (Canada) Limited, to handle the sale of its output of ammonium sulphate fertiliser. Sherritt Gordon estimates that its chemical metallurgical plant at Fort Saskatchewan, which is scheduled to go into production early in 1954, will produce in the neighbourhood of 65,000 tons of ammonium sulphate fertiliser per annum.

Isotope Production

The Norwegian production of radio-active isotopes is increasing steadily, says Professor Björn Trumpy, chairman of the Norwegian Reactor Commission. Since October last year, 120 deliveries have been made abroad, and much has also been sold in Norway. The isotopes are produced at the uranium reactor at Kjeller, north of Oslo, where the reactor and laboratories are run jointly by a Norwegian-Dutch Commission. Among the materials made radio-active at Kjeller are cobalt, iodine, sulphur, iridium, and phosphorus.

Industrial Research Council

His Excellency Mr. Ghulam Mohammad, Governor-General of Pakistan, inaugurated the Council of Scientific and Industrial Research in Karachi on 10 April. His Excellency spoke of the shortage of both scientists and laboratories in Pakistan, and said that the nation would have to overcome these handicaps. He expressed his appreciation of the fact that the task of industrial and scientific research for the progress and development of the young nation had been entrusted to an autonomous body.

Company Changes Hands

Control of The McArthur Chemical Co., Ltd., has been bought by the recently organized St. Maurice Chemicals, Ltd., it is announced by G. V. Bartram, president of St. Maurice. Included in the sale is McArthur's wholly-owned subsidiary, Chemicals, Limited. St. Maurice is just completing construction of its plant at Varennes, Quebec, to produce formaldehyde and pentaerythritol.

• PERSONAL •

DR. A. R. URQUHART, at present director of research of Lansil Ltd., Lancaster, will succeed DR. D. CLIBBENS, as assistant director in charge of chemistry and chemical processing at the Shirley Institute, Manchester on 31 July. Dr. Urquhart, a graduate of Edinburgh University, was formerly on the staff of the institute and from 1934-43 was in charge of the Rayon Section. In addition to his ability as a chemist and textile technologist, he brings to his new post considerable industrial experience. Dr. Clibbens has been with the association since its inception and as head of the General and Inorganic Chemistry Department (later the Dyeing Department) from 1920. He became head of the Chemistry Division in 1945. MR. A. H. LITTLE, also a former member of the staff and lately employed by I.C.I., particularly on the development of 'Terylene' production, has also joined the Shirley Institute. He will be mainly concerned with questions affecting the practical bleaching, dyeing and finishing of textile fibres.

At the annual general meeting of the British Disinfectant Manufacturers' Association held recently, the following officers and executive committee were elected for the ensuing year: Chairman, MR. A. ERNEST BERRY (Milton Antiseptic Limited); vice-chairman, SIR KNOWLES EDGE, Bart. (William Edge & Sons, Ltd.); honorary treasurer, MR. VICTOR G. GIBBS (William Pearson Limited); Executive Committee: MR. R. G. BERCHEM (Jeyes' Sanitary Compounds Co., Ltd.), MR. A. J. BLACK (Lehn & Fink Products, Ltd.), MR. P. J. BOVILL (Newton Chambers & Co., Ltd.), MR. J. H. CHAPMAN (Reckitt & Colman, Ltd.), MR. J. J. MCAULAY (Cooper McDougall & Robertson, Ltd.) and MR. W. M. MACMILLAN (Robert Young & Co., Ltd.). Honorary Auditors: MR. A. GALE (Milton Antiseptic, Limited) and MR. F. C. SEAGER (William Pearson, Limited). Secretary: MR. W. A. WILLIAMS, M.B.E., B.Sc., 166 Piccadilly, London, W.1.

Sharples Centrifuges, Ltd., recently held a dinner for all members of its staff at Moor Court in honour of its chairman, MR. A. H. KEABLE, M.I.Mech.E., M.I.Chem.E., to mark his retirement from the position of managing director, which he had held for 25 years.

MR. G. J. KEADY, president of The Sharples Corporation from Philadelphia, was in the chair, supported by MR. G. P. BALFOUR, managing director, and spoke most appreciatively of Mr. Keable's services to the business which he started in this country in 1919. On behalf of the parent company, he presented Mr. Keable with a beautiful silver coffee set of the famous American Paul Revere pattern, the tray being suitably engraved.

The staff of Sharples Centrifuges, Ltd., gave Mr. Keable an inscribed silver cigarette box and MR. G. A. FRAMPTON, technical director, in making the presentation, mentioned his long association with him and recalled some of their earlier experiences.

SIR ROBERT ROBINSON, O.M., M.A., D.Sc., LL.D., F.R.I.C., F.R.S., Waynflete Professor of Chemistry at Oxford University, has been awarded the Priestley Medal, the highest honour presented by the American Chemical Society. It has been awarded for 'outstanding services to chemistry.' Sir Robert is a past president of the Royal Society and a past president of the Chemical Society. He was awarded the Nobel Prize for Chemistry in 1947.

MR. E. H. BUCKNALL, of the University of Birmingham, has been appointed Director of National Metallurgical Laboratory, Jamshedpur, one of the eleven laboratories started by the Council of Scientific and Industrial Research, India. Mr. Bucknall is well known for his work at the Birmingham laboratory of the Mond Nickel Company, which led to the development of 'nimonic' alloys used for turbine blades in jet aircraft engines.

SIR HARRY JEPHCOTT was elected Coronation Year president of the Royal Institute of Chemistry at the annual general meeting of the Society held in London on 24 April. Sir Harry, who became a corporate member of the Institute in 1917 is chairman

and managing director of Glaxo Laboratories, Ltd., and a director of Metal Box Company, Ltd.

During the war years he was Manufactured Foods Advisor to the Ministry of Food, and later visited the U.S.A. on behalf of the Ministry of Supply to report on penicillin production. Sir Harry was knighted in 1946. The following year he was elected Chairman of the Association of British Chemical Manufacturers, and was re-elected to the office for the two subsequent years. He is president of the Association at the present time.

MR. GODFREY H. OWTRAM has been elected chairman of Petrochemicals Limited and MR. E. J. BARNSLEY has been elected a director of the Company.

The retirement of SIR WALLACE AKERS and MR. WILLIAM F. LUTYENS from the Board of Imperial Chemicals Industries, Limited, was announced last week. Sir Wallace is responsible to the Board for all I.C.I. research and Mr. Lutyens is in charge of development. The retirements were effective on 30 April.

DR. W. IDRIS JONES, Director General of Research to the National Coal Board, has been unanimously elected by the Council of The Institute of Fuel as President for the 1953-54 Session. He will succeed the retiring President, DR. G. E. FOXWELL, in October of this year.

Appointment of MR. P. H. DELACOUR as vice-president in charge of sales has been announced by the board of directors of Cabot Carbon of Canada, Limited, Canadian subsidiary of Godfrey L. Cabot Inc., Boston, Mass. The appointment of MR. F. RONALD GORRIE as assistant sales manager of the Canadian organisation, has also been announced. Prior to the establishment and operation of the Cabot subsidiary company in Canada, the firm of Delacour-Gorrie, Ltd., Toronto, directed by Mr. Delacour as president and Mr. Gorrie as vice-president, was exclusive sales representative for all Cabot products in Canada. Mr. Delacour's activities have been related to the sale of Cabot products in Canada for the past 25 years. Before the formation of Delacour-Gorrie, Ltd., he was a director of Harrisons & Crosfield (Canada) Ltd.

MR. E. A. O'NEAL, Jnr., who continues as chairman of Monsanto Chemicals, Limited, has been elected a director of Monsanto (Canada) Limited and appointed president of that company. Mr. O'Neal's activities will embrace general supervision of the affairs of Monsanto (Canada) Limited. Responsibility for all the operations of Monsanto (Canada) Limited will rest with MR. LEE RYAN, executive vice-president of that company.

MR. WALTER A. WELDON, an American ceramic specialist, is to advise the Government of India, under the United Nations Technical Assistance Scheme, in setting up a new plant for manufacturing high tension insulators. The projected plant will make ceramic insulators of all types suitable for high voltage lines, with an initial production of 2,000 tons, which is to be doubled later.

Newman Industries Limited announce that MR. R. F. SHEARMAN, A.M.I.E.D., has been appointed Technical Representative for Newman Industries Limited in the United States, and is leaving for New York on 20 April to take up his new appointment. Mr. Shearman has had a wide experience of Electric Motor applications and for the past three years has been Mechanical Development Engineer at the Company's Yate Works.

MR. W. C. LYLE, works manager since 1935 of the Cassel Works of Imperial Chemical Industries, Limited, Billingham-on-Tees, has been appointed deputy operations manager of the general chemicals division of I.C.I. at Liverpool. He was formerly with the Castner-Kellner Alkali Company, Wallsend. DR. R. N. KERR will succeed him as works manager at the Cassel Works.

MR. C. H. BRADBURY, M.I.C.E., M.I.Mech.E., M.I.Mar.E., chief engineer and technical director, at Petters Ltd., Staines, has been awarded the Percy Still Medal by the Diesel Engine Users' Association for his paper on 'Torsional Vibration in Diesel Engines—Some Observations and Practical Aspects.' The presentation was made at the association's annual luncheon on 16 April when the principal guest was MR. W. R. COOK, C.B., M.Sc., chief of the Royal Naval Scientific Service. Mr. Bradbury has been chief engineer and technical director at Petter's for the past 3½ years.

Next Week's Events

MONDAY 4 MAY

Society of Chemical Industry

London: Burlington House, Piccadilly, W.1, 6.30 p.m. Joint meeting of the Plastics and Polymer Group with the London Section. Dr. G. W. Ferguson: 'Standardisation of Shellac and Lac Products.'

TUESDAY 5 MAY

Institute of Metal Finishing

Birmingham: James Watt Memorial Institute, Great Charles Street, 6.30 p.m. E. Apsley: 'A Survey of the Applications of Wet Processing at Rolls Royce Ltd., Aero Engine Division' dealing with the special applications of nickel, chromium, cadmium, tin, lead-indium, and silver-plating, and with anodising, electro-polishing and chemical immersion processes.

WEDNESDAY 6 MAY

Society of Public Analysts

Glasgow: The University, 7.15 p.m. Ordinary meeting of the society organised jointly by the Microchemistry Group and the Scottish Section.

THURSDAY 7 MAY

The Chemical Society

London: Burlington House, Piccadilly, W.1, 7.30 p.m. Reading of original papers: 'The Catalytic Deuteration of Organic Compounds—Parts III and IV'; 'Studies on Biological Methylation—Part XIV'; and 'Oxygen Exchange Between Nitric Acid and Water—Part III.'

Leeds Metallurgical Society

Leeds: The University, 7.15 p.m. Annual general meeting followed by reading of papers by junior members.

Royal Institute of Chemistry

Salford: Royal Technical College, 6.30 p.m. Annual ladies' evening. 'Pottery.' Lecture by Mr. Litherland, demonstrations and exhibitions.

FRIDAY 8 MAY

The Chemical Society

Newcastle-on-Tyne: King's College, 5.30 p.m. Bedson Club Lecture. Professor E. R. H. Jones: 'Allene Chemistry.'

Market Reports

LONDON.—There has been a considerable improvement in the volume of inquiries for new business on the industrial chemicals market, and reports from nearly all sections indicate a more confident outlook in the chief consuming industries. There have also been a lot of inquiries for export, many of which are yet to reach the order books. There have been no changes in the general run of industrial chemicals, and the latest basis quotation for dry red lead and litharge is £110 5s. per ton, and for dry white lead £127 per ton. Cadmium metal is now 13s. 10d. per lb. Trade in the coal tar products has not been brisk although pitch, creosote and toluol continue to be in active request.

MANCHESTER.—Reasonably active buying on home trade account has been reported again on the Manchester market for heavy chemical products and further inquiries from the leading home industrial consumers, including the cotton and woollen textile trades, as well as for shipment are being dealt with. Contract deliveries of caustic soda and other soda compounds and of the ammonia and magnesia chemicals have been maintained. The demand for the general run of fertiliser materials is now rather below the peak, though a fairly steady movement of supplies is still being experienced. In the tar products market creosote oil, pyridine, and the benzoles and other light distillates are in steady request.

GLASGOW.—The increased demand for general chemicals experienced during the preceding week has been maintained and the outlook appears to be very favourable. Export remains steady.

New Rodenticide

'Pival,' a new anti-coagulant rodenticide with insecticidal and fungicidal properties, whose active ingredient is 2-trimethylacetyl-1,3-indandione, has just been released by Motomco Inc., of New York. The poison is used at an active concentration of 1 in 4,000, and is tasteless and odourless. Its lethal action depends upon continued eating over a period of several days, and it is claimed that 'Pival's' other properties impart to the bait an increased resistance to infestation by insects or mould, thus keeping it fresh and attractive.

Company News

A. Boake, Roberts & Co., Ltd.

An extraordinary meeting of A. Boake Roberts & Co. Ltd. will be held at Stratford on 19 May, to give effect to the proposals to change the name of the company to A. Boake, Roberts & Co. (Holding) Ltd., and to amend the memorandum and articles.

Solway Chemicals Ltd.

The Treasury has announced that Sir Henry Tizard and Mr. N. M. Peech have been nominated as the Treasury representatives on the board of Solway Chemicals, Limited, which is building a £2,000,000 plant at Whitehaven to produce high-grade sulphuric acid from domestic anhydrite. The share capital has been subscribed by Marchon Products, Limited (the parent concern) and the Industrial and Commercial Finance Corporation. Loan capital totalling £1,700,000 has been advanced by the Treasury. It is estimated that the anhydrite which exists on the plant site will last for 75 years. Initial output of acid will be 75,000 tons a year, starting in 1954.

Howards of Ilford Ltd.

On 2 April, 1953, the business of Howards & Sons, Ltd., was transferred to a new wholly-owned subsidiary company, Howards of Ilford, Limited. The parent company will continue as a holding company and there has been no change in the ownership or management of it. However, the four older directors, G. E. Howard, B. F. Howard, H. Ll. Howard and G. C. Mann are ceasing to hold full-time executive positions and the active management of Howards of Ilford, Limited, will be in the hands of T. W Howard, J. M. C. Fox, J. A. E. Howard and D. V. E. Howard. These together with G. E. Howard, as chairman, will constitute the board.

Eaglescliffe Chemical Co. Ltd.

Shareholders of the Eaglescliffe Chemical Co., Ltd., have approved the purchase of John and James White, Limited. Subject to approval of the Board of Trade, the name of the Eaglescliffe Co. will be changed to British Chrome and Chemicals, Ltd.

P. B. Cow & Co. Ltd.

An increase of capital from £987,500 to £2,000,000 by the creation of 5,062,500 new 4s. shares, in order to meet possible expansion, is proposed by P. B. Cow & Company.

Brotherton & Co. Ltd.

A final dividend of 7½ per cent, making 12½ per cent for 1952 (as for the previous 12 months), has been announced by Brotherton & Company, Ltd. A preliminary statement shows net profit for the year dropped from £317,985 to £217,324 after tax provision of £185,493 (£336,433).

Bakelite Ltd.

An issue of £1,000,000 five per cent debenture stock, 1968/77 at par, was announced by Mr. H. V. Potter, chairman of Bakelite. Limited, at its annual meeting on 23 April. The prospectus was published on 27 April and the subscription list opened and closed on 30 April. The issue was public with a preference given to shareholders' applications if made on a special form. Main purpose of the issue is to replace temporary loans from bankers which have been used to finance the construction of the company's new vinyl resin factory and plant at Aycliffe, County Durham, which is now nearing completion. The issue is being sponsored by Morgan Grenfell & Co., Ltd.

Newton Chambers & Co. Ltd.

The chemical and engineering departments of Newton Chambers & Co., Ltd. continued to show good and expanding profits in 1952. Total income for the year established a new record at £894,000 compared with £767,000. A dividend of 25 per cent (same on smaller capital and including 5 per cent bonus) is announced. As soon as the claims of subsidiaries to compensation for nationalised collieries and coke ovens have been agreed it is the intention of the board to revise the company's capital structure. Last year 77 per cent of the firm's gross profits went to the Inland Revenue.

British Xylonite Co. Ltd.

A decrease in the group net profit by £283,962 from £358,992 to £75,030 after a lower tax provision is shown by the British Xylonite Co., Ltd., for 1952. A final dividend of 6 per cent is announced. This makes a total of 8 per cent for the year on capital increased by 150 per cent share bonus to £1,500,000 from £600,000. For the year ended 31 December, 1951, an interim dividend of 5 per cent on the old, and a final of 6 per cent and bonus of 2 per cent on the present capital were paid.

Key Duty Exemptions

THE Treasury have made an Order exempting the following articles from Key Industry Duty, for the period beginning 30 April, 1953, to 18 August, 1953:—Synthetic organic chemicals, analytical reagents, other fine chemicals and chemicals manufactured by fermentation processes, the following: Di-*n*-propylamine, quinidine, quinidine bisulphate, quinidine citrate, quinidine hydrobromide, quinidine sulphate, quinidine tannate and *iso*valeric acid.

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

THE INSTITUTION OF CHEMICAL ENGINEERS

29TH (1953) ASSOCIATE MEMBERSHIP EXAMINATION

APPLICATION forms (returnable June 1st, 1953) and particulars of the 29th Associate Membership Examination, may be obtained from the Secretary, **INSTITUTION OF CHEMICAL ENGINEERS, 56, VICTORIA STREET, LONDON, S.W.1.** Sections C, D, E and F of the examination will be held in September, 1953, and the Home Paper (Sections A and B) will be issued at the end of September for return 15th December, 1953.

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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100 and 50 gal. **STAINLESS STEEL PANS.**
Stainless Steel Jacketed **GAS-HEATED MIXER,** 22½ in. by 36 in. deep. 400/3/50.
Twin Z-blade **MIXERS** from Laboratory size, 6 in. by 11 in. by 11 in., up to 36 in. by 30 in. by 26 in. deep.
Ditto, Jacketed, "**WERNER,**" all sizes.
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BALL MILLS, 2 ft. 6 in. by 2 ft. 10 in., and three 3 ft. 3 in. by 2 ft. 8 in. diam.
SIFTER/MIXER, with U-trough pans up to 6 ft. by 2 ft. by 2 ft.
Stainless Steel **GARDNER MIXER,** 5 ft. by 1 ft. 7 in. by 1 ft. 8 in. 400/3/50.
CONDENSERS, PUMPS, HYDROS, STILLS, OVENS, DRYERS.
Send for lists.
HARRY H. GARDAM & CO., LTD., STAINES.

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3—Baker Perkins and Werner Jacketed **MIXERS** screw tipping pattern, friction pulley drive, single geared, with double-fin type agitators.

4—Gardner **RAPID SIFTER MIXERS** and **MIXERS** only, various sizes, one with brass fitted interior and glass-lined end plates.

27—Various **POWDER DRESSING** or **SIFTING MACHINES,** totally enclosed with barrels from 80 in. long by 22 in. diam. to 120 in. long by 30 in. diam., belt driven with collecting worm in hopper bottoms.

1—Simon Horizontal Tubular **DRIER,** 12 ft. long, 100 lb. steam pressure. size 3B, requiring 12 b.h.p.

4—Recessed Plate **FILTER PRESSES,** 30 in. square, 70 plates in each, centre fed.

5—Johnson **FILTER PRESSES,** 24 in. square, side feed and enclosed delivery, fitted 29 plates and 30 frames.

1—Johnson **FILTER PRESS,** 36 n. square, plate and frame type, double inlet and enclosed delivery ports.

Johnson Oil **FILTER PRESS,** Premier type plates 2 ft. 8 in. by 2 ft. 8 in., of which there are 45, with angle lever closing gear.

1—Johnson **FILTER PRESS,** 42 C.I. plates, 32 in. quare, centre feed.

Steam-heated **FILTER PRESS,** Premier type, 32 in. square, with 30 recessed plates.

Wood **FILTER PRESS,** fitted 69 ribbed plates, 2 ft. 8 in. square, with top centre feed and bottom enclosed delivery channel.

1—24 in. **HYDRO EXTRACTOR,** self balancing, swan-neck type, self emptying bottom.

Heavy Cake **CRUSHING MILL,** 2-pair high, by Nicholson, for cake up to 3 in. thick, rolls 30 in. long, top with coarse teeth 9 in. diam., bottom with finer teeth 12 in. diam.

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1—" U "-shaped **MIXER,** as above, but 7 ft. long.

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WATER-COOLED **BALL MILL** by Houchen, approx. 5 ft. diam. by 6 ft. Capacity 500 gal. Internally lined ribbed cast-iron plates.

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THE Proprietors of Patent No. 599,683, for **"IMPROVEMENTS RELATING TO THE MANUFACTURE AND UTILIZATION OF COLD-SETTING POLYHYDRIC PHENOLIC ALDEHYDE ADHESIVES,"** desire to secure commercial exploitation by licence or otherwise in the United Kingdom. Replies to **HASELTINE LAKE & CO., 28, SOUTHAMPTON BUILDINGS, CHANCERY LANE, LONDON, W.C.2.**

THE Proprietors of British Patent No. 632,785, relating to **"MANUFACTURE OF COLD-SWELLING STARCH PRODUCTS AND OF SOLUTIONS OF SUCH PRODUCTS,"** are desirous of entering into negotiations with firms in this country for the purpose of exploiting the above invention, either by sale of the patent rights or by granting of licences to manufacture on a royalty basis. Inquiries should be addressed to **ABEL & IMRAY, QUALITY COURT, CHANCERY LANE, LONDON, W.C.2.**

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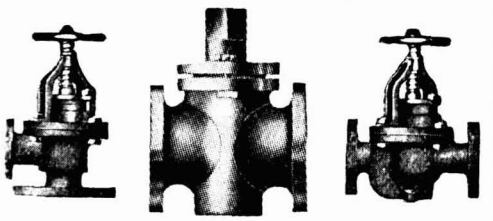

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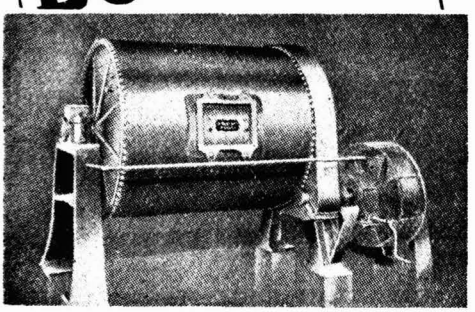

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