THE Chemical Age

VOL LXX 16 JANUARY 1954 No. 1801

Rover Car Factory, Solihull. High intensity lighting in a body spray tunnel by fluorescent lamps in a glazed enclosure.

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Chemical Soil Conditioners

IT is now a little over two years since Krilium, the first chemical soil conditioner, was announced by the Monsanto Chemical Company. The optimistic headlines of the last days of 1951 are best left undisturbed in blissful naïvety. It must be said, however, that the Monsanto company's original release of information was far from highly-coloured, and only experimental distribution was visualised for the first year or two. Regrettably, other producers of polyelectrolytes were less cautious, and within a few months one of the US chemical trade journals was referring in critical tone to 'the advent of a new conditioner every other week.' The popular interest that had been genuinely roused by Krilium was all too swiftly exploited by commercial camp-followers, and not surprisingly in these circumstances the distribution plans for Krilium itself were brought forward.

In mid-1952 a scornful correspondent wrote to *Chemical Week*:

'For gardening try Supercilium
When added to soil
Brings it to a boil
Thus first grows, cooks, then eats
Digests and repeats
All vegetables, grass, and Sweet
William.'

In a more recent article in *Scientific American*, there is another revealing picture of the trade background to soil conditioner development in 1952 and 1953. 'Amazing claims have been made for some of the new soil conditioners. Some hail them as wonder chemicals which, sprinkled on to the ground, turn clay or sand into rich, loose topsoil in a few hours, removing all need for organic matter and the back-breaking labour of digging and cultivation.'

In attempting to assess the progress made by soil conditioners in their first two years, it is essential to disregard the entire story of high-pressure exploitation. However, the strident sales-campaigning has been steadily accompanied by objective reports from US research centres, and particularly during 1953 much more information of a reliable kind about the properties and effects of chemical soil conditioners has become available. Needless to say, any scientific verdict that can so far be pronounced is much more sober and much less certain.

Conditioners are water-soluble polymeric molecules carrying numerous electric charges which attract soil particles and bind them into lumps or aggregates. The natural soil conditioners, mainly products of the decomposition of organic matter in soils, e.g., polyuronates, act in a similar manner. It has been possible for a diversity of commercial products to be cascaded on the market because there is a number of synthetic or semi-synthetic chemical substances that can be expected to act in this way; in addition, the same basic polyelectrolyte may be formulated in various combinations with inert or with plant-feeding materials, thus further widening the range of product development. The use of specific products rather than basic soil-conditioning substances in research station investigations must inevitably confuse knowledge rather than add to it. Some of the research reports from the United States seem to have been concerned with testing the claims of marketed products, specified or unspecified by trade-names, and at this early stage in the development of a new scientific idea it would have seemed preferable for equivalent time and energy to be devoted to fundamental

tests with the chemical and active ingredient. To that extent, fortunately not large, the impatience of commercial exploitation has delayed scientific progress.

However, a good deal of the research reported concerns itself with a particular class of basic conditioner, and there seem to be three such main classes—polyacrylates, polyvinylites, and derivatives of cellulose. Long-chain polymeric molecules with molecular weights above 50,000, water-soluble or at any rate water-absorbent, make up the present practical range of active ingredients. The utilisation of lignins, silicates and even silicones has not been ignored but water-repelling or severe *p*H-reducing properties bring effects that are in conflict with other requirements of soil fertility. Nomenclature that avoids the need to refer to trade-names follows the shorthand pattern of modern insecticide terminology, e.g., HPAN for a hydrolysed polyacrylonitrile, VAMA for a vinyl acetate-maleic acid compound, and CMC for the cellulose derivative mentioned above. Independent research so far reported in this country, from Rothamsted and Long Ashton, referred, however, to CRD 186 and CRD 189, the former a VAMA type and the latter a HPAN type. It would seem timely for agricultural research stations to adopt a universal policy for naming the active ingredients.

One of the realistic conclusions that can so far be drawn is that conditioners do not eliminate or even appreciably reduce the need for mechanical operations in achieving a good soil structure. Broadly, they stabilise the soil condition that they find, and the extent to which they change soil structure is limited. A soil should first be worked into a suitable tilth, and the virtue of a synthetic soil conditioner is that this tilth can then be 'fixed' for a considerable time. Very fine-particled soils may be aggregated to a more desirable condition, and this can be genuinely regarded as soil structure conversion; but even then, the soil conditioner application must be worked in or its effect will be limited to the top layer of soil, to a skin layer not even one quarter of an inch in depth. The beneficial action of a soil conditioner is quickly carried out. It is complete within two to three days. Rain during this period can seriously disturb results for if heavy rain damages the tilth the soil conditioner will 'fix' the impaired condition. It is obvious that the method of application is as influential as the conditioner itself, and it may well be that the present diversity of practical results—some good and some bad—is due to this factor.

Heavy rates of usage appear to depress germination, retard growth, and lower crop yields. Too much 'conditioning' binds topsoils into the plastic state that poisons the spring for those who have to cultivate heavy clay gardens. There is some indication that soils already endowed with a moderate proportion of clay are worsened rather than improved in structure. The 'right' amounts for particular soil types are still very much questions in search of answers. Again, therefore, misapplication may explain some of the complete failures that have been reported. For a number of crops, earlier seedling emergence and in some cases better yields have been reported by research stations. But there is no consistent picture. Evidence conflicts, and a crop that is improved at one centre is sometimes listed among the non-improved cases at another. British tests at Rothamsted and a Forestry Commission research centre showed no significant benefits for potatoes or tree seedlings.

In short, only a rash observer would attempt as yet to predict whether synthetic soil conditioners have an important future in food production. The claim that their effect is lasting because they are immune to bacterial attack has certainly been proved. How best to use them and for which types of soils out of the great natural diversity, and whether the benefits that can then be shown are worth the economic cost—these are huge queries still requiring a long and complicated research journey before they can be soundly answered.

Indonesian Oil Industry

The Indonesian Government has decided not to nationalise that country's oil industry, it being felt that such a move would not help the Government in its campaign to attract foreign capital. Annual output of oil in Indonesia is put at about 8,000,000 metric tons.

Notes & Comments

'Please Inquire Within!'

EVERY week we receive a variety of news-sheets and information bulletins, but not for a long time have we been as much impressed as by one from the Islington Public Libraries. The firms in this London borough would seem to be fortunate indeed, for not only does the Reference Library possess substantial resources in commercial and technical publications of all kinds with a trained staff to help inquirers, but it co-operates with the DSIR, other Government departments, and the research associations to obtain detailed 'economic, technical, and commercial information'. The current 'Information News-Sheet' from the Reference Department stresses the theme that there is an abundance of scientific material that can be used by small and large firms, but of which they remain unaware. 'There need be no hesitation in presenting your problem to the Reference Library. No matter how technical, abstract, or detailed, if there is an answer we will get it for you.' This is public service *par excellence*. It would be wrong to imply that Islington is outstandingly alone in the development of such specialised fact-finding facilities, but often enough these more serious services of public libraries are hidden shyly away, left to be unearthed by the occasional inquirer. The Chief Librarian, Mr. L. M. Harrod, F.L.A., and his staff are as much to be congratulated for the forthright manner in which they present their services as for the comprehensiveness of the services themselves. The co-operation arrangements that have been made with the DSIR and the research associations are, incidentally, a further sign that the DSIR's policy of expanded public contact is being vigorously prosecuted.

Nitrogen Fixation

THE fixation of atmospheric nitrogen has been far easier to achieve through the hydrogen and ammonia route than through direct oxidation, and this in spite of the fact that the first ideas and the first plants, both experimental and commercial, were based upon oxide formation. As we pointed out a few months ago (see THE CHEMICAL AGE, 1953, **69**, 695), the ammonia route is a costly consumer of reducing agents, for every atom of N that is won from the air requires the extraction of three atoms of H from water. We predicted that by the year 2000 the world's much greater needs of fixed atmospheric nitrogen might have to be derived from oxidation processes. A new US paper from the University of Wisconsin's Chemistry Department (*Industrial & Engineering Chemistry*, 1953, **45**, 2613) could well be looked upon as a practical pointer in this theoretical direction. The development of a regenerative furnace for N-O combination is now much nearer effective realisation. At temperatures above 2,200° there is a 2 per cent combination of atmospheric N and O; if the gas flow is chilled with great rapidity, the dissociation of the nitric oxide formed is prevented.

Problems Being Tackled

FOR some years Wisconsin workers have tried to devise a two-bed refractory pebble furnace through which the flow of air can be indefinitely alternated, the two beds acting in continuous succession as pre-heating and chilling beds. Formidable difficulties have faced this project from its initial conception. The limit for refractory furnaces in an oxidising temperature was 1,550 to 1,600°, but beds made of 93-94 per cent magnesium oxide enabled temperatures of 2,000 to 2,100° to be held for a few hours. Unhappily, bed shrinkage and settling made it impossible to extend the working period. Now with an improved furnace design and better refractory material—97 per cent magnesium oxide—temperatures as high as 2,100 to 2,200° have been held for about a week. Problems still remain. The volatilisation of the magnesium oxide now seems the major obstacle to long-period continuous operation although concentrations of over 1.7 per cent of nitric oxide can be steadily achieved until the furnace begins to deteriorate.

Success Appears Imminent

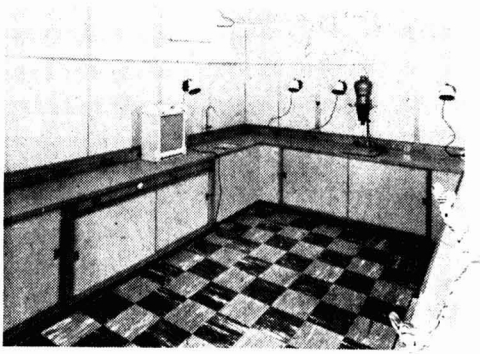
IT is always easy to be optimistic on paper and at a distance, but success appears to be very close. At a temperature range of 1,900 to 2,000° this type of furnace can be operated for long periods without deterioration, and this is only 200° below the temperature range needed for the N-O reaction. It is difficult to believe that the further improvement now required in developing a refractory material will elude the Wisconsin workers for long.

Urea for India

THE India Fertiliser Mission appointed in February 1953 by the Government of India has recommended the installation of a urea production plant at the Sindri fertiliser factory. Of all India's large-scale plans for chemical expansion, this must be regarded as the most ambitious. The recommendation has been qualified with two reservations; first, that until experience has been gained, the initial Sindri urea plant should be of 'small size consistent with economical production': second, that a once-through unit or one with only partial re-cycling arrangements should be considered. It is felt, after a study of 19 urea plants in other countries, that the re-cycling operations of urea production entail high maintenance costs and heavy capital expenditure.

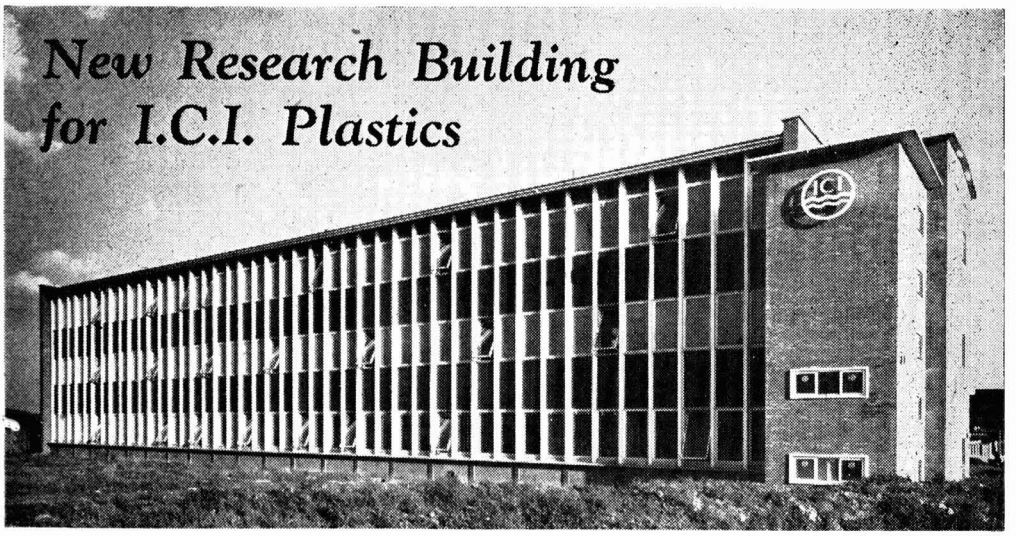
Britain a Non-runner?

CHOICE of process is left to be decided by quotation and the submission of data, but five are mentioned—the Chemico process operating in Japan, the Pechiney process of France, Germany's Badische Analin & Soda Fabrik process, the Inventa process of Switzerland, and Italy's Montecatini process. It is suggested that tenders should be made for both a 30-35 and a 60-70 ton per day plant. It is to be noted that Britain seems to be a non-runner in this opportunity for selling a large chemical plant. Is this the penalty for neglecting the development of synthetic urea as valuable nitrogenous fertiliser? It would seem to be the case. However, among the other recommendations for expanding Sindri's output and range of fertilisers a 'Nitro-Chalk' plant is suggested, and early consideration for the production of triple superphosphate and ammonium phosphate is stressed. We could be in rather than out of those pictures.



Claimed to be an example of the most advanced construction, a new research and design building has been constructed for C. A. Parsons & Co., Ltd., electrical engineers, Newcastle upon Tyne. In the spacious metallurgical laboratories, extensive use has been made of Warerite laminates for facing fronts and sides of benches, and of PVC tiling for the floors. Our photographs show (left) how double-glazed windows give good lighting in the main laboratory, and (right) the photographic darkroom

New Research Building for I.C.I. Plastics



THE opening of a new research building for the Plastics Division of I.C.I. at Welwyn Garden City, itself an event of considerable importance, was made the occasion of a luncheon, to which over 100 guests were invited, on Tuesday 5 January. The guest of honour was Professor Sir Cyril Hinshelwood, Doctor Lee's Professor of Chemistry in the University of Oxford, and among the many eminent guests were: Professor F. E. Simon, Professor of Physics in the University of Oxford; Professor F. S. Dainton, Professor of Chemistry in the University of Leeds; Professor Sir Eric Rideal, Professor of Physical Chemistry, University of London, King's College; Professor A. R. Ubbelohde, Professor of Chemistry, the Queen's University of Belfast; Sir William Ogg, President of the Society of Chemical Industry; Dr. V. E. Yarsley, President of the Plastics Institute; Mr. J. Davidson Pratt, secretary of the ABCM; and Mr. C. S. Dingley and Dr. W. E. de B. Diamond, of the British Plastics Federation.

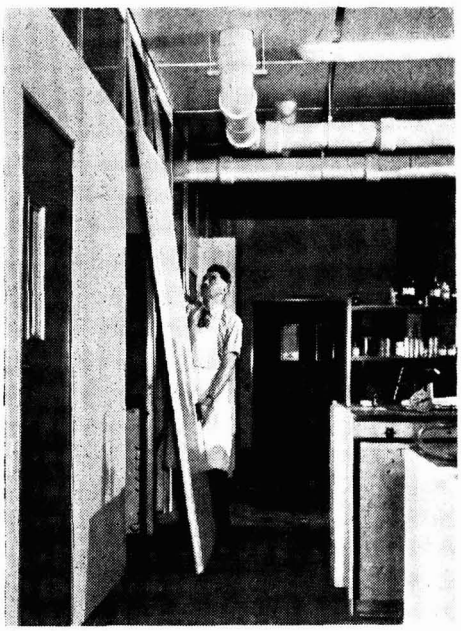
The toast of 'Research' was proposed by Dr. R. Holroyd, the research director of I.C.I., and replied to by Sir Cyril Hinshelwood who, in the course of a witty speech on the essential connection between academic and industrial research, expressed his fears that some university professors might find themselves elected 'to the howdah of a white elephant.' Dr. Alexander Fleck, chairman of I.C.I., proposed the toast of 'The Plastics Division,' and the reply was made by the chairman of the Division, Mr. J. C. Swallow. After the luncheon, guests were conducted round the new laboratories.

The laboratories are constructed on a novel principle, the main object of the design being to produce exceptional flexibility by internal arrangements. By means of standardised wall sections, laboratory equipment, plumbing and lighting, it is possible with the minimum of trouble to alter entirely the layout of any one of the three floors. This means that the research worker can at any time arrange his part of the laboratory to fit in with his individual needs, instead of carrying out his work within the fixed limitations of a standard laboratory.

Basically, the building consists of three unobstructed floors 176 ft. by 48 ft. Throughout, measurements are based on units of 4 ft. so that all wall panels, piping lengths, bench units, etc., are interchangeable.

The steel framework with brickwork terminations is clad externally in demountable 'Holoplast' panels filled with fibre glass. Double glazed Carda windows give good heat insulation together with good lighting. Stoved enamelled 'Holoplast' is also used for the demountable internal walls and doors and the ceilings are aluminium panels filled with cork.

Services are taken along the ground floor in two main ducts and, rising at the ends of the building, are distributed around the



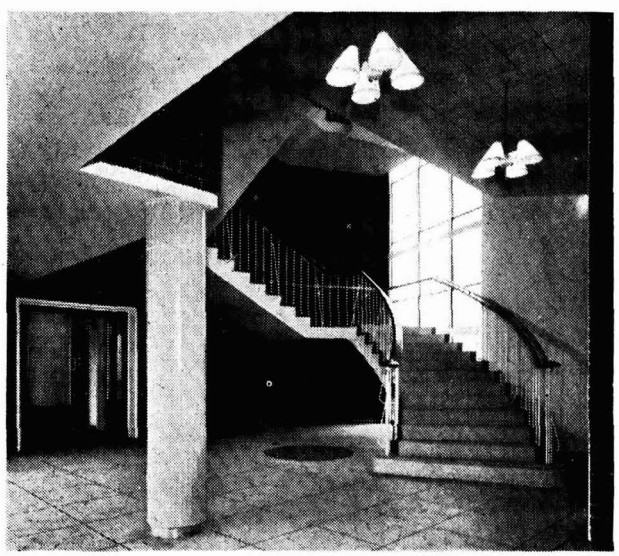
Fitting one of the demountable 'Holoplast' panels, which are fixed at the top by steel brackets connected to the main structure and at the bottom by a screw tapped into the floor

periphery walls and in the space between the upper floor and ceiling. The upper floors are constructed of foamed slag precast reinforced concrete blocks, some of which form ducts for the distribution of services.

The bench tops in the laboratories are of wood-veneered 'Holoplast,' and the underbench furniture of wood faced with 'Formica.' Cupboard and drawer units are placed in position beneath the bench tops, and raised to the correct height by adjustable feet. The floors are tiled throughout with PVC, and rigid PVC and polythene are used for the plumbing. The lighting fittings are of 'Perspex.'

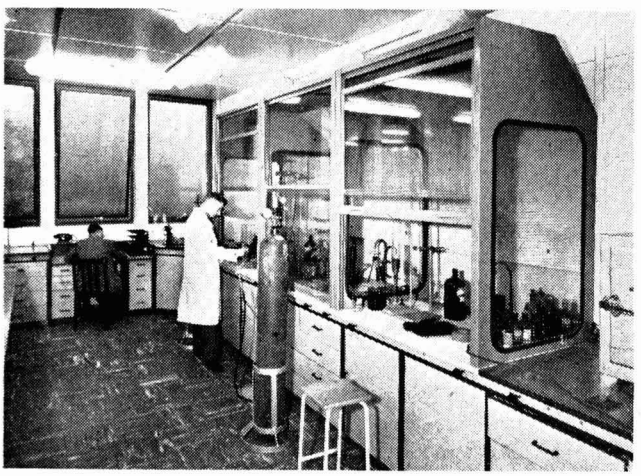
Completed at the end of 1953, these laboratories are capable of extension to four times their present size, with covered access to all parts. The main block at present has two links with possible future extensions. One forms the second emergency stairway and riser for the main services; the other is an administrative block which houses the conference room, first-aid room, rest room, lavatories, and those offices for which flexibility is not required. The main stairway and lift are housed between the main block and the administrative building.

Basing his design on earlier work carried out by the Plastics Division, which included trials in a complete prototype laboratory, the architect, Mr. E. D. Jefferiss Mathews, O.B.E., F.R.I.B.A., of J. Douglass Mathews & Partners, has evolved a very pleasing modern building which should prove a historic example for future laboratory construction.

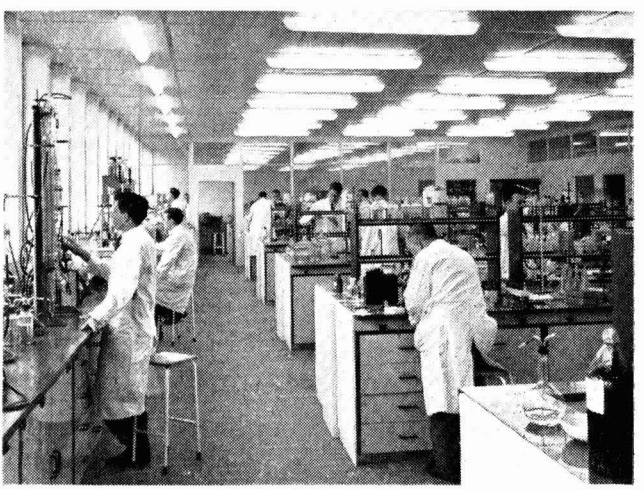


Fair-faced brickwork contrasts the white acoustic ceiling tiles and white plaster walls in the entrance hall. The cantilever stairway is finished with terazzo treads, white baluster rails with polished mahogany handrails in natural colour and backed by plaster finish walls painted in dark blue

The spacious glass-blowing room takes advantage of the full width of the building. Complete services are brought directly up to the benches from the ducts beneath the floor



Metal fume hoods stand on the standard bench units, which in this case have 'Sindanyo' tops. Fume extraction is led by visible ducting to branch outlets carried through the panels. In the background of the picture a standard desk unit, which has a blue 'Formica' top, has been incorporated in the bench-run. Venetian blinds can be fitted between the two panes of the Carda windows



The analytical laboratory; 16 ft. offices, balance rooms and other special rooms run down one side, and at the ends standardisation and spectrographic laboratories have been arranged

Oil & Colour Exhibition

THE sixth technical trade exhibition organised by the Oil & Colour Chemists' Association will be held at the Borough Polytechnic, Borough Road, London, S.E.1, on 12, 13 and 14 April.

Stand space has been allocated to the following:—

Aero Research Ltd., Arthur Brown & Co. Ltd., Beck, Koller & Co. (England) Ltd., Frederick Boehm Ltd., British Geon Ltd., British Industrial Plastics Ltd., British Industrial Solvents Ltd., British Oil & Cake Mills Ltd., British Resin Products Ltd., Rex Campbell & Co. Ltd., R. H. Cole & Co. Ltd., Cray Valley Products Ltd., Cromford Colour Co., Ltd., Leon Frenkel Ltd., J. M. Hamilton & Co. Ltd., Hercules Powder Co. Ltd., Hess Products Ltd., Holmes Bros Ltd., Hickson & Welch Ltd., Honeywill & Stein Ltd., Howards of Ilford Ltd., Hygrotherm Engineering Ltd., Imperial Chemical Industries Ltd., Imperial Smelting Corporation Ltd., Johnson, Matthey & Co. Ltd., Kelvin & Hughes Ltd., Laporte Titanium Ltd., Marine Oil Refiners of South Africa Ltd., Metal Propellers Ltd., Micafine Ltd., W. A. Mitchell & Smith Ltd., Monsanto Chemicals Ltd., Novadel Ltd., L. Oertling Ltd., *Paint, Oil & Colour Journal*, Petrochemicals Ltd., Plastanol Ltd., Paint Research Station, Research Equipment (London) Ltd., Russell Construction Ltd., Scott Bader & Co. Ltd., Sheen Instruments Ltd., Shell Chemicals Ltd., J. W. & T. A. Smith Ltd., Stydrene Co-Polymers Ltd., Torrance & Sons Ltd., Vickers Armstrongs (Keenok Sales Dept.) Ltd., Vinyl Products Ltd. and Younghusband Barnes & Co. Ltd.

Further information may be obtained from the general secretary, Oil & Colour Chemists' Association, Memorial Hall, Farringdon Street, London, E.C.4.

Clinical Chemistry

THE First European Congress on Clinical Chemistry will be held in the Netherlands under the auspices of the 'Commission on Clinical Chemistry' of the International Union of Pure and Applied Chemistry and will be organised by the Netherlands Society for Clinical Chemistry.

The Congress will take place in Amsterdam from Thursday 23 until Tuesday 28 August, 1954, in the Royal Institute for the Tropics, 63 Mauritskade, Amsterdam-O.

The two leading subjects will be: (1) Isotopes in the clinico-chemical laboratory; and (2) The physical methods of measurement in connection with clinico-chemical problems.

These subjects will be presented in symposia, consisting of several lectures for which qualified speakers will be invited, and of free communications, related to the above subjects. For these communications a maximum of 15 minutes will be allowed.

Further details, as to technical programme, registration, methods of payment, various classes of hotel accommodation, excursions, entertainment and receptions may be obtained from the secretary: Ir O. Muelemans, Racinelaan 17, Utrecht, Netherlands. Excursions to various institutes and laboratories and also to scenic parts of the Netherlands are being planned.

Ferro-Alloys & Calcium Silicide

The Board of Trade has announced that Open Individual Licences will be issued for imports of calcium-silicide and unwrought ferro-chrome, ferro-silicon, ferro-silicon-chrome and silico-manganese which are consigned from and originate in any country other than:—

Albania, Argentina, Bolivia, Bulgaria, Canada, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian Zone), Guatemala, Haiti, Honduras, Hungary, Japan, Korea, Liberia, Mexico, Nicaragua, Panama, Persa (Iran), Philippines, Poland, Roumania, Tangier, United States of America, Union of Soviet Socialist Republics, Venezuela.

Applications should be submitted on form ILB/A to the Import Licensing Branch, Board of Trade, 43 Marsham Street, London S.W.1.

Tungsten Ores Cheaper

On 5 January the Ministry of Materials reduced its selling price for tungsten ores of standard 65 per cent grade and ordinary quality as follows:—Wolframite from 185s. to 165s., scheelite from 170s. to 150s. per long ton unit delivered consumers' works.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

THE Deputy Minister for Natural Resources and Scientific Research of the Government of India has announced that extensive deposits of radioactive minerals and gold have been discovered on the south-east coast of India from West Bengal to Orissa. Though no details could be expected to be divulged, he stated that the Indian Bureau of Mines was now engaged in assessing the extent of the mineral finds. He also pointed out that investigations were in progress regarding the qualitative and quantitative estimates of pyrites deposits in Mysore and Bihar and of copper deposits in Rajasthan.

The government of the newly created province of Andhra are to undertake, through the Geological Survey of India, a comprehensive survey of the state for its mineral wealth to help planning the development of chemical and other industries in the State. It is known that the area has deposits of beryl, columbites, manganese, mica, asbestos, chromite, gypsum and refractories. It was reported some time ago that deposits of iron ore have been located in the region as also very large tonnages of limestone. In another state, Saurashtra, a survey of its mineral raw materials has been concluded and a report is awaited.

* * *

The Chemicals Research Committee of the Council of Scientific and Industrial Research, India, have recommended the preparation of some research chemicals at the National Chemical Laboratory, Poona, owing to inordinate delays and cost of importing certain chemicals from abroad. The scheme will help research workers in India in getting their requirements of urgently needed chemicals. The National Chemical Laboratory has made arrangements with nine laboratories in India for the supply of the different chemicals at prices that will be fixed by the committee.

* * *

The only factory in India to produce titanium dioxide, Travancore Titan Products Ltd., near Trivandrum, which ceased operations nearly a year and a half ago, has just reopened with the dawn of the new year. About 300 of its original employees have reported back. It is learnt that the firm has substantial orders and is now in a position to resume economic production of the white pigment. The Indian Tariff Commission which inquired in detail into the position of the industry consequent on its closure, has recommended that protection need be given only up to 31 December, 1954 and that there is no need for a subsidy and levy of surcharge on exports of ilmenite. The progress of this infant industry will be watched with interest.

* * *

A 14-man delegation of lignite experts from 10 Asian countries visited the brown coal deposits of Yallourn and other centres of coal production in Australia last year under a tour sponsored by the United Nations Economic Commission for Asia and the East East. India was represented by the Madras Lignite Project Officer, and the report of the experts, now released, has referred to the lignite project, inaugurated in the middle of last year. The report, among other things, recommends extensive prospecting before undertaking actual work, the adoption of sampling and analysing techniques as developed in Australia, the possibility of gasification of lignite and the possible utilisation of low-grade coals in modern vertical cement kilns.

Another ECAFE report, 'Mining Development in Asia and the Far East,' which has just been released in Bangkok, records that though mineral production in Asia and the Far East was affected by a drop in world prices in 1952-53, it continued to improve during that period. The fall in prices related mainly to the export minerals of the region, namely those of copper, lead and zinc, and mica and iron ore. The report forecasts a sizeable increase in the production of refined petroleum, aluminium and limestone in the coming year. A slight increase in coal, iron ore, copper and salt and a decline in tin, mica and gold production were also anticipated.

* * *

According to the final arrangements which have been concluded and signed between the Government of India and the firms of Krupps and Demag, a new com-

pany, to be styled the Hindustan Steel Ltd., will come into being with a capital of Rs.1,000,000,000 (£75,000,000). The Government of India will contribute four-fifths of the share capital while the participating firms will put in the rest. It is expected that a part of the contribution of the firms will be in the shape of equipment. While the expectation of actual expenditure for the 500,000 ton per year steel plant is about Rs.700,000,000 (£52,500,000), the additional amount of another Rs.300,000,000 (£22,500,000) has been provided to step up the production to 1,000,000 tons per year. Though the Government of India had hoped to raise a long-term loan from the World Bank for the purpose of financing the scheme, it is now considered unlikely that such a large sum will be forthcoming from that quarter. The Government have stated that the necessary finance would be found within the country itself. The participating firms have agreed to a penalty clause in case of failure to get the new plant into production within four years of commencement of work. The team of experts which came to India recently have selected four sites, viz., Durgapur in West Bengal, Sindri in Bihar, Roerkala in Orissa and Belhai in Madhya Pradesh and the final choice will be made shortly.

* * *

The Indian Institute of Chemical Engineers met at Hyderabad for the sixth annual session. In the presidential address, Dr. G. P. Kane dwelt on the shortage of sulphur in the country for the sulphuric acid and other chemical industries and described experimental work aimed at producing sulphur through hydrogen sulphide from raw materials which were readily available but which had not been tapped yet.

More Metals from Coal Ash

Research carried out in Essen and other parts of the Ruhr has revealed the possibility of extracting various metal oxides from the ashes of Ruhr hard coal. A recent report stated that, from one ton of coal ashes it should prove possible to extract 44 lb. of metals such as tin, zinc and copper; up to 12 lb. of lithium oxide; up to 10 lb. of cobalt, nickel and chromium; and several pounds of rarer metals such as beryllium.

Australian Oil Pipelines

WORK has been started on preparing the track for the two pipelines which will join the 3,000,000 tons a year Kwinana Refinery (which is being built by the Anglo-Iranian Oil Company's Australian associate, Australasian Petroleum Refinery Ltd.) with distribution and ships' bunkering installations on the outskirts of Fremantle. The 6 in. dia. white oil line will be 17 miles long; the 12 in. line for black oils two miles shorter.

When the pipelines are completed and the refinery operating early in 1955, nearly 1,000,000 tons a year of various grades of oil will be pumped to the installations. The two pipelines will be laid near the highway which is to be built from the refinery to Freemantle, and will be buried underground except at one point where the smaller pipeline will be carried on a traffic bridge over the Swan River. Before being buried both pipelines will be wrapped in protective coatings of enamel and fibreglass. 'Go-devils' (pistons made of steel and rubber) will be used periodically to scrape the inside of the pipes. These 'go-devils' will be fitted with radioactive capsules so that they can be easily located if they become jammed in the pipes.

Most of the pipe is now on the refinery site, the larger diameter having been shipped from the United Kingdom and the 6 in. pipe purchased in Australia.

Rennet Casein Standard

THE British Standards Institution have issued BS. 1416 'Methods for the Sampling and Analysis of Rennet Casein,' which is a revision of the document which was originally published in 1948. This revision has become necessary due to improvements in technology which have taken place in the intervening years.

The main alterations are as follows:—the deletion of reference to ground casein; deletion of methods of determination of acidity and water-extractable lactose; inclusion of a method for the determination of dirt; substitution of a wet heat resistance method for the heat discoloration test; deletion of the colorimeric determination of *p*H value; and the provision of a simpler sampling tube.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, British Standards House, 2 Park Street, London, W.1, price 3s. 6d.

Aldrin & Dieldrin for UK

Shell Insecticides to be Sold Freely

AT a Press conference held in London on Thursday, 8 January, Mr. G. H. W. Cullinan, general manager of Shell Chemicals Ltd., announced that his company are about to put on the market, for the first time in the United Kingdom, products based on aldrin and dieldrin. Supported by Mr. J. I. Hendrie, world-wide sales manager for these new Shell insecticides, and Mr. J. L. Hunt, head of Shell's Agricultural Development Department, he expressed the belief that this was the biggest step forward in insect control since the introduction of DDT.

It was also announced that a factory is being built at Shell's refinery at Pernis in Holland to produce aldrin and dieldrin products for the non-dollar area. This plant, which will cost approximately £1,000,000, will probably come on stream around the middle of 1955.

Although manufacture of the base materials is at present confined to the United States, three formulations for use in the United Kingdom are to be freely available in the near future. These are to be known as Aldrex Wireworm Dust, Aldrex 30 and Dieldrex 15.

The first of these is a dust containing 1¼ per cent aldrin and it has been proved to give a highly efficient control of many soil pests including wireworm, leatherjackets, cutworms, chafer grubs, cabbage root fly, symphilids, vine weevil, ants and mole crickets. There is no tainting of crops and it is said to be perfectly safe as a soil dressing before growing potatoes, carrots and sugar beet as there is no absorption by the roots of plants. The rate of application for field crops varies between 1½ cwt.-2 cwts. per acre depending on the type of soil, the pest and degree of infestation.

'Aldrex 30'

Aldrex 30 is a miscible oil containing 30 per cent aldrin and it is applied as a spray either to the soil immediately before cultivation, or to the growing crops themselves. In some cases it can be applied to growing crops at the low rate of two pints per acre (for cutworms and leatherjackets) or to the soil at four pints per acre (for chafers or mole crickets).

Dieldrex 15 contains 15 per cent dieldrin in a suitable oil base, and 1½ pints dissolved in 100 gallons of water is said to be sufficient to give exceedingly good control of cabbage root fly over one acre of land. Only slightly heavier applications are needed for the control of carrot fly, mangold fly and celery fly. Many important beetle and weevil pests can also be effectively controlled by this product. Again there is said to be no tainting and no toxic hazards to consumers.

Extensive Tests

During the past three years over 400 trials, initiated by Shell, have been carried out in over 60 countries outside the USA and Canada, and these have been followed by large scale acceptance in many parts of the world. Shell Chemicals Limited have been actively engaged on trials in the United Kingdom for two years and the formulations mentioned are based on the experience gained in these trials. Aldrin and dieldrin will be available to any insecticide manufacturers for incorporation in their own products.

Shell experts believe that aldrin and dieldrin will prove effective in controlling a number of other agricultural pests, but firm recommendations cannot be made at present owing to limited experimental evidence. These include millipedes, onion fly, narcissus fly, cabbage stem weevil and thrips.

There is an indication that these insecticides may act as deterrents to slugs, but this requires confirmation.

The use of aldrin and dieldrin as seed dressings for protection against wireworm, carrot fly, flea beetle, and possibly wheat bulb fly also shows considerable promise, but here again further development is required, before effective and reliable products can be marketed.

The incorporation of these materials in fertilisers is being investigated.

Aldrin is the name coined for the insecticidal product containing not less than 95 per cent of the compound, commonly abbreviated HHDN (1,2,3,4,10,10-hexachloro - 1,4,4a,8,8a - hexahydro - 1,4-

endo-exo-5,8-dimethanonaphthalene) and not more than 5 per cent of insecticidally active related chlorinated hydrocarbons.

Technical aldrin is a soft, waxy, brown solid containing not less than 82 per cent aldrin equivalent (77.9 per cent HHDN). Aldrin can be formulated as dusts, wettable powders or emulsions. Nonionic emulsifiers are most suitable for aldrin formulations because the emulsifying properties of concentrates utilising such emulsifying agents are not affected by chemical reaction with aldrin even after prolonged storage. Aromatic or paraffinic hydrocarbon solvents or blends of both may be used to prepare emulsifiable concentrates of aldrin. Solvents such as kerosene, light refined mineral oil or diesel oil can be utilised satisfactorily. The choice of solvents will, in general, be governed by the phytotoxicity, cost, availability, etc.

Absorptive Carriers Recommended

For dusts absorptive carriers are recommended for preparing dusts of high aldrin equivalent concentration (25.0 per cent). For low concentration dusts (2.5 per cent) non-absorptive carriers can be used.

Dieldrin is the name coined for the insecticidal product containing not less than 85 per cent of the compound commonly abbreviated HEOD (1,2,3,4,10,10-hexachloro - 6,7 - epoxy - 1,4,4a,5,6,7,8,8a - octahydro - 1,4,*endo,exo* - 5,8 - dimethanonaphthalene) and not more than 15 per cent of insecticidally active related compounds.

Technical dieldrin is a light tan, flaked solid containing not less than 90 per cent dieldrin as defined, the remainder being insecticidally active materials. It is suitable for the manufacture of both liquid and solid formulations.

The vapour pressure of dieldrin is only about 1/20th that of aldrin, so that dieldrin has an advantage over aldrin and most insecticides in hot climates or where long residual action is required.

As with aldrin, non-ionic emulsifiers are preferable when formulating emulsifiable dieldrin concentrates. Hydrocarbon solvents of high aromatic content are required to prepare satisfactory emulsible concentrates. The solubility characteristics of dieldrin in various solvents are, in general, similar to those of DDT.

Aldrin and dieldrin are chlorinated hydrocarbon insecticides whose physiologic action is similar to that of other insecticides of this group, such as DDT, Chlordane, BHC, Lindane and Toxaphene. They are soluble in fats but insoluble in water. They can be absorbed by ingestion, inhalation or through the intact skin.

Under ordinary conditions of use and with reasonable precautions, no cases of intoxication by aldrin or dieldrin have occurred during manufacture, formulation and application of many millions of pounds of these insecticides over a period of three to four years.

Experience has shown that there is a considerable margin of safety in the handling of these insecticides during formulation or blending, provided certain precautions are observed such as adequate ventilation in the plant, general plant cleanliness, use of cotton overalls and washing of exposed skin after handling the chemical.

In the field, formulated products should be handled in a sensible manner but no special protective clothing is necessary, other than the use of rubber gloves when handling emulsible concentrates of aldrin or dieldrin.

The several inherent advantages possessed by dieldrin over other insecticides for public health work (disease vector control) has resulted in dieldrin being fairly widely tested in this field recently and the successes already achieved indicate that dieldrin will be used more and more in the future for the control of insects transmitting human diseases.

Biologically More Active

Biologically it is more active than insecticides in common use for the control of insect disease vectors and its activity is from eight to ten times as great as that of DDT against the insect species concerned. Its biological activity is of the same order as that of the gamma isomer of BHC. Thus if the WHO recommendation for DDT residual spray is accepted (2.15 gms. 80 per cent pp DDT per sq. metre, which equals approximately 200 mgms per sq. ft.) then one may expect to get the same degree of kill using dieldrin at the rate of 0.25 gms. per sq. metre or approximately 25 mgms per sq. ft.

In spite of the increased insecticidal activity of dieldrin over DDT, dieldrin persists for longer periods of time than DDT and kills of up to 79 per cent have been reported after 18 months from low appli-

cations. This longer residual life of dieldrin is a great advantage compared with gamma BHC which, although a potent insecticide, is too volatile to persist for long periods of time.

There is evidence to show that dieldrin is effective against the Culicine mosquitoes which, with other species, transmit filariasis. In public health work it may, therefore, be possible with dieldrin to control the vectors of malaria and filariasis at one and the same time.

The chemical and physical nature of dieldrin are such that the insecticide may be readily formulated into highly concentrated emulsible oils or wettable powders or in low percentage dusts. Pelleted dieldrin is also available for the control of mosquito and other larvæ.

Dieldrin is compatible with other materials normally used for the control of insects and dieldrin is stable in the presence of alkalies. It may, therefore, be applied on to or in conjunction with lime washes without any danger of the dieldrin being inactivated.

The cost of dieldrin for residual spray purposes compares very favourably with other insecticides in common use, and, as it is odourless it can thus be used in any situation including those where odour would be considered unacceptable. Because of its low volatility, it does not give rise to vapours which could affect the health or comfort of occupants of treated dwellings.

Indian Oil Standard

THE Indian Standards Institution has issued a standard on the methods of test for essential oils. The standard is a necessary adjunct to the standard specifications for individual essential oils, such as lemongrass oil and sandalwood oil, recently published by Indian Standards Institution. It prescribes the tests common to most essential oils.

The standard contains definitions of terms used in trade and industry, methods of sampling, and instructions regarding the preliminary examination of the material and samples. It prescribes the methods for determining specific gravity, optical rotation, refractive index, solubility in alcohol, acid value, saponification value, saponification value after acetylation, and the percentage of free and total alcohols, aldehydes, ketones and phenols contained in the material. Suggestions are given for an examination of the evaporation residue, and special tests are indicated for the detection of the more common impurities found in adulterated essential oils. The standard also includes directions for the methods of packing and marking.

New Smokeless Fuel

FROM Holland it is reported that a new smokeless and odourless fuel called 'synthracite' is to be marketed by the Dutch State Mines next year. The new fuel is claimed to equal the best anthracite.

At first, it will be produced on a small scale only, but it is planned to expand the production capacity as quickly as possible. Eventually, 'synthracite' is expected to assume great importance in Holland's general fuel economy for two reasons: at present the Dutch mines cannot satisfy the home demand for anthracite, some of which has therefore to be imported; and 'synthracite' is expected to become a valuable export—or an exchange article for other coals suitable for general purposes.

Chemicals in Turkey

A CHEMICAL manufacturing industry is being built up in Turkey according to a *Financial Times* correspondent.

The first step was the formation in Adana of a company in which foreign capital participated to the extent of 51 per cent engaged on building a superphosphate factory. The second was the signature in November last of a contract for the establishment of a nitrogen plant at Kütahya, designed for an output of 100,000 tons of artificial manure. The initial capital is £T30,000,000, but this will have to be raised to at least £T70,000,000 and, with ancillary construction, eventually to £T100,000,000.

The third step will be the formation at Murgul of a sulphuric acid factory. With production of 6,000 tons of nitric acid, the materials will be available within the country for the production of explosives for the army.

It is estimated that the home production of artificial manure will effect an economy of £T20,000,000 a year in foreign exchange.

Water Gas Disposal

Two American Studies of Purification Methods

AMONG papers presented at a recent meeting of the American Institute of Chemical Engineers, held in St. Louis, Missouri, were some dealing with the disposal of waste aerosols and gaseous suspensions.

A paper on 'Filtration of Radioactive Aerosols by Glass Fibres,' was read by A. G. Blasewitz and B. F. Judson of the General Electric Company, Washington.

The disposal of radioactive waste gases from the plant-scale processes at the Hanford Atomic Products Operation presents a problem that is of considerable importance in the plant operation. This study was concerned with the efficient removal of the particulate matter suspended in the contaminated gas streams and involved an extensive investigation of the filtration properties of glass fibres, undertaken to develop a filter unit having better performance characteristics than those of the initially installed sand filters.

Three Primary Studies

The programme was divided into three primary studies consisting of: (1) the correlation of collection efficiency under start-up conditions with the superficial velocity of the gas stream and the bed depth and packing density of the various types of glass fibres; (2) the correlation of flow resistance under start-up conditions with the same variables; and (3) a study of the expected service life of glass fibre filters.

The results of the development programme led to the design of glass fibre filters capable of operating at a higher superficial air velocity than the plant sand filters and with a greater efficiency, a lower flow resistance, and a greater life expectancy. Such filters have been constructed and are at present employed at the Hanford Atomic Products Operation. The measured efficiency and flow resistance of the large-scale filters are in excellent agreement with the design data. The operating performance of the fixed-bed filters at this plant has been highly satisfactory.

In a paper entitled 'Performance of Wet Dust Scrubbers,' C. E. Lapple and H. J. Kamack, of the Engineering Research Laboratory, E.I. du Pont de Nemours and Co., described how a wide variety of wet dust-scrubbing equipment—cyclones, pipeline contactors, venturi contactors, orifice contactors, and a sieve plate column—were tested for pressure drop and dust collection efficiency. The effects of dust concentration, air-flow rate, water loading, method of water injection, degree of water atomisation, and steam injection were evaluated on laboratory and semiworks scales, using talc, ilmenite, and titanium dioxide as test dusts.

All the types of equipment tested gave essentially the same collection efficiency when operated at the same pressure drop, regardless of whether pressure drop was achieved by high gas velocities or by high liquid loadings. From this it was concluded that power input is the controlling factor in the performance of wet scrubbers.

Dust collection efficiency improved rapidly as the pressure drop exceeded 10 in. of water, and collection efficiencies as high as 99.9 per cent were obtained on dust substantially all smaller than 5μ particle diameter. Steam injection reduced the dust loss by five-fold.

Total Synthesis Economic

THE successful development of a process for the total synthesis of alkaloids of the tropane group has been announced by T. and H. Smith Ltd., pharmaceutical manufacturers of Edinburgh. This follows some three years of research in the firm's laboratories. It is believed that this is the first time that these products have been produced synthetically on an economic basis.

The company has been associated with the production of alkaloids for over 100 years and have produced tropane alkaloids from natural sources for the past 50 years. By this latest development they are no longer dependent on the vagaries of crops, while raw materials transportation is less bulky, prices more favourable and steady. Atropine and homatropine are the two most widely used members of the tropane group.

The Future Demand for Chemicals

Forecasts for the Next Quarter Century

THE chemical industry works mainly with raw materials which are cheap and plentiful. It has a unique facility for developing products capable of replacing scarce materials and also products with combinations of properties superior to or different from those of any materials previously available.

For a number of years chemical manufacturers had ready markets overseas for all they could export. Now they are faced with foreign competition on a scale reminiscent of pre-war days and the sellers' market has ceased to exist. While Britain's share of world trade will depend on the success with which this new challenge can be met, the long-term outlook for the chemical industry will be governed primarily by the extent to which the growing demand for chemical products will be capable of absorbing the expansion of manufacturing capacity throughout the world.

It is, of course, impossible to make precise estimates of future demands, since these depend on many human decisions and on circumstances which cannot be gauged in advance. Nevertheless, an authoritative guide to future probabilities is available in 'Resources of Freedom,' the five-volume report presented by a Commission under William S. Paley, which was appointed by the President of the United States for the purpose of making a comprehensive study of the material resources of the free world during the period 1950 to 1975.

Increasing Consumption

The principal factors leading towards increased consumption of chemical products are growth in population and increase in productivity. In the years between 1900 and 1925, and again between 1925 and 1950, these factors resulted in more than doubling the US total output of goods and services. Between 1950 and 1975 they are expected yet again to double the gross national production.

The Commission emphasise that their projections of materials demand depend upon a number of explicit assumptions which, though now considered reasonable, may not hold in the future. These assumptions are, briefly, that productivity and population will grow at specified rates, that international tension will continue, that a third world war will be prevented, and that high employment and economic prosperity will prevail in the free countries. Account was taken only of those technological developments whose applications were clearly foreseeable. A final assumption was that the raw materials would be freely available at approximately the prices prevailing during 1950.

Six Basic Requirements

Virtually all economic requirements in a material sense are related to six basic requirements: food; clothing; shelter; transportation and communication; medication; and tools, machinery and equipment.

In foods, the big ultimate problem is more output per unit of land. Chemically, this means enormous increases in the use of the basic plant foods—nitrogen, phosphorus and potash; similar increases in the use of pesticides—chlorinated hydrocarbons in particular; greater use of protective film for packaging; and much more refrigeration.

The future trend in clothing is clearly shown by recent developments—i.e., continued supplementing of natural fibres by synthetic polymer fibres, particularly the polyamides, the polyesters, the polyacrylonitriles, and new fibres yet to be developed.

Much greater use will be made of glass products in insulation, building blocks, reinforced sheathing, and woven glass-fibre goods for curtains and wall coverings. Synthetic fibres, asphalt, synthetic rubbers and plastics will also come into greater use, particularly in floor coverings. Less hardwood but more hard-surface flooring will be used (employing polymers such as the vinyls). Wood will continue to be used, but it will be wood that has been chemically treated for longer life, greater fire-resistance and lower maintenance. The trend in sheathing and roofing will be towards compounded compositions, combining inorganic fibres with polymeric binders—making use of integral pigmentation and therefore less paint and lower maintenance. Ducts and piping will be plastic or plastic composition, and metal cabinets will give way to ones made

of a combination of fibre and plastic.

One of the developments of the next 25 years will be enormous construction programmes for super highways, super airports, pipelines, and coaxial cable and microwave radio relays for radios, television and television systems. Progress in transportation means a tremendous demand for cement. For communications, the conducting metals, copper and aluminium, will continue to be used, but with plastic-metal sheathing and plastic dielectrics. Improved vehicles will be developed, using light metals and plastics together with glass-fibre reinforcing. Petroleum will be the basic fuel, but a given quantity will have to do much more useful work.

Chemotherapy Expansion

The use of medicine of all kinds will greatly increase, though many of the old diseases will disappear. The trend towards chemotherapy will continue. New antibiotics, polymeric blood plasma substitutes, synthetic cortisone and cortisone-like substances, and many new chemotherapeutic agents will be produced. More medication will be required for promoting good health than for curing disease.

For capital goods requirements, there will be greater use of glass and glass-lined equipment for piping, stills, and reaction vessels used in high-temperature operations. There will be new refractories withstanding higher temperatures, using compounds of zirconium, vanadium, aluminium, boron, silicon, carbon and other elements. Glass-fibre-plastic combinations having the strength of steel will begin to be applied in industrial equipment. New carbon-fluorine and carbon-silicon plastics that can withstand high temperatures, and artificial graphite pipes, rods and shapes, will be increasingly used. Plastics—either alone or reinforced—will replace much industrial piping, especially where corrosion resistance is important.

The quantity of prime and intermediate chemicals needed by 1975 to supply these six major categories will have to be nearly three, and perhaps four, times that consumed in 1950. The minimum increase suggested will not, of course, apply to all types of chemicals; some, such as pigments, dyes and industrial explosives, will hardly increase twofold, whereas the synthetic polymer materials will probably increase between five- and ten-fold.

Various estimates for the growth of plastics production in the United States indicate a likely figure of some 22,000,000,000 lb. by 1975, or about ten times current production. The alkyds are growing in volume but not spectacularly. A total of 1,330,000,000 lb. may be produced in 1975, compared with an expected output of 530,000,000 lb. in 1953. Demand for the phenolic plastics in 1955 is estimated at 850,000,000 lb.—almost double the 1950 production. The 1960 demand may be 950,000,000 lb.

Polystyrene is one of the most rapidly growing plastics. The total styrene requirements for 1955 have been estimated at over 1,000,000,000 lb. The styrene requirements for polystyrene plastics alone are expected to be (in millions of lb.) 500 for 1955, 700 for 1960, and 1,500 for 1975. Urea and melamine resins have grown steadily but not spectacularly. A production of 570,000,000 lb. is predicted for 1975.

The vinyl plastics have had a phenomenal growth. Production (in millions of lb.) could reach 700 by 1955, 1,200 by 1960, and 2,000 by 1975. The chemical requirements in 1975 would amount to 924,000,000 lb. of acetylene or 1,106,000,000 lb. of ethylene.

Among the miscellaneous plastics, the most important are the cumarone-indenes, polyethylene, and acrylates. Production of miscellaneous plastics is likely to total (in millions of lb.) at least 480 by 1955, 720 by 1960, and 1,700 by 1975. Polythylene production alone will probably rise from 200,000,000 lb. in 1955 to 1,000,000,000 lb. in 1975. New plastics will, of course, be developed in this period.

Plasticisers

The total US plasticiser requirements have been projected as 350, 480 and 900 million lb. for 1955, 1960 and 1975. Chemical requirements have been projected only for the largest class of plasticisers, namely the phthalic anhydride esters. At present other derivatives are produced in greater quantity, but the di-*iso*-octyl phthalates will probably become the most important. Assuming the latter represent the total production, requirements for them will be 210, 288 and 540 million lb. in 1955, 1960 and 1975. To produce these requirements, 70, 95 and 180 million lb. of *n*-heptene will be needed; and if the phthalic anhydride is made from *o*-oxylene, 76, 103 and 195 million lb. will

be needed respectively for the three periods.

The total US demand for rubber is expected to reach 3,300,000 long tons in 1975. Reclaimed rubber production will account for 800,000 tons, leaving a balance of 2,500,000 tons to be met by new supplies. The demand for new rubber in the rest of the free world is taken as reaching about 2,500,000 long tons by 1975, compared with 825,000 tons in 1950. It is not possible to evaluate accurately the relative contributions of natural and synthetic rubber to the free world total of new rubber supplies in the future. The authors of the Paley Report conclude, however, that synthetic rubber supplies will continue to increase in relative importance and may account for as much as 50 to 60 per cent of the total supply of new rubber by 1975.

Great Increase in Insecticides

It is estimated that by 1975 the annual production of insecticide materials in the United States will be approximately 500,000,000 lb. This estimate, made with the aid of industrial insecticide producers in the United States, includes only the active ingredients used in the final insecticides marketed. The chemicals used in insecticides and weed killers come in large part from petroleum and natural gas. Carriers for these chemicals also require large amounts of petroleum oil fractions. The most important consumers of petrochemicals are the two insecticides, DDT and benzene hexachloride, and the plant hormone weed killer, 2,4-D. In 1952 the United States produced approximately 105,000,000 lb. of DDT and 160,000,000 lb. of benzene hexachloride. The production of 2,4-D and its derivatives was 28,000,000 lb. in 1950. The future demand for DDT may rise to 125,000,000, 150,000,000 and 200,000,000 lb. in the years 1955, 1960 and 1975 respectively. The corresponding figures for benzene hexachloride may be 170,000,000, 200,000,000 and 225,000,000 lb.; and for 2,4-D and its derivatives they may be 40,000,000, 50,000,000 and 80,000,000 lb. The chemical requirements for these products would then be 162,000,000 194,000,000 and 251,000,000 lb. of benzene, and 25,000,000, 31,000,000 and 44,000,000 lb. of ethylene in the years 1955, 1960 and 1975 respectively.

The US fibre consumption in 1975 is estimated at 7,500,000,000 lb. compared with 6,000,000,000 lb. in 1950. This figure was arrived at by projecting the average number of lb. consumed per person per year—approximately constant for over 30 years at 39 lb.—on the basis of an expected population of 193,400,000 people in 1975. For individual kinds of fibres the 39 lb. was apportioned at 2.2 lb. per head for wool, 20.2 lb. for cotton, and 16.6 lb. for rayon and other synthetics. Rayon consumption is placed at slightly less than twice its present quantity of 1,000,000,000 lb., leaving about 1,250,000,000 lb. for other synthetic fibres.

The estimated increase in the use of ethylenic chemicals is from 2,000,000,000 lb. in 1950 to 9,500,000,000 lb. in 1975, or 500 per cent. This figure is based on halogen-containing solvents, vinyl plastics, ethyl chloride used in tetraethyl lead, and other chemicals. An important factor is the use of halogen-containing solvents for metal degreasing. The breakdown for 1975 (in millions of lb.) is as follows: polyamides 800, acrylonitrile and copolymers 1,200, polyesters 1,000, and miscellaneous 1,000.

Between 1945 and 1950, detergents increased from about 6 per cent to 47 per cent of the total soap-detergent market. Production in 1950 was 1,660,000 lb. The use of detergents will continue to increase. Production should be raised to 2,000,000,000 lb. by 1955, 2,500,000,000 lb. by 1960, and possibly 4,000,000,000 lb. by 1975.

More Potent Agents

The active compounds in detergents comprise 40 per cent of the total weight. More potent agents are likely to be developed and therefore the percentage of active ingredients used in finished detergents will be diminished. Sulphated or sulphonated cyclic compounds constitute by far the largest class of surface active agents. They are derived principally from benzene and long chain aliphatic compounds and from selected aromatic gas-oil fractions. Some alkyl naphthalene sulphonates are also made. The consumption of surface active agents is expected to rise from 800,000,000 lb. in 1955 to about 1,600,000,000 lb. in 1975—almost a fourfold increase. Present estimates are that petrochemicals comprise over half the total surface active agents. This proportion will be higher, as more benzene is derived from petroleum.

The 1975 requirements for chlorine are projected to be 8,000,000 tons—four times those of 1950. One of the problems asso-

ciated with the manufacture of this material arises from the simultaneous production of 1.1 tons of caustic soda for every ton of chlorine. Hence, a readjustment in the use of caustic soda may be necessary or some other solution to the problem may have to be provided to handle a possible surplus of caustic soda. This surplus may be increased by the growing replacement of soap by other detergents. The problem may be attacked by developing economical methods for the manufacture of chlorine that do not simultaneously produce caustic soda, by developing new and economically sound uses for caustic soda, or possibly by developing methods for converting caustic soda to soda ash. The last-mentioned possibility would take care of most of the surplus projected for 1975, since the requirements for soda ash are expected to double in the next 25 years, but the cost of either chlorine or soda ash would be slightly increased.

Decrease in Glycerine

Another problem associated with the replacement of soap by other detergents is the decrease in the potential output of by-product glycerine from soap manufacture and from the hydrolysis of fats generally. Fortunately this difficulty can be overcome by making glycerine from propylene, and research is in progress to make it also from some of the sugars.

According to the Paley Report, the chemical industry, and in particular the synthetic organic chemical industry, is increasing at a rate approximately four times that of all industry. Cyclic chemicals have grown at about the same rate as acyclic chemicals. The volume of acyclic chemicals is approximately 1½ times that of cyclic chemicals.

The Paley Report points out that in the United States the so-called coal chemicals have come so far only from the carbonisation of coal. Hydrogenation and direct gasification will probably develop into major industries over the next 25 years. These two methods, plus the recovery of oil from oil shale, will form the basis for a huge synthetic oil and by-product chemical industry. In addition, direct gasification of coal will be the first step in the manufacture of synthetic ammonia and methanol.

Some impressive figures are given to indicate the substantial increases in the demand for chemicals derived from coal, which can be anticipated during the next 25 years. For example, it is estimated that 924,000,000 gal. of crude tar will be produced in United States by-product ovens in 1955 and 1,160,000,000 gal. in 1975. In the latter year there may also be from 50,000,000 to 100,000,000 gal. of low-temperature tar. The production of tar acids is expected to rise from 52,000,000 lb. in 1950 to 104,000,000 lb. in 1975. In response to increased demand the majority of coke plants will be recovering the pyridine chemicals in 1975, when annual production will probably have reached 12,000,000 lb. It is also estimated that the production of hydrogen cyanide at coke plants will be about 3,000,000 lb. in 1955 and 15,000,000 lb. in 1975.

The output of synthetic ammonia in 1975 is projected at the high level of 6,300,000 tons because of the constantly increasing demand for fertiliser nitrogen and because plastics, textiles and some chemicals are demanding industrial ammonia at rapidly increasing rates.

A major factor in estimating future requirements of synthetic methanol is the quantity of this product that will be required to manufacture formaldehyde. By far the largest consumers of formaldehyde are synthetic resins—particularly the phenolic, urea and melamine resins. It is concluded that demand for formaldehyde in the United States would increase from 718,000,000 lb. in 1950 to 8,000,000,000 lb. in 1975. In contrast to the formaldehyde requirements, a relatively moderate increase for the other uses of methanol has been projected to 1975, mostly based on new chemical applications. The total demand for synthetic methanol in 1975 is placed at 875,000,000 gal., which would require 715,000,000 gal. of new production capacity, in addition to any replacement of older plants.

Broadly Applicable

Though the authors of the Paley Report have attempted to appraise the future demand for commodities both in the United States and throughout the rest of the world, their observations on the chemical industry and its products were confined to the United States. From their own introductory remarks, however, it seems evident that their conclusion can be accepted as broadly applicable to the rest of the free world regarded for this purpose as a single entity.

Slow but Steady Improvement Continued

Exports Down but Confidence High

PRESENTING his annual report for 1953 to the Chemical and Allied Trades Section of the Manchester Chamber of Commerce, the chairman, Mr. T. C. Fawcett, said that the improvement in the chemical and allied industries, which became apparent in the latter months of 1952, had continued at a slow but steady pace throughout the year under review. With user industries at home making recovery from the recession of 1951-2 progressively, and with the absence of any sudden demand from these industries, no shortages had been experienced generally and chemical manufacturers had, in the great majority of cases, been able to meet the demands made upon them. There had, however, been exceptions and one which might be mentioned was the case of titanium products, shortage of which had caused some concern during the year.

The benefits of new plant brought into operation in post-war years were becoming apparent, and there was no cessation in the further developments planned. Worthy of particular mention was the increasing manufacture of sulphuric acid from indigenous products, for, although the industry had safely emerged from the crisis of 1950, some fears were being expressed towards the end of 1953 as to future availability of imported sulphur. If any shortage did occur, it was most unlikely that the difficulties would achieve the major proportions of those experienced in 1950.

Competition Increasing

Although exports of chemicals, drugs, dyes and colours had continued at a fairly high level, figures did not reflect the same improvement during the year as that experienced in the home market. Compared with 1952, exports during the first ten months fell by about 10 per cent, reaching a figure of £106,400,000, as against £117,400,000 for the previous year. To some extent reduced prices for some items were reflected in this decrease, but an intensification of competition from other producing countries, with continuing, and in some instances worsening, import restrictions imposed by overseas countries, had considerable effect.

An example of the latter feature was the result of the industries' trade with Brazil during the 10 months' period. Because of that country's severe shortage of sterling, exports from the UK of chemicals, drugs, dyes and colours fell from the figure of £3,500,000 for 1952 to £110,000 for the current year.

Exports to the United States showed a substantial fall from £8,500,000 to £6,800,000 for the ten months' period, but those to Canada showed an almost compensating increase from £3,100,000 to £4,400,000. The list of those countries restricting imports continued to grow, and the reduced trading figures did not show any lack of effort on the part of UK manufacturers and exporters. Confidence remained that with an improvement in conditions, the high reputation enjoyed by British chemical products would be reflected in the export figures for future years.

Improved Demand for Dyes

The demand for dyestuffs had continued to improve throughout the year and had now attained a figure reasonably close to the assessment of purchases for use during 1951 as distinct from the stock accumulations which tended to distort the picture.

Processors of textiles were operating closely to capacity, but a large part of the output was for the home trade and the forward booking was not sufficiently extended to permit of complete confidence beyond the early part of 1954.

Difficulties in the export trade had continued, due in some cases to representations for tariff protection by local manufacturers (as in Australia), and caution predominated in those centres likely to feel the first effects of any substantial recession in America.

There had been no diminution of German competition, particularly in South American countries and India, and offers from the latter country had also been reported.

In the home market the continued heavy calls upon the National Health Service had been responsible for sales of pharmaceutical products at the same high level as during recent years.

The Ministry of Health had continued to be active in assuring itself that it was paying

reasonable prices for pharmaceutical products, and manufacturers were under constant pressure to justify their prices. It had come as a surprise to many, including members of the medical profession, that a great number of frequently prescribed proprietary drugs cost the State no more than standard preparations in the National Formulary.

Hopes not Justified

Export sales on the other hand failed to justify the hopes of improvement expressed at the end of 1952. While the actual volume of drugs and medicines exported remained at about the same level as last year, and there were indeed some groups of products, notably antibiotics, where the quantity exported was considerably in excess of the 1952 rate, the value of these shipments showed an overall decrease.

This was in part due to the greater proportion of pharmaceuticals being shipped in bulk form for processing in overseas markets locally, but even more to a marked downward trend in prices. British exporters in general showed themselves ready to quote special prices wherever necessary to meet the intensified competition which arose not only from the earlier over-production of established drugs but also from the appearance of fresh discoveries.

By the middle of the year, these conditions had led to some slackening of the rate of production on virtually a global scale, with the result that, in the later months, there was a marked tendency for the demand to outstrip supply.

The lubricating oil industry had made steady progress, and although the demand for some of its products had shown a tendency to diminish, there had been compensating increases. An example of the latter was the greater need of oils for the motor industry, consequent upon the increase in vehicles now in use at home and overseas.

Research and development continued in all sections and mention might be made of the development of new oils for the textile industry. Legislation under consideration aimed at the compulsory use of white oils for lubrication of mule spindles with a view to minimising the danger of mule spinners' cancer. Although the oil specified would be more expensive than the anti-cancerous oils at present being used, the health of those engaged in spinning should benefit.

The incorporation of additives was a further example of development within the industry, which had not only helped very considerably in the improvement of lubrication for certain specialised types of new machinery, but also was used extensively in other types of petroleum products. Users of petroleum products were kept fully posted with these developments by the technical services afforded by most suppliers—services which were readily available to those requiring them.

The report for 1952 mentioned an improvement in the supply of oil containers and this had continued. Packages were now more freely available than hitherto, but they were by no means as plentiful as they were in pre-war years. Moreover, they had considerably increased in cost and it still remained important that users should aim at returning drums, etc., to suppliers in good condition as soon as possible

India's Manganese Exports

ALTHOUGH ranking as one of the world's leading producers of high-grade, hard-lump manganese ore for metallurgical purposes, India uses itself only about 15 per cent of its total output of that commodity. During the year ended 31 March, 1953, India's principal foreign customers for manganese dioxide were the USA (890,000 tons), Western Germany (146,000 tons) and the UK (136,000 tons). Lesser quantities were taken by France, Japan, Italy, Norway, Sweden and Canada (in that order).

Indian manganese ore reserves have not been reliably estimated but it is assumed that the country possesses approximately 15,000,000 to 20,000,000 tons of high-grade ores and up to 60,000,000 tons of the lower grades. Though the experts have carried out little underground mining and drilling to determine the extent of the ore bodies, recent surveys indicate that the reserves may be even larger.

The mining and marketing of manganese ore was begun in a small way in Madras Province in 1891. Later, rich deposits were discovered in Central India, in Bombay Province, Mysore and Orissa. Production increased with world expansion of the iron and steel industry and with the growing use of manganese for metallurgical purposes. In 1951 production reached nearly 1,300,000 tons and it increased further in 1952.

Change of Name

Society for Analytical Chemistry

AT an extraordinary general meeting of the Society, held in London on 17 December, 1953, the name of the Society of Public Analysts and Other Analytical Chemists was changed to 'The Society for Analytical Chemistry.'

The Society of Public Analysts was founded at a meeting held on 7 August, 1874. Membership was then restricted to practising public analysts and their assistants, but in course of time analytical chemists other than public analysts were also admitted as members. When, on 7 August, 1907, the society was incorporated, its extended membership was recognised by the adoption of the title 'The Society of Public Analysts and Other Analytical Chemists.'

Original Purpose Outgrown

Even then there were doubts about the suitability of this title, and today the society has far outgrown its original purpose of looking after the professional needs of the public analysts. The continued growth of the society and the varied interests of its members have convinced the Council that its functions in the matter of the professional needs of analysts would be very much better discharged by the newly formed 'Association of Public Analysts' and the Royal Institute of Chemistry. The new professional association is receiving the full support of the society, and financial and other help has been extended to them.

The spirit of the society has not changed, but there is no doubt that the quarters into which its interest has been directed have been altered. The developments in analytical chemistry have been so vast and striking in this period that the society has had to grow in order to accommodate them. While the society's interest extends over the whole range of natural and manufactured products, there will still be the same platform for the discussion of investigations into the composition of food and drugs.

The Council has for some time past considered the needs of young chemists and, with the object of encouraging them, a class of Junior Membership has been instituted for chemists aged between 18 and 27 years. Junior Members will pay a considerably reduced subscription and no entrance fee, and will receive *The Analyst*. It is hoped that they will attend meetings.

There is every intention that the character of *The Analyst* and of the ordinary meetings of the society will be maintained unchanged. The Society for Analytical Chemistry will continue in the tradition, established in 1874 and upheld ever since then, of encouraging, assisting and extending the knowledge and study of all questions relating to the analysis, nature and composition of natural and manufactured materials generally.

Safe Radio-Active Isotopes

SPEAKING at the annual meeting of the Science Masters' Association at Oxford, Dr. W. P. Grove, head of the Radiochemical Centre, Amersham, said certain radio-active isotopes could be used without danger in school laboratories by sixth-form students. He explained their value as aids to teaching and urged schools to show an interest so that equipment could be manufactured and formal approval of their use obtained.

Radiation from iodine, phosphorus, or carbon 14 isotopes would not, he said, be in any way harmful. The most serious handicap to their use was the expense of equipment such as counters. To prove that this could be overcome, he displayed a special economy model which had been made at a cost of £15 and which, he thought, would sell at about £20.

Q.V.F. Sales Conference

TECHNICAL representatives of Q.V.F. Limited, the new company formed to market the 'Visible Flow' glass pipeline manufactured by James A. Jobling & Co. Ltd., and the 'Quickfit' industrial plant in glass of Quickfit & Quartz Ltd., recently attended a two-day conference at Stone, Staffordshire, with the object of becoming familiar with the more comprehensive range of industrial chemical glassware available following the formation of Q.V.F. Limited. They were welcomed by the managing director, Mr. B. H. Turpin, supported by Mr. J. G. Window, the sales director, and Mr. J. McNicol Bruce, technical director. After a series of technical meetings, the party toured the Quickfit factory and visited the development department.

Hygroscopic Aerosols

A PAPER on 'Particle Size Distribution in Hygroscopic Aerosols' was read by Mr. G. R. Gillespie and Mr. H. F. Johnstone, of the Engineering Experiment Station, University of Illinois, at a recent meeting of the American Institute of Chemical Engineers.

The selection and design of aerosol removal equipment depend largely on knowledge of the size of the particle. In this work the distribution of particle sizes of aerosols of sulphuric, phosphoric, hydrochloric, hydrobromic, and chlorosulphonic acids was measured by means of a four-stage high velocity jet impactor. The effect of the relative humidity of the air stream, the addition of foreign nuclei, the concentration of the aerosol particles and time on the size distribution, was studied.

The aerosol was formed almost instantaneously by the rapid and continuous mixing of a hygroscopic vapour with a moist air stream. The particles attained equilibrium with their surroundings in a fraction of a second by taking up water vapour. If the number concentration was greater than 10^6 particles per ml., the particles continued to grow by coagulation. The particle size, which ranged between 0.1 and 6.0 μ diameter, appeared to depend primarily on the method of formation of the nucleus. The size distributions followed the log-probability function from which the number of particles per unit volume of gas was obtained.

The jet impactor was shown to be readily adaptable to field work. Samples of sulphuric acid mist from the waste gases of a contact acid plant showed the particle size distribution to be nearly identical with those made from sulphur trioxide and water vapour under similar conditions in the laboratory.

Scottish Oil Pipeline

WORK has nearly finished on the project designed to increase the capacity of the pipeline from Finnart oil port to the Grangemouth Refinery of the Anglo-Iranian Oil Co., Ltd., from 2,400,000 tons a year to 3,250,000 tons. An additional pump has been installed at Finnart depot, and a new booster pumping station at Balfron will be completed this month. The increased capacity of the pipeline will be available shortly. When the Grangemouth Refinery was enlarged in 1949-51 and its refining capacity increased from its pre-war figure of 360,000 tons a year to 2,700,000 tons, the jetties at the refinery were suitable only for tankers up to 12,000 d.w. tons. It was considered more economical to establish unloading facilities on the west coast of Scotland, with its shorter haul, and pipe the crude oil overland to Grangemouth, than to install larger jetties at the refinery.

Finnart, on Loch Long, was chosen for the unloading site, and work on the 57-mile long pipeline to the refinery was begun in May, 1950. The pipeline was commissioned in May, 1951, with a capacity of 2,400,000 tons a year. Work started last July on the project to increase this capacity to 3,250,000 tons a year.

Standard for Xyloles

THE series of revisions of the four British Standards for benzoles and allied products has been completed by the publication of 'British Standard for Xyloles' (BS. 458: 1953), the previous edition being issued in 1939. Revisions of the standards for benzoles, coal-tar naphthas and toluoles were issued in April last year.

As before, the 'Standard Specifications for Benzole and Allied Products' (1950 edition), published by the National Benzole Association, has been used as a basis for the specifications of the nine grades of xylole, and the 'Standard Methods for Testing Tar and its Products' (1950 edition), published by the Standardisation of Tar Products Test Committee, has been used as a basis for the methods of test given in the appendices.

The main features of this revised standard are (a) the inclusion of specifications for products of lower specific gravities than those previously standardised, (b) the inclusion of two additional grades of xylole of 10° boiling range, (c) the inclusion of xyloles of the 3° and 5° boiling ranges which have received a less drastic sulphuric acid treatment than was previously usual, namely solvent xyloles, and (d) the introduction of an improved copper-strip test capable of numerical interpretation, for those products for which it is considered necessary to limit the corrosive sulphur. Copies of this standard may be obtained from the British Standards Institution, sales branch, 2 Park Street, London, W.1 (price 7s. 6d.).

Bradford Chemical Society

Exhibition & Symposium on Analysis

AN EXHIBITION of chemical apparatus will be held on Friday and Saturday, 12 and 13 February, at the Technical College, Bradford, from 10 a.m. to 6 p.m. each day. The emphasis will be on apparatus for chemical analysis and the exhibitors will include: Messrs. Quickfit and Quartz, Hilger and Watts, Baird and Tatlock, W. G. Pye, Evans Electroselenium, Electronic Instruments Ltd., Towers, Ralph Cuthbert, Reynolds and Branson, Robinson and Partners. A wide range of methods and apparatus will be exhibited and demonstrated.

A symposium on Methods of Chemical Analysis, designed to present new methods or developments of established ones, will be held on Saturday, 13 February at the Technical College, Bradford, from 2 to 5 p.m. The chair will be taken by H. Richardson, Esq., M.Sc., F.Inst.P., Principal, Bradford Technical College.

The symposium will be divided into two sessions, with an interval for light refreshments between them. In the first session the following papers will be read and discussed:

'The Direct Determination of Oxygen in Oxygen Compounds,' by G. A. Vaughan (Coal Tar Research Association); 'The Analysis of Tar Bases by Infra-red Spectroscopy,' by G. Wilman (Coal Tar Research Association); 'Isotopic Dilution Analysis,' by E. N. White (Coal Tar Research Association); 'The Application of Tracer Techniques to Amino-acid Analysis,' by Dr. Robson (Wool Industries Research Association).

In the second session the following papers will be presented and discussed: — 'The Estimation of Polybasic Acids,' by G. Robson (Sandoz Products); '*p*H measurement in relation to Wool Scouring,' by W. L. Thomas (Woolcombers Ltd.); 'Determination of the Composition of Ethyl Ether-Petroleum Ether Mixtures by a Dielectric Method,' by Dr. G. F. Wood (Esholt Sewage Works). In most cases, the apparatus described in the above papers will be available for inspection.

Members of other societies and all interested are cordially invited to attend both exhibition and symposium. Further details may be obtained from Dr. W. R. Moore, Department of Chemistry and Dyeing, Technical College, Bradford.

Reverse-Jet Filtration

AT a recent meeting of the American Institute of Chemical Engineers, K. J. Caplan described the Hersey reverse-jet filter, which constitutes a commercially practical realisation of the principle of filter back-washing applied to gas filtration. A small jet of air, issuing from a slotted tube slowly traversing the filter medium, flows in the reverse direction to the main gas stream and maintains the porosity of the filter medium.

Using dense wool felt as a filter medium, collection efficiencies on the order of 99.99 per cent and higher are obtained at flow rates from 5 to 10 times that obtainable with conventional cloth filters. Since the unit is not shut down or taken off-stream for cleaning, it is possible to use differential pressure control to govern the cleaning action and keep the porosity, and consequently the pressure drop, constant within narrow limits.

Use of the reverse-jet introduces several new variables into the operating characteristics of a dust filter, and these were discussed. Pressure drop through the filter varies approximately with the 1.5 power of the flow rate at constant dust loading. Although at present limited in usefulness to applications amenable to the mechanical and chemical properties of wool felt, further development work is directed toward mechanical arrangements capable of handling other filter media.

Microchemistry Meeting

AN ordinary meeting of the Society for Analytical Chemistry (organised by the Microchemistry Group) and the tenth annual general meeting of the Microchemistry Group will be held at the Sir John Cass College, Jewry Street, Aldgate, London, E.C.3, on Friday, 29 January. The programme will be as follows:—

3 p.m. to close of meeting. Exhibition of microchemical apparatus in the laboratories of the College.

7 p.m. Annual general meeting of the Microchemistry Group in Room 37.

7.15 p.m. Ordinary meeting of the society in Room 73, at which a film entitled 'Old Masters of Michochemistry' will be shown and the following papers will be presented and discussed:—'Organic Ion Exchange,' by L. Saunders and 'Inorganic Ion Exchange,' by G. H. Osborn.

HOME

University's New Building

New buildings of Sheffield University Department of Chemistry will be opened by the Earl of Scarborough on 5 February, when there will be a special degree congregation.

New Barrier Creams

Evans Medical Supplies Ltd. are marketing two new barrier creams—Hanguard 'D' for dry and dirty work and Handguard 'W' for wet work. These products, which are of course, C.F., have been developed after several months' laboratory work, followed by trials in industrial concerns and by a number of individuals.

New Scottish Companies

Oil, colour, chemical and allied trades in Scotland were more prominently featured in new companies registered in 1953 than in 1952, with £190,950 of new capital as against the 1952 figure of £61,500. The allied industries occupied eighth place in the list of categories receiving support in the new lists.

Repair & Service Depot

The Cambridge Instrument Co. Ltd. have opened a repair and service depot at 7 Norfolk Street, Glasgow, C.5, to which communications regarding repairs or servicing of Cambridge instruments in Scotland should be sent. Inquiries in respect of new apparatus should be sent as heretofore to 13 Grosvenor Place, London, S.W.1.

Explosives in Ships

The fifth list of amendments to Appendix A of the 1951 Report of the Departmental Committee on the Carriage of Dangerous Goods and Explosives in Ships, may now be obtained from HM Stationery Office, price 4d. Further amendments will be printed and published by HM Stationery Office as and when necessary.

Benn Brothers Ltd.

The directors of Benn Brothers Limited (publishers of THE CHEMICAL AGE) have declared the following dividends, less tax, payable on 15 February, 1954:—3 per cent on the Preference Shares for the half year ended 31 December, 1953 (same), and 5 per cent (4 per cent) interim, on the Ordinary Shares.

Official Refinery Opening

The official opening of the Anglo-Iranian Oil Company's Isle of Grain refinery will take place during June.

Coal Distillation Plans

The South Western Coal Board plans to spend £3,000,000 on building 24 more coking ovens at Nantgarw colliery, near Cardiff. In addition, more than £2,000,000 will be spent on building a new plant at Abercwmboi, Glamorgan, for the production of carbonised ovoids, and £150,000 to extend the tar distillation plant at Caerphilly.

New Petrol Additives

All three of the major British oil companies announced last week the introduction of special features in their premium grade petrols. The addition of tricresyl phosphate to prevent pre-ignition was announced by Shell; Esso claimed that a new 'naphthenic solvent oil' had remarkable solvent effects on engine deposits; and Regent Oil introduced 'Volatene control' claimed to give improved ignition.

Powder Metallurgy Consultants

A new company has been formed (see THE CHEMICAL AGE, 2 January, p. 39) by the '600' group—George Cohen Sons and Co. —to be known as George Cohen Sinteel Ltd. Its function will be to provide an advisory service for powder metallurgy, and it is an alliance of the existing Powder Metals Division of the Group with the American Electro Metal Corporation Inc. and Metallwerke Plansee GmbH of Reutte.

Krilium Price Reduction

Monsanto (Soil Conditioners) Ltd. announces a reduction in the retail price of the 1 lb. container of Krilium Merloam formulation from 10s. 6d. to 7s. 6d., with effect from 1 January. Monsanto (Soil Conditioners) Ltd. also announces that early in 1954 Krilium in the Merloam formulation will be available in a new 2 oz. package particularly suitable for pot plant and window box cultivation. The new package, which will retail at 2s. will also permit users to carry out small scale introductory trials with Krilium at reasonable cost.

OVERSEAS

Copper Deposit Discovered

Argentine geologists who have been exploring the mountains of Catamarca state that they have found a copper deposit in the nearby region of San Francisco.

Pulp & Paper from Norway

In the first ten months of 1953, Norway exported 768,253 tons of mechanical and chemical pulp, paper and fibre boards. This was 17 per cent more than during the corresponding period of 1952.

New Australian Oil Company

Following the recent oil strike near Exmouth Bay, a new company is being formed with a capital of £A5,000,000. It will be registered in Western Australia as Australasian Oil Exploration NL and will explore areas in that state for which applications have already been lodged.

Ammonia in West Virginia

The production of ammonia at Natrium, West Virginia, is being planned by the Columbia-Southern Chemical Corporation. This location was chosen because of the availability of hydrogen supply and because industrial and agricultural outlets can be readily serviced from West Virginia.

$15,000,000 Expansion

The Canadian company of Imperial Oil Ltd. has called for tenders for the major part of a $15,000,000 expansion of its Edmonton refinery, which will give Western Canada its first large-scale plant for the manufacture of lubricating oil. It will be exceeded in size only by Imperial's plant at Sarnia, and will have an output of 750,000 barrels per year. Construction will begin shortly for completion late in 1955.

Oil Refining in USA

Oil refiners in America spent $2,778,000,000,000 (almost £1,000,000,000) on new plant and equipment during 1953, according to the Petroleum Information Bureau. The US Department of Commerce has predicted that outlay for the same purpose during the first quarter of this year will exceed by 25 per cent the expenditure for the first quarter of last year.

Chilean Copper for USA

The Chilean Central Bank has confirmed sales of fire-refined and electrolytic copper to USA industry with a price basis of 30 cents per lb. for the former, delivered.

Sulphur from Trinidad

It has been officially stated at Georgetown that a saving of hard currency will accrue to Great Britain this year when Trinidad increases its sulphur exports to 5,000 tons a year, after supplying the island's normal requirements.

Phosphate Rock Record

According to reports sent by producers to the Bureau of Mines, USA Department of the Interior, phosphate rock produced in the USA during the first half of 1953 broke all previous records with a 14 per cent increase above the total for the first half of 1952.

To Acquire Cement Factories

It has been reported from Karachi that the British-owned Associated Cement Companies of India are selling their two cement factories in West Punjab and Sind for £5,000,000. The factories are being purchased by a semi-Government organisation, the Pakistan Industrial Development Corporation, who plan to modernise and expand them in an attempt to make the country self-sufficient in cement.

Northern Rhodesian Copper

Reports of a new copper-bearing area near Mwinilunga, in Northern Rhodesia, have been mentioned by Mr. W. G. Reeves, acting provincial commissioner, in a report on the newly-established north-western province. The report states that the area concerned may well have 'rich mineral surprises' in store.

Canadian Molybdenite

Mr. Hector Authier, president of the Molybdenite Corporation of Canada, has announced that that concern will use a leaching process to separate the bismuth content from ore in profitably marketable form. The cost of the process will more than be met by the recovery of bismuth and the separation will also enhance the value of the molybdenite concentrates.

• PERSONAL •

DR. E. D. ADRIAN, Master of Trinity College, Cambridge, 1932 Nobel prize winner in physiology, and President of the Royal Society, was installed as president of the British Association for 1954 at a meeting at Burlington House on 8 January.

MISS VIOLET BUFF, woman welfare manager of the Stork Margarine Works of Van den Berghs & Jurgens Ltd., Bromborough, Cheshire, was presented with a corner cabinet and linen chest by MR. J. D. BUXTON, director and general works manager, in the works' main dining-room on Monday, 6 January, to mark her retirement after 35 years with the company. Miss Buff, who joined the company in 1919, was appointed welfare manager in 1940 and has been an active member of the Merseyside branch of the Institute of Personnel Management.

The United Steel Companies Ltd. have announced a number of appointments at their different branches. On 1 January, at the Appleby-Frodingham Steel Co., Scunthorpe, MR. E. F. FARRINGTON, senior civil engineer in charge of maintenance, became assistant to the chief engineer for duties in connection with capital expenditure schemes, and MR. R. B. ATKIN, the assistant civil engineer, was appointed to succeed him. On 1 April, MR. K. PATERSON, director and chief engineer of the company, will take up the appointment of general manager of the United Steel Structural Co.; MR. L. GASKELL will succeed Mr. Paterson; MR. W. E. SMITH will succeed Mr. Gaskell as chief electrical engineer; and MR. D. R. M. NISBET will become deputy chief electrical engineer.

At Samuel Fox & Co. Ltd., Stocksbridge, on 1 January, MR. H. P. FORDER, assistant general manager, was appointed deputy general manager; MR. R. J. BAVISTER became commercial manager; MR. J. H. GOODLAD was appointed to deputise for Mr. Bavister as required; MR. A. GRAYSON, buyer, was appointed sales manager; MR. J. MASON became buyer; and MR. G. J. CUMMINGS was appointed education officer.

At Workington Iron & Steel Co., Workington, MR. V. SMITH was appointed development engineer on 4 January.

MR. ALEXANDER MCKNIGHT, manager of the General Commodities Division, and MR. FREDERICK R. MCINTOSH, manager of the Ores and Concentrates Division, have been appointed assistant vice-presidents of C. Tennant Sons & Co., of New York, 100 Park Avenue, New York 17, N.Y. Mr. McKnight has been with Tennant, a company of world traders, for the past 28 years. He is a member of the Chemists Club of New York and the Salesmen's Association of the American Chemical Industry. Mr. McIntosh came to the Tennant company eight years ago, after service as a mineral specialist with the Foreign Economic Administration, and later the Reconstruction Finance Corporation during World War II. He is a graduate of Stanford University.

Bakelite Limited announce the following executive staff changes, effective from 1 January, necessitated by the continued expansion of the company:—MR. A. LLOYD: Previously joint manager Thermosetting Division, and works manager at the company's works at Tyseley, to be general works manager. MR. G. J. TAYLOR: Previously joint manager of Thermosetting Division, and Thermosetting Division sales manager, to be manager of the Thermosetting Division. MR. P. SMITH: Previously sales manmanager Laminated Materials, to be ales manager Thermosetting Division. MR. C. E. TOFTS: Previously assistant to Mr. P. Smith, to be sales manager Laminated Materials. MR. R. HULSE: Previously manager moulding material production at Tyseley, to be works manager, Tyseley. MR. A. TONKS: Previously works technical department, to be manager, moulding material production at Tyseley. The Thermosetting Division of Bakelite Limited is the major division of the company and handles the production and sales of all thermosetting products, i.e. synthetic resins, moulding materials and laminates.

Publications & Announcements

THE British Standards Institution has accepted Dunlop's silicone rubber tubing for blood transfusion equipment. The chief advantage of this tubing over natural rubber tubing is that it stands up against repeated heat sterilisations, remaining unchanged after the same number of them that cause natural rubber to lose its elasticity. As the tubing is also non-wetting, it reduces the tendency of blood to congeal, thus allowing the drip to keep going longer. A translucent type allows the blood to be seen passing along the tube, which has a certain psychological value. Tests demonstrate that the tubing, usually of 3/16 in. bore for blood transfusion work, is non-toxic and relatively inert both chemically and physically.

* * *

JUST published by the Institute of Cost and Works Accountants, 'Employee Remuneration & Incentives' is the result of nation-wide study by branches of the Institute. The report is timely coming as it does when the country faces disputes over wages, which are a most important factor in the cost of production. In addition, price is now the first consideration in the export market. Increased productivity—greater effectiveness in the use of resources in the production of goods or the provision of services—is one way to overcome these difficulties, and, as the report shows, systems of remuneration must recognise this truth and contain the incentive for the achievement of that objective. Copies of the report are obtainable from the distributors, Gee & Co. (Publishers) Ltd., 27/28 Basinghall Street, London, E.C.2 (price 7s. 6d.).

* * *

DURING the annual general meeting of the Manchester and District Section of the RIC, in the Manchester College of Science and Technology, on 7 and 8 January, Hilger & Watts Ltd., of 98 St. Pancras Way, London, N.W.1, exhibited several instruments. These were: a photoelectric recording spectrograph, consisting of a Hilger medium quartz spectrograph, with a photomultiplier cell connected to a mains amplifier and pen recorder; a Uvispek spectrophotometer, a mains model using interchangeable glass and quartz prisms; and the re-designed model of the Biochem absorptiometer.

THE first of a series of technical notes on the established products of Watford Chemical Co. Ltd., Copperfield Road, London, E.3, are included in the latest issue of the company's house jourial, *The Molecule,* which is published quarterly. The writer deals in this instance with the Estax range of emulsifying agents. Changes in the company's policy in regard to research generally form the subject of a contribution by the chief chemist and works manager, Mr. G. B. Frost, and other articles include one entitled 'Britain as a Trading Nation Must Trade With the East,' by Mr. Bob Edwards, general secretary of the Chemical Workers' Union.

* * *

MUCH research has been directed in the past towards the development of paint that will dry quickly, so that successive coats can be applied, one on top of another, almost immediately, thereby avoiding interruption of normal work when interiors of large industrial plants, office buildings, etc., have to be repainted. A new paint which is claimed to have attained this goal is the subject of an article in a recent issue of *The Rohm & Haas Reporter,* published by the Rohm & Haas Company, Philadelphia 5, Pa. Other contributions of interest include one concerning the use of reinforced plastics in the manufacture of radar equipment.

* * *

STEEL tubes are needed today all over the world in greater quantities than ever before, to play their essential part in those functions without which this modern world could not survive. This fact is brought home most forcibly in a recent 'special' number of the *S. & L. Review,* published by Stewarts & Lloyds Ltd. While not purporting to be a comprehensive history of the company, its 160 pages provide an illustrated commentary on the major events within the organisation —at home and overseas—that have occurred since Stewarts & Lloyds Ltd. came into being in 1903, and the national and international background against which they have taken place. During those 50 years the pattern of industry and the national way of life have changed a great deal and there will be much stirring of memories as readers of this excellent publication look back on all that has happened.

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsib.e for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

DORMER PLASTICS LTD., West Hartlepool. 8 December, £7,500 debenture, to HM Treasury Solicitor; general charge. *Nil. 7 February, 1952.

INSECTICIDE ACTIVATED PRODUCTS LTD., London, S.W. 4 December, £1,250 debenture, to Branch Nominees Ltd.; general charge. *£1,647. 11 February, 1952.

Increases of Capital

The following increases of capital have been announced:—CONHILL PLANT EQUIPMENT, LTD., from £250 to £1,000; CANNON (CP), LTD., from £35,000 to £40,000; the purpose being to acquire such part of the undertaking of Cannon (Holdings), Ltd. as relates to the sale of chemical plant products.

New Registrations

Wadimex (Great Britain) Ltd.

Private company. (527,461.) Capital £6,000. To enter into agreements for the acquisition of the manufacturing and selling rights of Wadimex products in Great Britain and in any Dominion, Colony or Dependency of the United Kingdom; manufacturers of and dealers in bitumen or any bituminous substances, etc. Directors: A. F. Smith, P. M. Fisk. Reg. office: Beech Corner, Woodland Way, Kingswood, Surrey.

S. & D. Ltd.

Private company. (527,685.) Capital £2,000. Research, analytical, agricultural, veterinary, manufacturing and wholesale and retail chemists, druggists, etc. Directors: Malcolm R. MacLennan, Dorothea Y. O. Baptie, Geo. P. Smith and Florence E. Smith. Reg. office: 23 Lyons Crescent, Tonbridge, Kent.

R.H.C. Reclamations Ltd.

Private company. (527,559.) Capital £15,000. Reclaiming, grinding, processing, improving, manufacturing, importing, exporting and dealing in plastics, chemicals, resins, gums and other materials, etc. Directors: R. H. Cole, J. H. Reed. Reg. office: 2 Caxton Street, Westminster, S.W.1.

Monsanto Plastics Ltd.

Private company. (527,494.) Capital £100. Manufacturers, processors, converters and dealers in all kinds of plastics, polymers, synthetic resins, fibres, textiles and rubbers, etc. Subscribers: P. J. Bunyan, F. Pethram. First directors are not named. Solicitors: Slaughter & May, 18 Austin Friars, London, E.C.2.

Dexter Paints (Fylde) Ltd.

Private company. (527,759.) Capital £1,000. Manufacturers of and dealers in paints of all kinds, etc. Directors: Jas. C. Eatough and Harry C. Eatough, directors of Dexter Paints Ltd., etc. Secretary: H. C. Eatough. Reg. office: 18/20 Sandygate, Burnley.

Albatros Fertilizer Co. Ltd.

Private company. (14,890.) Capital £150,000. Manufacturers, processors, importers, distributors, buyers and sellers of and dealers in granulated and other fertilisers. Directors: J. D. Waller and E. Bloembergen, both of Utrecht, Holland, W. S. Dowley, E. G. Dowley, W. V. Stafford and F. J. Stafford.

Slimaid Products Ltd.

Private company. (527,674.) Capital £10,000. Chemists, druggists, drysalters, oil and colour men, etc. Directors: Dr. Bernard Samuels, Louis Marks, and Patricia Nevison. Reg. office: 40 Hoghton Street, Southport.

Lennox Pest Exterminators Ltd.

Private company. (14,863.) Capital £1,000. Manufacturers, compounders, purchasers, sellers or distributors of rodenticides, pesticides, insecticides and disinfectants, etc. Directors: David W. Mitchell, Edwin Croxon.

Next Week's Events

MONDAY 18 JANUARY

Royal Institute of Chemistry

Leeds: The University (Chemistry Lecture Theatre), 6.30 p.m. Professor B. Lythgoe: 'The Naturally Occurring Polyacetylenes.'

Society of Chemical Industry

London: Chemical Society rooms, Burlington House, Piccadilly, 5.30 p.m. Meeting of the Agricultural Group (Crop Protection Panel), F. G. Ordish: 'Economics of Crop Protection.'

Institute of Metals

Renfrew: Visit of Scottish Local Section to research laboratories of Babcock & Wilcox Ltd.

TUESDAY 19 JANUARY

Society of Chemical Industry

London: Chemical Society rooms, Burlington House, Piccadilly, 6.30 p.m. Plastics and Polymer Group. P. Griffin: 'Some Chemical and Technological Aspects of Silicone Resins.'

Birmingham: Birmingham and Midland Institute, 6.30 p.m. N. P. Inglis: 'Titanium.'

Institute of Petroleum

Manchester: Engineers' Club, Albert Square, 6.30 p.m. 'Mechanical Handling in the Petroleum Industry.'

WEDNESDAY 20 JANUARY

Royal Institute of Chemistry

London: King's College (Chemistry Lecture Theatre), 6.30 p.m. Joint meeting with SCI London Section. D. J. O. Brandt: 'The Manufacture of Iron and Steel.'

Society of Chemical Industry

London: Chemical Society rooms, Burlington House, Piccadilly, 6.30 p.m. Corrosion Group meeting. L. B. Pfeil: 'Metallurgical Aspects of Dry Corrosion.'

Widnes: Technical College, 7 p.m. E. Stables: 'The Manufacture, Properties and Uses of Titanium Metal.'

Newcastle: King's College (Chemistry Lecture Theatre), 6.30 p.m. Display of Agricultural Films.

Society for Analytical Chemistry

London: Institute of Electrical Engineers, Savoy Place, 6 p.m. D. W. Kent-Jones & G. Taylor: 'The Determination of Alcohol in Blood and Urine.'

Glasgow: Ruhl Restaurant, Sauchiehall Street, 12.45 p.m. Scottish Section annual general meeting.

Institute of Fuel

Leeds: The University, 6.30 p.m. W. J. Driscoll: 'Hot-Blast Cupola Practice.'

Manchester Metallurgical Society

Manchester: Central Library, 6.30 p.m. Professor G. V. Raynor: 'Equilibrium Diagrams.'

THURSDAY 21 JANUARY

Royal Institute of Chemistry

Manchester: Engineers' Club, Albert Square. Annual meeting of the Manchester and District Section.

Chemical Society

London: Burlington House, Piccadilly, 7.30 p.m. Reading of original papers.

Bristol: The University (Dept. of Chemistry), 7 p.m. Joint meeting with RIC and SCI. Dr. R. Belcher: 'Some New Methods in Analytical Chemistry.'

Hull: University College (Chemistry Dept.), 7.30 p.m. Joint meeting with RIC. Lecture by Professor J. B. Speakman.

Liverpool: The University (Chemistry Lecture Theatre), 5 p.m. Joint meeting with RIC, SCI, BAC, and University Chemical Society. Dr. E. J. Bowen: 'Fluorescence.'

Society of Chemical Industry

London: Battersea Polytechnic, S.W.11, 6.30 p.m. Corrosion Group: Exhibition and Conversazione.

London: Institute of Structural Engineers, Upper Belgrave Street, 6 p.m. Road & Building Materials Group meeting. F. A. Shergold, P. A. Sabine & J. E. Morey: 'The Correlation of the Mechanical Properties and Petrography of a Series of Quartz-dolerite Roadstones.'

Aberdeen: Robert Gordon's College, 7.30 p.m. Joint meeting of Aberdeen Section with RIC and CS. Professor W. F. K. Wynne-Jones: 'New Outlooks in Electrochemistry.'

Fertiliser Society

London: Caxton Hall (Tudor Room), Victoria, 2.30 p.m. W. H. Coates: 'Flash Roasting,' and a representative of Cie. de St. Gobain: 'The "Kachkaroff" process.

FRIDAY 22 JANUARY

Chemical Society

Glasgow: Royal Technical College, 7.15 p.m. Professor F. E. King: 'The Investigation of Natural Products Derived from Wood.'

Society of Chemical Industry

Exeter: Singer Laboratories, 5 p.m. Joint meeting of SW section with RIC. H. K. Cameron: 'The Chemist in the Electrical Industry.'

Birmingham: The University (Chemistry Dept.), 4.30 p.m. Joint meeting with Birmingham University Chemical Society. Professor M. J. S. Dewar: 'Aromatic Substitution.'

Institute of Chemical Engineers

Manchester: Annual general meeting. N.W. branch.

Plastics Institute

Manchester: Engineers' Club, Albert Square, 6.45 p.m. G. Campbell: 'The Injection Moulding of Vinyl and Nylon Type Polymers.'

North East Metallurgical Society

Newcastle-upon-Tyne: King's College, 7.15 p.m. Professor C. W. Dannatt: 'Evolution in Extraction Metallurgy.'

Corrosion & Packaging

A COURSE of evening lectures on 'Corrosion & Packaging' has been drawn up by the Department of Chemistry, Northampton Polytechnic, Clerkenwell, E.C.1, in co-operation with the Printing, Packaging & Allied Trades Research Association and the Institute of Packaging. The course will extend over five weeks, beginning 10 March, each lecture starting at 7 p.m. The fee is £1 1s. The following is the syllabus:

10 March—'General Principles of Corrosion,' by Dr. W. H. J. Vernon, O.B.E. (Chemical Research Laboratory, Teddington).

17 March—'General Principles of Packaging of Corrodible Articles,' by J. J. Ferriggi, M.Inst.Pack. (Shell Petroleum Co. Ltd.).

24 March—'Prevention of Corrosion,' by D. Clayton, D.Sc., M.I.Mech.E., F.Inst.Pet. (I.C.I. Ltd., Billingham Division).

31 March—'Barriers and Desiccated Packs,' by D. J. Evans (Ministry of Supply).

7 April.—'The Selection of the Packaging Method,' by F. A. Paine, B.Sc., A.R.I.C. (PATRA).

Shell IPS Price Reductions

SHELL CHEMICALS LIMITED have announced a reduction in their IPS 1 and IPS 2 grades of from 2d. to 3d. a gallon. The new prices which will take effect from Wednesday, 6 January, are as follows:—

	IPS 1 Per gal. s. d.	IPS 2 Per gal. s. d.
5 gal. to 10 gal.	5 5½	4 10½
10 gal. to 30 gal.	5 2½	4 7½
30 gal. to 100 gal.	5 0	4 5
100 gal. to 500 gal.	4 9½	4 2½
500 gal. to 2,500 gal.	4 7½	4 0½
2,500 gal. to 10,000 gal.	4 7	4 0
10,000 gal. to 25,000 gal.	4 6½	3 11½
25,000 gal. and over	4 6	3 11
	in drums	

Bulk rebates remain the same as before.

Market Reports

LONDON.—Active conditions have been reported on the industrial chemicals market with home consumers delivery specifications covering good quantities. Price changes have been few and the undertone remains firm, with the quotations for the soda alkalis a little harder. As noted in last week's issue the ethyl acohol prices were slightly reduced as from 1 January. There has been slightly more inquiry for fertilisers and this improvement is expected to continue. The coal tar products market remains steady with no outstanding feature.

MANCHESTER.—Fairly satisfactory trading conditions have been reported on the Manchester market for heavy chemical products during the past week. Leading consumers in the Lancashire and West Riding areas are calling for steady deliveries of a wide range of products against contracts, while a fair flow of new inquiry has been in circulation. Export bookings keep up at around their recent level. In the fertiliser section, there is a continued steady movement of supplies of basic slag and in several other directions there are signs of improvement. Most of the light and heavy tar products are meeting with persistent inquiry.

GLASGOW.—Owing to the fact that quite a number of factories were closed for a few days last week due to the new year recession, business has been slow in getting under way, and it is extremely difficult to assess prospects under these conditions. However, trade generally in 1953 finished on a strong upward note and the next few weeks should see consumers back to normal conditions.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

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

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A VACANCY exists for a **CHEMIST** in the **FEDERATION OF MALAYA.** Appointment is on probation to the pensionable establishment with consolidated salary according to experience in the scale £1,005-£2,044 per annum. A variable cost-of-living allowance, according to family commitment, is also payable.

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ANGLO - IRANIAN OIL COMPANY require a **TECHNICAL ASSISTANT** in their Geological Laboratory at their London Office. Applicants should be under 30 years of age, have completed National Service and be in possession of School Certificate. Preference will be given to those in possession of Higher School Certificate or Inter. B.Sc. Experience in general scientific laboratory work, or the preparation of thin sections of rocks and microfossils desirable. Salary according to age and qualifications. Write, giving full details and quoting **DEPARTMENT H.3011, TO BOX 6529, c/o 191, GRESHAM HOUSE, E.C.2.**

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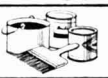
for COLOUR MAKING 

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