The Chemical Age

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The
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Sulphur in Prospect

'IN retrospect, the sulphur shortage was not as severe nor as fearsome as was first believed.' This sentence from a recent survey-article in *Chemical & Engineering News* (**31**, 19, 1968) undoubtedly expresses what is now general opinion. A frequent dictum of economists, today probably old-fashioned, was to the effect that quite small changes in any supply/demand balance could bring about slump or shortage. With low-cost sulphur this would seem to have been the story. The factors of imbalance diagnosed in the article are these: (1) stock depletion after the war without time for rebuilding, (2) high demand by Western nations in post-war recovery programmes, and (3) the sudden demands caused by the Korean crisis. In two years the sulphur shortage has dispersed; as reported previously (THE CHEMICAL AGE, **68**, 729), US producers have now been released from price control. So swiftly has the situation improved that no one could be blamed for suggesting that there was never as much cause for alarm as US producers and officials suggested. Another retrospective reaction is to wonder how suddenly and severely a second scare of this kind can develop.

As is known, it is not sulphur in general that has been short. The shortage has been of a specific grade, the Frasch-mined sulphur, hitherto an American monopoly and much the cheapest sulphur available to the world. Even now after recent price rises Frasch sulphur sells at $25 to $27.5 per ton at port, a price range that must be compared with other forms of sulphur selling at from $35 to $110 per ton. It is said now that the crisis remedies taken—export quota reductions, allocations, changes by some large consumers to other sulphur-containing materials altogether—have enabled the Frasch-process producers to increase their stocks by approximately 400,000 tons since 1951. When the United States entered the last war stocks were over 5,000,000 tons; today they are about 3,000,000 tons. The actual demand for sulphur—excluding the Communist countries—in 1952 was 6,000,000 tons, though estimates made the year before had indicated a demand of 7,100,000 tons. Thus, the Frasch sulphur supply picture to be seen today is much more favourable than any picture that could have

been anticipated twelve or twenty-four months ago. Nor is this the only improvement. Though it has often been said that the domes suitable for the Frasch process are few and must be exhausted in not too distant time, the crisis of shortage has brought several new centres into operation. This new US capacity, most of it added only in the past year, amounts to at least 700,000 tons per annum, and two more domes are still in the pre-production stage of development.

Across the Gulf of Mexico and further south there is still Frasch-extractable sulphur to be found. Not even 800 miles of sea intervening between the facing coasts has checked the geological impulse to form these strange sulphur-containing salt domes. Soon a Mexican dome with the picturesque name San Cristobal will be adding 200,000 tons a year to the world output of Frasch sulphur; not far away a 500,000 ton per year plant is shortly to be built. Prospecting for domes in Mexico has proved remarkably successful. The capital being poured into these drillings and plant installations is American, though in stark fact the large-scale development of the Frasch process outside Texas and Louisiana spells the end of an American monopoly. No one yet knows how much sulphur awaits the Frasch process in Mexico, but drillings by two companies have indicated deposits totalling some 18,000,000 tons and these are estimates only for sections of the sulphur-bearing land. One fact is clear enough. The view of a few years ago that Frasch sulphur resources would be exhausted within 10 to 15 years is no longer valid.

Nevertheless, it is prudent to assume that Frasch sulphur, even allowing for the additional domes of Texas and the new Frasch industry of Mexico, will fade away before the end of this century. To take even as long a view as this presupposes the steady uncovering of new sites. There is no shortage of higher cost sulphur in the world, or of alternative materials from which sulphuric acid can be made. The most probable forecast now is that Frasch sulphur will gradually increase in cost, and equally gradually this will encourage the development of higher cost sulphur-mining operations. That is to say, no sudden crisis in sulphur or acid costs for the chemical industry is lurking ahead among the unknowns. In any case, the cheapness of Frasch sulphur for consumers hundreds or thousands of miles distant from the Gulf of Mexico is reduced by the cost of transport; rises in the Frasch price at port lead to an economic point of no return, when acid costs based on pyrites or anhydrite from much less distant sources are in fact lower. In contrast with the situation of 1950 and 1951, time is henceforward on the side of orderly development, of the ordinary and calculable interplay of economic factors.

On Other Pages

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Notes & Comments

Indian Technology

THE Indian Council of Scientific and Industrial Research was founded as recently as 1942, an early by-product of world war. India, faced with the cessation or dwindling of many necessary imports, had to develop alternative materials from her own resources. With the end of the war and with India's new political independence, the Council was able to change a short-term and emergency policy into a long-term policy to foster economic and industrial development. The Council's rate of achievement has certainly been high. Eleven technological research centres were projected and the eleventh of these—the Central Building Research Institute—was opened recently. India has not been isolated from the economic strains and stresses of the post-war non-dollar world and her ability to transform bold plans into accomplished facts must be admired. It is true that her need for technological development is very great—national urgencies that are as obvious as the creation of research centres where none at all exist are not easily put into suspense by the caution of government counting houses. Nevertheless, this post-war progress of the new India might be compared without complete injustice with the lack of progress now being revealed in Britain. Few of our post-war plans for research expansion have come into fruition; in recent years the annual reports of our national research centres have made gloomy reading. The 'deepening concern' expressed in their last Report by the Advisory Council of the DSIR has been matched by similar expressions of doubt and criticism in most of this year's reports from state-funded research organisations. Technology in India may be in its infancy, but is our own so mature that it can suffer delays and cuts in expansion? If the comparison is not completely fair, it is none the less salutary for that.

Too Narrow?

OUR distinguished contemporary, *Chemistry & Industry* (1953, No. 23, p. 549) has taken up the cudgels on behalf of chemists, the Royal Institute of Chemistry president, Mr. H. W. Cremer, having commented in his retiring address upon the tendency for chemists to have a narrow outlook and range of interests. That the fact has more than a modicum of general truth is admitted; that it is the fault of chemists is debated. What other time is there for the young chemist to study subjects other than chemistry and closely-related sciences? And all the time the subject itself widens, the syllabus for a chemical qualification becomes heavier and heavier. If a university graduate reading chemistry today can play one of the sports solely to keep fit and absorb enough chemistry and allied subjects to obtain a degree, his expendable span of hours will have little residue. Indeed, what residue there is should not be 'organised' in some other pursuit to plan. A little time 'to stand and stare' is the vitamin B complex of psychological growth. We find it difficult to disagree with the leader writer of *Chemistry & Industry* whose main point—by implication if not by direct statement—is that we cannot have broadly accomplished chemists unless the load of specialised study is lightened.

Increased Incentive Needed

IT is certainly unfair to criticise the product of an examination system when those who are examinees have no voice in its design or aims. It is suggested by *Chemistry & Industry* that one of the troubles is 'that we refuse to accept the idea that chemistry has become too big to be regarded as one subject'. In our view that is only one way of looking at the crucial facts. It is just as valid to say that we refuse to accept the idea that chemistry is now so big a subject that a degree should require a five-year and not a three-year university course. There is nothing sacrosanct about the three-year idea. Doctors and, we believe,

veterinary surgeons have long regarded a five-years period of pre-qualifying study as inevitable. Barristers, likewise, spend a long period training for their profession and a dental surgeon does not qualify before five or six years. Certainly this alternative view cascades fat on the fire while the other, with its suggestion of limited coverage of chemistry for training, merely sprinkles fat. The problem is economic, and it is deep-rootedly so at that. A salary range of £450 to £500, so often about what is offered to the young graduate, may seem almost lordly to chemists who can remember the 'twenties and 'thirties, but set against the background of current values it represents little or no premium on the rewards of unqualified workers who entered business on leaving school. If we are going to quibble about the kind of chemists we produce, we might well start at the incentive end. Better rewards would encourage both longer and broader training.

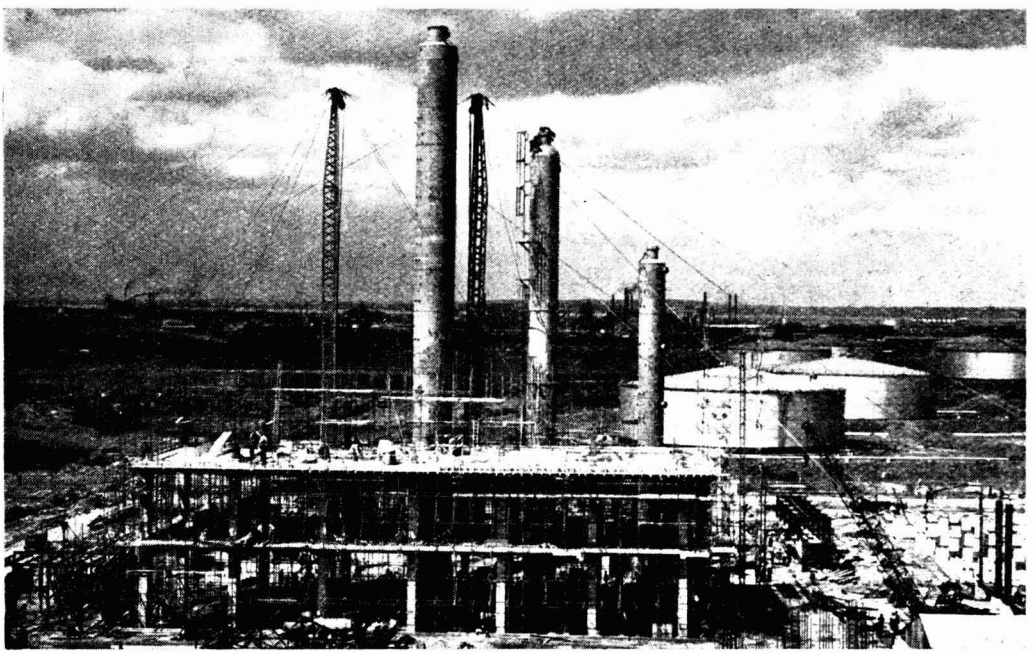
Linseed Imports

THE Board of Trade has announced, in Notice to Importers No. 561, that imports at the rate of one ton of linseed oil (or three tons of linseed) for every two tons of linseed oil bought from the Ministry of Food, will be allowed from 1 July.

This ratio will apply not only to future purchases from the Ministry of Food, but also to purchases since 7 September, 1952. For example, a firm which has bought 300 tons of linseed oil from the Ministry of Food since 7 September and has been granted an import licence for 100 tons of oil, may apply for a further licence for 50 tons.

Imports of linseed and linseed oil can be made from any source, and licences will be valid for six months from issuing date. Importers will be asked to continue submitting monthly returns.

Applications for licences should be made to the Board of Trade, through the Ministry of Food, Oils & Fats Division, London Road, Stanmore, Middlesex.



A general view of the 'platforming' unit, the first of its kind in the United Kingdom, during construction at Shell's oil refinery at Stanlow, near Ellesmere Port, Cheshire. The pumphouse can be seen in the foreground and the steel structure on the right will carry the reactors. The 'platformer' is so called because a platinum catalyst is used to reform petrol from a low to a high grade

The Oil & Colour Chemists' Association

Biennial Conference at Eastbourne

THE biennial conference of the Oil & Colour Chemists' Association was held at the Grand Hotel, Eastbourne, from 2-6 June, the theme being the optical properties of films of surface coating materials.

The business part of the conference comprised three technical sessions and the annual general meeting. The social activities began with a Coronation dinner and dance at the Grand Hotel on Tuesday evening. On Wednesday there was a reception just before lunch, and a civic reception and dance at the Winter Garden in the evening. The Association's annual banquet and ball on Friday evening was the grand finale of the conference.

Mr. A. Crombie (past president) opened the first technical session on Wednesday morning, and conveyed the regrets of the president, Mr. L. O. Kekwick, who was unable to reach Eastbourne until later in the day. Among those present were Mr. E. Oostens, of Belgium, (president of FATIPEC); Dr. R. H. Kienle, of the USA; Mr. R. Basse (France); Dr. H. W. Talen and Dr. J. A. W. van Lear (Holland); Mr. R. B. Khan (president of the Pakistan Paint Manufacturers' Association); Mr. Claus Johannsen and Mr. Dagfinn Schinsted (Norway); Mr. E. Lavsen and Mr. P. Fink-Jensen (Denmark); Mr. H. Meyer (Sweden); and Mr. Poswick (Belgium). Mr. Crombie asked them to convey to their associations when they returned to their own countries the very best wishes of OCCA.

Annual Report Presented

Mr. R. S. Law (hon. secretary) presented the annual report of the Council for 1952 at the annual meeing on Friday. For the past 2½ years, he said, the Council had been giving attention to the revision of the Rules. It was felt that they needed to be brought up to date and a draft of the revised Rules was discussed later in the meeting.

With regard to the post-graduate lectures which have been held each year, Mr. Law said the Council had felt for some time that it might be more appropriate if a one-day symposium were held instead in a year in which there was no biennial conference. The matter was under consideration, he said, and proposals would be made in the near future.

A very gratifying feature was that membership continued to grow at approximately the same rate as previously; the percentage increase in 1952 was again 10 per cent, the total figure of fully paid up members at the end of 1952 being 2,161.

The liaison with the Federation of Paint and Varnish Production Clubs of America and FATIPEC in Europe had developed from strength to strength.

Revenue Doubled

Mr. N. A. Bennett (hon. treasurer) presented the accounts and balance sheet for 1952. They showed that the revenue from sales of the Association's *Journal* and from advertisements had doubled as compared with the previous year, and income from entrance fees and members' subscriptions had increased. The surplus for the year was £3,545, compared with a deficit in the previous year of £1,967.

In connection with the British National Committee for Chemistry, Dr. L. A. Jordan (the Association's representative on that body) drew attention to the statement in the Report that that committee had in 1952 concerned itself with the question of the delegation to Stockholm for the conference of the International Union of Pure and Applied Chemistry in July, 1953. At that conference, he siad, there would be meetings of the Organic Coatings Division of the Section of Applied Chemistry, which was founded in New York almost two years ago. There had been discussions to find the *modus operandi* whereby the national bodies could co-operate in looking to the Organic Coatings Division as the focal point for certain international activities. That was fairly accomplished.

One of the first things to be undertaken was the establishment of a Commission on terminology. M. Le Basse, in France, had prepared a booklet dealing with some of the terminological definitions, and had consented to be chairman of the Commission on terminology which was to be established at the Stockholm conference. Dr. Jordan proposed that Mr. P. J. Gay, the hon.

research and development officer of OCCA, should be the British representative on the Commission and he was unanimously elected.

The president, replying to a question concerning co-operative research within the association, which has been practised for some years, said it was still being developed.

H. Gosling Elected President

Mr. H. Gosling, the Council's nominee for the presidency, was unanimously elected, on the proposal of Mr. Kekwick.

Expressing his appreciation of that very high honour, he said that, on looking at the list of illustrious past presidents, he felt the association had hitched his wagon to the stars; he would do his best, with the help of the excellent team of honorary officers, to uphold the high traditions which had been set by his predecessors. He asked Mr. Kekwick to continue to act as president for the remainder of the conference.

Elected vice-presidents were: Mr. G. Copping, Mr. T. A. Fillingham, Mr. S. L. Leach, Mr. F. Sowerbutts and Mr. H. C. Worsdall.

The hon. officers were re-elected as follows: hon. secretary, Mr. R. S. Law; hon. treasurer, Mr. N. A. Bennett; hon. editor, Dr. R. F. Bowles; hon. research and development officer, Mr. P. J. Gay.

It was announced that the section chairmen, as follows, would serve on the Council for 1953/54: Bristol, Dr. E. Marsden; Hull, Mr. S. J. Reed; London, Mr. R. F. G. Holness; Manchester, Dr. M. E. D. Jarrett; Midlands, Mr. G. W. Whitfield; Newcastle, Dr. A. I. Escolme; New South Wales, Mr. A. E. Cameron; New Zealand, Mr. J. M. C. Tingey; Scotland, Mr. H. McNair; South Africa, Mr. R. Jones; South Australia, Mr. D. R. Turnbull; Victoria (Australia) Mr. W. M. Davis; West Riding, Mr. W. H. H. Hawkins.

The following members of Council were elected by ballot: Dr. S. H. Bell, Mr. R. N. Wheeler, Dr. J. O. Cutter, Mr. F. E. Morley, Mr. H. R. Touchin and Mr. C. J. A. Taylor.

A good deal of the discussion concerned the proposed Rule which provides that entrance fees and annual subscriptions shall be as determined from time to time by the Council by resolution at two successive Council meetings, of which resolutions, in case of difference, the second shall prevail. There were some members who held that rates of subscriptions should be agreed by the membership generally rather than the Council, whereas others urged that the Council, being elected by the members of the association, was competent to decide. The meeting having decided the principle that the Council should fix subscriptions, some question arose as to whether the actual working of the proposed Rule really carried out the intention that decisions by the Council concerning subscriptions should be only by the same resolution at two successive Council meetings. Eventually the Rule was approved, subject to further legal consultation to ensure that the wording was clear.

At the banquet and ball, held on Friday evening, Mr. E. E. Oostens, of Belgium, proposed the toast of 'The Oil and Colour Chemists' Association'. After offering his congratulations on the success of the conference, the organisation of which had been excellent, he said the association was created in 1918 as a result of chemists in the paint and allied industries having met together during the 1914-1918 war to consider how to turn fatty acids into drying oils in the absence of glycerine. In 1923, OCCA had absorbed the Paint and Varnish Society and at the same time had widened its interests so that it covered paints, printing inks, pigments, varnishes, drying and essential oils, resins, lacquers, linoleum and treated fabrics and the plant, apparatus and raw materials used in their manufacture.

A Triple Alliance

There was now the triple alliance of the association, having more than 2,000 members in its sections overseas and in the British Isles, with the Federation of Paint and Varnish Production Clubs in America and with FATIPEC. Originally continental Europe was represented only by France, but her membership had become merged in that of the FATIPEC, which was formed in 1949. The Council of the FATIPEC had decided that every two years an international congress should be organised, making it possible for British technicians to present lectures and communications to the technical representatives of the countries of continental Europe.

Inviting members of OCCA to the international congress to be held in Belgium in 1955 by the FATIPEC, under his presi-

dency, he said the Council of his Belgian Association, the ATIPIC, hoped to decide three or four months hence the title of the congress and the communications to be prepared.

Mr. Kekwick thanked Mr. Oostens for his very kind reference to the association and said that in a quiet way they felt quite proud that it was really started in 1907, even before their friends on the Continent or in America had started an association of that kind.

Mr. G. A. Campbell, M.Sc., F.R.I.C., who proposed the health of the guests, said the Oil & Colour Chemists' Association, scientific and technical though undoubtedly it was, reached back in effect through the Renaissance and the days of Leonardo da Vinci to the practical times of Rome and Greece. It would be remembered that its past president, Dr. Jordan, had busied himself to find a Latin motto to suit the Association; it was embodied in the association's emblem, which was reproduced on the menu, '*Et mente et manu,*' meaning minds and hands, denoting the art and craft of the profession. It seemed to Mr. Campbell that there should be a motto for the conference. They could retain the technical connection, which they prized so much; so that they must retain the word '*mente*' (the mind, because the chemist liked to hold on to the idea that he had a mind !). Another very important thing for the chemist was ego, the first person singular—not always singular, but always first! So that taking '*mens*' for the mind and '*ego*' for the eye, and linking them together with the good Latin possessive '*vester*'—the chemist was possessive—they obtained a very useful motto. '*Mens vester ego*' might freely be translated as '*mind to eye.*' But a much freer translation would render it 'mind your optics,' an excellent motto for a conference on the optical properties of surface coating materials.

Dr. Kienle Toasted

The toast was coupled particularly with the name of Dr. Kienle, who had shown himself in the conference room to be a most able expositor of the art and craft of the oil and colour chemists, and throughout the conference had shown himself to be possessed of that good fellowship which helped to make such conferences what they were.

Mr. and Mrs. Oostens, from Belgium, were equally welcome. Mr. Oostens was very courageous to propose the toast of the association in a foreign tongue, and Mr. Campbell paid tribute to him for having done it so ably. There were visitors from other Continental countries who had contributed ably to the discussions in the conference room, and also Mr. Khan and his family, from Pakistan, who added colour to the gathering.

Other guests whom Mr. Campbell welcomed included Mr. Silman, the president of the Institute of Metal Finishing, who represented a side of industry very closely akin to that of oil and colour chemists.

Responds for Guests

Dr. R. H. Kienle responded, and on behalf of the guests he thanked the association for the wonderful time they were enjoying. He was very happy that OCCA and the Federation of Paint and Varnish Production Clubs of America were relatives. How else could Mrs. Kienle and himself feel, coming as they did from New England to meet their friends in the mother country ?

Mr. Kekwick then invested his successor, Mr. H. Gosling, with the presidential insignia.

First he said how very honoured he had been to occupy the highest position in the association and he thanked all the sections throughout England and Scotland and the Commonwealth for the wonderful support they had given him and the grand way in which they had received Mrs. Kekwick and himself. He hoped that the many friends they had made would continue to be their friends.

Mr. Gosling thanked the members and said he would do his best to maintain the very high traditions which had been set by past presidents.

He then presented to Mr. Kekwick a replica of the presidential insignia to mark his successful period of office, and expressed on behalf of all members their very sincere appreciation of his outstanding service. When Mr. Kekwick had taken office two years previously the association was in process of re-organising the structure of its secretariat and occupying premises of its own. That that step was highly successful had been due not only to the loyal and efficient service given by the general secretary, Mr. Hamblin, but also to the able and wise leadership of Mr. Kekwick. Again,

only a little time ago there was concern about the finances of the association; with the help of its gifted hon. treasurer, Mr. Bennett, and by the astute direction of the president, the position had become most favourable. One had only to sit on the Council under his chairmanship to realise that the association had been led with enthusiasm and ability.

Mr. Gosling ventured to suggest, however, that great as that contribution had been, it might not be the outstanding feature of Mr. Kekwick's presidency. He had done more than many to make the oil and colour chemists into an association. Not only had he visited every section and sub-section in this country at their social gatherings, where his ready and unassuming friendliness had been so much appreciated, but he had made very successful visits to the overseas section.

Dutiable Chemicals

Additions to Key Industry Duty List

THE Board of Trade have made the Safeguarding of Industries (List of Dutiable Goods) (Amendment No. 4) Order, 1953, adding the following 40 chemicals to the list of chemicals liable to Key Industry Duty:—

3-Aminoacetophenone, 1-aminopropan-2-ol, aneurine *mono*nitrate, calcium D-pantothenate, di-*n*-butyltin dilaurate, di*iso*butyltin dilaurate, di-*n*-butyltin maleate, di*iso*-butyltin maleate, di-*n*-butyltin oxide, di*iso*butyltin oxide, di*iso* - propanolamine, di-α-propylene glycol monobutyl ether, di-α-propylene glycol monoethyl ether, di-α-propylene glycol monomethyl ether, di-(tri-*n*-butyltin) oxide, di-(tri*iso*butyltin) oxide, di-(triethyltin) oxide, formamidinesulphinic acid and (-)1-(3′-hydroxyphenyl)-2-methylaminoethanol.

Synthetic mannitol, 3-methylpentyl-3-ol, 3-nitroacetophenone, D-pantothenyl alcohol, 1: 2-propylene glycol 1-butyl ether, 1: 2-propylene glycol 1-ethyl ether, 1: 2-propylene glycol 1-methyl ether, α-propylene oxide and sodium D-pantothenate.

Tetra-*n*-butyltin, tetra*iso*butyltin, tetraethyltin, tri-*n*-butyltin bromide, tri*iso*butyltin bromide, tri-*n*-butyltin chloride, tri*iso*-butyltin chloride, tri-*n*-butyltin hydroxide, tri*iso*butyltin hydroxide, triethyltin bromide, triethytlin chloride and triethyltin hydroxide.

The Order, which came into operation on 8 June, is published as Statutory Instruments 1953, No. 878. Copies may be obtained (price 2d. net, by post 3½d.) direct from H.M. Stationery Office, Kingsway, London, W.C.2, and branches, or through any bookseller.

Fungal Resistance of Boards

A BRITISH Standard entitled 'Methods of Testing the Fungal Resistance of Manufactured Building Materials Made of or Containing Materials of Organic Origin' has been issued with the reference number BS 1982: 1953.

It specifies methods of testing the fungal resistance of fibre building boards, wood chip boards, improved wood, cork slab, woodwool slab, plaster boards, insulating quilts and compressed-straw slabs or other manufactured building materials composed wholly or partly of organic constituents, excluding paint, distemper and other decorative finishes.

The tests are not intended to apply to timber, although this is subject to fungal attack, as it is not a manufactured product but the methods given may be used for testing resistance to decay of 'weatherproof' type exterior plywood; the methods described are not however designed to test the resistance of adhesives used for bonding plywood.

Copies of this standard (price 2s.) may be obtained from the British Standards Institution, 24 Victoria Street, London, S.W.1.

Think Again on Chlorophyll

In a recent poll of 200 advertisement agents, the American *Tide* magazine found that only 6 per cent thought that chlorophyll would be a major advertising sales point for any product next year, and 55 per cent believed that the material would be considerably less important. *Chemical Week* quotes two typical comments: from a man who forecast a decline—'unless manufacturers of chlorophyll do something in the way of research to support the many claims. I look for the product to be seriously discredited within a year. Many scientists of note are challenging right now, as we all know'; and from an optimistic, but cynical spokesman—'Why not? some dopes still believe in Santa Claus.'

German Chemical Finance

Capital Requirements of DM500,000,000 a Year

THE German chemical industry has reached a critical point as far as finance of long-term investments is concerned. Having spent all available funds since the war—and more particularly since the currency reform of 1948—on rehabilitating and modernising existing plant, chemical manufacturers in the German Federal Republic now feel increasing concern at the continuing lack of outside capital to provide new production capacity.

The position is strikingly illustrated by the decision of DEGUSSA, Frankfurt, one of the leading companies, to postpone a projected extension to the administrative buildings at a cost of DM3,100,000 in order to have funds available to enlarge certain factories. Another prominent company, Phrix-Werke AG, Hamburg, reports that a special loan had to be negotiated with a group of banks to overcome the financial stringency caused by selling difficulties last year.

These two instances indicate how narrow are the financial margins on which the West German chemical industry now operates. As outputs and sales expanded, larger sums had to be put into current assets permanently. But when sales fell last year, operational needs for finance did not decline as larger stocks had to be carried. The problem of financing current operations is rendered more difficult by the slow paying habits of home buyers and the inability of commercial banks to provide all the short-term accommodation needed by their clients.

Long Term Investments Needed

More serious, however, is the lack of long-term investment capital, which now occupies the thoughts of the Government and industrial associations to an increasing extent. It was discussed by a German-USA commission in December last.

President Menne, of the Association of the Chemical Industry, recently suggested that several thousand million marks, to be spent at a rate of DM500,000,000 a year, would be needed for chemical investments in the near future.

He said that DM500,000,000 should be provided for the establishment of a petroleum-chemicals industry in the German Federal Republic—an estimate last year put the capital required for this purpose at DM200,000,000—and that DM3-400,000,000 would be needed for extending the fully synthetic-fibres industry. Quite as important as the needs of the younger branches of the chemical industry are the capital requirements for 'technical rationalisation' and normal growth in the older branches.

Export Losses to Blame

It is widely believed in the German chemical industry that lack of capital must be blamed partly for the disproportionately heavy sales losses by German manufacturers in export markets last year. While substantial funds have been allocated to the chemical industry out of ECA and other loan programmes, other German industries have received much larger allotments. By the end of September, 1952, about DM4,500,000,000 had been made available for the whole of the German economy under various loan programmes, but no more than DM210,000,000 was earmarked for chemical projects.[1] This compares with chemical investment projects totalling DM808,000,000 which the Federal Government recognised as deserving official support.

It is now suggested that the chemical industry should be given a substantial proportion of the proceeds of a World Bank loan which the German Government hopes to obtain, but leading chemical manufacturers seem to entertain greater hopes for securing foreign capital by private arrangement, especially with USA interests.

The possibility of attracting foreign capital through a European Chemicals Union analogous to the European Coal and Steel Union has also been mooted. Licence contracts under which USA companies undertake to furnish German firms with finance, as well as 'know how,' have been reported in the Press. It is estimated that a total of DM25,000,000 has been invested by USA interests in the German chemical industry.

To attract more foreign capital, the Government has been asked to bring about a settlement of pre-war debts, ease currency restrictions, conclude double taxation

[1] *Die Chemische Industrie*, p. 1000 (Dec., 1952).

agreements, and promise convertibility of dividends due to foreign shareholders.

Of the ECA allocations for the German chemical industry, about half went into fertiliser factories, chiefly for the production of nitrogen and potash. Of other funds a larger proportion went into plants for the production of basic chemicals, intermediates, plastics and fibres. Apart from the petroleum chemicals and synthetic fibres industries, substantial sums of capital are still needed for modernising the coal-tar distillation industry (especially by installations for continuous processes), for extending the production basis for organic and inorganic chemicals (especially the products of electrolysis), for making new plastics and rubber chemicals in connection with the expected heavy increase in motoring, and for producing some of the newer metals and their compounds.

On the other hand, there is already surplus capacity in some branches of the chemical industry, e.g., in soap and paint manufacture. The needs of the fertiliser industry seem to have been met by now, although the potash producers budget for a steady increase in consumption at an annual rate of five to seven per cent.

Further chemical capacity will be required in the next decade as a result of extensions now under way in the oil refining and coke-oven industries, which are expected to supply growing quantities of by-products for chemical utilisation. Similarly, the demand for chemicals is expected to grow as a result of the establishment in the Federal Republic of plant for the production of certain commodities previously obtained from Soviet-occupied Germany and foreign countries.

The first sulphate wood-pulp factory of the Federal Republic is now being erected at Mannheim, and there are other industrial projects which will call for increased production of chemicals.

Atomic Energy Advance

USA Success in 'Breeding' Process

WIDELY acclaimed as 'a revolutionary advance' in the field of atomic energy, an atom reactor, producing new atomic fuel at least as fast as it is consuming uranium, was announced on 4 June by Mr. Gordon Dean, chairman of the USA Atomic Energy Commisson.

Mr. Dean, who was speaking to members of the Edison Electric Institute, cautioned his hearers not to assume that economic power from atomic energy had arrived, but said the achievement held out the promise of making a civilian atomic power industry even more feasible and attractive in the long range than it had hitherto appeared to be.

Fissionable Plutonium Produced

Describing the process worked out in a special reactor at Arco, Mr. Dean said: 'The reactor is operating in such a way that it is burning up uranium-235, and, in the process, it is changing non-fissionable uranium (U-238) into fissionable plutonium at a rate that is at least equal to the rate at which the uranium-235 is being consumed.

'This brings us to another milestone, but I think, however, that we must take care to see that this encouraging development is kept in its proper perspective.

'It does not mean that overnight we have suddenly obtained all the fissionable material we want or need. It does not mean that uranium can now be regarded as a virtually costless fuel. It is quite possible that the "breeding" principle will not even be incorporated in the first atomic power plants. It may be that some other types (other than a breeder type of power plant reactor) will be more feasible from the economic point of view, at least at first and possibly for some time.

Possible Use of Thorium

'A large-scale "breeder" reactor would be a costly proposition. It would require a very large initial investment of scarce fissionable fuel. But the real significance of "breeding" is that it is now possible for mankind ultimately to utilise all the uranium that can be extracted from the earth's surface in its natural state.

'The proof of success in "breeding" at the Idaho station suggests, in addition, that the other potential atomic fuel, thorium, may also ultimately be utilised. Thorium, however, was not used in this particular experiment, and I do not wish to imply that its susceptibility to "breeding" has been proved.

'In summary, I should like to emphasise that the achievement of "breeding" with uranium is an important event, but it is not one that is likely to cause any immediate, or even imminent, revolutionary change in the economics of atomic-power production.'

British Plastics Exhibition

Many Important Developments in Products & Machinery

THE second British Plastics Exhibition and Convention opened on 8 June at Olympia, London, and remains open until 18 June. Brief speeches of welcome were made on Monday by Mr. C. E. Wallis, managing director of Associated Iliffe Press, and Mr. C. S. Dingley, chairman of the British Plastics Federation, the joint sponsors.

More than 90 firms are represented in the exhibition which occupies 90,000 square feet of the ground floor and gallery of the National Hall. Machinery and manufactured articles are on the ground floor and materials in the gallery.

What particularly attracts the attention is the increase in size, both of the machines themselves and the articles they produce, since the first exhibition in 1951. One stand is devoted solely to the display of particularly large mouldings, and here one may see a glider wing 30 ft. long and weighing 155 lb., with a gross area of 200 sq. ft., and a parabolic radar reflector aerial 14 ft. in diameter, both moulded in one piece from impregnated asbestos; a static water tank, weighing 800 lb., 12 ft. square, and with a capacity of 3,600 gallons, made up of a number of panels moulded in glass-bonded polyester resin (one of the recent developments to be seen in the materials section of the show, which is dealt with in greater detail below); and a two-door car body, designed to fit on a standard Lancia chassis, also in glass-bonded polyester.

Giant Pre-plasticiser

Among the machinery, the giant is surely the SH. 8/10 single-stage, multi-screw pre-plasticiser, made by R. H. Windsor, Ltd. This machine, which is claimed to be the only one of its kind in the world and was kept secret until the opening of the exhibition, incorporates pre-plasticiser and injection moulder as a single unit, thus eliminating bleed-back, and giving easier control of material and completely automatic operation with lower power consumption.

By pre-plasticising the raw material on the same machine, articles three times as large as on a similar unit, separated from the plasticiser, can be produced, at lower cost and of better quality. Articles weighing up to 32 oz. can be made, and the plasticising capacity has been raised from 60 to 140 lb. per hour.

The cycle of operation is as follows: raw material is fed to the rear of a plunger, incorporating two specially designed screws, which is housed in a heated barrel. The screws rotate under hydraulic power, and press the material forward, heating and plasticising it as they do so. At the end of the screw drive it is fully plasticised and is delivered to the injection process under high pressure.

The Injection Phase

The pressure exerted at the front portion of the barrel forces back the screws, gear drive and hydraulic piston against a predetermined pressure; the return movement can be arrested at any point of the stroke. During the injection phase the screws are stationary; the machine is closed and the plasticised material shot into the mould by the hydraulic cylinder, the screws and drive assembly moving forward with the action. When moulding is completed the cycle starts again.

Another giant is the Peco 16/24 oz. injection moulder, on the stand of the Projectile & Engineering Co., Ltd., who are also exhibiting, among other things, the Peco 8/10 oz., which is fitted with a pre-plasticiser, a 2½ in. extruder with a combined portable roller and conveyor take-off, and a mould temperature control unit.

T. H. & J. Daniels Ltd., have on display the first of a range of low-pressure hydraulic moulders for glass-reinforced plastics, with a maximum load of 100 tons, capable of reduction to 10 tons, and with a table size of 4 ft. × 3 ft.

Equipment for the vacuum coating of plastics is on show at two stands. Plants not previously exhibited by Vacuum Industrial Applications Ltd. — which has absorbed the company of British American Research Ltd.—include a fully-automatic twin tank unit, with alternative control panels, one based on time cycle and the other on pressure cycle. W. Edwards & Co. (London) Ltd., display not only a number of coating ovens, but also a wide range of

control and measurement equipment for use with them.

A development of growing interest is the use of electronic heating equipment for the welding of PVC and other thermoplastics. Radio Heaters Ltd., are exhibiting new Radyne 2kW and 5kW press welders incorporating many original features, which they claim to be unequalled anywhere in the world. The generators employed operate at very high frequency, and this, coupled with full surge suppression and a very low HT ripple, reduces the possibility of electrical breakdown between tools.

In the plastics pre-heating field, Radio Heaters show for the first time in Great Britain, a 15 kW pre-heater with an operating frequency of approximately 40 mc/s, and two others of 1½ kW and 5 kW output respectively.

Preheaters and radio-frequency welders are also displayed by Redifon Ltd., who share a stand with their associated company Rediweld Ltd. Fabricated articles of interest on this stand include a range of laboratory ware in polythene and hard PVC: measuring cylinders, spatulas, bottles, drip trays, jugs, churns, etc.

Lacrinoid Products Ltd., have begun a new venture with the blow extrusion of bottles from PVC and polythene, and examples of both kinds, together with completely unplasticised rigid PVC tubing, and shrunk sleevings of PVC for plier handles and condensers, are on show.

Mass Production Articles

The display on the Lorival stand stresses the very wide field of the company's activities in the mass production of articles from the whole range of plastics materials. There is a section dealing with the extrusion and calendering of PVC, and the use of Lorival sheeting for industrial aprons and protective clothing is prominently featured. Several mouldings in Ebonite demonstrate that its characteristics are still superior to those of many newer synthetics for certain chemical and electrical applications.

A range of glass fibre reinforced laminates is exhibited by Ashdowns Ltd., including melamine, phenolic, polyester and silicone mouldings. These last are for high temperature insulation up to 250° or 300° intermittent, and are made in thicknesses up to 1 in.

The main features of the display of the Telegraph Construction and Maintenance Co., Ltd., are Telcothene (polythene) powder, and Telcothene-coated papers. The development of Telcothene in powder form enables it to be applied to metal surfaces by a simple hot-dip process, providing a surface with excellent insulating properties and which is proof against corrosion and mould growth. Telcothene-coated papers have many uses, as a moisture-proof layer in multi-wall sacks, for drum-liners in drums for chemical products, as wrappng medium for food or metal components, etc.

Ministry of Supply Exhibits

The most interesting exhibits, purely from a chemical point of view, are those of the Ministry of Supply, which include several pieces of work in the advanced research or development stage. Sebalkyd resins which have been developed by the Royal Aircraft Establishment, Farnborough, are already at the marketing stage, and have been used in the construction of a famous modern air liner.

The starting resins are mixtures of dihydric acids with a trihydric alcohol, in which some of the OH and COOH groups have been left unlinked, so that the material is a thick syrup. On the addition of a liquid diisocyanate further cross-linking occurs coincident with the evolution of carbon dioxide, and the result is a rigid foamed plastic. By adjustment of the proportion of reactive groups and the viscosity/temperature characteristics of the Sebalkyd, the properties of the foam may be varied.

The foamed plastic finds particular use in the filling of large cavities accessible only by a small hole, or in the filling of accurately defined spaces between skins, as in the manufacture of radomes for aircraft. Three grades are produced: Type A gives a foam of about 8 lb. per cu. ft. density, comparable with high-grade balsam; and type B gives a heavy foam of about 20 lbs. per cu. ft. Both these have good structural strength. Type C is an adhesive composition intended particularly as a primer for type A.

A no-pressure process for the moulding of durestos felts has also been developed at the RAE. These consist of 50 per cent asbestos fibre, and 50 per cent water-soluble phenol-formaldehyde. They are rendered pliable by damping with water and may then be worked to a mould by hand-rolling and

cutting where necessary. An auxiliary resorcinol-formaldehyde resin incorporating a wetting agent is used as the adhesive between the laminations, and enables the shape to be cured at 75° instead of the usual 150°.

Other exhibits of interest on the Ministry of Supply stand are a method of high-speed curing of Durestos felts by the application of an alternating current, the printing and 'potting' of electrical circuits, and the atom 'cooked' plastics described in a recent issue (p. 632).

New and improved stabilisers for PVC are exhibited by A. Boake, Roberts & Co., Ltd. Lead salicylate is a good heat stabiliser and an excellent light stabiliser, and is particularly recommended for such applications as vinyl floor compositions; lead octyl maleate is especially effective as a light stabiliser in concentrations as low as 0.5 per cent, and is available as a dispersion in diethyl phthalate. Of particular value for such uses as wrapping film for food is glycerol 1,2-*iso*-propylidene ether laurate, which is non-toxic and colourless.

Lead and lithium stearate are produced as very finely dispersed creams, which means that less of the substance is necessary in formulation, and consequently clearer films are obtained. Among other new developments in the Abrac list are polyglycol esters for emulsification, specially deodorised phthalates, and reodorants for phthalate films.

Glass Fibre Bonded Polyesters

The use of glass fibre bonded polyesters opens up possibilities of 'back-yard' application of plastics, since no pressure and only the simplest of moulds are required, and the uses of these are exhibited by British Industrial Plastics Ltd., and by British Resin Products Ltd., among others. The polyesters are produced by cross-linking between styrene and an alkyd, which are mixed on the site, together with a peroxide catalyst and an accelerator, and applied as a liquid to the glass fibre in the mould. If required, the resultant resin may be cured by mild heat treatment.

The bonded resins have high impact and tensile strength, and among applications exhibited are dinghies, piping and a lorry-cab door on the stand of BIP, and piping and a large dashboard panel on the BRP stand. The piping may prove of considerable importance in chemical works, since it is highly resistant to chemical attack, even at quite high temperatures, and is much lighter than ceramic or lead.

Another important development demonstrated by British Resin Products is high-impact strength polystyrene. Known as 'Distrene' Toughened (High Impact), this material provides moulders with an injection moulding substance which is many times stronger than ordinary polystyrene, with much less brittleness, and with no tendency to craze in kerosene. It is available so far only in natural fawn-coloured shade and in black.

Colour Almost Unaffected

A similar material, with lower strength, but with the advantage that the colour and finish are almost unaffected, is Lustrex MI, to be seen on the stand of Monsanto Chemicals Ltd. It is available in a wide range of colours. Monsanto also display Lustrex colorant blend, for colouring polystyrene to any desired shade on the moulder's own premises, general grade Lustrex, and a wide range of Aroclors.

Of particular topical interest among the displays of PVC packaging, protective clothing, chemical ware and rigid moulded products exhibited by British Geon Ltd., are examples of the gramophone discs on which the BBC recordings of the Coronation commentaries were made, to be flown to all parts of the world.

Bakelite Ltd., and Warerite Ltd., exhibit a considerable number of Bakelite and Vybak materials, and some recent developments, including shell-moulding resins, polyester resins, rubber-modified alkyd and silicone glass-filled moulding materials.

The main feature of the exhibit of Shell Chemicals Ltd., is the 'Epikote' resins, and their uses as casting resins, laminating resins and PVC stabilisers. Other products include DAP, plasticisers made from Alphanol 79 and Nonanol, and a range of intermediates and solvents.

The inaugural address of the convention was given at 4 p.m. on Monday by the Rt.-Hon. the Earl of Halsbury, F.R.I.C., F.Inst.P., managing director of the National Research Development Corporation, who spoke on 'Reinforced Plastics — Public Invention and the Introduction of RAE Techniques to Industry.' Other papers have been read in symposia on 'Unplasticised PVC,' 'Plastics Material Developments,' 'Reinforced Plastics,' 'Durability and

Performance' and 'Selling to the Public.' On Monday, 15 June, at 2.30 p.m., a paper on 'High-Quality Injection Moulding' is to be read by E. Gaspar, and on Tuesday at 10.15 a.m., D. Radford will speak on 'The Economics of Large Moulding Machines.' Morning and afternoon sessions on Wednesday will be devoted to papers on 'New Uses in Industry.'

Great Britain is an important exporter of plant for the production of plastics materials, and for fabrication. The use of British presses in the USA was remarked on by the industry's productivity team in its recent report. Materials, too, are an important export item: in 1949 some 20,000 tons were sold abroad for over £5,000,000, and by 1951 these figures had risen to 53,000 tons worth £16,330,000. With the fine show put on at Olympia, it is certain that this effort will be maintained and indeed intensified.

New Food Standards

Fluorine Content of Acid Phosphates

THE Minister of Food, Major the Rt. Hon. Gwilym Lloyd-George, M.P., has approved for publication a report, which has been presented to the Food Standards Committee by its Metallic Contamination Sub-Committee, recommending that the undermentioned limits for the fluorine content of acidic phosphates used for food purposes and of foods containing acidic phosphates should replace those contained in the Fluorine in Food Order, 1947:—

	Articles of Food	*Fluorine Content*
(i)	Acidic phosphate	30 p.p.m.
(ii)	Baking powder, including golden raising powder	10 p.p.m.
(iii)	Self-raising flour or any similar mixture (not included in item (ii) above) containing a farinaceous substance and an acidic phosphate	3 p.p.m.

The Sub-Committee point out that the limits placed on the fluorine content of these substances in 1947 were unavoidably high since a part of the acid calcium phosphate used for food purposes at that time was manufactured from rock phosphate with a high natural fluorine content. This is no longer necessary and the Sub-Committee consider that it should be possible with reasonable precautions to keep the fluorine content of acidic phosphate produced from elemental phosphorus within a limit of 30 p.p.m. and of baking powders within a limit of 10 p.p.m.

The limit of 3 p.p.m. proposed for self-raising flour makes allowance for any fluorine which may be contributed by the flour or by *creta* and for the difficulty of ensuring a uniform distribution of *creta* in flour.

Keeping the Irons Steaming

A DISADVANTAGE attached to the use of electric irons which produce steam for steam pressing and other types of ironing in USA households—the necessity of using distilled water in their operation—has been overcome by the introduction of a simple device by the Rohm & Haas Company, Philadelphia. Mineral salts and other compounds in tap water build up deposits within the irons and soon ruin them, while mineral-free water is not always readily available. With the new device, however, tap water introduced at one end passes through a section containing a granular material and flows out the other end freed of all mineral-forming deposits.

The granular material is an intimate mixture of two types of synthetic ion exchange resin supplied by the Rhom & Haas Company under the trade name Amberlite Monobed. The resin granules of one type will exchange anions from a solution; the other exchanges cations. The metal salts in the 'raw' water are ionised in solution, so that both parts of the impurity are removed as the water trickles through the Monobed. In the exchange, the resin releases hydrogen and hydroxyl ions which unite to form water themselves. The mineral salts are held tenaciously by the resin molecules. A built-in indicator shows when the capacity limit of the resin bed has been reached—the colour of the resin changes from blue to yellow—showing that a new supply must be added.

First of its Kind

Claimed to be the first of its kind, a new plant for the production of phenol and acetone from petroleum, through oxidation of cumene, has been opened at Montreal by B.A.-Shawinigan Ltd., a new company owned jointly by Shawinigan Chemicals Ltd. and British American Oil Company Ltd. The plant has an annual capacity of 13,000,000 lb. of phenol, about 8,000,000 lb. of acetone and several by-products.

Flexible Steam-Raising Plant

Electrode Plants Suitable for Works or Laboratory

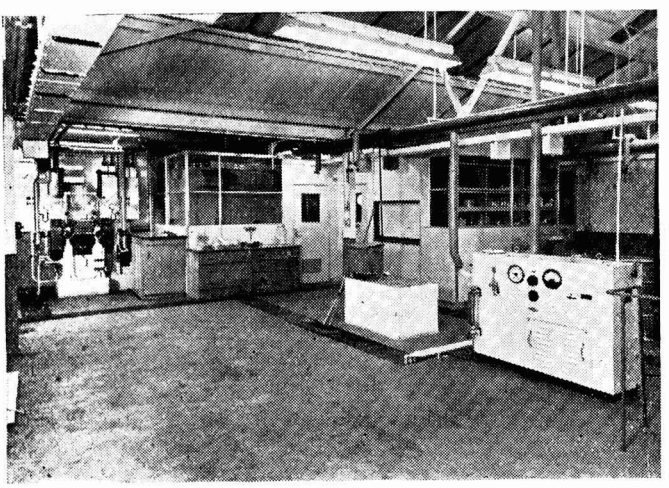
THE scarcity of manpower has enhanced the attractions of steam-raising equipment which is fully automatic and which also requires minimum maintenance. The high cost of coal and the necessity for effective utilisation of the limited supplies available have made it no less important that heating efficiencies of a very high order should be achieved. These requirements are effectively met by electrode steam raisers, which are proving equally suitable for works and laboratory applications.

Electrode steam raisers represent an entirely new approach to the supply of steam. The principle itself is by no means novel, but rapid progress in the methods of application has been achieved in recent years, and performances recorded in commercial operation are far ahead of any results achieved by previous methods. The principle of operation makes it possible to obtain very high efficiencies, since the whole of the electricity used is converted 100 per cent into heat within the water itself, the only losses being by radiation and convection from the boiler shell, which is very carefully lagged. Efficiencies of 98 per cent are consistently being achieved.

G. W. B. Electric Furnaces, Ltd., have developed a standard range of 'Autolec' continuous steam raisers, extending from 30 kW to 1,000 kW on low tension supplies up to 600 volts. Above 1,000 kW the units are usually designed to operate on high tension supplies. The output of the LT units ranges from 100 lb. up to 3,350 lb. of steam per hour.

The design is based on simple principles of regulating water levels and there are no complicated mechanisms or drives for carrying electrodes or insulator shields. Installations of this nature are therefore extremely simple to operate and maintain, and in practice they have proved to be an economical and reliable method of generating steam. One of their principal advantages is that they can be left running without attention, but another valuable gain is the saving in time and labour which results from the absence of fumes, smoke and dust. No foundations are required and there are no heavy supply pipes, flues or chimneys.

Running costs are not heavy because the current is only switched on when steam is required and the automatic control maintains the steam supply in direct proportion to the electrical consumption. When the unit is started up, the pump cuts in and the level in the water-gauge soon begins to rise. As the boiler heats up the resistivity falls and a higher current flow is produced. Based on the current flow is a transformer which operates a relay and causes the pump to cut in and out. As the rating is increased the water level becomes higher and the pump cuts out less frequently. The pressure is



'Autolec' electrode steam raiser at the Fulmer, Bucks., laboratories of the Monsanto Chemical Company Ltd.

controlled by a Budenberg gauge with two special contacts, one being spring loaded and the other fixed. When the needle approaches within about 7 lb. of the set point the motor cannot cut in, so that the level does not rise and therefore the load cannot increase any further. Should the steam requirements at the point of usage be reduced the pressure will rise beyond the set point, but as soon as contact is made with the upper pointer the boiler is blown down by means of a magnetic valve back to the feed tank.

Entirely Automatic

Being entirely automatic, an electrode steam raiser cannot be damaged by careless operation or by incorrect setting of the controls. It is also impossible for the boiler to burn out in the accepted sense through shortage of water, because any absence of water breaks the circuit and no load is taken by the equipment.

Maintenance costs are kept down by low temperature operation, which minimises the wear on all parts and eliminates many of the corrosion troubles and stresses caused by high temperature firing. The life of the electrodes is greatly dependent, of course, on the nature of the water supply.

An advantage which is particularly attractive for laboratory applications is the compactness of electrode steam-raising plants. A typical installation consists of a self-contained unit with feed tank, feed pump, control gear and switchgear totally enclosed in a cream stove-enamelled casing of pleasing appearance and clean design. The overall dimensions are only 4 ft. 10 in. by 1 ft. 4¾ in. by 3 ft. 7 in., and the unit might well be taken for a piece of laboratory equipment. Since little or no local heat is given off, it can be mounted in any convenient position adjacent to the point of use. The complete installation as supplied by the manufacturers requires only power and water connections for immediate use.

An 'Autolec' steam raiser has been installed by Monsanto Chemicals, Ltd., in their laboratories at Fulmer Hall, Bucks, where this company carries out application research and undertakes technical service work on behalf of customers. The bulk of the steam requirements of these laboratories are supplied by an oil-fired boiler, which has an output of 1,000 lb. per hour and operates normally at 100 p.s.i. Provision had also to be made for raising a small quantity of high-pressure steam (up to 250 p.s.i.) for certain purposes, but to install a second oil-fired boiler to supply 100 lb. of steam at 250 p.s.i. would not have been a very economical proposition.

The electrode steam raiser has been in operation for over a year and has proved to be very convenient and adaptable. Besides supplying high pressure steam at very short notice, it is being used to keep a small supply of steam overnight and over week-ends for controlled temperature and humidity rooms. The oil-fired boiler is shut down in the evening and the electrode steam-raiser is then switched on. The unit is set to maintain a pressure of about 100 p.s.i., which is sufficient to keep conditions in the two rooms constant. Since there are often no technicians on the premises overnight, a system which can be kept running without attention for an indefinite period is essential.

The unit can normally reach full operating efficiency in about 20 minutes from cold, whereas it requires about 1¾ hours to raise steam in the main boiler. As a rule the electrode steam raiser is not switched on while the main boiler is in operation, and it tends to smooth out demand to a more constant figure.

Courtaulds 'Courlose'

COURTAULDS Limited are now marketing their sodium carboxymethyl cellulose products under the registered trade mark 'Courlose.' 'Courlose' is being put to an increasingly wide variety of uses. It is used in formulations for industrial and domestic detergents, textile sizes and finishes, emulsion and dispersion stabilisation in the paint and insecticide industries coating, sizing and other processes in the paper industry, and in many other applications for which its special properties are suitable. Purified 'Courlose' is of value for pharmaceutical purposes and the manufacture of foodstuffs.

USA Synthetic Rubber Plants

Legislation authorising the sale of the USA Government's synthetic rubber plants to private industry has been introduced by the chairman of the USA Senate Banking Committee. The Bill 'requires that the Government obtain the full fair value for each facility sold.'

Plans for Nuclear Power Stations

Sir John Hacking's Forecast at Conference

THE forecast that in the near future this country will go ahead with plans to consume natural uranium on a scale which will make a significant contribution to electrical energy supplies of 15-20 years hence was made by Sir John Hacking, M.I.E.E., in his presidential address at the fifth British Electrical Power Convention at Torquay on Tuesday.

Sir John, who is Deputy Chairman (Operations) of the British Electricity Authority, took as his subject 'The Production and Use of Energy in Great Britain.'

He said nations were notorious for their prodigality in disposing of readily available resources and Britain had been no exception. Over the 100 years from 1814 to 1913, direct exports of coal and coke reached the enormous total of 1,700,000,000 tons—sufficient, had it been retained, to provide 40 per cent of our annual requirements, on the present scale, for 20 years.

He did not suggest that the coal should not have been exported; it was on the export of coal that our industrial supremacy was built up. It was only now, because we were unable to raise all the coal we need, that the policy of continued exports of coal might be questioned. Our lavishness in providing for the energy requirements of other countries was matched by an equal prodigality in home use.

Improved Utilisation of Fuel

Dealing with improvements in fuel utilisation, Sir John said we used energy mainly in three forms—light, mechanical power and heat. In producing energy in 1952 we used nearly 207,000,000 tons of coal, and oil and petrol equivalent to about 23,000,000 tons of coal. The overall efficiency with which the energy in coal was converted into light energy was only between 1 per cent and 2 per cent.

Striking improvements had been made in the luminous efficiency of electric lamps, and further improvements were expected. The latest fluorescent lamp had an efficiency of 50 lumens per watt, as against the 3½ lumens per watt of the carbon filament lamp in general domestic use 50 to 75 years ago.

Electricity was supreme in the lighting field. The substantial improvement in efficiency of electric lighting had resulted in fuel economy and had played an important part in increasing industrial output.

Of the estimated 25 to 30 per cent of the national fuel consumption which went towards producing mechanical power, about half was accounted for by transport. In 1951, transport took nearly 15,000,000 tons of coal 2,000,0000 tons as electricity and oil and petrol equivalent to 12,000,000 tons of coal. Oil and petrol were not entirely without competition from electricity in the field of road transport—he referred to the trolley bus and to the electric battery vehicle whose advantages for short-radius delivery were slowly becoming recognised.

Diesel Locomotives

On the railways, replacement of steam by diesel locomotives offered scope for substantial fuel economy—of the order of 9,000,000 tons of coal a year for complete electrification.

The other half of the fuel which produced mechanical power was attributable almost entirely to industry; in 1951 it amounted to 11,000,000 tons of coal, coke and equivalent oil, used directly, and 12,000,000 tons as electricity. Electrification had undoubtedly brought about a major economy in this field by replacing inefficient plant; the fuel efficiency had usually been at least doubled and had led to greater output and better quality of the product.

For lighting and mechanical power, the pattern of development was clear. It was only when they came to heating that they found solid fuels, gas and electricity in strong competition and where it was impossible to dictate in general terms the best fuels for particular purposes.

'This competition,' said Sir John, 'arises from the form of our main source of energy —coal; it would disappear if coal were to be replaced by an abundant new source of energy such as nuclear fission.'

The best prospect of achieving appreciable fuel economy in the domestic heating field was to cut down the heat losses from buildings by adopting proper standards of insulation. In this way it would be possible to

halve the coal required for domestic space heating—now of the order of 30,000,000 tons a year—but this would involve considerable capital expenditure.

Unfortunately, with the present cost of insulating materials, there was little inducement to adopt proper standards of heat insulation even for new buildings.

Sir John estimated that heating in all its forms accounted for about 30-35 per cent of the public consumption of electricity, the remainder being in the unchallengeable fields of lighting and mechanical power and in electrolytic processes.

One of the major causes of the overall industrial improvement had been the large-scale substitution of publicly generated electrical power for less efficient power production—either mechanical or electrical—by industry itself, together with the consistent improvement in efficiency achieved by the electricity supply industry.

In 1924 over half the electrical energy consumed by industry was supplied by private plant. By 1950, when the total requirements of industry had increased four times, the proportion supplied by private plant had fallen to a quarter. One factor which contributed to this trend was the small proportion of total manufacturing costs represented by electrical energy.

The Ridley Committee had expressed the view that by 1961 the inland demand for coal might be some 230,000,000 tons. He estimated that by the end of 50 years the requirement would be 300 tons.

Bridging the Gap

How was the gap in coal production to be bridged? One future possibility was the underground gasification of thin coal seams. If developed satisfactorily this would provide a further source of fuel for electrical generation, using gas turbines, but present indications did not suggest that it was likely to reach significant proportions.

Full development of the known potential hydro-electric resources of Great Britain would produce additional energy equivalent to an annual consumption of 3,000,000 tons of coal. Development of wind power, taking 'a very optimistic view,' would save another 1,000,000 tons of coal. Tidal power also offered possibilities and the Severn Barrage, if constructed, would save about 1,000,000 tons of coal a year.

There remained the nuclear sources of energy. Sir John Cockcroft had indicated that the capital cost of a power station using natural uranium was unlikely to exceed twice that of a conventional steam power station. The fuel cost would depend not only on the initial cost of the uranium, but also on the working life of each charge.

It seemed probable that the fuel cost would be less than that of a coal-fired station, particularly when credit was allowed for the value of the plutonium recovered. At present both capital cost and fuel cost were, to a great extent, speculative, and reliable comparisons would only be possible after practical working experience.

Experimental Plants

'It is clear,' the speaker continued, 'that a stage has been reached at which the building of one, or preferably more, large-scale experimental plants is well justified; and I fully expect that, in the near future, we shall go ahead, in this country, with plans to consume natural uranium on a scale which will make a significant contribution to our electrical energy supplies of 15-20 years hence.'

World reserves of uranium, assuming 100 per cent utilisation, were many times greater than the known reserves of coal and oil. It was possible to convert thorium into the isotype U233, which could be used as a nuclear fuel, and the quantity of thorium was nearly three times as great as that of uranium. There seemed little doubt that, in terms of the next 100 to 200 years, nuclear fission would provide an abundant source of energy, which would be delivered in the form of electricity.

We were faced with an urgent two-fold task; to find ways of eking out our present resources to provide the ever-increasing quantities of energy demanded by the march of civilisation; and, at the same time, to press ahead our nuclear development with all possible speed.

In both those directions success was likely to depend to a large extent on the amount of capital which was made available. He would not attempt to make any clear forecast of how the energy picture would develop during the new reign, as we were now at a stage when important changes might occur in the basic factors to be taken into account.

We were confronted with three major uncertainties. First, everything depended on

solving the country's economic problem of maintaining competition in the export markets so that we could pay for essential imports. Unless we succeeded in this there would be a drastic change in our standard of living and our energy problem would assume smaller proportions or even disappear temporarily.

An important contribution which could be made towards maintaining competitive prices for our exports would be to make better use of our costly manufacturing equipment by a general change from one-shift to two-shift working.

The second uncertainty was as to how the development of the gas industry would be affected by the rising price of coal, the shortage of coal suitable for carbonisation, and the possible total gasification of lower-grade coals. The third uncertainty was the rate at which nuclear power stations would be built.

Reference to the increased use of electricity in the chemical and other industries was made at the conference by Mr. A. O. Johnson, chief commercial officer, North Western Electricity Board, and Mr. C. P. Holder of the Metropolitan-Vickers Electrical Company, Ltd., in a paper entitled 'Electricity Supplies for Industry.'

84 per cent Increase

Compared with 1935, they said, the total consumption of electricity by industry in 1948—the latest year for which statistics are available of electricity generated by industry —had increased by no less than 84 per cent. Some of the major industries had increased their consumption by nearly double that percentage. While the total electricity consumed by industry in 1948 was 84 per cent greater, the electricity privately generated was only 15.6 per cent greater. The overall trend was very markedly to increased proportionate use of public supplies.

Mining and quarrying, which had the highest electricity consumption of any trade group in 1935, had fallen to second position in 1948, and the increase in the consumption of this group, while amounting to the not inconsiderable figure of 1,073,000,000 units, represented a percentage growth of only 37 per cent.

The metals group had the largest quantitive increase and the second largest percentage increase in electricity consumption, and moved up from second to first position. Chemicals, with a 131 per cent increase in consumption, remained in the third position, and the engineering group, with a 130 per cent increase in consumption, moved up from sixth to fourth place.

In the course of a paper entitled 'Industrial Applications of Electricity,' Mr. T. B. Rolls, of a London firm of consulting engineers, said the photo-electric 'pinhole' detector was an example of electrical apparatus which could be used for rejection of inferior material. It was used in the metal-strip industry and also in the paper-making industry for cable-insulating paper.

Detecting Small Holes

The problem of detecting very small holes in strip which was moving rapidly was one of amplification. A row of lamps was arranged over the strip which, in the case of tinplate, might be 3 ft. or 4 ft. wide, and a line of photo-electric cells, or 'magic eyes,' was arranged beneath the strip. The very small amount of light energy passing through a hole 1/100th part of an inch in diameter in the strip travelling at 1,000 ft. per minute was detected by the photo-electric cells.

The signal from these was amplified and used for the rejection of unsaleable material. A signal from the amplifier caused a serrated roller to mark the strip at the point where the pinhole occurred and, later, after the strip was cut into lengths, the off-quality sheets were rejected by the aid of a 'memory' device.

Radio-active isotopes, with the sensitive and complicated electronic gear needed for their detection, had an increasing field in industry. The introduction of small quantities of activiated material, in order to trace what happened in subsequent processes, was the biggest use of radio-active material.

Radio-active gauges were used where mechanical or photo-electric means were not suitable, for example:—

(a) Determining whether packets or containers had been properly filled —e.g., sugar, oil drums.

(b) Determination of levels where plant could not be introduced into the vessels due to high temperature, the need for sealing from the air, corrosive conditions, etc.

(c) Measurement of thickness of moving strips, etc.

The thickness of material was normally measured by putting the radio-active material on one side and the measuring device on the other, but, in some cases, there was an advantage in having both the source and the measuring device on the same side and working by reflection. The different amount of reflection by materials of varying atomic weights could be applied to measure the thickness of coatings such as that on tinplate.

The difficulty of applying radio-active isotopes to industry successfully was not in finding the applications or any lack of fundamental knowledge, but in constructing apparatus which would stand up to heavy industrial use. Firms producing electronic plant would do well to discuss all the designs with engineers experienced in maintenance of electrical plant in industry.

Synthetic Fibres Increase

Effect on Use of Cotton

THE International Cotton Advisory Committee, Washington, in a review of cotton prospects, states that the immediate competition of the newer synthetic fibres must not be over-stressed as they are high in price and are as yet available only in small quantities.

If capacity is fully employed, it is estimated that world output of non-cellulosic man-made fibres, which reached a value of £260,000,000 in 1951, may be valued at £600,000,000 in 1953. Even the latter figure, however, is equivalent to only about one-twentieth of the value of world cotton supplies.

In contrast, rayon, with a world capacity in 1953 equal to about two-fifths of world cotton supplies and competing keenly in price, has advanced without causing any reduction in total world consumption of cotton.

Rayon has now almost completely displaced cotton for tyres in the USA, although tyres were once the most important single outlet for cotton. During the past two years, however, cotton has at least held its own against rayon competition in the clothing and household fields.

In other countries, cotton is also being replaced by rayon for tyres and the trend towards increased use of spun rayon yarns, and cotton and rayon mixtures, continues.

Rayon is also being developed in Australia, China, the Phillipines, Egypt, India, Israel, Cuba, Peru, Uruguay and Venezuela, and seems certain to continue offering serious competition to cotton. The International Cotton Advisory Committee, however, believes that the 'most dynamic of cotton's competitors undoubtedly are the new synthetics.' Apart from the disadvantage of high price, some of the new fibres presented serious technical difficulties to textile manufacturers.

Big Nickel Contract

THE International Nickel Company of Canada has signed a contract with the Defence Materials Procurement Agency whereby the USA Government has agreed to purchase for quick delivery a total of 120,000,000 lb. of metallic nickel and 100,000,000 lb. of electrolytic copper.

Dr. John F. Thompson, chairman of the INCO board, has announced that as a result of the completion of certain mining and metallurgical developments in the Sudbury district of Ontario, increasing current peak nickel production by 2,000,000 lb. a month, it will be possible for deliveries under the contract to be started in December.

The principal development which makes this possible is the completion of extended pilot plant studies of a process for the treatment of nickel-bearing pyrrhotite for the recovery of nickel and iron. This process involves the removal from INCO's ores of a considerable part of the iron content, which can be recovered as marketable iron ore.

Petrochemicals in the USA

A new entry into the field of petroleum chemicals in the USA is the Warren Petroleum Corporation which is to build a plant at its gas terminal on the Houston ship canal. Decision to enter the petrochemical field is said to be due to improvements developed at the company's research laboratory in an oxidation process which will be used to convert either propane or butane, or their mixtures, into methyl alcohol, acetaldehyde, and other petroleum chemicals.

Quickfit & Quartz Extensions

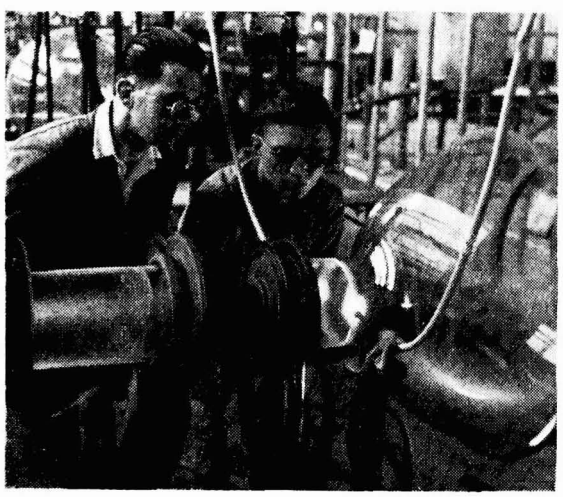
AS we reported in a recent issue (p. 637), considerable extensions have now been completed at the Stone (Staffs) factory of Quickfit & Quartz Limited, and on 26 May representatives of the Press were invited to view the improvements.

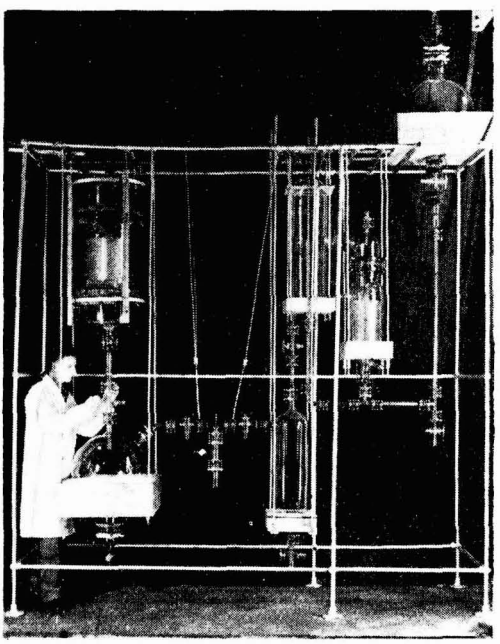
An increase of 25,000 sq. ft. in floor space has meant that much of the factory could be reorganised and units for special work, such as research, development and special fabrication, have been moved to separate premises. In particular, an entirely new unit has been established to undertake the design, specification and complete erection of industrial plant employing glass. This represents a very useful service to chemical engineers who have little experience with glass plant, and the company will test the completed set-up to make sure that the installation is entirely suitable. They are prepared to undertake any commission where their experience in the applications of glass plant, no matter how small a part it plays in the complete specification, could be of advantage.

A new process, and one which may prove of great importance in the fabrication of glass plant, is electric welding. In large-scale construction, such as in the fusion together of piping units up to 18 in. in diameter, heating with the gas-oxygen flame has always been very difficult, since the glass will not readily conduct heat from the outside to the inside, and uniform heating has been almost impossible. The new process depends upon the fact that above a certain temperature, borosilicate glass becomes capable of conducting electricity. The piping to be joined is set up on a lathe and revolved at a steady speed, while the temperature is raised to the required level by gas heating. When the glass is sufficiently hot, a high-voltage arc is struck at the flange of the pipe; the heat resulting from the electric conduction in the glass rapidly raises the temperature to white heat, and another pipe, similarly heated, is readily welded on. The great advantages of this method are that thick-walled material is heated throughout, and that the heating is very local and sets up far less strain in the welded joints. The welds are annealed in a gas-heated muffle.

Developments in progress in the research laboratory include triple stills, pressure regulators, and a complete set of the Norwood Technical College small-scale apparatus for organic preparations.

Below : Electric welding of a neck on a 100-litre flask. Right : An assembled industrial plant





Indian Newsletter

From Our Own Correspondent

THE Government of India has acquired extensive powers of control over substances which can be used for the production of atomic energy. By the Atomic Energy Act of 1948, the Government had the right to control development, production and use only in respect of certain materials. The Atomic Energy Order 1953 gives the Government control over the production and use of many minerals including columbite, samarskite, uraniferous allanite, monazite, uranium bearing tailings left over from ores of extraction of copper or gold, ilmenite, rutile, zircon and beryl. No one can acquire or deal in any material designed for the production of atomic energy without a specific licence from the Government.

* * *

In this connection, it is interesting to note that construction of India's first uranium processing plant (near Bombay) has begun. This was announced recently by the Atomic Energy Commission of India. The plant will treat the 'cake' left over from monazite after extraction of rare earths at Alwaye and uranium bearing concentrates from Bihar and other places in the country. The extracted uranium will be converted into metal for use in experimental atomic reactors.

* * *

On the recommendation of an expert committee, which expressed the view that operations of the Oorgaum Gold Mining Company of India have become uneconomic, the Government has permitted the company to close. The company was first formed in 1880 in England and was registered two years ago as an Indian company. It produced about 3,200 oz. of gold per month, but latterly production has dwindled to about 1,900 oz. per month. Simultaneously, there has been a steep fall in gold prices. As it is impossible to work the mine as a viable unit, the committee recommended that its leases be transferred to the neighbouring Champion Reef Gold Mines (India), Ltd., which may exploit the residuary ore in Oorgaum mine. Other recommendations relate to the absorption of nearly a fourth of the 3,500 employees of the closed mine by the Champion Reef Gold Mines, the payment of compensation and rehabilitation of the unemployed, and the vesting of certain powers in the Government of the State of Mysore.

* * *

While it is the declared aim of the Indian Government to foster private enterprise in the country, a recent measure, the Industries (Development and Regulation) Amendment Bill, passed by both Houses of Parliament, empowers the Government to take over and run industrial concerns for a period of five or more years in exceptional circumstances. Contravention of the provisions of the Bill will entail fine and/or imprisonment. The Government has, however, assured the concerns affected that the provisions of the Bill will be enforced only in extreme cases and that the Government will not interfere with the normal working of industrial concerns. The Minister of Commerce announced recently that a dozen small-scale industries will be selected for intensive development. These include glass-works, steel wire products and instruments.

* * *

The Norwegian Parliament recently voted a grant of 10,000,000 Kroner, on next year's Budget for Norway's Technical Aid Programme in India. This is as a result of a nation-wide appeal for funds for Norwegian aid to India.

* * *

'The application of modern engineering and management techniques for the purposes of raising productivity and earnings by making better use of existing plant equipment and by improving working conditions and human relations,' is the object of the International Labour Organisation Productivity Mission in India, according to its leader, Professor T. U. Mathew. The Mission has been in India for four months and has been highly successful in demonstrating to management and trade union leaders that improvements in productivity can be effected. It is hoped that chemical, metallurgical and engineering industries may benefit from the Productivity Mission's recommendations.

Control of Gas Producers

New Regulating Mechanism is Completely Automatic

THE importance which is nowadays attached to deriving the optimum performance from a gas producer has emphasised the need for applying automatic control to this process. Such automatic control is particularly desirable in producers subjected to considerable load variations, such as those associated with open-hearth furnaces in unit installations, under which circumstances manual control would be unable to avert large fluctuations in the quality of the gas produced. In any type of installation, however, the application of automatic control will result in considerable improvement over the conditions prevailing with average manual control.

A full automatic control scheme applied to a gas producer will regulate the input of the three constituents of the process, namely air, steam and coal. Automatic control of gas offtake pressure and blast saturation temperature regulates the first two of these in their respective control circuits which have been employed in many undertakings as standard producer practice for some time. The advantages which are respectively produced from these circuits are the ability to meet load demands of the associated plant, and the provision of the optimum proportion of steam in the blast.

Automatic Regulation

Automatic regulation of the coal feed with the ultimate aim of attaining a steady gas quality can best be effected by employing the related condition of gas temperature as a criterion of such quality and as the control condition in the control circuit. Although past attempts at control of gas-offtake temperature have met with considerable technical problems, these difficulties have been overcome in joint development work carried out by George Kent Limited and the British Coal Utilisation Research Association; and a complete gas-producer control scheme is now being offered by George Kent Limited.

In this scheme, automatic regulation of the coal feed is carried out by means of a coal-feed regulator, actuated by a combined control signal which is based partly on a measurement of producer load and partly on the deviation of gas offtake temperature from its desired value. In addition, the full scheme includes control circuits providing for the control of gas offtake pressure and blast saturation temperature.

Consistently High Quality

The ultimate advantage of this application of automatic control to the coal feed is that a gas of higher and more consistent quality is obtained than could be produced with manual control. This increase in quality is effected by enabling the producer to be operated with a deeper fuel bed, since the danger of tar deposition in the gas mains due to falls in gas temperature is averted. The advantage of the Kent scheme for the automatic control of gas temperature is said to be that a good control can be obtained which on the one hand does not interfere with the physical and chemical requirements relating to the fuel bed, and which on the other is not itself adversely affected by fuel bed conditions such as the presence of flares.

The complete control scheme as applied to one type of gas producer, equipped with a steam jet-blast injector, is as follows (this scheme may be modified to suit certain other similar types of producers):—

The gas pressure is detected in the gas-offtake duct and is measured by means of a low-range pressure meter containing a two-term pneumatic controller, whose control signal is fed to a diaphragm-operated control valve situated in the steam main to the blast injector.

The temperature of the blast is detected by means of a mercury-in-steel thermometer situated beneath the blast hood, and is measured by a temperature recorder containing a proportional pneumatic controller, whose control signal is fed to a diaphragm-operated control valve situated in the steam by-pass round the blast injector.

The gas temperature is detected by means of a thermocouple situated in the gas-offtake duct, and is measured by a potentiometric temperature recorder containing a three-term pneumatic controller, whose output signal is added to that generated by a load-signal transmitter. The latter is a pneumatic

unit installed in a steam meter which measures the pressure of the steam at the inlet to the blast injector of the producer. The combined control signal is fed through a differentiating relay to a standard Kent power cylinder, which positions the coal-feed regulator, thereby regulating the rate of coal feed to the producer.

Albright & Wilson Ltd.

New Factories in Operation

THE expansion programme of Albright & Wilson Ltd. has been well maintained. In a statement issued in connection with the annual general meeting of the company on 28 May, the chairman, Mr. Kenneth H. Wilson, said the new factory at Barry is already producing silicones and other chemicals; the Kirby plant has just come into operation and the new phosphorus plant at Portishead is scheduled to produce early in 1954.

The following are further extracts from Mr. Wilson's statement:—

The net profit of the group for the year 1952 attributable to the shareholders of Albright & Wilson Ltd., after all charges, including taxation, was £594,653, compared with £859,256 for the previous year.

The year was not a prosperous one for many sections of the chemical industry either in the United Kingdom or in North America. Their subsidiary companies at home and abroad were most affected. Fortunately the turnover of the parent company was fully maintained, and they did not consider the group results as a whole as unsatisfactory for a somewhat difficult year.

The expansion of the firm's manufacturing centres in this country and the corresponding capital outlay had been a recurrent theme in his statements over several years.

Last year he had indicated that they should require further finance to cover these developments and he was now able to announce that they had negotiated a further loan of £1,500,000, subject to the approval of the Capital Issues Committee, on satisfactory terms and conditions.

Such additional finance as might be temporarily required would be provided by the company's bankers with whom they had made suitable arrangements.

The Oldbury Electro Chemical Company, their subsidiary in the USA, experienced some trade recession, and its profits were also reduced by the price 'roll-back' which was imposed by the United States Government as a counter to inflation.

During the year additional capacity for sodium chlorate manufacture was installed at Niagara Falls and the development of a new site in the State of Mississippi had been undertaken, primarily for the production of the same chemical.

The Canadian subsidiary, the Electric Reduction Company, suffered slightly from the recession, and profits were also affected by the strength of the Canadian dollar.

The erection of the phosphorus plant near Montreal had proceeded very rapidly and was expected to be in production during the coming autumn.

Their new research laboratories at Oldbury were now complete and had enabled the firm to enlarge this very necessary section of their activities, on which so much of their future must depend.

Plastics Scholarships

ABOUT eight scholarships, each worth £125 a year for two years, for young people wishing to make a career in the plastics industry, are being made available in September at the Borough Polytechnic, Borough Road, London, S.E.1.

The trustees of the Plastics Industry Education Fund have provided £2,000 for the scholarships, which are offered to young men already employed in the industry or to boys leaving grammar or technical secondary schools. The scholarships will lead to examination for the Plastics Institute diploma, holders of which can later proceed to Institute associateship. In that case deferment from national service may be obtained.

Leading plastics firms have agreed in principle to sponsor one or two students at the end of their first year, with a view to offering them permanent employment when they obtain their diploma.

Applications—from boys who have reached the standard of the General Certificate of Education (ordinary level) in chemistry, physics and mathematics—should be made to the Head of the Chemistry Department at the Borough Polytechnic.

The Chemist's Bookshelf

PETROLE—PROPRIETES & UTILISATIONS. Vol. IV. By M. Moulin. Presses Documentaires, Paris. 1953. Pp. 107.

This is one of a series of books written in French on petroleum. Although it comprises 107 pages, there are only two chapters. The first of these deals briefly with the petroleum industry as a source of raw materials for the production of chemicals. The processes of cracking, dehydrogenation, polymerisation, alkylation, Fischer-Tropsch synthesis, and extraction methods are briefly described. The uses of chemicals from petroleum sources are described briefly in Chapter 2. The industries concerned are those involving the manufacture of solvents, plastics, resins, synthetic rubber, carbon black and detergents.

The text as a whole is not detailed and does not compare with a work such as 'The Petroleum Chemicals Industry' by Goldstein. However, it does provide an admirable basis for the uninitiated French reader who wishes to gain an insight into the petrochemical industry. It is hardly likely that the book would be of much assistance to the English chemist or chemical engineer, apart from its use in illustrating French technical terminology in this particular field. —E.J.C.

ENCYCLOPEDIA OF CHEMICAL REACTIONS. Vol. V. Compiled and edited by C. A. Jacobson, C. A. Hampel and E. C. Weaver. New York: Reinhold Publishing Corporation. London: Chapman & Hall. 1953. Pp. 787. 120s.

A publisher's note at the beginning of this volume draws the reader's attention to the death of Dr. Jacobson, who was the moving spirit in the inception of this work, and was the editor of earlier volumes in the series. It is planned, however, to complete the series rigorously according to Dr. Jacobson's conception, and then, at intervals, to issue supplementary volumes which will contain new reactions and reactions omitted from the main series, as well as any corrections to the main series which may prove necessary.

Earlier volumes have been reviewed in this journal (THE CHEMICAL AGE, **55**, 575; **60**, 165; **62**, 343; **66**, 353) and the plan of those earlier volumes is continued here. The elements covered in the present volume are nickel, niobium, nitrogen, osmium, oxygen, palladium, phosphorus, platinum, potassium, praseodymium, radium, rhenium, rhodium, rubidium and ruthenium. Oxygen, which, with carbon, was expressly excluded originally from the scheme as outlined earlier, occupies only six pages. It is more than confusing to find that niobium which, in its American guise as columbium had 16 pages devoted to it in Vol. III, here as niobium occupies a further three pages without any indication that the two elements are one and the same. Otherwise the other elements appear to be adequately represented according to their chemical importance.

As in previous volumes, the magnitude of the task has given rise to many difficulties, and a number of anomalies are to be found. Thus, V-2157 reads 'Under ordinary conditions potassium iodate reacts with potassium iodide to give iodine and potassium oxide.' It is difficult to decide what 'normal' can signify here if one of the products is potassium oxide. Again, in reaction V-2180, under potassium permanganate, the statement reads: 'Hydrogen peroxide (containing glacial acetic acid) is used to destroy excess potassium permanganate in solution, according to Fendler and Stüber.' The reference given is not to Fendler and Stüber: and the equation quoted shows conversion to potassium maganate, an unusual reaction, but not one that would be envisaged normally from the use of the expression 'destruction of permanganate.'

General consideration of the reactions of potassium permanganate shows a number of points which could be criticised. In the first place, 17 of the reactions with organic

materials are included. Four are concerned with the oxidation of glycerol. The remaining 13 include reactions with such widely diverse materials as formaldehyde and oxalic acid on the one hand, and benzylidene-*o*-methyl-γ-ethoxyquinaldine and benzylidene-*p*-methyl-γ-methoxyquinaldine on the other. In view of the almost unlimited uses of permanganate as an oxidant in organic chemistry, this choice seems completely irrational.

To go further, there is no discernible rule determining which reactions of potassium permanganate are listed under potassium, and which are listed under manganese in Vol IV: nor, indeed, in choosing which reactions will be given in any case. Thus in Vol. IV there are two versions of the reaction between permanganate and hydrogen peroxide, which differ only in giving hydrated manganese dioxide as the end-product in one (IV-1909) and manganese hydroxide in the other (IV-1910). Yet a different reaction is given in the present volume at V-2179. Both volumes include (differing) reactions with concentrated sulphuric acid. The present volume gives two different versions of the behaviour with dilute sulphuric acid.

It is true that proper use of the indexes will at least enable the user to determine that such reactions are listed in separated portions of the completed work. As in the previous volumes, very comprehensive reagent and product indexes are provided. Indeed, in some ways the volume is over-indexed. Although the listing of 153 reactions in which water is a reagent may be of value, since the index gives a guide to the other reactants, it is difficult to see what purpose can be served by listing 817 numbers referring to reactions in which water is a product, with no clue to the type of reaction involved. It would probably be no more time-consuming, if one were concerned to find reactions of this type, to go through the volume page by page.

Since the appearance of Volume II the number of pages per volume has steadily decreased, although the latest decrease is very slight. More regrettably, the price per volume has steadily increased, and this volume is 8s. dearer than its immediate predecessor and dearer by two-thirds than Vol. II. It is to be hoped that the flattening which can be observed in both curves indicates that some degree of stability is being reached, since possessors of the earlier volumes will certainly wish to add this and future volumes to the series.

Finally, it is a trifle unfortunate that the appearance of yet a third form of the publishers' imprint on the spine gives a somewhat untidy appearance to the complete set of volumes.—C.L.W.

STARCH AND ITS DERIVATIVES. Vol. 1. Third Edition. By J. A. Radley. Chapman & Hall, Ltd., London. 1953. Pp. xi + 510. 65s. net.

During the last decade considerable advances have been made in the chemistry of starch, as regards both academic and industrial aspects, with the result that authoritative reviews of the subject written only a few years ago must now be considered to be largely out of date. If full advantage is to be taken of these developments, it is essential that a fresh attempt should be made to collect and correlate data from the almost overwhelming mass of original papers, and for this reason the third edition of Radley's book is particularly welcome.

In his task of rewriting large sections of the book, the author has been assisted by a number of eminent workers (B. Brimhall, G. V. Caesar, E. F. Degering, R. M. Hixon, L. Hough, J. K. N. Jones, S. Peat, T. J. Schoch, and R. L. Whistler), who have reviewed their own specialised fields. This time a greater proportion of the contributors are American, so that it should be possible to gain a better idea of current American processes; for example, a chapter by R. M. Hixon and B. Brimhall is devoted to waxy cereals and starches, which, by virtue of their negligible amylose contents, are now finding many applications in the United States.

The expansion of knowledge in this field has necessitated the division of the work into two volumes, the first of which deals with the structure and reactions of starch and the amylases, while the second will cover the manufacture, industrial applications and analysis of starches. There is an abundance of references, and an extremely useful list of abstracts of some 300 articles, provided by T. J. Schoch. In certain chapters, additional references have been grouped according to their subject matter, thus enhancing the value of the book to those workers who wish to use it as a key to original papers.—E.J.B.

HOME

ICI Ammunition Contract

The headquarters of the USA Army in Europe announced at Heidelburg recently that Imperial Chemical Industries Ltd. has been awarded a contract worth about £640,000 to produce small arms ammunition under the American Army offshore procurement programme.

USA Factory in Scotland ?

With a view to erecting a chemical factory, representatives of a USA concern are reported to have been examining possible sites in Scotland. The Scottish Council (Development and Industry) is said to be co-operating and although sites elsewhere are also being examined the Council hopes that one in Scotland will be chosen.

Seaweed Chemical Research

The annual report of the Institute of Seaweed Research for the past year states that work is going on to assess the value of seaweed chemicals as a starting point for the production of antibiotics and fermentation chemicals, as well as on the isolation and identification of the micro-organisms involved in the decomposition of marine algae. The work is being aided by 25 different centres.

Modern Aspects of Ramsay's Work

How the rare gases discovered by Sir William Ramsay are being applied to more and more practical uses, was the theme of the papers of a special meeting of the Chemical Society held in London on 4 June. Aspects of Sir William's work in relation to work on the atom were discussed by Dr. J. S. Anderson, F.R.S., of the Atomic Energy Research Establishment, Harwell. The part played by the rare gases in current experiments on the sampling of the upper atmosphere during rocket flights was described by Professor F. A. Paneth, of Durham University, and Dr. H. J. Taylor, of the Naval Research Laboratory, Alverstoke, referred to the greater safety made possible in deep-sea diving by the use of helium. An account of the uses of the rare gases in modern lighting was given by Mr. H. G. Jenkins, while how they provide an inert atmosphere for the protection of metals at high temperatures was explained by Dr. L. C. Bannister.

Distillation Plant Opened

A valve to start the second distillation plant at the Sandycroft chemical works of R. Graesser Ltd., was turned on 4 June by Mrs. N. H. Graesser, of Ruabon, wife of the managing director. She opened the first plant at the works in 1935.

Smoke Abatement Council

A proposal to establish a South East Divisional Council of the National Smoke Abatement Society is to be considered at a meeting to be held at the Caxton Hall, Westminster, London, on 26 June at 2.30 p.m. The area concerned includes Bedfordshire, Berkshire, Buckinghamshire, Essex, Hampshire, Hertfordshire, Isle of Wight, Kent, London, Middlesex, Oxfordshire, Surrey and Sussex.

Value of Fuel Research

Speaking as president at the annual meeting of the British Coal Utilisation Research Association in London, Sir Charles Ellis, scientific member of the National Coal Board, said that membership of the association now included over 130 private firms and groups and over four great national industries. They had built a programme of research which touched national life at every point, from steam-raising in industry to heat service in the home. Moreover, this programme now had an intrinsic momentum. Problems were flowing in from industry and ideas and services were flowing out into industry.

Scottish Companies Formed

Two new companies have been formed at Port Dundas, Glasgow, to operate long established interests there. One is Ferguson Shaw and Sons Ltd., of the Imperial Oil Works, Tyndrum Street, Port Dundas, Glasgow, manufacturers, importers and refiners of oils and greases. Capital is £50,000 and the directors are William Shaw, Clifford Fenton and Thomas Yuille. Ivie Hair and Co. Ltd., of 23 Tyndrum Street, an associated company, has a capital of £40,000 in £1 shares and is in business as drysalters, chemists and distributors. Directors are William Shaw and Thomas Yuille.

• OVERSEAS •

Brazil's Uranium Deposits

According to a statement made in New York by Admiral Alvaro Alberto, chairman of the National Research Council of Brazil and head of that country's atomic research bureau, recent surveys have shown that Brazil has some of the richest deposits of uranium and thorium in the world. He added that it was expected that these raw materials could be used to produce cheap power for industrial use within five years.

Canadian Synthetic Latex

A synthetic latex unit is being constructed at Sarnia, Ontario, on behalf of the Dow Chemical Company of Canada Ltd., at a cost understood to exceed $1,000,000. The unit is expected to be in production early next year. The company's new styrene monomer unit at Sarnia is now on stream.

Tricresyl Phosphate in Canada

A new plant in Toronto for the production of tricresyl phosphate is to be constructed by the Dominion Tar and Chemical Company. Tricresyl phosphate is not at present manufactured in Canada.

Peruvian Cement Problem

The rapid industrial development of Peru is causing a greater demand for cement than can be produced by the only factory now working. A new factory is being built at Chilca, where raw materials are plentiful, and a further project is reported to be contemplated at Pacasmayo.

Indian Aluminium Progress

India's aluminium industry is making steady progress in its expansion programme to raise rated capacity for primary ingots from 4,000 tons in 1951 to 20,000 tons by the end of 1956. The Indian Aluminium Company is examining the possibility of setting up a 10,000-ton smelter in the vicinity of the Hirakud project.

USA Titanium Shortage

Because of the worsening shortage of titanium in the USA, the Defence Materials Procurement Agency has made a short-term contract with the Bureau of Mines for delivery of 500,000 lb. of the metal during the next 18 months from the Bureau's experimental plant at Boulder City, Nevada.

European Sulphate Competes in USA

European ammonium sulphate is being imported into the USA on such a scale as to worry domestic sellers. Offers of East German sulphate are reported as low as $43 per ton, while domestic prices are from $33 to $52 per ton, with freight extra. If it can be shown that the sulphate is being marketed in the USA substantially below costs in Europe, the 'antidumping' law may be enforced.

The ACHEMA XI

Exhibitors have already reserved more space at the ACHEMA XI—Chemical Engineering and Equipment Exhibition—to be held at Frankfort-on-Main from 15-22 May next year, than was taken by the whole of the exhibits at the ACHEMA X in 1952. Reservations to date will take approximately 18,500 square metres, as against the previous total of 14,500 square metres.

Japanese Deal with India

A Japanese company—Tokyo Refractories Industry—is reported to have arranged to provide machinery and construction material, worth 30,000,000 yen, to increase the production of magnesia clinker by the Salem Magnesite Company, Salem, Southern India, by 1,000 tons a month. This amount will be exported to Japan on behalf of the big steel concerns at Yawata, Fuji and Japan Steel Tube.

Norwegian Aluminium

Norway's biggest aluminium plant, Årdal and Sunndal Verk, made a gross profit of £1,551,000 last year. After deducting taxes and pension premiums, the entire surplus has been used to write-off capital assets. Production at Årdal, West Norway, last year, was 25,000 tons of raw aluminium and 30,000 tons of pig iron. Of the aluminium 8,280 tons went to the Aluminium Union Ltd. of Canada in payment for oxide supplied by that company.

Penicillin Production in Norway

Production of penicillin, recently started by a Norwegian pharmaceutical firm, is estimated to be sufficient to meet the national annual requirement of about 500,000,000,000 units a year. Hitherto, Norway has had to import pencillin at a cost of about £75,000 a year.

PERSONAL

Recipient of an honorary M.Sc. at the hands of the Princess Royal, Chancellor of Leeds University, recently was MR. JOHN WILKINSON, chief metallurgist and a director of the Yorkshire Copper Works, Ltd., who is a leading authority on the metallurgy of non-ferrous tubes. For nearly 20 years his main responsibility has been the quality of the tubes manufactured by the Yorkshire Copper Works, Ltd. He took a leading part in perfecting the modern condenser tube.

SIR JOHN DOUGLAS COCKCROFT, C.B.E., chairman of the Defence Research Policy Committee, Scientific Adviser to the Minister of Defence and director of the Atomic Energy Research Establishment, who was awarded the K.C.B. in the Coronation Honours List, had the honorary degree of Doctor of Science conferred upon him at Cambridge University last week. Presenting Sir John for his degree, the Orator, Professor W. K. C. Guthrie, said: 'We can congratulate ourselves that in our country the high priest of atomic science is no lover of war, but a man kindly of aspect and of heart, a lover of peace and tranquillity.'

MR. B. H. HOLLAND, M.Sc., of the Department of Coal Gas and Fuel Industries with Metallurgy, Leeds University, has been awarded the Institute of Fuel Students' Medal and Prize for 1952 for a paper on 'The Structure and Stability of Flat Burner Flames.' He graduated B.Sc. at Nottingham University in 1950 and after undertaking research under Professor A. L. Roberts at Leeds University in 1952 was awarded the M.Sc. degree in Fuel Technology. For the past year Mr. Holland has been a research assistant to the Joint Research Committee of the Gas Council and Leeds University.

MR. WILFRED KERSHAW, F.T.I., who received the O.B.E. in the Coronation Honours List for his work as hon. secretary of the Textile Institute from 1944 until this year, is well known in the textile industry. A research chemist and director of the Bleachers' Association, Ltd., Manchester, he has been a member of the Institute since 1922, and became a Fellow in 1927. He has served on the Institute's Council since 1926, and was chairman from 1938 to 1943. Since 1936, he has been a vice-president. He was presented with the Institute Medal (awarded for distinguished services to the textile industry in general and to the Institute in particular) in 1932.

DR. W. B. PEUTHERER, of Scottish Oils, Ltd., Grangemouth, and DR. W. G. REID, manager of Imperial Chemical Industries, Ltd. (Dyestuffs Division), Grangemouth, have been elected vice-presidents of the Grangemouth and District Chamber of Commerce. Among the industries represented by the Chamber are the petroleum, petroleum chemicals, pharmaceutical, chemical, soap, tar and allied chemical industries as well as a wide range of older Grangemouth industries.

MR. A. D. BONHAM-CARTER and MR. J. F. VAN MOORSEL have been appointed members of the board of Unilever Limited and of the board of Unilever N.V.

Mr. Bonham-Carter, who was appointed Head of the Personnel Division of Unilever Limited in August, 1950, joined the company as a management trainee in 1929 and later entered the soap side of the business. He was appointed sales director of Watson and Gossage in 1939 and in September, 1945, became commercial officer of the newly formed Personnel Division, where he remained until July, 1948, when he was appointed chairman of two other Unilever companies, John Knight, Limited, and T. H. Harris & Son, Limited.

Recently Mr. Bonham-Carter was appointed a member of the committee set up by the Department of Scientific and Industrial Research and the Medical Research Council to advise on the study of Human Factors in Industry: he is also a member of the Council of the British Institute of Management, and chairman of its Education Committee. He is a member of the Education Committee of the FBI.

Mr. J. F. van Moorsel (who is a Doctor in Economics) joined a Unilever company in Holland in 1934. He was appointed

chairman of the Dutch Unilever National Management in October, 1945, and in January, 1948, went to Hamburg as chairman of the National Management of the German Unilever organisation. He returned to Holland in May, 1952, and resumed his earlier appointment as chairman of the National Management. He is a member of the board of the Dutch Federation of Employers.

DR. V. E. YARSLEY has accepted an invitation to join the trustees of the Plastics Industry Education Fund, the chairman of which is MR. P. C. ALLEN.

MR. N. K. SMITH (The Murphy Chemical Company, Ltd.), is chairman of the Association of British Insecticide Manufacturers for 1953-54. Other recent elections are: Vice-chairman, MR. M. N. GLADSTONE (Pest Control Ltd.); hon. treasurer, MR. D. J. S. HARTT (May & Baker Ltd.); hon. auditor, MR. A. G. PONTON (Pan Britannica Industries Ltd.); executive committee: DR. J. R. BOOER (F. W. Berk & Company, Ltd.), MR. E. T. BUGGE (Bugges Insecticides Ltd.), MR. J. M. BUTLER (Shell Chemicals Ltd.), MR. D. J. S. HARTT (May & Baker Ltd), MR. F. W. HUCKLE (Shell Chemicals Ltd), MR. F. W. SUGDEN (Plant Protection Ltd.), *Ex-officio* members of the Executive Committee are: DR. E. HOLMES (Plant Protection Ltd.) and MR. H. J. JONES (Hemingway & Company, Ltd.).

Obituary

Dr. George Lewi

It is with regret that we announce that DR. GEORGE LEWI, D.Sc. Chem. Eng. (Prague), M.I.Chem.E., M.Inst.F., of 31 Curzon Street, London, W.1, died in London on 30 May, aged 50. Dr. Lewi was a well-known figure in the chemical and plastics industries throughout the world.

Born in Roudnice, Czechoslovakia, in 1903, he received his technological education at the famous Charles University in Prague, graduating at D.Sc. Chem. Eng. At the early age of 26, he became secretary general of the Federation of Czechoslovak Chemical Industries, in which capacity he attended numerous international trade and technical conferences and gathered many friends throughout the world.

He left Czechoslovakia in 1937, coming to England with the firm of SIGMA who established at Gateshead a factory under the name of Sigmund Pumps Great Britain, Ltd., manufacturing trailer pumps for civil defence and during the war years, anti-aircraft guns. Dr. Lewi was the London manager of this company and was responsible for introducing into their range a series of chemical process pumps.

In 1945, desiring to return to the practice of his own profession, he established a private consulting practice, now bearing the name of George Lewi & Partners. He became a British subject and was a member of several British scientific and professional societies, including the Institution of Chemical Engineers, Institute of Fuel, and the Royal Institution.

Textile Institute Bursary

The Textile Institute has announced that it is offering a bursary, value £450, tenable at the Massachusetts Institute of Technology, for nine months from September of this year until May 1954. The Bursary, offered under the terms of the Frank Wright Memorial Fund, is open to Associates of the Institute of British nationality, and is intended to enable the successful candidate to undertake a broad programme of study and research into problems concerning cotton spinning, doubling and twisting. The latest date for the receipt of applications is 9 July, 1953.

Alleged Pollution

Owners of fishing rights in the River Dee applied to Mr. Justice Danckwerts, in the Chancery Division on 5 June to fix the date of the hearing of an action against John Summers and Co. Ltd., of Hawarden Bridge Steel Works, Shotton, Chester, to restrain the alleged pollution of the estuary of the river. The hearing was fixed for Monday, 13 July. Sir Hartley Shawcross, Q.C. (for defendants) said the defendants, without admitting liability, had taken steps which they believed had completely decontaminated the effluent which had contained a cyanide content. They had not only done that but piped it away from the estuary into the open sea.

Publications & Announcements

THE National Oil Refineries' new plant at Llandarcy, South Wales, which produces premier-grade kerosene by the sulphur dioxide extraction process, is believed to have been the first refinery plant in the world to be controlled electronically, the instrumentation being by the Evershed Electronic Process Controller System. There are 24 Evershed electronic process controllers on the main control panel and in addition there are in the plant 'Rollflow' meters, pressure transmitters and displacer level transmitters which operate indicators and recorders as well as the process controllers. These facts are given in the latest issue of 'Evershed News,' published by Evershed and Vignoles Ltd., Acton Lane Works, Chiswick, London, W.4. Numerous other uses of this company's instruments are also described and illustrated.

* * *

AN ADHESIVE duster is being put on the market by Adhesive Dusters, Dudley, Worcs. The fibres of the duster are impregnated with a non-drying adhesive that leaves the duster non-tacky and easy to use. Dust is collected by the fibres and it is claimed that it will collect efficiently until it is black. Used as a pad, there are 32 surfaces without counting the reverse side and it is claimed by the proprietor (Mr. K. H. Watson) that every square inch can be used. It is intended for general 'dusting' in offices, hospitals, canteens and factories. It is said to be particularly useful in the product finishing field where 'nibs' in the paint film detract from sales appeal. Details regarding prices, etc., can be obtained from the firm, St. John's Street, Kates Hill, Dudley, Worcs.

* * *

AMONG the contents of the latest edition of *Science News*—No. 28—published by Penguin Books, is an article by Paul V. Smith entitled 'The Origin of Petroleum'. This is an extensive abstract of a paper presented at the 1952 annual meeting of the American Association for the Advancement of Science. Subjects dealt with in the 'Research Report' by A. W. Haslett include 'Protein, Nucleic Acid and Enzymes' and 'Microscopy of Fine Particles'. As usual, the book is good value for the 2s. it costs to buy.

GUM content apparatus for motor fuel and kerosene is the subject of Data Sheet No. 2 published by F. J. Hone & Company, 324 Stafford Road, Croydon, Surrey. The equipment illustrated conforms strictly to IP and ASTM specification requirements and enables consistently accurate determinations to be made of the non-volatile material content of either motor fuel or kerosene. The cleanliness, simplicity and ease of adjustment which this apparatus provides are claimed to make it a great improvement over the original glycol baths in laboratories where the demand for this test is increasing.

* * *

COVERING the months of April-June, the latest issue of 'The Welder,' published by Murex Welding Processes Ltd., Waltham Cross, Herts, is a special Coronation number. Distinguished authorities on welding and allied subjects have contributed articles, which, although dealing with a wide variety of subjects, have a definite theme covering problems associated with welding development, research, approval and construction. Written in a simple, concise and practical manner, the articles have the additional merit of presenting information never previously published.

* * *

ONE of the great French authorities on evaporation plant, Dubrunfaut, when considering evaporators for sugars in 1830, gave this definition of an ideal evaporator: — 'Concentrate the juice as rapidly as possible so as to avoid any alteration. Give the liquor to be evaporated great speed, and if possible accelerate the movement of the liquor so as to evaporate in the form of a thin film.' This conception remained one of theory only until 1899, when Paul Kestner, the well-known French physicist and inventor, first patented the Climbing Film Evaporator. Since then a considerable amount of development work on this has been carried out by the Kestner Evaporator & Engineering Co., Ltd., 5 Grosvenor Gardens, London, S.W.1, but the principle remains the same. The various types of the modern Kestner Film Evaporator are described and illustrated in the company's latest publication, Leaflet No. 292.

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible 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.)

GENERAL CHEMICAL & PHARMACEUTICAL CO., LTD., Sudbury (Middx.). (M., 13/6/53.) 6 May, mortgage and charge, to Midland Bank, Ltd., securing all moneys due or to become due to the bank; charged on Judex Works, Harrow Road, Sudbury (Middx.), with machinery, fixtures, etc., also a general charge. *£2,900. 13 August, 1952.

BRITISH OVERSEAS SUPPLY CO. LTD., Oxford, chemists. (M., 6/6/53.) 5 May, charge to Barclays Bank Ltd., securing all moneys due or to become due to the Bank; charged on 6 Lovelace Road, Oxford. Nil. 31 December, 1952.

PEST CONTROL, LTD., Bourn (Cambs). (M., 6/6/53.) 1 May, charge to Temperance Permanent Building Society, securing £3,750 and any other moneys, etc.; charged on Brantwych, Melbourn (Cambs). £633,527. 9 June, 1952.

CHAS. H. WINDSCHUEGL, LTD., London, E.C., chemical merchants. (M., 30/5/53.) 20 April, debenture to Swiss Bank Corporation, securing all moneys due or to become due to the Bank from the company, Amber Chemical Co. Ltd., Amber Pharmaceuticals Ltd., Verpine Co. Ltd., Vialit Co. Ltd., and R. T. Burley Ltd.; general charge. Nil. 18 June, 1952.

LAPORTE CHEMICALS, LTD., London, W. (M., 30/5/53.) 20 April, supplemental deed for securing £2,500,000 debenture stock of Laporte Industries Ltd., secured by a Trust Deed dated 11 March, 1953; general charge.

PHOTO-CHEMICAL CO. LTD., London, W. (M., 30/5/53.) 24 April, £3,145 debenture to Associated British Pathe Ltd.; general charge. £13,000. 30 October, 1952.

Satisfactions

BRITISH CELANESE, LTD., London, W. (M., 13/6/53.) Satisfaction, 7 May of Trust Deed registered 2 October, 1943, and supplemental deed registered 2 October, 1943, to the extent of £4,000.

CLAY & SON, LTD., London, E., fertiliser manufacturers, etc. (M., 13/6/53.) Satisfactions 12 May of mortgage and a charge registered 11 March, 1944, of assignment registered 20 April, and letter of irrevocable authority registered 12 July, 1950.

Increases of Capital

The following increases of capital have been announced: PHOTO-CHEMICAL CO., LTD., from £100 to £200; BRITISH CHROME & CHEMICALS LTD., from £350,000 to £1,200,000; C. J. SCHOFIELD LTD., from £50,000 to £100,000; UPJOHN OF ENGLAND LTD., from £100 to £35,000; WALLACE MANUFACTURING CO. LTD., from £1,000 to £1,250; HOWARD LLOYD & CO. LTD., from £5,000 to £77,600; H. RUDEBECK & CO. LTD., from £5,000 to £15,000.

New Registrations

F.S.D. Ltd.

Private company. (520,290). Capital £100. Research into the use of the wind as means for the production and storing of energy, power, fuel, chemicals and other by-products, chemical and general engineers, etc. Directors: A. MacIntosh, S. C. Joseph, W. Moore, and W. K. Wasdell. Solicitors: Godfrey and Diggines, 44 Waterloo Street, Birmingham, 2.

Company News

The Fullers' Earth Union Ltd.

The board of The Fullers' Earth Union Ltd. are recommending a final ordinary dividend of 10½ per cent for the year ended 31 March last. With the interim dividend of 2 per cent, this makes a total of 12½ per cent for the year, an increase of 1¼ per cent. After charging tax of £114,453, net profits were £83,881, compared with £56,245 last year.

[continued on page 912

Company News

Brotherton & Co. Ltd.

A policy of improvement, development and expansion was outlined by Mr. Bertram L. Ratcliffe, the chairman, in his statement at the fourth annual general meeting of Brotherton & Co. Ltd., held in Leeds on 29 May. A site has recently been acquired in Cheshire, conveniently situated in relation to the Bromborough works and the industrial area of North-West England, where laboratories are to be built to follow up the work of the central research station in Leeds and to develop existing and new products. Erection is to be begun shortly of a large and improved liquid sulphur dioxide plant at Bromborough to meet increasing demand, and further plant to provide more efficient production of sulphuric acid and sulphate of ammonia is about to be installed. Such a programme was costly both in time and money, but the long-term results would prove its value. Currency difficulties and increased competition had been experienced during the period under review, and no return to easier trading conditions seemed likely for some time. Confidence in the future prospects of the company had, however, enabled the directors to recommend a dividend the same as the previous year.

Coalite & Chemical Products Ltd.

Trading surplus for the year ended 31 March, 1953, of Coalite & Chemical Products Ltd., after depreciation and debenture interest fell to £356,832 compared with £604,089 in the previous year. Net profit of the group totalled £152,827 as against £265,552. A final dividend of 5 per cent is recommended making 8 per cent for the year (same).

Thomas Hedley & Co. Ltd.

The annual report of Thomas Hedley & Company Ltd. shows a sharp fall in profits for the year to 30 June, 1952—£287,773 (after charging depreciation but before tax), as against £1,703,961 for the previous year. Commenting on this, a spokesman for the company said the reduction in profit was mainly due to a deliberate decision to spend heavily on the development of the company's business during a period of great activity and change in the industry. Results were also affected by the abnormally high cost of some materials—costs not fully passed on to the consumer. Events had since justified the view that the successful manufacture and marketing in Great Britain of the new household detergents would make a major contribution to the company's strength.

Market Reports

LONDON.—During the past week a fairly steady trade has been passing in most sections of the industrial chemicals market, and delivery of specifications against contracts have covered good quantities. There has been no pronounced trend in demand, nor have there been any outstanding price changes, although the new prices of zinc oxide, received too late for last week's report, are £9 a ton cheaper as from 1 June. Business in the coal tar products is quiet, but the demand for creosote oil and for the xylols and toluols remains fairly active.

MANCHESTER.—The Manchester chemical market during the past week has been livelier than in either of the previous two weeks and trading conditions are now pretty well back to where they were before the Whitsuntide and Coronation breaks. Home users are taking steady deliveries of caustic soda, soda ash, and most other soda compounds, though in some cases there is room for improvement on the export side. There is a fair call for supplies of the ammonia and magnesia products, with a reasonably steady business passing in a wide range of miscellaneous chemicals, including borax, peroxide of hydrogen, alum and sulphate of alumina. In the fertiliser section, there is a fair demand still for top-dressing materials, but otherwise trade is now on seasonally quiet lines.

GLASGOW.—Trading on the whole during the course of the past week has been somewhat quiet due mainly to the coronation celebrations and prices have remained firm, both in the home and export markets.

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.

CHEMISTRY GRADUATE required for laboratory of large Chrome Mine in Southern Rhodesia. Salary according to experience. Cost-of-living allowance. Passage paid. Further details at interview. Write Box **"D.P." c/o J. W. VICKERS & CO., LTD., 7-8, GREAT WINCHESTER STREET, LONDON, E.C.2.** Engagement subject to Ministry of Labour permission.

CHEMIST required by **MINISTRY OF SUPPLY ESTABLISHMENT, ALDERMASTON,** Berks, to develop and supervise a unit engaged on quantitative analysis of organic compounds by microcombustion techniques. Qualifications: Minimum of Higher School Certificate (Science) or equivalent, but degree or H.N.C. in Chemistry may be an advantage. Experience relevant to duties essential, experience in organic spectroscopic analysis desirable. Salary within range, Experimental Officer (min. age 26), £649-£799. Women somewhat less. Post unestablished. Application forms from **M.L.N.S., TECHNICAL AND SCIENTIFIC REGISTER (K), 26, KING STREET, LONDON, S.W.1,** quoting F.252/53A, closing date, July 11th, 1953.

FOR SALE

MORTON, SON AND WARD LIMITED
offer
MIXERS

ALL types of **MIXERS** made to requirements—Horizontal, or Vertical, Jacketed or Unjacketed.
"MORWARD" "U"-SHAPED TROUGH MIXERS, in any size up to 3 tons.
TROUGH MIXER by **CHALMERS,** 3 cwt., stainless steel tilting trough; motorised.
TWO **TROUGH MIXERS** by **GARDNER,** 3 cwt., stainless steel lined troughs; one motorised; one fast and loose pulley.
ONE 350g. Homogeneous Lead-lined **JACKETED PAN** with lead-lined anchor-type stirring gear. Arranged fast and loose pulley drive.
ONE **CHANGE PAN MIXING UNIT** with stainless steel agitators; fast and loose pulley.

HYDRO EXTRACTORS

72 in., 60 in., 48 in. and 36 in., by **BROADBENT**; 48 in. and 42 in. by **WATSON LAIDLAW**; and 42 in. by **MANLOVE ALLIOTT.** All electric, 400/3/50, with starters.

LEAD-LINED VESSELS

TWO 100g. and one 75g. totally enclosed, cylindrical. As new.

PUMPS

A large selection of **MONO** and other **PUMPS** in stock, 2 in. to 6 in.—new and second-hand.

INQUIRIES INVITED
MORTON, SON AND WARD LIMITED
WALK MILL,
DOBCROSS, NR. OLDHAM,
LANCS.
'Phone: Saddleworth 437.

FOR SALE

CHARCOAL, ANIMAL AND VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "INVICTA" MILLS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON," TELEPHONE 3285 EAST.

ECONOMIC BOILERS—9 ft. diam. by 12 ft. 6 in. Foster Yates, 200 lb. w.p.; 8 ft. diam. by 14 ft. Paxman, 180 lb. w.p. Twenty others, all sizes.
NEW GALVANISED PIPING. Immediate delivery. Johnson Filter **PRESSES,** 25 in., 18 Frame, practically new.
FIVE new **FURNACE RETORTS,** 8 ft. diam., 6 ft. 8 in. deep, approx. 8 tons each. Welded Steel.
FIVE Dish-ended **NAPHTHA TANKS,** 18 ft. 6 in. long by 4 ft. 4 in. diam., two having agitators.
TWO 35 ft. long by 9 ft. diam. Lead-lined **TANKS.** Stainless Steel **FILTER TANK,** 3 ft. 6 in. diam.
ONE Stainless **CONICAL HOPPER,** 7 ft. 3 in. diam., overall depth, 7 ft. 6 in.
TWO Broadbent **WATER-DRIVEN CENTRIFUGES,** 30 in. diam., 12 in. deep, 1,150 r.p.m., 150 lb. pressure.
FOUR Papier-mache **O.T. TANKS,** 8 ft. 3 in. diam., 9 ft. deep. (Unused.)
SIX O.T. TANKS, 7 ft. diam. 14ft. deep, lined inside with acid-resisting bricks.
SIX Aluminium **CONDENSERS,** 14 ft. long by 2 ft. 6 in. diam. 386 Tubes, ¾ in. o.d.
ONE Rectangular Lead-lined **TANK,** 8 ft. by 4 ft. 6 in. by 2 ft. 6 in.
FORTY Riveted **RECEIVERS,** 8 ft. 6 in. long, 5 ft. 6 in. diam., 75 lbs. w.p.
CAST-IRON PIPES, 5000 ft. Each 6 in. and 8 in. **NEW VALVES** in Stainless, Gunmetal, Enamel Lined.
Free Catalogue, "Watkins Machinery Record," available
FRED WATKINS, COLEFORD, GLOS.

FOR sale, Brand New **PETROL-ENGINE** Driven Pumping Sets, comprising Continental (U.S.A.) Model M330 38.4 h.p. engine driving through link belt; (U.S.A.) Model S-10 double helical speed reducer, 1,500-215.8 r.p.m.; a National Transit (U.S.A.) 500 Model F positive pump, 8 in. suction, 6 in. discharge, delivering 270 g.p.m. of liquid having sp. gr. = 1 to 360 g.p.m. of liquid (petroleum) having sp. gr. = 0.75 against 70 lb. p.s.i. pressure. Mounted on skid bedplate containing fuel tank. Packed in export case 14 ft. 6 in. by 6 ft. 9 in. by 5 ft. Eight sets available at much less than half original cost.
W. H. COLLINGBOURNE & CO., LTD.,
1481, STRATFORD ROAD, BIRMINGHAM, 28.
'Phone: Shirley 3303.

ROTATING PAN MIXER by **ARTOFEX.** Two **PANS,** 47 in. diam. by 22 in. deep; 2-sack capacity. Human arm type blades. Fast and loose pulley drive. £100 ex-works.
One Ditto by **T. COLLINS, BRISTOL.** Two **PANS,** 47 in. diam. by 24 in. deep; 2-sack capacity, with automatic feed. Chain drive to 5 h.p. motor. £85 ex-works.
THOMPSON & SON (MILLWALL), LIMITED,
CUBA STREET, LONDON, E.14.
TEL. EAST 1844.

ZIMMER RECIPROCATING CONVEYORS. Open or Closed **TROUGHS** for fine or coarse chemicals, etc. **CONVEYS, SIEVES AND GRADES.** Silent running; little or no maintenance; low priced; quick deliveries. **"Z" EQUIPMENT CO., POYLE ESTATE, COLNBROOK, BUCKS.** ('Phone 279.)

FOR SALE

3 **JACKETED INCORPORATORS,** double " Z " arms, double geared, power-driven tipping motion, with counterbalancing weights.

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

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

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

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

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

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

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

1—Johnson **FILTER PRESS,** 42 cast-iron plates, 32 in. square, centre feed.

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

1—Johnson **FILTER PRESS,** 46 plates, 32 in. square, centre feed, bottom corner open delivery.

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

1—24 in. and 1—30 in. **HYDRO EXTRACTOR,** self-balancing, swan-neck type, self-emptying bottom, belt driven.

1—30 in. and 2—36 in. Ditto with enclosed motors, 400 volts, 3-phase, 50 cycles.

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

5—sets A.A. **CRUSHING ROLLS** for linseed, cottonseed, etc., 48 in. long, belt driven, with feed hopper, side frames, baseplate and striking gear.

Bennett Copper-built **EVAPORATOR,** 4 ft. diam. by 4 ft. 6 in. high, steam-jacketed bottom, mounted on legs, with swan-neck vapour pipe and separate vertical belt-driven vacuum pump.

Douglas **ROTARY PUMP** for oil, soap, etc., belt driven.

6—various Horizontal Duplex **STEAM PUMPS,** Worthington and Tangye pattern, 1 in. to 2¼ in. suction and delivery.

" U "-shaped Horizontal **MIXER,** 7 ft. long, 3 ft. wide, 3 ft. 3 in. deep, belt and gear driven, end outlet, square horizontal centre shaft with cast radial type mixing arms, last used for linoleum paste.

4—5-roll **REFINERS,** fitted chilled iron, water-cooled rolls, 40 in. long, 16 in. diam., belt and gear driven with clutch drive suitable for motor, by Baker Perkins, Ltd.

No. 2HS Hammamac **HAMMER MILL,** No. 1 size, Standard Miracle Mill, No. 2 size Standard Miracle Mill and a No. 3 Super Miracle Mill, with fans, piping and cyclones.

7 ft. Torrance Positive-driven **EDGE RUNNER,** 2 vertical Paint Pug Mills, 2-bar Disc Paint Grinding Mills, and 2 Horizontal 40-gallon capacity Cox Pug Mills for paint.

1—No. 1A Water-cooled **CIRCULATOR MILL.**

2—4½ Christy & Norris **DISINTEGRATORS** with 60 h.p. A.C. motors and starters.

RICHARD SIZER, LTD.,
ENGINEERS,
HULL.
Telephone : 31743.

FOR SALE

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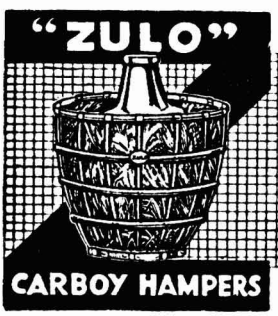

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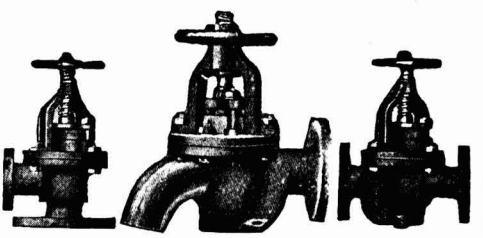

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