THE Chemical Age

VOL. LXX 27 MARCH 1954 No. 1811

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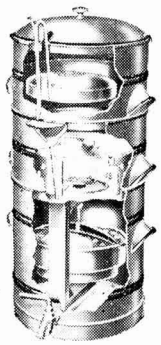

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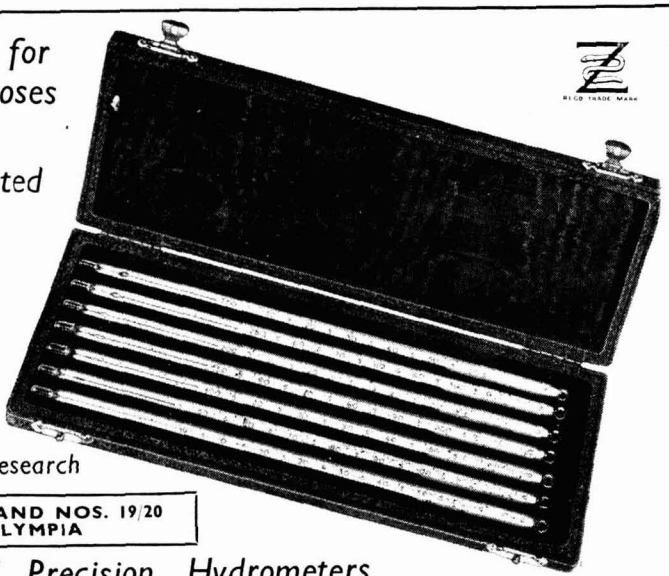

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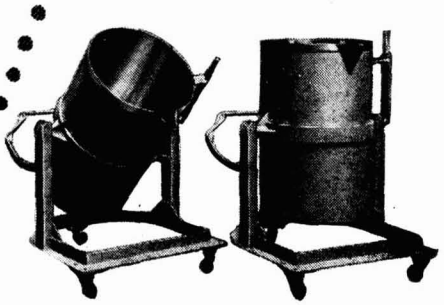

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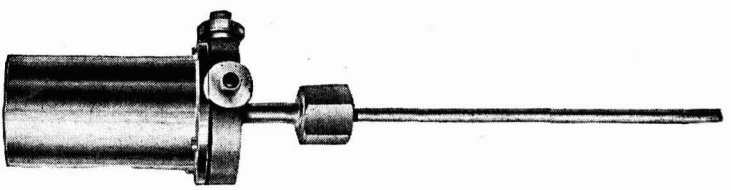

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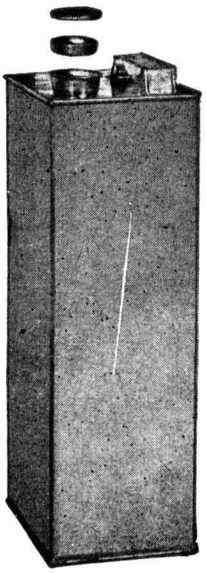

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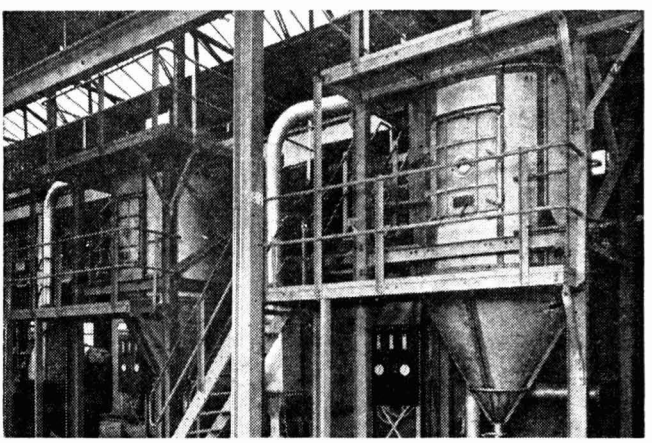

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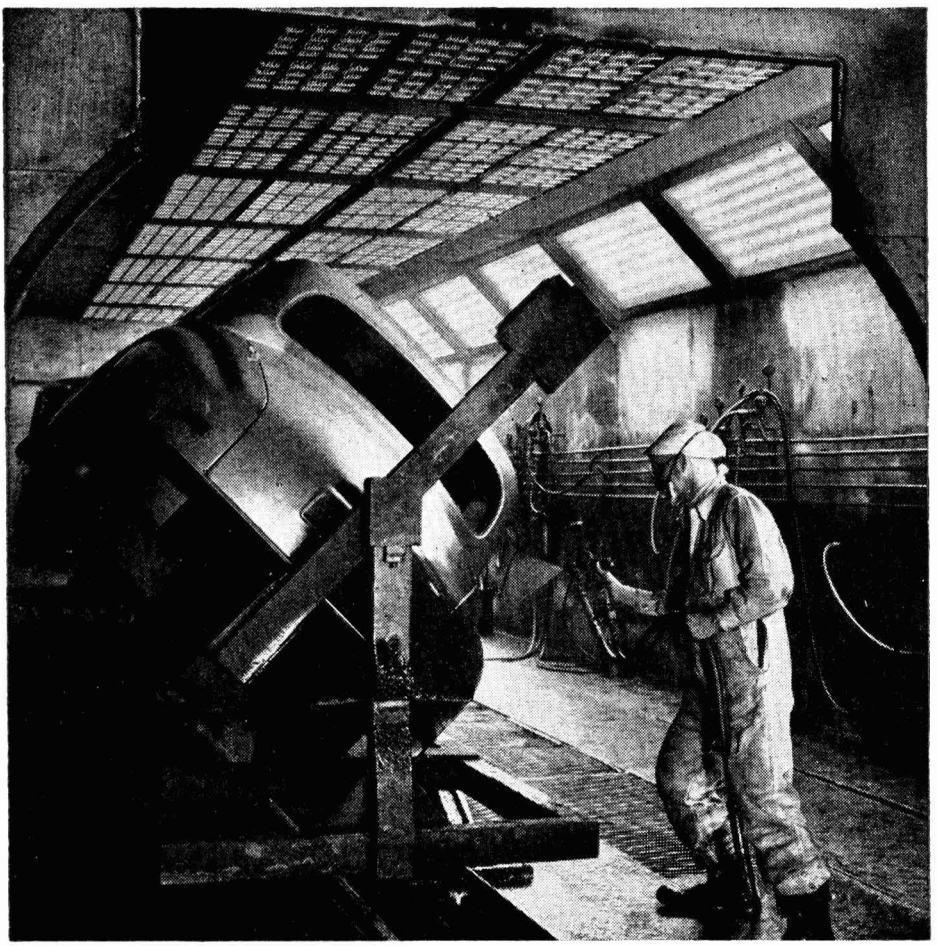

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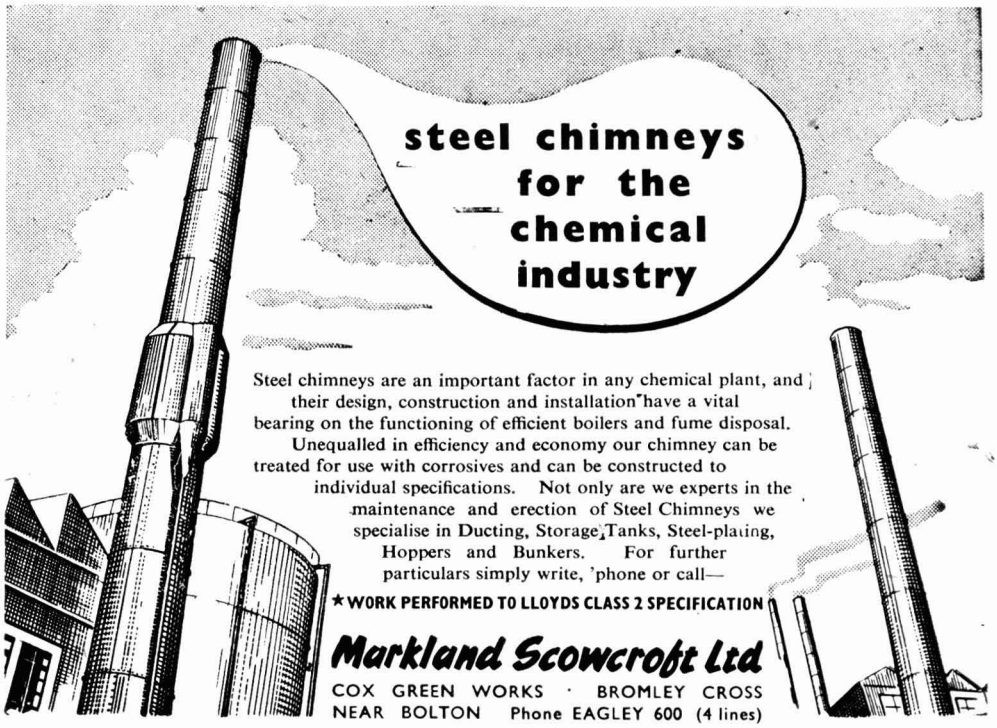

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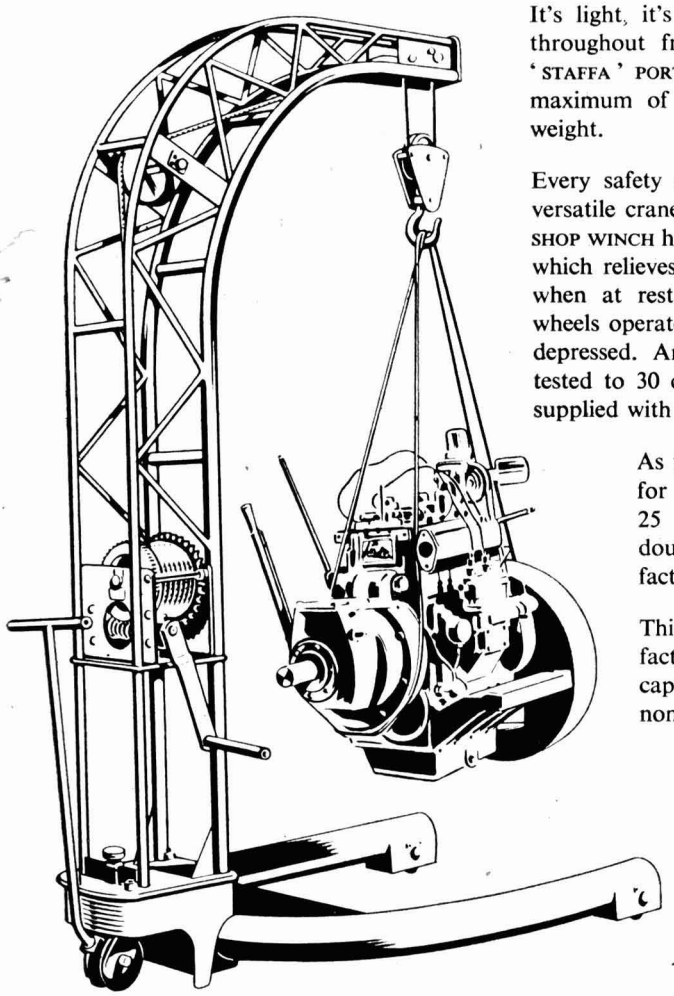

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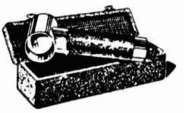
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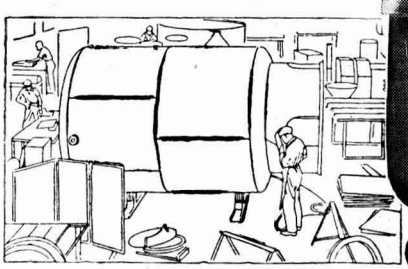

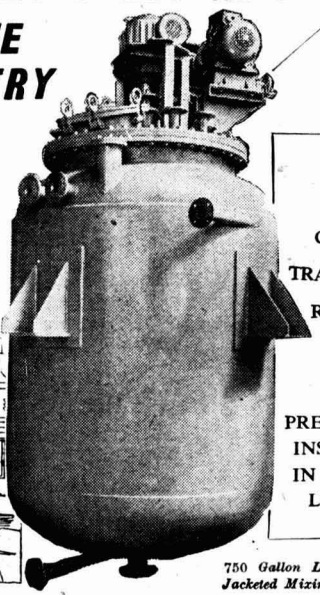

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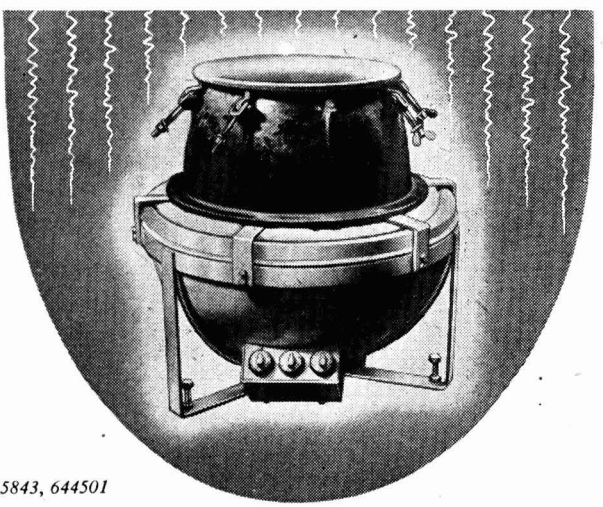

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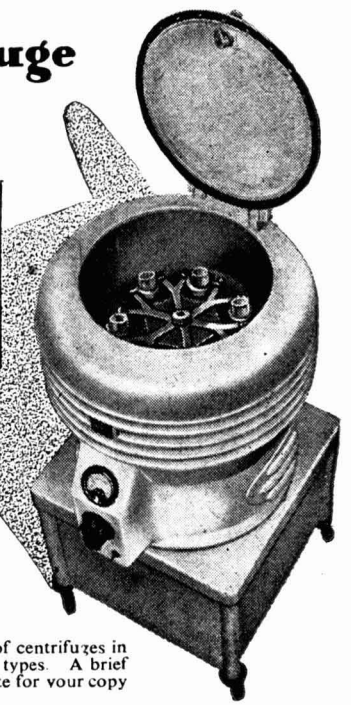

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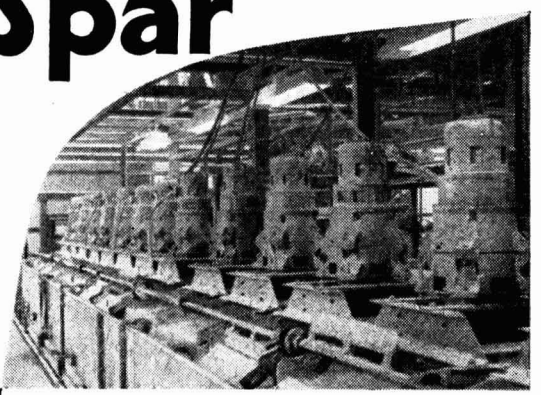

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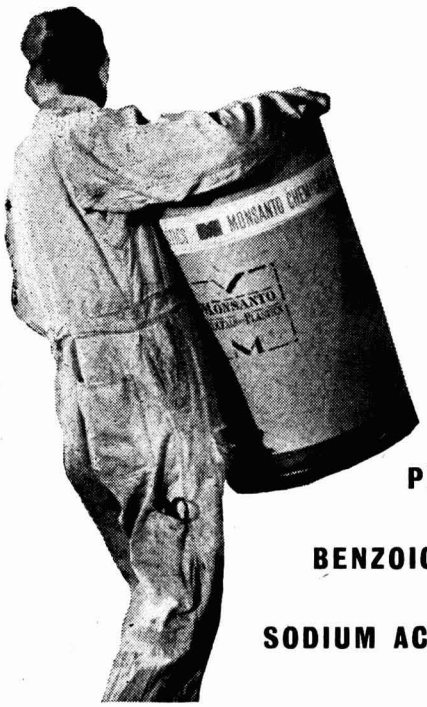

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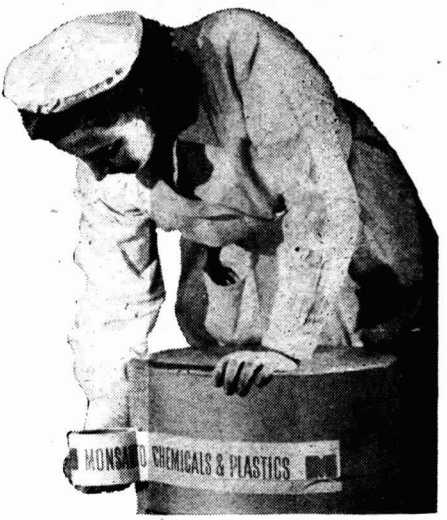

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Number 1811

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Established 1919

The Weekly Journal of Chemical Engineering and Industrial Chemistry

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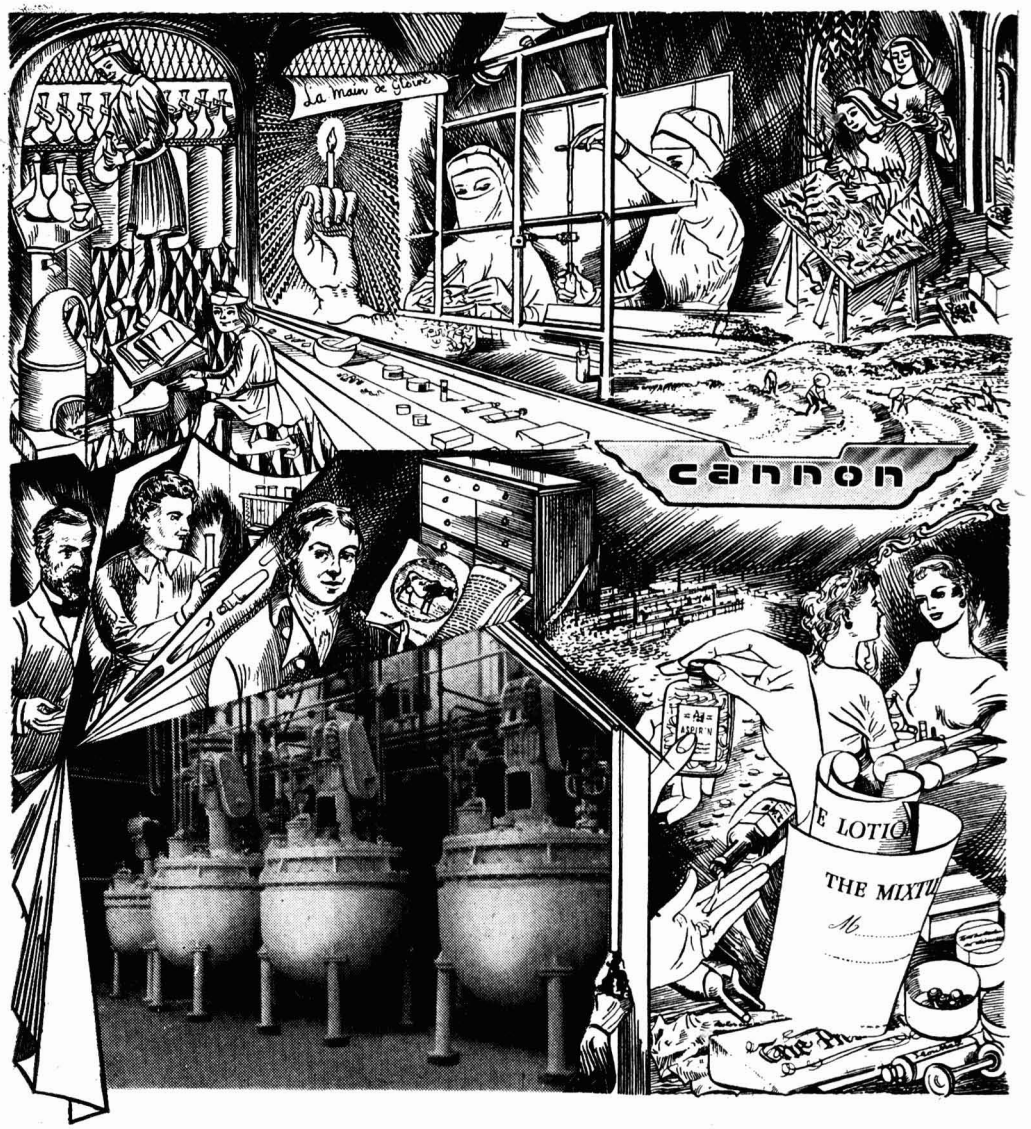

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A Return to Sense

THE latest Report from the DSIR—for 1952/3 (HMSO, 8s. net)—is a happier document than the Report we discussed almost exactly 12 months ago (see THE CHEMICAL AGE, 1953, **68**, 509). Then we were conscientiously obliged to attack the folly of including this great state-funded organisation in the governmental economy parade. When the greater application of science to industry and productivity is so obviously a major economic lifeline for the country, the reduction of DSIR staff, the freezing of plans for building expansion, and a general tendency to curtail funds, are indeed false economies. It was greatly to the credit of the DSIR Advisory Council that its separate report then was openly critical. It may be that rising pressure of criticism forced the DSIR issue into a higher level of political judgment. Whether or not this suspicion is correct, the fact remains that the policy of economy has now been discarded and the original post-war policy of expansion and encouragement has been revived. It is indeed a welcome return to sense.

'We do not wish to recapitulate the unhappy past—that is on record in our Reports . . . .' In those words the Advisory Council tactfully acknowledges the changed policy. There is certainly no virtue in recrimination, but there is virtue in learning from experience. At least three years of badly-needed and long-promised progress have been lost for the DSIR by petty economy, and lost at a time when no national investment can be more valuable than investment in science and technology. The annual cost of running the DSIR is about £5,000,000. Set against the total income of this country it is a very small figure and it may readily be argued that even twice this annual expenditure would not be profligate. Total economy, i.e., the disbanding of the DSIR and the reduction of the figure of £5,000,000 to nil, would make about as much difference to the national economy as the finding of a sixpence in the gutter would affect a millionaire's economy. What possible effect can be achieved by marginal economies on that £5,000,000?

Even now it is only proposed that in the five years from 1 April, 1954, the DSIR cost should be allowed to rise to 'rather more than £6,000,000,' and that about £6,000,000 should also be spent upon new building. The DSIR has long proved itself to be a profitable investment of public money. The national value of its many achievements is impossible to assess fully, but even the most grudging estimate far exceeds all that the DSIR has ever cost. To provide a 20 per cent rise in funds over five years and to permit further building (after many years of non-expansion and congestion) to the capital equivalent of one year's income is not a particularly bold recognition of success.

These proposals are only presumptive at present. They require first of all the sanction of the House of Commons and, assuming this, they will during the five-year period remain 'subject to reservations related to the national economy as a whole.' We can perhaps discount these qualifications as things that must be said in official reports, as possibilities that will not in practice arise; but the pessimist or cynic may not feel quite as certain that folly cannot return. 'The national economy as a whole' is a phrase of most unfortunate choice. It implies that the DSIR must again make its *pro rata* contribution of economy if another crisis turns up. To the extent that this implication is a true one, the lesson of the past has not been learnt

at all. Does the invalid economise on medical treatment, good food, etc., at times of recurrent ill-health?

There is plenty of evidence in the Report that not even the spending of another £1,000,000 per annum will enable the DSIR to meet all the demands that are made upon it. For example, the first permanent housing of the Water Pollution Research Laboratory will be achieved later this year. Since the initiation of this section in 1927 the problems of water pollution have increased enormously, and the current Report states that the condition of the Thames estuary is causing anxiety. The Thames both as a source of water and a channel of navigation to London is a national property of inestimable capital value and 'measures for improving its condition cannot but be costly and have far-reaching effects.' It follows that ample and flexible resources must be devoted to the research that will make such measures possible and effective. No user of the roads is unaware of the enormous sum that this country must for many years ahead spend upon these basic means of communication. The sum recently allocated for future expenditure upon roads has been widely attacked for its inadequacy, and a Government Committee has called for the expansion of the Road Research Laboratory's work as 'the one way in which any significant reduction in roads expenditure could be made.' The DSIR has promised to respond to this call to 'the best of our ability' but has pointed out, very appropriately, that the claims of many other DSIR activities must be kept in mind. In its financial aspects alone the problem of the roads has outgrown the facilities of a DSIR department funded by a share of the general DSIR grant. There is today a case for the separate funding of these specialised sections whose work has such a great and direct bearing upon national expenditure. The Road Research Laboratory should still remain a branch of the DSIR but should be maintained by the income from road-users' taxation.

A new section of the DSIR is the Intelligence and Information Division. Its principal function is to improve the liaison between the DSIR and the rest of the community. The speedier utilisation of scientific knowledge is more important than its actual provision and accumulation, but it is no simple problem to bring together the appropriate pieces of the jigsaw. Keeping industry and the DSIR in close touch—a two-way, not a one-way operation—is a major task, and a sound though somewhat exploratory beginning has been made. If these efforts are to be appreciably successful, the new Division will need to be considerably expanded during the next five years. Logically, all those sections of the community, whether private companies or other Government departments, who can hope to benefit from DSIR work should seek out the DSIR. The fact that a reverse procedure is required may be regrettable, but it is realistic to accept it. It is clearly being accepted by the Research Associations for most of their separate reports in the present DSIR Report devote a significant proportion of space to information service activities. Indeed, the DSIR might well be accused of under-estimating the value of the 'shop-window approach' in the past. A bold effort of liaison is urgently required and the basis for it has been created. Will there be the resources to make that effort when the whole of the DSIR's expansion in the next five years must be obtained for an extra £1,000,000 per annum? The net cost of DSIR headquarters and administration for 1952/53 was £213,119. It is a modest enough figure and includes the costs of the Intelligence and Information Division. An adequate liaison effort, properly and sufficiently staffed, is unlikely to be obtained unless £100,000 rising to £150,000 per annum is placed behind it. Any such addition to expenditure will make a sizeable dent in the extra £1,000,000 per annum that the DSIR now anticipates.

Let it be made clear that these comments are not made for the sake of journalistic controversy, and the reversal of the misguided policy of economy is genuinely welcomed. THE CHEMICAL AGE has steadily urged the financial cause of DSIR and kindred research establishments and will continue to do so. The extra £1,000,000 a year is a step in the right direction; but when all the activities of the DSIR are considered, it is soon seen that it is no large sum.

Notes & Comments

Crossing the Currency Gap

'IT may seem odd that an oil refinery in the West Indies, a steel mill in France, and a packinghouse in Australia should figure in a sale of crude oil to a French buyer. But in these days a company engaged in trade abroad may find that a roundabout way of doing business is the only way possible.' These are the first two sentences from a recent article in *The Lamp*, house journal of the Standard Oil Company of New Jersey. Briefly, the business operation referred to was handled as follows: Esso Export agreed to sell oil to Esso France for part payment in francs and part payment in dollars, but the oil Esso Export supplied had to be paid for fully in dollars. To compensate for this, Esso Export bought from a French steel company a quantity of steel pipe needed by a refinery in the Netherlands West Indies, using francs for the purchase but being paid in dollars. There was still left over a residue of francs; these, by agreement were converted into sterling, which was then used to buy frozen beef in Australia and also to pay for its transport in a British ship to the West Indies, where again payment to Esso Export was finally made in dollars.

A Two-way Business

THIS, of course, is no more than a complicated transaction by barter. It has its uneconomic aspects when one considers the diversity of work and market knowledge required to fit together the jig-saw of unrelated demands and supplies. Far from being a novel method of world trading, modern examples of it now are revivals of ancient commercial history. If the French steel company had been able directly to secure the order for the piping in the West Indies, France would have obtained dollars with which to increase her purchases of US goods; similarly, dollars might have been directly secured by the Australian packing firm and the British shipping company had the order for beef been directly obtained. The query is irresistibly raised whether the maintenance of these currency barriers to trade is not in fact useful for it would seem to have fortified French, Australian, and British export selling power with free American assistance. No doubt this query is more mischievous than constructive, and a better way of expressing the same point is to say that if dollar-bound materials are to be sold in soft currency countries, the industries producing them must buy some of their own requirements from the countries they seek as customers. The shortest comment is, of course, in a single word—*convertibility*. But convertibility cannot be embarked upon without huge risks of disaster unless the dollar countries realise to the full that trade with any country must be a two-way business; the more these complex jugglings of international trade have to be conducted to make hard currency goods exportable, the more likely it is that this fundamental lesson will be assimilated.

Fluoridation & British Tea

THE British addiction to tea has not altogether indirectly been the subject of some interesting research in America. As is now well known, the trace-addition of fluorides to water is a means of reducing the incidence of caries, especially in younger age-groups. Controversial though this has been, with violent opposition from those who call it 'compulsory medication,' more and more fluoridation of public water supplies has steadily been developed in the United States and plans to introduce it here are fairly well forward. However, it is pointed out by Philadelphian biochemists at the Albert Einstein Medical Centre that tea is richly endowed with fluorine; and as tea is so highly and widely consumed in Britain the intake of fluorine from this source may be significant enough to cause either a smaller response to fluoridated water than has been generally obtained in American towns and cities, or some risk of excessive dosage. This intriguing speculation has been experimentally pursued with rats on diets likely to produce caries. Groups of rats (a) with perpetual access

to fluoridated water, and (b) given tea infusions made with fluoridated water, were compared. No striking differences were found for both sets of animals seemed to exhibit the adverse consequences of overdosage with fluorine, with marked failures to gain weight normally and with decalcification of the skeleton. This result would have been more alarming had it been largely confined to the group of rats receiving the tea infusions; nevertheless, the suggestion of danger is not disposed of, and in an area where the water is fluoridated the heavy tea-drinker may be exposed to this risk of excessive intake. The tea infusions contained as much as 20 ppm. of fluorine, and there is other evidence that rats are less sensitive to this element than humans.

Investigation Desirable

THIS investigation may not have sufficient US implication for it to be actively continued. It would certainly seem desirable for tests to be conducted in this country while the fluoridation project is in its initial stages. Confirmation of any risk of over-dosage would certainly be vexatious for the main benefit of water fluoridation is received by children who are usually not heavy tea-drinkers. The US work is described in *Nature* (1954, **173**, 304).

Big Capital Increase

£2,000,000 More for Wellcomes

THE Wellcome Foundation Ltd. has increased its authorised capital from £1,000,000 to £3,000,000. With the consent of the Capital Issues Committee, the issued capital has been increased to the same amount by capitalising reserves and issuing the additional shares to shareholders.

At the time of his death in 1936, Sir Henry Wellcome owned all the shares in the Wellcome Foundation Ltd. By the terms of a unique will, he established The Wellcome Trust, a public charity administered by five trustees to whom all the shares were bequeathed.

The objects of the trust are the furtherance of research work bearing upon medicine, surgery, and allied sciences and the entire declared dividends of the company are at the disposal of the trustees. During the celebration of the centenary of the birth of Sir Henry Wellcome last summer, it was announced that they had already distributed well over £500,000 for these purposes.

The Wellcome Foundation Ltd., which trades under the name of Burroughs Wellcome & Co., carries on business as manufacturing chemists on a world-wide scale. The capital increase will bring the issued capital more into line with the capital actually employed in the business. It foreshadows a large programme of expansion beginning with a new £350,000 pharmaceutical manufacturing unit at the Wellcome Chemical Works, Dartford.

Last week we published details of the new phosphorus plant built by Albright & Wilson Ltd. at Portishead, Bristol. The photograph shows the first consignment of phosphorus from this plant arriving at the firm's new works at Kirby, Lancashire, which will convert the phosphorus into phosphoric acid and sodium tripolyphosphate

More Confidence in the Future

DSIR Welcomes its New Deal

A MORE cheerful note than has been apparent for some years is struck by the Advisory Council in the report for the year 1952-3 of the Department of Scientific and Industrial Research, which was published last week. Although, during the year under review, they have had to carry on with the handicap of resources which they believe to be far less than those necessary for the Department's purposes, the Council are glad to record that the Chancellor of the Exchequer accepted slightly increased estimates for 1953-4. Moreover, it gave them even greater satisfaction to learn, towards the end of the year, of the five-year plan which had been agreed upon (see THE CHEMICAL AGE, 1953, **69**, 1317).

Nevertheless, the report quotes some of the difficulties encountered due to lack of resources in the past. For example, at the Hydraulics Research Station, 'requests for investigation and advice from the United Kingdom and the Commonwealth are greater than the station can meet now or for some time to come. It is most regrettable that in some cases inquirers should have to get their investigations carried out abroad, and we look forward confidently to the station's contribution increasing in scope and importance in a way which will justify the decision to create it.'

Premises Unsuitable

The Water Pollution Research Laboratory also, says the report, has a great and important task to fulfil, and the temporary premises at Watford were utterly unsuitable; the Council are glad to know, therefore, that building is now well under way at Stevenage.

Details of the many valuable grants made by DSIR out of their limited resources are included in the report. The general policy governing grants to Research Associations is designed to ensure that an association shall attain an effective scale of operation as rapidly as possible, and thereafter grow steadily until it reaches adequate size. The grants are for five-year periods, and take the form of a block grant, payable against a fixed minimum sum to be raised by the industry, and an additional payment up to a certain maximum, *pro rata* on industrial subscriptions in excess of the minimum. As an association develops, it is expected, when applying for a renewal of grant for a further five years, to be willing to shoulder a substantially increased share of the cost.

Room for Growth

In 1939 there were 21 grant-aided associations with a total annual income of £480,000 of which £178,000 was grants from DSIR. In 1952 there were 41 associations with a total income of £4,000,000 of which £1,300,000 was grant. There is still need, however, says the report, for the substantial expansion of many of the existing associations, and for the creation of new ones, which will call for a considerable expansion of resources.

During the year the Industrial Grants Committee considered applications for the revision of renewal of grants from the British Cast Iron Research Association, the British Ceramic Research Association, the British Coal Utilisation Research Association, the Coal Tar Research Association, the British Gelatine and Glue Research Association, the British Hydromechanics Research Association, and the British Scientific Instruments Research Association, and from two analogous bodies, the Research Committee of the Furniture Development Council and the Research Council of the British Whiting Federation.

Applications for further grants were received from Aslib and the Commonwealth Mycological Institute, and, for special grants towards heavy capital expenditure, from the British Electrical and Allied Industries Research Association for a new laboratory, and from the British Coke Research Association for a full-scale test-oven plant. Details of all grants made are given in the report.

An outstanding development during the year was the Government's decision to join the European Organisation for Nuclear Research. A laboratory to be built near Geneva will be equipped with the latest apparatus, and the United Kingdom will participate in the various research projects, and will have access to the costly research facilities, for about a quarter of the sum it

would have to spend in constructing similar apparatus for its exclusive use.

DSIR will be responsible for official relations with the Organisation and for co-ordinating UK policy on the scientific and administrative matters involved. The contribution to the budget of the Organisation is to be borne on the DSIR Vote, and is expected to average some £350,000 per annum during the seven years while the laboratory is being built, and some £180,000 per annum thereafter.

During the last few years many complex problems have arisen in relation to the conservation and substitution of raw materials which were scarce or whose acquisition from abroad involved currency difficulties. With the Intelligence and Information Division as a co-ordinating centre, DSIR has undertaken much research in this field, working closely with the Ministry of Materials.

Many industrial problems arising from the scarcity of sulphur have been investigated, and economic uses for waste sulphuric acid have been found in a number of instances. Economic assessments have been made in the long-term trends in the demand and supply of selenium, germanium and vanadium, and the possibilities of increasing supplies by technological improvement have been examined. In the case of vanadium, proposals have been made for applying to production practice known technical processes for the recovery of the metal from indigenous iron ore and steel scrap.

Non-Ferrous Metals Recovery

Following a large increase in the number of pyrites roasting plants in this country as a consequence of the recent sulphur shortage, an investigation was made of the technical and economic possibilities of recovering non-ferrous metals from the resulting cinders. It included a survey to determine where a recovery plant could best be located in relation to pyrites burning plants, on the one hand, and existing iron-works which make use of high-grade iron-ore residue, on the other.

The report devotes considerable attention to the exploitation of science by industry, and welcomes the sixth annual report of the Advisory Council for Scientific Policy (THE CHEMICAL AGE, 1953, **69**, 118), and states that one of DSIR's main tasks in the coming year will be to implement the recommendation that the use of research and development contracts should be extended.

It is estimated that the present activities of the Research Associations amount to about 1/10th of the total research and development activities of civil industry. Many of the associations, therefore, apply much less direct effort to research than do their individual members, collectively, in their own laboratories, but it seems there is little more that can be done to make the member firms aware of the scientific information which their association can supply.

Delays in Application

What is in much greater doubt is whether the use made of the knowledge supplied through the association is as great as it should be. There are often powerful factors operating to delay the application of results of research—shortage of staff and funds, unwillingness to disturb current production and marketing arrangements. The Research Associations are already attacking these issues in many ways, including the use of the development contract.

However, the report emphasises that the success of an association must not be judged only by the number and importance of the new discoveries or inventions that it may produce, since much of its work will consist of studies of details of the processes and materials used in its industry, work which produces a steady flow of small improvements whose cumulative effect on efficiency is great. In this connection the liaison and advisory services are of particular importance.

Steps have been taken by some associations to establish separate but related companies to take over inventions and discoveries on a basis similar to that for development contracts. Companies of this sort already in existence are Shirley Developments Ltd. (Cotton), CURA Patents Ltd. (Coal Utilisation) and ERA Patents Ltd. (Electrical). This system has the advantage of relieving a Director of Research and his staff of responsibilities outside their normal training and experience.

For the development of inventions made in its own establishments, DSIR seeks the assistance of the National Research Development Corporation just as do many other bodies, including some Research Associations. Nevertheless, there may be potentially important scientific discoveries in the fields of the department's establishments for which direct action by development con-

tracts would be appropriate and desirable, and an inquiry is proceeding in parallel with the inquiries addressed to Research Associations. An already existing example is the contract with a firm for the development of a commercial model of the automatic computer designed at NPL.

Looking to the future, the report says that arrangements made for the five years beginning 1 April, 1954, are far more satisfactory than hitherto. Staff increases at the rate of 150 non-industrial staff per annum with about one-third that number of industrial staff, will be approvable, with funds to match. Specially welcome is the flexibility given by the provision that a shortfall of expenditure in one year may be made good in subsequent years. The Council is greatly relieved to see this clear road before them.

Department of Scientific & Industrial Research: Report for the year 1952-53. Cmd. No. 9083. HMSO, 8s.

Plastics Advances

A PERMANENT exhibition dealing with the plastics industry is likely to be included in the Science Museum as part of the new gallery covering organic chemistry. This is disclosed in the annual report of the British Plastics Federation which states that the project will take four or five years to complete. It has financial support from the Federation and the Plastics Industry Education Fund.

Membership of the Federation has increased by 21 during the year, the new members joining mainly the Fabricators or the Raw Material Suppliers Group. Total membership of the Federation is now 284.

Four draft specifications were completed by technical committees of the Federation in 1953 and forwarded after approval by the main Technical Committee to the British Standards Institution as the basis for British Standards. Work continued on four other specifications and was started on six others. Two standards are being revised.

The Federation's Information Bureau dealt with more than 5,500 inquiries and 1,700 inquiries were answered at the Federation's stands in the BIF. The report gives details of other activities of the Federation, including some important technical investigations.

International Congress

THE XXVIIth International Congress of Industrial Chemistry is to be held in Brussels from 11-19 September, 1954. It will be the fifth time that the Congress has met in Belgium. As in previous years, the programme will include many items in addition to the plenary conferences, such as sectional meetings, visits to works in Belgium's principal industrial centres, and a number of excursions.

The congress will include 29 sections grouped under the following main headings: (1) general problems of the chemical industry; (2) fuels; (3) nuclear science; (4) metallurgy; (5) industrial inorganic chemistry; (6) cements, building materials, glassware, ceramics, enamels; (7) industrial organic chemistry; (8) foodstuffs and agricultural industries; (9) colonial problems; (10) organisation: industrial, commercial and professional.

Full particulars of the congress may be obtained either from the Secrétariat du Comité d'Organisation, XXVIIème Congres International de Chimie Industrielle, 32 Rue Joseph II, Brussels, or from the Commission Permanente d'Organisation des Congrés de Chimie Industrielle, 28 Rue Saint Dominique, Paris 7me.

Lead Development

UNDER the sponsorship of the leading Commonwealth producers of lead, the Lead Development Association has been formed as a non-profit earning body. The objects of the association are to extend the knowledge of lead in its manifold uses and to foster appreciation of its services to mankind.

Hitherto, the only organisation of its kind in the country giving information on lead matters has been the Lead Industries Development Council, which confined its activities to those connected with lead sheet and lead pipe. With the formation of the Lead Development Association the name Lead Industries Development Council will cease and its activities will continue as the Lead Sheet and Pipe Council, which becomes an associate member of the Lead Development Association.

The offices of the Lead Development Association and those of the Lead Sheet and Pipe Council are at Eagle House, Jermyn Street, London, S.W.1 (Telephone: WHItehall 4175).

The Chemical Engineer

Birmingham University Society's Dinner

BETTER processing of raw materials and industry's ability to meet the demand for higher qualities, which were the two main trends in industry during the past 25 years, depended to a large extent on the contribution made by the chemical engineer, said Sir Harold Hartley, former president of the Institution of Chemical Engineers, when speaking at the annual dinner of the Birmingham University Chemical Engineering Society last week.

An Extinct Animal

Sir Harold, who was responding to the toast of 'The Chemical Engineer & the Community,' proposed by Professor F. H. Garner, spoke of the difference between the university-trained chemical engineer and 'that extinct animal' the chemical technologist. He said the university student was not learning special tricks, but the fundamentals of physics, chemistry and engineering and the mathematical techniques which made it easy to apply those fundamentals to new problems he would meet in industry.

Mr. T. M. Fraser (Courtauds Ltd.), replying to the toast of 'The Guests,' proposed by Mr. J. R. S. Morris, junior treasurer of the Society, said the prosperity of industry depended greatly on the endeavours of graduates who entered it. Industry's main problem was that of productivity per man and the achievement of maximum productivity depended on the application of scientific and technical knowledge in the industrial field.

Mr. E. J. Dunstan (Manchester Oil Refinery Ltd.) proposed the toast of 'The Society' and the chairman, Mr. J. M. Davies, replied.

List of Guests

In addition to those mentioned, the guests included Mr. C. G. Burton, secretary to the university; Mr. G. le B. Diamond, chairman of West Midlands Gas Board; Dr. F. J. Dent, director of research, West Midlands Gas Board; Dr. A. Parker, director of fuel research, DSIR; Mr. W. E. Aylwin, Midland Tar Distillers Ltd.; Mr. K. A. Sherwin, Fisons Ltd.; Dr. A. H. Kaye, Cabot Carbon Ltd.; and Mr. B. G. Banks, Trinidad Leaseholds Ltd.

African Research Plans

THE research manager of African Explosives and Chemical Industries recently elaborated the plans of his organisation to develop a modern research department at Modderfontein, near Johannesburg, at an initial outlay of £250,000 and an annual cost of up to £300,000, with a staff of some 70 chemists, physicists, etc., and at least 150 laboratory assistants. The company has long been producing explosives and chemicals, insecticides and a number of other products, and it has more recently developed the production of heavy chemicals. All this activity has demanded the provision of research facilities to improve these products and to relate them to local requirements. It will also be possible to initiate original research in developing new products. In much of this work it is planned to collaborate with the scientific staff of the Council for Scientific and Industrial Research and the South African Bureau of Standards, both in Pretoria, and with laboratories equipped with up-to-date scientific instruments. Thus it will be possible to avoid expenditure on expensive items that are not often needed. It is claimed that the company's Modderfontein factory is the largest commercial explosives factory in the world, and that at Somerset West in the Cape either the second or third largest.

Computers in Chemistry

SPEAKERS in a symposium on the use of computing machines, organised recently by the American Institute of Chemical Engineers in Washington, referred to 'mechanical brains' which do in 30 hours what it would take one man 20 years to accomplish with hand calculators. They claimed that by the use of mathematical calculations instead of laboratory work it may be possible to determine whether new chemical products can be made.

Another possibility, it was stated, was to feed into the machines data based on laboratory experiments and from the results tell how the process might be worked out on a large scale. If perfected, this method could eliminate much of the costly and time-consuming scale model testing now followed in developing a new chemical process.

Electrical Engineers' Exhibition

Variety of New Instruments Shown at Earls Court

ORGANISED by the Association of Supervising Electrical Engineers, the third Electrical Engineers' Exhibition held at Earls Court, London, from 16-20 March, was twice as big as last year's event, there being about 200 exhibitors. Switchgear was the principal feature.

In addition to switchgear, the Brush Electrical Engineering Co., Ltd., Loughborough, exhibited fuse gear and electrical rotating machinery. Brush motors can be supplied in a range of sizes from 1 to 3,000 BHP and those on show were all squirrel cage, totally enclosed, fan-cooled, 380/420 volts, 1,500 rpm. synchronous speed and of British Standard dimensions. The company had a special display in Switchgear Avenue, embracing fuse switchgear type 'AF-U' for 440-volt distribution systems, cubicle type switchgear type 'AF-C' for 440-volt distribution systems and metal-clad industrial switchgear type 'IM.'

Insulation Testing

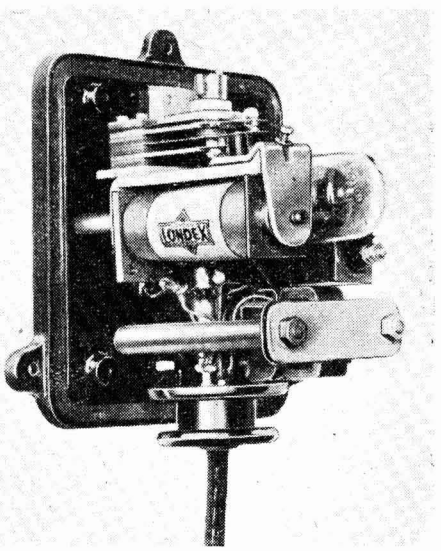
Among the exhibits of Evershed & Vignoles Ltd., Chiswick, particular interest was attached to a 10 kV 'Megger' insulation tester, in which the hand generator is replaced by a static rectifier operating from AC mains through a step-up transformer; the instrument is of the direct indication type. Also shown was a 2½ kV 'Megger' having three voltage ranges, and other such testers. Other instruments included a miniature recorder for use with process control in conjunction with an electronic transmitter.

A wide range of switchgear and motor control gear was displayed on the stand of Erskine, Heap & Co., Ltd., London, and of special interest was a new range of ASTA-tested switchgear. A complete 11 kV, 150 mVA rupturing-capacity unit was on view, together with an 11 kV, 250 mVA circuit breaker fitted with patented 'direct-blast' arc control device. Also shown were all types of air break starters, both hand-operated and push button control, oil immersed motor control gear of the star delta, stator and rotor, and auto-transformer types, etc.

Indicating and industrial instruments in wide variety were exhibited by Ferranti Ltd., Hollinwood, Lancs. Among these were switchboard instruments, clip-on ammeters, maximum demand alarm and power factor relay. Much interest was aroused by the Ferranti portable viscometer, which enables viscosity measurements to be carried out easily and quickly on bulk liquids under works conditions and with a high degree of accuracy. Changes in viscosity due to thixotropy, dilatancy, or change of temperature or chemical composition can be observed continuously.

The display of instruments by the General Electric Co. Ltd., London, included the GEC miniature AC link testing ammeter and the GEC link testing power factor indicator, both of which are recent additions to their range. The 'M.W.' range of switchfuses and fuse switches, and a selection of circuit breakers were shown, together with typical distribution boards and trunking, ducting and conduit material. Accessories displayed included 'Litealarm' equipment for providing visual and audible warnings in hazardous atmospheres, and a fire alarm system incorporating visual signals and telephones.

As usual, Londex Ltd., London, gave em-



New Londex electronic relay

phasis to electrical relays on their stand, a working exhibit showing 20 standard types out of the many they manufacture. New additions included a triple pole mercury switch contactor, a bus-bar relay and an electronic relay, all of which, it is claimed, are suitable for many industrial applications. Other electronic instruments included a photo-electric control unit and an electronic counter, counting up to the rate of 500 impulses a second. Pressure switches in a range of controls for fluid and gas included a new unit sensitive to 2-8 in. W.G.

New Regent switchgear panels, flameproof switchgear panels, unique items such as what is claimed to be Britain's only fully certified flameproof handlamp and switch socket, a new range of ironclad switches of compact design, and a comprehensive Lundberg 'Miniac' range of AC switches and switch sockets, were among the exhibits on the stand of the Simplex Electric Co. Ltd., Oldbury, Birmingham. The ironclad switches —shown for the first time—can be supplied with protective iron covers, steel covers or brass finished covers.

Among the high-nickel alloys produced by Henry Wiggin & Co. Ltd., Birmingham, are the Brightray series of electrical resistance materials; Nilo controlled-expansion alloys; 'Thermometals' (thermostatic bi-metals); sparking plug alloys, etc. Expert advice on the selection of materials was available at the company's stand, together with technical literature.

An Unusual Task

Flue Gas Washing Tower Lined with Tiles

LONDON craftsmen have just completed a minor yet essential operation for the maintenance of the plant which washes flue gas at Battersea power station. They have fixed 95,400 quarry tiles in the tower where the gases are washed to remove sulphur compounds, and they have taken 30 tons of cement up to 150 ft. aloft in doing the job.

Flue gases from a modern power station can amount to 100,000,000 cu. ft. an hour, and Battersea uses some 250,000 gal. of water, with added chalk, to absorb the sulphur compounds in them. As the erosion of the concrete structure caused by this water falling continuously upon it would be far from negligible, the tower has been completely lined with tiles on its vertical, horizontal, and under-horizontal surfaces.

Each tile has been fixed to its concrete base by Semtex Ltd. with their bonding cement, which contains pure rubber from the Dunlop plantations. The mild degree of extensibility of the cement provides against loss of adhesion by differential expansion which may be set up in a system subject to hot and cold zones resulting from the spraying of cold water and the flow of hot gases. The tiles, moreover, are specially laid with a cement even more resistant between the joints so that the set tiles may wholly resist any onslaught, a double build-up calling for special craftsmanship, particularly when tiles have to be fixed to the under side of horizontal surfaces.

The whole inside of the wash tower has had to be scaffolded and the men, engaged on direct contract for this tricky job, have carried it out from the top, working downwards, from about 150 ft. above ground level. Tiles have been fixed to the underside of beams by wedging them while they were setting; awkward fittings have been completed with tiles specially cut; and throughout the whole operation joints have been kept narrow and tight. Tests have since demonstrated the thorough adhesiveness of the bond of rubber latex and cement.

Better Canadian Sales

THE annual report of Canadian Industries Ltd. for the year ended 31 December, 1953, shows sales totalling $153,587,000, an increase of 7 per cent over 1952.

Initial operations late in the year at the Maitland and Edmonton plants, the report states, marked 1953 as the year of the greatest expansion of the company's manufacturing capacity. Construction expenditures, which in 1952 had exceeded by a wide margin those in any previous year, were even higher in 1953 as these two large projects neared completion.

At the same time, notwithstanding an attitude of caution on the part of many customers and despite disturbed conditions in some markets, the demand for a number of the company's wide range of chemical and allied products improved and sales were above those of the preceding year.

Business Quiet in German Chemicals

Saran on the Market—Perlon Cheaper

BUSINESS activity in the German chemical industry was affected recently by cold weather, a more than seasonal decline in the demand for consumer goods, caution in stock dispositions due to apprehensions about the economic situation in the USA, and the lower level of production in heavy industries. The decline in the coal and coke output has of course a direct bearing on the supply of raw materials to the chemical industry, and imports of foreign raw materials have also been at a reduced rate in recent months. In the field of exports, German trade negotiators have of late made special efforts to increase outlets for German manufactures by stimulating the flow of foodstuffs and raw materials in the opposite direction; these efforts are not yet, however, reflected by increased shipments.

Production Plans Being Made

Saran yarn has made its appearance on the West German market. Four firms are making yarns from raw material imported from the USA. In Germany one firm, Chemische Werke Hüls AG, is now producing small quantities of a similar material under the trade name of 'Vestan'; its production is to be extended shortly, and several other German chemical producers, including Badische Anilin- und Sodafabrik AG and Wacker Chemie GmbH, are reported to be making plans for the production of polyvinylidene chloride-vinyl chloride polymerisation products.

Anticipating increased imports of nylon from the dollar area following trade liberalisation measures in February, German Perlon producers have lowered their prices by 4-19 per cent. In East Germany a new fibre has been brought on the market, It is an acrylic nitrile fibre called 'Wolcrylon' and is available in small quantities only in mixtures with wool.

Despite the dissatisfaction with the present position of synthetic rubber production expressed from time to time by the only German Buna producer, the seven leading rubber tyre manufacturers in the Federal Republic have joined a scheme for the erection of a new Buna works with a capacity of 30,000 metric tons a year. The plant is to be built with the participation of the Federal Government, and production is to be managed by Chemische Werke Hüls GmbH, the company now running a much smaller plant. It is assumed in the light of post-war experience in other countries that the capacity chosen is about the minimum permitting economical operation. Before a plant of this size can be set up, Allied permission will have to be obtained. Participation by the Federal Government is probably envisaged.

Salt and potash production in the important mining region of Lower Saxony attained a new peak in the first month of this year—670,234 metric tons compared with a monthly average of 570,000 tons in 1953—thanks to increased calls both for crude salts and for highgrade fertiliser from local agriculture. The export demand also appears to have improved since Christmas, and German potash producers are confident that world consumption of potash fertilisers will increase further as a result of special publicity undertaken now. The production of nitrogenous and phosphatic fertilisers, on the other hand, seems to be somewhat below the record figures of the first half of 1953.

Factory Equipment on Show

Approximately 150 stands filled the Royal Horticultural Society's Halls, London, S.W.1, during the 2nd National Factory Exhibition, which was held 22-26 March. The exhibits ranged from office machines and equipment to brooms, brushes, conveyors, time clocks, waste paper baskets, soaps, disinfectants and detergents. A number of firms displayed industrial clothing including nylon and Terylene laboratory smocks and there was a wide selection of protective clothing suitable for the chemical worker. As a matter of fact the interest which is being shown in industrial safety was well illustrated by the large number of firms who were showing clothing, equipment and devices to protect the factory worker.

Synthetic Rubber Race

Day-by-Day Developments in Situation

DEVELOPMENTS in the British synthetic rubber industry have been rapid during the last week, and the following announcements, received at this office on three consecutive days, show the situation clearly:—

Monday, 22 March

PLANS have been made by Imperial Chemical Industries Ltd. for the first large-scale production in Great Britain of a range of rubber-like polymers based on butadiene. Pilot plant quantities should be available later this year, but it is not expected that the full-scale plant at Wilton, North Yorkshire—which will have a planned capacity of about 10,000 tons per year—will commence operation before 1956.

Using butadiene produced in I.C.I.'s oil cracker at Wilton, it is intended to manufacture copolymers using a variety of second components, including acrylonitrile and styrene. These copolymers will cover a range from oil-resisting substances of the Perbunan type to hard, reinforcing resins. The resins will be particularly attractive for use in shoe-soling compositions, and they will also be available in the form of latices suitable for emulsion paints.

Some of the polymers it is proposed to manufacture will be similar to those already being made in the United States, but others will be novel, both in composition and in properties.

I.C.I.'s Plastics Division, with headquarters at Welwyn Garden City, will be responsible for polymer production, development and sales, using raw materials obtained mostly from other divisions of the company.

Tuesday, 23 March

AS an essential step towards establishing a synthetic rubber industry in this country a new plant, costing £500,000, is to be built at Fort Dunlop. Work on the site has already begun. The plant will be used to produce new synthetic rubbers on a sufficient scale to try them out in tyres and other products.

'The importance of synthetic rubbers during the war,' said Mr. John H. Lord, a Dunlop director, 'and the great emphasis since laid on their development are what has led us in our own synthetic rubber research team to build up a considerable technical knowledge and to engage, in the last few years, in pilot scale production of synthetic rubbers at Fort Dunlop over a wide range of applications. Dunlop will, of course, continue its work in the natural rubber field. . . . . Now that the necessary raw materials, including butadiene and styrene, are to some extent becoming available for the first time in this country, we are erecting this plant which we regard as a valuable step towards establishing a synthetic rubber industry in Great Britain.'

Wednesday, 24 March

MONSANTO Chemicals Ltd. announces that it has recently completed construction of a tonnage-scale pilot plant from which a range of styrene-butadiene rubber-like resins will be available from July of this year. About £500,000 is also to be spent on a large-scale plant which will begin production in about two years, with a planned initial capacity of 4,000 tons per annum of these materials. This early expansion has been made possible, the company states, by its strong existing position and manufacturing facilities in the styrene polymer field.

The products of both the existing and the large-scale plant will be made available for sale in home and export markets and in the first place are expected to find use both in the manufacture of synthetic shoe soling and of emulsion paints.

Monsanto holds a strong position in the styrene-polymer field. It holds a one-third interest in Forth Chemicals, the only company in Britain producing in bulk styrene monomer, an essential ingredient. The other two-thirds interest is held by British Petroleum Chemicals, which is jointly owned by Anglo-Iranian Oil and the Distillers Company.

* * *

The rubber race is going to be interesting. I.C.I. were away to a good start when the news leaked out at Billingham a fortnight ago. Dunlop are in the best selling position, with a good name and an established market; but Monsanto, with styrene actually in production, should prove dangerous rivals to both the other contestants.

Science in Food

Aspects of a Rapidly Growing Technology

OPENING the conference on 'Chemical Engineering Methods in the Food Industry' at the Wellcome Research Institution on 18 March, Sir Ben Lockspeiser, secretary of DSIR, said:—

The scientific study of food is a modern growth and has provided the foundation for chemical engineering in the service of the food industry, one of the many branches of chemical technology. The lead which the United States hold in this latter field has arisen from the rapid growth of the American oil industry which created the need and provided the impetus. Chemical technology was reared there in the favourable environment of a vigorous industry that was conscious of the power of science and engineering from the beginning, and progressed rapidly from batch to continuous operation, through a series of bold innovations leading to self-working processes based on a high degree of instrumentation and automatic control. This has been of great value not only in itself but in creating an army of chemical engineers skilled in designing and making equipment for chemical processes of all kinds, including those concerned with the processing, storage and packaging of foods.

Continuous Methods Preferrerd

One of the main aims of progressive manufacturing industrialists in all branches of chemical engineering is the conversion from batch to continuous operation. Certain foods have for long been prepared by continuous methods, and food manufacturers are now reviewing and reorganising their processing lines with the emphasis on higher working speeds without prejudice to quality. But the insufficiency of basic scientific data is bound to prove a serious handicap in the designing of efficient equipment. These problems are many and various and involve studies in plant physiology and biochemistry in relation to the storage life of fruits and vegetables, in chemical studies of certain substances in foodstuffs which affect the changes in flavour and colour during the processing or storage, or in the changes occurring in dehydrated foods.

We know far too little also about the physico-chemical changes that occur or about the mechanism whereby changes are produced, as, for example, the migration of water in solids because of gradients in the moisture and temperature, or the effect of small quantities of ozone and ethylene in the atmosphere and the corrosion resistance of various protective coatings of metal containers. Factors such as these and many others in the field of biophysics, biochemistry and microbiological chemistry lie at the heart of the whole complex problem of the prevention of wastage in foods, ranging from the control of micro-organisms to the control or inhibition of chemical changes which result in breakdown products affecting flavour and storage and leading to what is generally known as 'spoilage.'

Extensive Knowledge Necessary

This is, however, only half the story. Mechanical knowledge must be brought to bear for a variety of purposes, such as grinding; mixing and agitation; and refrigeration, a vital engineering requirement for the preservation of food, calling for reliable data on heat and vapour transfer, both under normal conditions and at iced surfaces. Much of the required engineering data is peculiar to the food industry itself, but a good part is common to other fields. In the design of compressors, for example, great advances have been made in other fields on centrifugal and rotary types which the refrigerating engineer could turn to his advantage.

All this adds up to a very formidable task, but food technology is not to be had by a process of addition. Food technology is a subject in its own right with a unity of its own, and like other advanced technologies of the present day must be treated as such if practical results are to be obtained. Technology calls the tune today, and the piper is the designer who must understand the engineering, the chemistry and the biology of the business. The food industry requires adequate staffs of biologists, chemists and engineers and it is essential for success that these groups should co-operate

and understand fully the other's point of view.

In this country the food industry is well served on the chemical and biological side, in research and control laboratories, but the insufficiency of trained engineers or technologists capable of translating the biologist's requirements is probably the main problem facing the industry. Apart from some large progressive concerns few firms have a first class engineering staff capable of undertaking intelligent development of machines in co-operation with the biologists. Piecemeal attack and divided control belong to a simpler and less sophisticated past. What is needed now is a comprehensive treatment of this all-important subject.

Co-operative Research Desirable

A start has been made on these lines by the setting up of a joint body comprising the Food Manufacturers' Federation and the Food Machinery Association. So far it only meets to exchange views of current interest such as, for example, the need for certain types of equipment, the requirements of performance and likely demands from the user. But it is a welcome step in the right direction which would be immensely strengthened if funds and facilities for co-operative research were to be provided. Further action on these lines by the food manufacturers and food machinery makers could not fail to be of great advantage to progress in food technology in this country.

The establishment of the National College of Food Technology in 1951 was another welcome step and a particularly necessary one too in providing technological training and covering the examination, handling, processing and preservation of food of all kinds. Regular teaching on the subject in the Universities and affiliated bodies is provided by courses at the Royal Technical College, Glasgow, on food technology and at Reading University on dairy technology, but it is doubtful whether the means are yet adequate to train a sufficiency of men capable of becoming leaders of the industry.

There is a great demand for such men in the United States, trained in the Department of Food Technology at the Massachusetts Institute of Technology and other universities, and the extensive facilities in the United States for training food technologists of this quality are no doubt due in a large measure to the extensive demand which the United States industry makes for them.

Meanwhile, our task and duty must be to do all we can to promote the fruitful co-operation of research and industry. The purely competitive spirit of the food as well as of other industries has been considerably modified over the last thirty or forty years in favour of a move towards mutual exchange of information and mutual advantage. This has been reflected in the growth of the research associations. Supported by the Department of Scientific and Industrial Research, over forty such organisations exist, of which five research associations concern themselves to a greater or lesser degree with the processing of food, particularly in milling, baking, canning, fruit preservation and such foods as chocolate, cocoa, jams, pickles and sauces.

To meet the great need for information based on systematic observation and investigation the DSIR set up towards the end of the first world war the Food Investigation Organisation, whose functions were to break new ground in the study of the properties of foodstuffs of many kinds and to explore the possibilities of new and improved practical methods of storage, processing and distribution. The work of the organisation's laboratories, which now number six, has resulted not only in many scientific contributions on the biology of foodstuffs but in striking achievements in the applied field such as new methods for storage and transport of fresh fruit, fish and meat as well as in a better understanding of processes such as canning, curing and dehydration, all of which require the determination of basic chemical engineering data.

Importing Water

Some of this work was carried out in collaboration with the Ministry of Food, particularly that on the technology of the dehydration of various classes of foodstuffs, work which was primarily undertaken to meet wartime needs and possible emergencies. It has been calculated that two or three million tons of water are imported into this country annually as part of our foodstuffs. We all prefer normal to dehydrated food, but it is satisfactory to know that we have accumulated a large proportion of the requisite data for reducing this transport of water by 80 per cent should it ever become necessary.

Nor should we overlook the savings which can be had from the reduction of waste in bulk storage of normal foods. The present narrow limits of safe storage of grain, for example, might become widened as a result of studies by the DSIR Pest Infestation Laboratory on the atmospheric conditions governing storage, and steady work is going on to ensure the conservation of supplies here and in the Commonwealth.

Much useful engineering research can be carried out on a laboratory scale with comparatively simple apparatus and at no great cost. Typical examples are provided by the researches of the DSIR Food Investigation Organisation on the drying of foodstuffs by heated air, freezing and vacuum techniques, or by a recent request for research into the fundamentals of bacon smoking on the same lines as the work done by FIO on the smoking of fish. A wide field for research is offered in the application of high frequency techniques, ultrasonics and electronics to food processing. FIO is also investigating the interactions between foodstuffs and aluminium and their inhibition, work which should be extended to other metals.

Extent Not Realised

On somewhat larger plant the above work has been extended to cover blanching of foodstuffs; contact, blast air and immersion freezing of foods; compression and packaging of foodstuffs. Heating and cooling of viscous liquids in cans and heat transfer and frothing in evaporators are also typical of investigations suitable for this scale of research. It is not generally recognised or accepted that such a wide field exists for this type of laboratory 'food engineering' research, and it is often confused with the more expensive development of pilot plant or pre-production stage, which involves the design and construction of plant bearing some relationship in scale to the final production unit and which requires collaboration between the research stations and industry.

From work of this nature already carried out by DSIR the food industry has greatly benefited as, for example, from the researches carried out in the fruit and vegetable experimental hold at Ditton. At Torry similar scale work is in progress on the storage of fish in trawler holds and freezing on board ship. In all of these activities an essential feature was the prior field work on existing conditions, and as in the case of refrigerated cargoes, the subsequent integration of field work and research. It cannot be too strongly stressed that what has been accomplished on these lines can also be effected in all branches of the food industry, given full co-operation. The high standard of engineering efficiency in the milk industry is an outstanding example of the results of this type of co-operation. The new Ministry of Food experimental factory should itself provide a valuable nucleus for development and co-operation and could also perform a very useful function in the training of development engineers for the industry.

Manganese by New Process

A NEW four-step method of producing fertiliser, steel and critically short manganese from waste material of the steel industry was described at the recent national meeting of the American Institute of Chemical Engineers in Washington. The new process, now being tested on a large scale, may reduce the nation's dependency on manganese imports, said Mr. P. H. Royster, director of research of Mangaslag Corp., a government sponsored organisation.

Mr. Royster explained that the process consists of resmelting the slag and blowing air through the molten metal to yield manganese ore, synthetic steel scrap and phosphate fertiliser. The USA steel industry, with an annual capacity of 125,000,000 net tons of steel, uses 2,000,000 tons of manganese ore. The domestic mining industry produces only enough to keep the steel mills operating for one month each year. The 9,400,000 tons of recoverable slag produced each year may be made to yield about 500,000 tons of managanese through use of the new process, enough to meet more than one half the country's annual requirements.

Development of Natural Gas

Speaking at a Coal Trade Benevolent Association dinner in Birmingham, Mr. G. le B. Diamond, chairman of the West Midlands Gas Board, said the Government is to spend £1,000,000 in the next five years on the development of natural gases. He said every means possible was being used to supplement dwindling coal resources.

Sir George Beilby Awards

AT a meeting on 9 March, the administrators of the Sir George Beilby Memorial Fund considered the claims for an award from the fund of candidates whose merits had been brought to their attention. The Committee was impressed by the promise shown by several of these candidates but concluded that none of them adequately fulfilled the conditions of the award, which is made 'in recognition of continuous work of exceptional merit, bearing evidence of distinct advancement in science and practice.'

It was decided, therefore, to make no award for 1953 but to let it be known that this decision should not discourage future applications by or on behalf of the present candidates or other investigators working on subjects relating to the special interests of Sir George Beilby, including problems connected with fuel economy, chemical engineering and metallurgy.

Against Rust & Rot

THE Norwegian Industries Development Association, in co-operation with other scientific and industrial research institutes, is organising an international exhibition and conference in Oslo from 11-20 June this year. The exhibition will be a review of methods and products for the protection of metals, concrete and wood.

During the exhibition there will be a conference with lectures by foreign and Norwegian experts, which will last for 4-5 days. During the first two days subjects of general interest will be covered (mainly theoretical views on corrosion, corrosion prevention and so forth). On the last 2-3 days short 'clinics' on the practical applications of methods and means for protection will be held.

Rheumatism in Industry

ALTHOUGH rheumatism is one of the greatest causes of absenteeism in industry, only a few general hospitals have modern rheumatic units and even these have few beds available. The British Rheumatic Association has therefore decided to follow a policy of providing hostels linked with appropriate hospitals.

The first of such hostels has been opened at Bracken Hill House, The Woods, Northwood, Mdx. Patients can be treated under the National Health Service at the modern rheumatic and rehabilitation centre nearby, Mount Vernon Hospital. Works medical officers and others interested can obtain full particulars from the British Rheumatic Association, 11 Beaumont Street, London, W.1.

Alarming Experience

Earth Subsidence at Canadian Industries

BUILDINGS were almost buried and others tilted at perilous angles as a result of a subsidence of earth at the chemical plant of Canadian Industries Ltd., Windsor, Ontario, recently. The adjoining premises of the Canadian Salt Co. were also affected, but there the damage was confined to the appearance of cracks in the walls of a new office building, which had to be evacuated for a short time.

The latter company flushes salt from the ground by brine pump and had been supplying part of the brine to the Canadian Industries' plant, where it was used to produce caustic soda, hydrogen and chlorine. Both plants were shaken by rumblings shortly before the occurrence of the subsidence, which officials stated was probably due to a 'cave-in' somewhere around the 900 ft. level of an area where there are no active salt wells.

The subsidence caused a hole about 175 yd. long, 125 yd. wide and 27 ft. deep. As the ground sank, water under artesian pressure spurted to the surface and formed a lake. One building was up-ended under water and left with the point of its hip roof thrust above the surface. One small office building and a two-storey washroom went under to about ceiling level. A railway spur sank, leaving several cars isolated from the main line and one tilted at an acute angle on the edge of the lake.

A big hydrogen tank had to be emptied when it showed an 8 in. list. Chlorine was escaping from storage tanks and caused concern, but employees laid a temporary pipe line to a tank car and pumped it off. A major loss was the plant pumphouse which contained equipment with an estimated value of $10,000. It was submerged to the window tops. It was expected that the plant would be closed for a month or more.

Carbon Dioxide Cooling

A Significant Improvement in the Machine Shop

SUCCESSFUL attempts in the past few years to produce stronger and tougher metals with ever increasing heat resistance, and the consequent development of cutting tools to deal with them, have made extremely complex the necessary properties of the coolants normally used in their machining.

The primary purpose of a coolant is to cool the cutting tool, and thus, by controlling its temperature, to maintain its strength and prolong its useful life. The average liquid coolant used is a poor conductor of heat, and it is usual practice to flood the tool. Much of the coolant is thus wasted in the needless and possibly harmful cooling of the turnings or chips while they are being parted, or after they have been parted, from the workpiece. The liquid may contribute some lubrication, but it is not possible for it to penetrate between the workpiece and the cutting edge of the tool and provide any lubrication along the actual line of cutting.

Good Technique Developed

The use of carbon dioxide as a coolant is not new, but up to now it has not been satisfactory in practice; hitherto it has been applied in much the same way as ordinary liquid coolants, and the opportunity has been missed of utilising its unique properties efficiently. The 'CeDeCut' technique, described in a recently published booklet, has been developed by the Carbon Dioxide Co. Ltd. in collaboration with the Central Research Department of the Distillers Co. Ltd., and it marks an important advance in the controlled application of CO_2 as a coolant.

The particular importance of the use of CO_2 as a coolant is in the fact that, in the expansion of the liquid from high compression to atmospheric pressure, the Joule-Thomson effect gives not only a gas at low temperature, but a considerable proportion of solid 'snow.' This solid has a temperature of $-78°$ and every lb. sublimed removes 250B.Th.U. from the surroundings.

Although it is very desirable to cool both the tool tip and the workpiece, the turnings or chips from the machining should be at the highest possible temperature, and the special developments of 'CeDeCut' enable this to be done. The coolant is introduced by a capillary within the tool (Fig. 1) and any excess is discharged only on to the workpiece (Fig. 2).

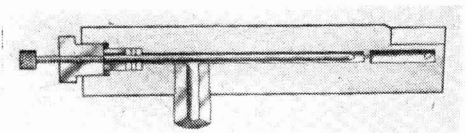


Fig. 1. Cross-section of the tool

Since a control valve will involve an orifice of dimensions comparable with those of the jet, and corresponding pressure and temperature drop, an orifice valve has been designed which can be fitted as a complete unit within the lathe tool, or even embodied in the tool shank.

The Carbon Dioxide Co. can provide eight-cylinder racks incorporating a small electric refrigerator to provide cooled liquid CO_2 at a normal maximum rated output of 30 lb. per hr., or bulk storage tanks with capacities of 1½ or 6 tons. Full details of the tool fittings and CO_2 storage can be obtained from the company.

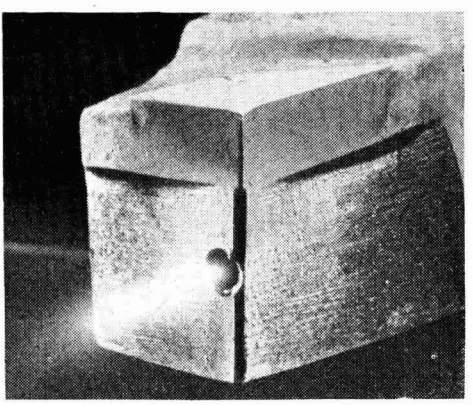


Fig. 2. Close-up of the tool tip

The platformer now being erected at Lavera Refinery, owned by Anglo-Iranian's French associate, Societe General des Huiles de Petrol BP, will have a capacity of 250,000 tons a year.

1953 Hinchley Medallist

G. T. Gurr Honoured by BAC

ON Friday, 19 March, The British Association of Chemists Hinchley Medal for 1953 was presented to Mr. G. T. Gurr, F.R.I.C. The presentation was made by Dr. Herbert Levinstein, M.Sc., Ph.D., F.R.I.C., M.I.Chem.E., as the president of the BAC. Mr. F. Scholefield, M.Sc., F.R.I.C., was unfortunately prevented by illness from being present. Dr. Levinstein is a former president and himself received the Hinchley Medal for 1952.

In making the presentation, Dr. Levinstein said that he did not think that the BAC had ever had a more loyal and dedicated member than in Mr. Gurr whom the Association was honouring on this occasion. Mr. Gurr had founded and built up a firm of international reputation as suppliers of microscopical stains. He was chairman of the Association's Unemployment Benefit Fund for 10 years and had been a member of this committee since the inception of the fund. It was largely owing to his efforts that its assets now exceed £55,000, although about £25,000 has been distributed in benefits.

A Fascinating Story

In thanking Dr. Levinstein for making the presentation, Mr. Gurr said that he regarded it as a very great honour to receive it from the hands of such an eminent member of the chemical profession. He then delivered his address which was entitled 'Bright Pictures of Little Things—A story of Microscopical Stains.' It was illustrated by a number of lantern slides, many of which were in colour.

After the address Mr. C. S. Garland, B.Sc., A.R.C.S., F.R.I.C., M.I.Chem.E., also a former president and Hinchley Medallist, proposed a vote of thanks to Mr. Gurr. He said that it gave him very great pleasure indeed to do this, having regard to the remarkable story those present had heard. It was fascinating, not only from the point of view of the subject matter and the many beautiful illustrations, but also as an example of that which in this country we are so proud and from which we have derived so much benefit. Those present had heard how an organisation of international reputation had been founded and developed by the courage, skill and enterprise of one man.

Biggest in the Country

Glasgow University's New Department

NEW buildings which have been erected at Glasgow University in the past six years, at a cost of about £2,000,000, were formally opened on 19 March by the Secretary of State for Scotland, Mr. James Stuart. The completion of the Chemistry Institute makes it probable that, in terms of sizes of buildings and numbers of students, the department is now not only the largest in the university, but also the largest chemistry department in any British university.

When the new chemistry building is fully occupied the teaching of chemistry will be centralised. Two groups of buildings were erected before the war and the post-war group completes the institute. It is expected that the three blocks will meet all the needs of the Department of Chemistry likely to arise in the foreseeable future.

The central block and the organic chemistry wing were first put into commission in 1940, although for reasons connected with the use of some of the rooms to meet temporary needs they are only now being completed.

It is Glasgow University's boast that chemistry has been taught there since 1747, when the first lecturer, William Cullen, was appointed to give instruction to medical students. Instruction in practical chemistry was not given until the early part of the 19th century. The first Regius Professor, Thomas Thomson, who was appointed to the chair in 1818, had already conducted laboratory classes in Edinburgh.

The octagonal laboratory at the university, which is being used for the last time during the present term, was modelled on the abbot's kitchen at Glastonbury.

At Antwerp oil refinery (jointly owned by the Anglo-Iranian Oil Co. Ltd., and Petrofina) work has begun on a catalytic cracking plant and a catalytic polymerisation unit. The Porto Marghera Refinery, Venice, jointly owned by the Anglo-Iranian Oil Co. Ltd. and Azienda Generale Italiana Petroli, will produce lubricating oils for the first time now that acid and clay treatment units have been completed. These units will produce 15,000 tons of lubricating oils a year.

Practice & Patience

Essentials in Training a Perfumery Chemist

'TALKING of Perfumes Again,' at a recent meeting of the Society of Cosmetic Chemists, Mr. J. Pickthall said that the lack of descriptive words made discussion of perfumery very difficult. Such words as top or back notes, light and heavy notes, and warmth of odour were sadly lacking in descriptive properties, even between experts, while to employ chemical terminology, e.g., aromatic, aldehydic or phenolic was not much better, considering the number of organic chemicals which qualify for the description 'aromatic.'

Long and arduous practice and patience were essential for a perfumer. The first step was to learn the odours of certain standard oils, and to be able to recognise them whenever they occurred. One of the best means of doing this was to work as an analyst in a fine chemical laboratory, where association of events tended to 'fix' compounds in the memory. There were four floral perfumes which occurred repeatedly in bouquets or fancy perfumes. These were Rose, Jasmin, Lilac and Muguet, and a crude formula for these could be made up from mixtures of phenyl ethyl alcohol, hydroxycitronellal, geraniol, geranium oil, terpineol, amyl cinnamic aldehyde, benzyl acetate, linalol, linalyl acetate and traces of musk ketone. The making up of the floral notes from these basic ingredients afforded very good practice for the trainee in illustrating how variation of the proportions of basic notes leads to inflexions in the final odour.

Training Technique

One of the finest training techniques was the matching or imitation of an existing perfume. Some information could be obtained by chromatography, fractional distillation, etc. This, of course, took no notice of any chemical blending which might have taken place, as for example, group exchange between alcohols, and the formation of hemi-acetals. In effect, this meant that a perfect match was rarely achieved; at best a satisfactory imitation could only be obtained by a route quite different from that used by the originator. Points to find out were selling price, origin and use, which gave certain clues.

Then followed use of smelling slips to determine rates of evaporation, and the use of the back of the hand as a steam distillation unit by rubbing the perfume on to it. This speeded up the evaporation and by using these processes it was relatively simple for an experienced perfumer to strip a perfume of its fineries and get down to basic ingredients. Each perfumer had a 'peculiarity' note personal to his art, which might be, for instance, a 'cardboard' note signifying a heliotropin-vanillin combination, a 'wet bathing costume' one indicating the presence of the anisyl odour grouping and a 'plasticine' smell suggestive of amyl salicylate.

Fixation was simply a retarding of the rate of evaporation of the constituents of a mixture of volatile substances. In an ideal case of a mixture of ingredients all strong in odour and possessing identical, low vapour pressures, no fixative was necessary, but in actual fact, one blend would contain many substances of varying vapour pressure, and the problem was to make sure that the more volatile ingredients were not lost too readily.

From theoretical considerations based on Raoult's law, it was apparent that an effective fixative would have three distinct and important requirements:

(a) low molecular weight
(b) low vapour pressure
(c) molecular attraction for the other constituents.

Fixative effects might be present by virtue of the composition of a blend; e.g., by dilution phenomena, or by chemical blending, e.g. formation of hemi-acetals between aldehydes and alcohols, and Schiff's bases from aldehydes and amines.

If the chemical aspects of molecular attraction were considered it would appear to indicate that certain hydrogen bonding effects would explain the very good fixative properties of benzyl benzoate. It was possible, of course, to obtain fixative effects with non-polar materials, such as paraffin wax, but although such a material might bring about the effect by solid solution, hydrogen bonding phenomena could not be entirely ignored.

Division of Interests

Du Pont & I.C.I. Plans Approved

MORE than a year ago final judgment was given in New York in the lawsuit under which E.I. Du Pont de Nemours & Co. Inc. and Imperial Chemical Industries Ltd. were accused of conspiracy in restraint of trade and were ordered to separate their joint manufacturing and trading interests in Canadian Industries Ltd., Duperial Brazil and Duperial Argentina (including its subsidiary Duperial Uruguay).

Segregation plans drawn up by the two companies in regard to Brazil and Argentine were eventually approved by the court and their effect has now been announced as follows:—

Brazil.—A new company has been formed by I.C.I., called Cia Imperial de Industrias Quimicas do Brasil. Duperial Brazil continues temporarily as a 100 per cent Du Pont company, but will change its name later. The Du Pont company takes over the explosives factory and the miscellaneous products section from the nitrocellulose products factory. This section is being transferred to the explosives factory.

I.C.I. Brazil takes over the nitrocellulose products factory, including the manufacture of leathercloth, thinners, lightning fasteners, smoke generators and 'Westropol' detergents. This factory will also take over the processing of pharmaceuticals from Laboratorio Farmaceutico Imperial. In addition, I.C.I. Brazil will retain the silicate of soda factory.

Argentina.—Du Pont are taking over the whole of the Duperial Argentina holding in Ducilo, a company which produces rayon, nylon yarn and cellophane. Duperial Argentina is thus retained as such under the same name by I.C.I. together with Duperial Uruguay (a subsidiary of Duperial Argentina).

The Duperial Argentina manufacturing interests are sulphuric acid, alum, 'Gammexane' mixtures, PF moulding powders, hydrogen peroxide, synthetic finishes, carbon disulphide and tartaric acid. I.C.I. will also take over Cartoucheria Orbea Argentina, which manufactures sporting ammunition, and the whole of Duperial's holding—50 per cent—in Electroclor, which manufactures anhydrous ammonia, caustic soda liquor, liquid chlorine, and a number of chlorine compounds. Duperial Uruguay, which also comes to I.C.I., manufactures phenothiazine and sodium hydrosulphide and manages Fabuca, another subsidiary of Duperial Argentina, making shotgun ammunition in Uruguay.

The division of the assets of the South American companies called for some financial adjustment between I.C.I. and Du Pont and in both Brazil and Argentina I.C.I. will be making some payments to Du Pont to adjust the balance between the two companies. This brings to an end a happy association between I.C.I. and Du Pont in Brazil, Uruguay and Argentina, which has lasted in the case of Argentina from 1933 and in the case of Brazil from 1936.

Canada.—In Canada progress has not been quite so rapid. The segregation of C.I.L. into two separate companies—one to be controlled by I.C.I. interests and the other by Du Pont interests—proved a matter of considerable complexity, due to the size and nature of C.I.L.'s business, the existence of outside stockholders holding preference and common stock in C.I.L., and legal and taxation considerations. Certain plans worked out by missions from I.C.I. and Du Pont are hoped, in the long run, to prove the basis of an equitable settlement which all the stockholders of C.I.L. can properly endorse.

US Progress Week

THE important role of the chemical industry in American life will be brought home to thousands of Americans in their own communities by members of the Manufacturing Chemists' Association during the first annual Chemical Progress Week, May 17-22.

Announcing this, the MCA president, Mr. William C. Foster, said: 'For the first time our industry will band together to explain, all at the same time, the contributions to the American people that are resulting from the progress of the chemical industry in terms of individual welfare.' On the basis that the best people to tell Americans about the chemical industry are their neighbours who work in it, most of the Chemical Progress Week programme will be carried out in the communities of the 5,000 or so plants of MCA member companies. Where there are two or more plants in a community, plant managements will be asked to form community committees.

Some Uses for Hydrazine

Of Growing Importance to Several Industries

HYDRAZINE plays an important part in organic synthesis, many derivatives finding useful applications in agriculture and pharmaceutical preparations and in the production of synthetic fibres. Fibre-forming and plastic materials have been prepared by heating bifunctional carboxylic acids with hydrazine, the reaction being carried out in closed conditions above atmospheric pressures, preferable temperatures being 220° to 280°. Such derivatives have 4-amino-1,2,4-triazole rings in their structures, and the fibres they form may be melt spun or spun from solutions of acetic or formic acid (BP. 612,609). Rigid plastic materials having a high proportion of cross linkages have been obtained by the action of hydrazine on polychlorocarbonates (BP. 613,280).

Thallophytocidal and fungicidal preparations have been manufactured from carriers containing hydrazine and inorganic salts (USP. 2,659,688) and organic derivatives such as phthalylhydrazine, or their halogen, nitro or amino derivatives, have found useful applications in fungicidal compositions. Miticidal preparations have also been prepared containing the dihydrazides of aliphatic dicarboxylic acid (USP. 2,663,664).

Tuberculostatic Activity

Organic thiosemicarbazones and the carbonohydrazides of thiazole and pyridine have been credited with tuberculostatic activity, examples being pyridine-4-carbonohydrazide, *iso*nicotinyl hydrazide and the 2-, 4-, and 5-thiazole carbonohydrazides. Such compounds have been prepared by the action of hydrazine hydrate in alcoholic media on the appropriate esters (Beyerman and Bontekoe, *Rec. Trav. Chim. Pays-Bas.*, 1953, **72**, 262). In the synthesis of thiosemicarbazides, facile methods have been provided by reacting slightly alkaline solutions of hydrazine with various dithiocarbamates (USP. 2,657,234).

In the synthesis of thiadiazole and complex phthalazine derivatives, hydrazine has proved an invaluable reagent; thus with carbon disulphide it reacts to give the corresponding 1,3,4-thiadiazole-2,5-thiol, which on oxidation with potassium permanganate gives the appropriate sulphonic acid. The more complex triazole derivatives have been obtained by treatment of 1-hydrazinophthalazine with acetyl chloride, formic acid or benzoyl chloride (BP. 629,177).

At elevated temperatures and pressures hydrazine reacts in a novel manner with carbon dioxide to give 1,2,3,4-tetrahydro-3,6-diketo-1,2,3,4-tetrazine. This reaction is effected at between 150° and 250° and at between 50 and 1,500 atmospheres. In this reaction, the carbon dioxide, being acidic in nature, appears to form an intermediate monohydrazide of carbonic acid, loss of water at the hydroxyls and amino groups giving the appropriate tetrazine.

Reacts with Lactonic Structures

Hydrazine also reacts with lactonic structures such as β-propiolactone and ethylene oxide to give in the first case ring structures like the 3-pyrazolidones, the appropriate 1-alkyl or aryl derivative being prepared from the corresponding hydrazine compounds. The reaction may be understood assuming the intermediate formation of a hydrazide of β-hydroxypropionic acid, loss of water yielding 3-pyrazolidone (BP. 650,911). In an analogous manner hydrazine reacts with ethylene oxide to give hydroxyethylhydrazines.

In ethylene modified cellulose derivatives, hydrazine hydrochloride has been employed as a catalyst. Such modified cellulose derivatives have been prepared by heating cellulose acetate, nitrate and propionate with such polymers as polythene, polyvinyl chloride or alcohol at elevated temperatures and pressures, in the presence of hydrazine salts (BP. 604,708). As a softening agent for textiles, the reaction products of long chain fatty acid hydrazides and glucose in acetic acid media have found useful applications, the material being padded in solutions containing these derivatives. Azines of fluorenone have been used as antioxidants for vinylidene chloride copolymers, being produced by the action of hydrazine on fluorenone in the presence of an acid catalyst (BP. 701,996).

Prices for Unrefined & Refined Oils

Changes Announced by Minister of Food

CHANGES in the prices of unrefined oils allocated during the current allocation period have been announced by the Minister of Food, as follows:—

PRICES OF UNREFINED OILS TO PRIMARY WHOLESALERS AND LARGE TRADE USERS DURING THE FOUR WEEKS WHICH BEGAN 21 MARCH, 1954

Coconut oil	Crude and crude oleine	from £138	to £124	Per ton naked ex-works
Palm kernel oil	Crude and crude oleine	,, £137	,, £123	
Cottonseed oil	Crude	,, £144	,, £143	
	Washed	,, £154	,, £153	
Groundnut oil	Crude	,, £157	,, £156	
Palm oil		,, £74/10	,, £76/10	Per ton c.i.f. in casks, to be returned.
		,, £74	,, £76	Per ton c.i.f. in loan drums.
		,, £73	,, £75	For ton c.i.f. in bulk
Herring oil	Crude	,, £85	,, £80	Per ton naked ex-works
Whale oil	Crude No. 1	,, £90	,, £85	
Whale/Herring oil	Crude hardened up to 42°	,, £102	,, £97	
	46°/48°	,, £103	,, £98	
	50°/52°	,, £104	,, £99	Per ton naked ex-works
	54°	,, £104/10	,, £99/10	
Iodine value 3/5		,, £104/10	,, £99/10	

The Minister has also announced that the changes listed below will be made in the prices of refined oils for the three week period 18 April to 8 May, which is the final period before decontrol. These prices have been announced earlier than usual to enable traders to place their orders for this final period well in advance.

As a further measure to ensure that pressure on processing and delivery facilities during the final short period of three weeks does not cause any hold up in supplies, trade users and wholesalers will be able to obtain advance deliveries against their entitlement at any time after 4 April. Trade users and wholesalers have already been notified that their entitlement for this period will be one-half of the total quantity (including supplementary issues) which they are authorised to obtain during the current eight-week period ending on 17 April. They should note, therefore, that this quantity (or alternatively, one-third of their total entitlement for the eleven weeks 21 February to 8 May) is the maximum that they will be able to obtain at the new prices.

PRICES OF REFINED OILS TO PRIMARY WHOLESALERS AND LARGE TRADE USERS DURING THE THREE WEEKS 18 APRIL TO 8 MAY, 1954 (FINAL PERIOD BEFORE DECONTROL)

Coconut oil	Refined deodorised	from £152	to £136	Per ton naked ex-works
	Refined hardened deodorised	,, £159	,, £144	
Palm kernel oil	Refined deodorised	,, £149	,, £133	
	Refined hardened deodorised	,, £156	,, £141	
Cottonseed oil	Refined deodorised	,, £172	,, £171	
Groundnut oil	Refined deodorised	,, £177	,, £176	
	Refined hardened deodorised to 40°	,, £193	,, £192	
	50°/52°	,, £194	,, £193	
Palm oil	Refined deodorised	,, £102	,, £103	
	Refined hardened deodorised	,, £111	,, £112	
Whale oil	Refined hardened deodorised to 42°	,, £109	,, £102	
	46°/48°	,, £110	,, £103	

Portuguese East Africa Find

Rich deposits of titanium have been found on the banks of the Inkomati River at Villa Luisa, 20 miles north of Lourenco Marques. A company has been formed by Mr. Bruna Fernandes, the Portuguese prospector, in collaboration with the Union Carbide and Carbon Corporation of New York, to recover the ore in quantity.

Gold Stolen from Safe

Granulated gold, weighing 10 lb. and valued at £2,300, was stolen from a safe in the offices of May & Baker Ltd., Rainham Road, South Dagenham, during last week-end. The theft was not discovered until the staff arrived on Monday morning. A drawer in the works manager's office had been forced open and the safe keys taken from it.

CHEMIE UND TECHNIK DER VITAMINE. By Dr. Hans Vogel, revised by Dr. Heinrich Knobloch. 3rd Edition, Volume II, Part II. Ferdinand Enke Verlag, Stuttgart. 1953. Pp. 160. DM. 26.00.

Previous reviews of this series (THE CHEMICAL AGE, 1951, **64**, 360; 1953, **68**, 639) have covered Volume I (the fat-soluble vitamins) and most of Part I of Volume II (the water-soluble vitamins). The present review deals with the rest of Volume II, Part I and with Part II, covering vitamin B_2 (riboflavin) and vitamin B_{12} (cobalamine).

The arrangement is the same as previously, the story of the vitamins being told under the familiar headings, vitamin B_2 in 98 pp. and B_{12} in about 100. The inclusion of vitamin B_{12} is very welcome, since it provides a comprehensive summary of extensive investigations on a natural product obtained in a crystalline condition as recently as 1948. The pharmacological aspect of this vitamin is especially fully covered.

Complete lists of international patents are again given, with copious references (totalling more than 1,500) to the original literature, which is covered up to and including 1953. The readable style has been maintained and the work is remarkably free from errors. The appearance of the subsequent parts of this volume will be eagerly awaited by all with an interest in the various aspects of the vitamins.—A. R. PINDER.

FOAMS: THEORY AND INDUSTRIAL APPLICATIONS. By J. J. Bikerman. Reinhold Publishing Corporation, New York; Chapman & Hall Ltd., London. 1953. Pp. 347. 80s.

Foams are agglomerations of gas bubbles separated from each other by thin liquid films. They can be formed either by dispersion, as by the blowing of soap bubbles or the injection of air into a frothing solution, or by condensation (or agglomeration), as in the formation of foam on beer or a boiling liquid where the dissolved gas molecules combine to form larger aggregates. The two main fields in which foams have been put to considerable industrial use are in firefighting and in froth flotation.

It has long been established that the use of foam provides the most effective means for extinguishing inflammable liquid fires of all types and sizes. The idea for the use of chemical foam as a fire-extinguishing medium originated in the early part of this century, but the principles involved in its formation and application have not appreciably altered since then. From a chemical standpoint subsequent improvements consisted primarily in the development of improved foam stabilisers to be used with the acid and carbon dioxide liberating chemicals. Mechanical foams came into prominence and general use in the USA during the last war. In this method the foam liquid—usually based upon a hydrolysed protein foam stabiliser—and also air are separately introduced into the water line so as to produce a foam consisting of about 90 per cent air, 9.4 per cent water and 0.6 per cent foam liquid by volume. Mechanical foams seem to have become generally accepted as vastly superior to chemical foam and attention has in the last few years been directed to the production of foams that are stable to alcohol vapour.

Froth flotation is a process of ore concentration involving the segregation of the minerals in an ore into concentrates containing the valuable mineral and a tailing containing the gangue components of the ore, which are usually worthless. Nearly a century ago it was observed that the wettability of sulphide and certain oxide mineral surfaces was changed by agitating ores with large quantities of fatty and oily materials. This treatment known as bulk oil flotation segregated the sulphide and oxide constituents of the ore in an oily layer. Later it was established that the oil content could be considerably reduced if air was also introduced

into the system Further developments led to the use of a wide range of chemical substances as frothers (these produce a froth of desired characteristics), promoters or collectors (these alter the surfaces of the minerals to be floated so as to cause them to adhere to the froth bubbles), and modifiers in the flotation process.

Conversely, apart from these examples where foams are put to important applications, there are many industrial operations involving liquids where the production of a foam is highly undesirable. Consequently, much importance is attached to the use of the most suitable antifoaming agent and a large variety of chemical substances are available for this purpose. Many factors enter into the choice of the best defoamer for a specific foaming problem. Thus in the production of antibiotics the defoamer must be stable during sterilisation and maintain its effectiveness throughout the whole period of aeration, and in food processing it must have no undesirable toxicological properties.

The present treatise is the only complete one on the subject of foams. About three-quarters of the book is devoted to a discussion of the chemical and physical properties of foams. In this section the fundamental characteristics of the formation and structure of foams, foam drainage, the methods available for the measurement of foaminess, and the optical, electrical and mechanical properties of foams are described in detail. The remaining part of the book deals with the commercial applications of foams, mainly in fire protection and in ore flotation, and with the inhibition of foams where their presence is undesirable.

The book contains extensive literature references and should be of great value to those engaged in industries where the use or destruction of foam is of major importance.—G.S.E.

ANNUAL REVIEW OF PHYSICAL CHEMISTRY. Vol. 4. Edited by G. K. Rollefson. Ann. Reviews Inc., Stanford, California. 1953. Pp. 493. $6.00.

The high standard of the previous volumes of the Annual Review is maintained in this latest one. Its contents include the following topics: Thermochemistry and the Thermodynamic Properties of Substances (J. W. Stout); Heterogeneous Equilibria and Phase Diagrams (R. H. Bogue and T. F. Newkirk); Solutions of Electrolytes (R. M. Fuoss and A. S. Fuoss); Solutions of Non-electrolytes (S. E. Wood); Isotopes (H. G. Thode); Radioactivity and Nuclear Theory (A. Turkevich); Quantum Theory of Molecular Structure and Valence (J. Lennard-Jones); Spectroscopy (G. B. B. M. Sutherland); Co-operative Aspects of Phase Transitions (B. H. Zimm, R. A. Oriani, and J. D. Hoffman); Experimental Molecular Structures (S. H. Bauer and P. Andersen); Experimental Crystallography (W. N. Lipscomb); Reaction Kinetics (H. Taube); Contact Catalysis and Surface Chemistry (C. Kemball); Photochemistry (E. R. W. Steacie and F. P. Lossing); Physical Properties of High Polymers (J. D. Ferry); Ion Exchange (W. Rieman, J. A. Marinsky and N. W. Rosenberg); Photosynthesis (R. Lumry, J. D. Spikes and H. Eyring); Microwaves and Nuclear Resonance (B. P. Bailey); Magnetism (P. W. Selwood).

It will be clear from the above list of topics and authors that most important physico-chemical topics have received expert treatment. In every instance extensive reference lists of the original literature are supplied, and, often, papers which are not readily available are usefully summarised in the text. Considerations like these make the 'Review' invaluable to both the general student and the specialist.—H. MACKLE.

Race Against Time

THE Bechtel-Wimpey organisation and an army of employees on the spot are working against time to ensure that the Anglo-Iranian Oil Co's new refinery at Aden will be completed by the target date—1 December.

It was for this reason that, when Sunvic Controls Ltd. were entrusted with the manufacture of the graphic control panel for the platforming unit, they were asked to do the work in a shorter time than usual. Delivery of the panel on site on the date planned was a vital part of the overall constructing programme. Due to excellent co-operation of the Bechtel-Wimpey engineers and the flexibility of the Sunvic organisation, not only was the work able to proceed before the final specification was available, but modifications were incorporated as construction proceeded and the Sunvic contribution to this important new oil refinery was delivered on time.

HOME

French Study 'Terylene'

A team of five French experts has been visiting Yorkshire and Lancashire studying the manufacture and processing of Terylene. They represent Societe Rhodaceta, of Lyons, who have been licensed to make Terylene in France by Imperial Chemical Industries, who hold the manufacturing rights for all countries outside the United States. The team visited the I.C.I.'s Dyestuffs Division at Blackley and a Lancashire mill as well as Terylene Council establishments.

Indicator for Iodine & Iodometry

Purkis, Williams Ltd., Brook House, Torrington Place, London, W.C.1, have announced that their Thiodene Indicator for iodine and idometry will in future be known under the registered trademark 'Thyodene'. The quality of the indicator is unchanged and the price is maintained at 7s. 6d. per 100 gram bottle. The announcement adds that bilirubin and biliverdin are now regularly produced by the company.

Yorkshire Potash Deposits

In the House of Commons last week Sir L. Ropner asked the Minister of State, Board of Trade, as representing the Minister of Materials, what arrangements were being made to mine the potash deposits at Aislaby, Yorkshire. Mr. Heathcoat Amery replied: 'This is primarily a matter for the two firms concerned. My noble friend is, however, keeping in touch with them. He understands that they are still examining the difficult financial and technical problems involved.'

Sequel to Slump in Lanolin

The public examination took place in Bradford Bankruptcy Court on 17 March of Richard K. Curtis, who traded as J. Best & Co., Otley, and the Keighley Paint Co., both companies being started early in 1952. There were unsecured liabilities of £2,136, with assets nil. Curtis attributed his failure to a sudden slump in the lanolin market early in 1953. The assistant official receiver applied for an indefinite adjournment of the hearing, submitting that Curtis's statement was 'extremely unsatisfactory' and his records 'worthless.' The hearing was adjourned until 12 May.

Air Pollution Campaign

In its campaign to prevent complaints regarding bad odours emanating from its Stanlow refinery, Shell plan to spend £50,000 this year. A staff of 20 voluntary observers, all living in districts surrounding the refinery, are co-operating with the firm. If their weekly reports reveal a smell which can be traced to the refinery Mr. R. Robb, the man in charge of the project, takes steps to put the matter right. Mr. Robb also maintains his own watch in the refinery and £48,000 has already been spent in modifying plant to prevent air pollution.

University Graduates & National Service

When the Minister of Labour (Sir Walter Monckton) was asked in the House of Commons recently whether he would arrange for university graduates with high honours in science and mathematics to be given the option of doing two years' teaching service in a school or university instead of the normal National Service with the armed forces, he replied that he had no power to do so, but he thought the matter would be considered by the Technical Personnel Committee which met on 23 March.

Fellows & Associates

The 1950 edition of the Register of Fellows and Associates of the Royal Institute of Chemistry contained particulars of 11,545 corporate members; the 1952 edition, just published, contains 12,637 entries. The body of the register consists, as before, of an alphabetical list of the names of all persons who were corporate members at 31 October, 1952, together with their qualifications, addresses and occupations. Amendments to such particulars notified by 15 January, 1953, have been incorporated. No entries have been added for members elected after 31 October, 1952, nor have the entries of persons who ceased to be members after that date been deleted, but the words 'since deceased' have been inserted after the particulars of members whose deaths were notified before the end of June, 1953. Application for copies of the register should be made to the Institute at 30 Russell Square, London, W.C.1.

• OVERSEAS •

Polish Nitrogen

Production has been started at the largest and most modern nitrogen factory in Poland, situated at Kedzierzyn (Opole Voivod). The factory is expected to supply thousands of tons of artificial fertilisers for use in agriculture.

'Fog' to Fight Pests

Hungarian plant pest specialists are experimenting with a new method of spreading protective liquids and powders on crops. The insecticides are shot high into the air under high pressure by motor equipment and then descend in the form of fog which covers the plants completely.

Israeli Cement Production

Production of cement in Israel has become an important earner of hard currency. An order from USA military authorities for more than 1,000,000 tons will assure the full production of all the cement factories in Israel for a long time. The present rate of production—550,000 tons a year—is expected to be increased shortly.

Improved Mining Processes

As a result of an improvement in mining processes, the Israel Mining Corporation hopes to produce 30,000 tons of iron a year from 45,000-50,000 tons of pyrites from local mines.

Oil in Turkey

The Turkish Government's new oil Bill, permitting the exploitation of Turkey's oil resources by local and foreign private enterprise, has been approved by the National Assembly. Companies tapping oil must sell in Turkey the amount of petrol needed to meet the country's requirements, including those of crude oil, which would be refined in refineries to be established in the country later.

Filling the Holes

A new method of filling holes in teeth is attributed to two American chemists working in the Jewish Hospital, Brooklyn. Using collagen and chondroitin sulphate, they have made a compound which, when inserted in a cavity, is claimed to behave like a piece of growing tooth and takes up from the blood supply to the tooth those salts, like calcium and phosphates, which are normally built into the growing tooth.

Exporting Glycerine

The Japan Soap Manufacturers' Association has announced that soap manufacturers in Japan are negotiating the export of 300 tons of glycerine to Spain, due to rapidly accumulating stocks.

Explosives for Bolivia

In cooperation with the Chacur Group, the Bolivian government is to build an explosives plant, it is reported. Although no date for completion has been announced, it is known that the government have a majority holding, and are anxious for construction to be carried out as rapidly as possible.

Far Flung Fertilisers

Two phosphoric acid plants are being constructed by the Dorr Co. in two widely separated parts of the world. At Minimata in Japan, plant is being erected for the Shin Nippon Chisso Hiryo KK; and at Odda in Norway, for Det Norske Zinkkompani AS.

Italian Refinery on Stream

The largest Italian-owned refinery in Italy, that of the 'Condor' Società per l'Industria Petrolifera e Chemica, is now in operation near Milan. Designed for a throughput of 1,800,000 tons a year, this refinery will produce more propane and butane than any other Italian plant.

Dry Ice in the Desert?

It is announced that the Saudi Arabian government plans to establish a factory for the manufacture of ammonium sulphate and dry ice, with an annual capacity of 400,000 metric tons of ammonium sulphate and 500 metric tons of dry ice. The raw materials will be natural gas from the country's oil fields and gypsum and anhydrite from deposits near Al Kharj.

Congo Uranium Ore

Following news that Belgian scientists at Brussels University have evolved a new uranium ore extraction technique, the Belgian Government is reported to be making arrangements to ensure that it obtains adequate supplies of ore from the Belgian Congo for its own use. It is hoped that the Belgian demand for the metal in connection with the new pile being erected near Antwerp will keep the Belgian Congo mine in adequate production.

• PERSONAL •

MR. A. E. SKAN was elected chairman of the British Plastics Federation at a council meeting following the 19th annual general meeting in London on 17 March, in succession to MR. C. S. DINGLEY. MR. C. C. LAST was elected vice-chairman, and MR. H. W. GRAESSER-THOMAS was re-elected honorary treasurer. Mr. Skan is a director of Tufnol Ltd., George Ellison Ltd. and Alfred Ellison Ltd., a trustee of the Plastics Industry Education Fund and a member of the council of BEAMA.

MR. F. N. JUDSON, who has completed 40 years' service with Vacuum Oil Co. Ltd., has been general sales manager responsible for industrial marketing since May, 1952. He was manager of the company's first personnel department and subsequently held branch managerial and other positions in different parts of the country. In 1925 he left the company to join Vacuum Oil Co. Inc., New York, as assistant general manager in China, but returned four years later.

DR. H. W. CLARKE, managing director of James Booth & Co. Ltd., who has been prominent in the non-ferrous metal industries for many years, has been selected by the council of the City & Guilds of London Institute to receive one of the annual Insignia Awards in Technology given in respect of each of the five main industrial groups. He is founder-president of the British Non-Ferrous Metals Federation and was a pioneer in the commercial production of Duralumin. He holds various City & Guilds certificates in metallurgical subjects and was awarded an honorary doctorate by the University of Birmingham for his services to the industry.

In recognition of his services to the Italian glass industry, DR. B. P. DUDDING, vice-chairman of the advisory scientific panel of the G.E.C. research laboratories, has been awarded an honour by the Italian Government. He will become an Ufficiale of the 'Ordine al Merito della Repubblica Italiana.' Dr. Dudding was president of the Society of Glass Technology in 1934 and of the Second Congress on Glass held in England in 1936. He received the honorary degree of Ph.D. from Sheffield University in 1939. In 1921 he was elected a Fellow of the Institute of Physics and in 1936 a Founder Fellow of the Society of Glass Technology. He became hon. secretary of the Institute of Physics in 1946 and hon. secretary of the International Commission on Glass in 1950. Last year he was president of the International Commission on Glass.

MR. HARRY B. MCCLURE has been appointed president of Carbide and Carbon Chemicals Co., a division of Union Carbide and Carbon Corporation, in place of DR. J. G. DAVIDSON, who becomes chairman of the company and a member of the appropriations committee of Union Carbide. Dr. Davidson is also a vice-president of Union Carbide and Carbon Corporation. For the past 20 years Mr. McClure has been concerned mainly with the development of new chemicals. In 1948 he was awarded an honorary D.Sc. degree by Morris Harvey College, and in 1950 received the first honour award of the Commercial Chemical Development Association for valuable service to the chemical industry.

The centenaries of Paul Ehrlich and Emile von Behring were celebrated simultaneously in Bonn, on 14-15 March. During the celebrations, HERR HENNIG, a member of the Government of Hesse, announced the foundation at Frankfurt University of a Paul Ehrlich chair of chemical therapy, and SIR HENRY DALE, representing the British Medical Research Council, handed over to the Paul Ehrlich Institute documents connected with the scientist, including the original award of his Nobel prize. The Paul Ehrlich prize for 1954 was presented to PROFESSOR ERNST BORIS CHAIN, for his distinguished part in the development of antibiotics.

PROFESSOR PAUL KARRER, director of the Chemistry Institute, University of Zurich, has been elected an honorary fellow of the National Institute of Sciences of India. Among those elected ordinary fellows were DR. S. K. BHATTACHARYA, assistant professor of chemistry, Institute of Technology, Kharagpur, and DR. S. GHOSH, professor of chemistry, University of Allahabad.

DR. A. M. MCKAY, who joined the Billingham-on-Tees Division of Imperial Chemical Industries Ltd., 20 years ago, has been appointed personnel director and takes up his new duties on 1 April. He has been deputy chief engineer for four years. MR. C. M. WRIGHT, who has been personnel director at Billingham, has been appointed chairman of Wilton Council.

At a meeting of the Midland Institute of Mining Engineers at Doncaster on 1 April, MAJOR T. W. ADAM, managing director of the Monckton Coke & Chemical Co. Ltd., is to be presented with the Peake Medal. This award, for distinguished service to mining engineering, has been presented on only four previous occasions, the first holder being SIR WILLIAM GARFORTH in 1917.

VISCOUNT WAVERLEY, a director of I.C.I., recently presented long service awards to 117 of the company's employees at the Ardeer factory, Stevenston, Scotland. The longest serving recipient was MR. FRED PEPPER, who recently retired after 48 years' service.

H.R.H. THE DUKE OF GLOUCESTER has consented to be patron of the Society of Engineers (Incorporated), which celebrates its centenary this year. The society—the only one covering all branches of engineering—has a separate division in Australia, where the Duke was Governor-General in 1945-47. The hon. secretary of the Australian Division, MR. A. S. LINDSAY, was presented to H.M. the Queen at the recent royal garden party at Sydney.

The vacuum products activities of Metropolitan-Vickers Electrical Co. Ltd. has been merged with the New Products Division, which has been renamed the Scientific Apparatus Department, with officers as follows:—sales manager, MR. J. W. BUCKLEY; assistant sales manager, MR. W. J. BROWN; chief engineer, MR. J. BLEARS; assistant superintendent, MR. R. S. CLARK.

MR. T. CORLETT MITCHELL, who has been appointed a director of Plant Protection Ltd., has been a director of Scottish Agricultural Industries since 1951 and deputy chairman of Imperial Chemical Industries' central agricultural control since January, 1952.

Chemists are prominent among winners of top awards in this year's distribution of Kossuth Prizes in Hungary. The highest prize of £900 goes to ACADEMICIAN ALADAR BUZAGH, an eminent worker in colloid chemistry, who has been doing intensive work on the use of home-grown materials for the manufacture of paper, particularly the use of straw for cellulose. BELA OBERRECHT, chemical engineer, Industrial Medicine Research Institute, has been awarded £600 for his work in connection with the factory production of streptomycin.

Obituary

MR. JAMES MITCHELL KING, who has died in Edinburgh at the age of 74, was a former personnel director of the Nobel Division of I.C.I. He joined the Glasgow staff of Nobel's Explosive Co. Ltd. in 1900 and was secretary of that company for some time. When Nobel Industries Ltd. was formed in 1921 he was transferred to the London headquarters, where he did much valuable work before and after the formation of I.C.I. Mr. King was appointed first secretary of the I.C.I. staff pension fund in 1927 and later became head of the pension department. He retired in 1944.

The death occurred on Sunday, 21 March, of DR. MARSTON BOGERT, emeritus Professor of Organic Chemistry in Columbia University. He was 85. After some years as a tutor, he was appointed to his chair at Columbia in 1904, and continued there 35 years until his retirement. During the 1914-18 war he was a member of the executive board of the National Research Council, and chairman of the division of chemistry and chemical technology. At the end of hostilities he declined an offer of a post as tariff commissioner, and later worked as a consultant to the Chemical Welfare Service. From 1926 to 1933 he was on the council of the International Union of Pure and Applied Chemistry, and began a second term in 1937 which ended only with his death. He was a former president of the American Chemical Society and Honorary Fellow of the Royal Society of Edinburgh.

The death has occurred of MR. HAROLD STEVENSON, aged 70, who for 25 years had been a director of R. P. Lawson & Sons, dyers, Collyhurst, Manchester, and works manager for 30 years.

Publications & Announcements

ISOPROPYL acetate is fully described in a new technical bulletin recently issued by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. It gives data on the physical and physiological properties of *iso*propyl acetate as well as its specifications, shipping data, resin solubilities, constant-boiling mixtures, and performance in nitrocellulose lacquers. *iso*-Propyl acetate is most widely used as a solvent in the protective-coatings industry, particularly in the preparation of nitrocellulose lacquers and also in coatings for paper and cloth. It is an extractant and crystallising agent in the preparation of pharmaceuticals and antibiotics. Copies of this technical bulletin (F-8295) are available on request from Carbide and Carbon Chemicals Company, 30 East 42nd Street, New York 17, New York.

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ONLY relatively recently has the presence of hydrogen in steel become the object of serious study, and the latest issue of the *Murex Review* (published by Murex Ltd., Rainham, Essex) contains a valuable addition to the literature of the subject: 'The Significance of Hydrogen in Steel Manufacture' by K. C. Barraclough, of the Brown-Firth Research Laboratories. This is a 44-page article, well illustrated, and with a number of up-to-date references.

* * *

THREE data sheets from Croda Ltd., Snaith, Goole, Yorks., describe recent additions to the 'Cithrol' range of dispersion agents. These are 'Cithrol A,' nona-ethylene glycol mono-oleate, which is a powerful non-ionising emulsifier of the oil-in-water class, and can be employed for emulsifying solvents, oils, fats, waxes and other materials; 'Cithrol 2.10,' polyglycol 200 di-oleate, which is dispersible in water, acetone, *iso*propanol, mineral oil, vegetable oils, toluene and ethyl acetate; and 'Cithrol 10MS,' polyglycol stearate, soluble in water, alcohol, acetone, toluene, ethyl acetate, and xylene, substantially soluble in white oil and insoluble in vegetable oils.

* * *

COURLENE, the monofil or multifilament yarn produced by Courtaulds from polythene, is the subject of a recently published booklet which describes its manufacture, properties, uses, etc. A tough, flexible thermoplastic material, Courlene is claimed to be exceptionally inert, resisting attack by most chemicals at normal temperatures. It does not absorb moisture and is unaffected by insects and bacteria. Monofils are in commercial production, but multifilament yarns are at present only available for development work. Copies of the booklet are obtainable from Courtaulds Ltd., 16 St. Martin's-le-Grand, London, E.C.1.

* * *

THE marketing of a new type of pressure-operated extinguisher in which chlorobromomethane, the new fire fighting chemical, is held with absorbed carbon dioxide under constant pressure, is announced by Nu-Swift Ltd., 25 Piccadilly, London, W.1. In an interesting brochure details are given of tests carried out on a petrol fire 2 sq. ft. in size. An old-fashioned quart size Nu-Swift hand pump, holding carbon tetrachloride, failed to extinguish the fire after 40 seconds pumping, but the pressure-operated chlorobromomethane extinguisher, of the same size put out a similar fire in 1½ seconds. Stated to be particularly effective on extra-hazardous risks, such as electrical equipment, switchgear, etc., and medium-sized organic solvent fires of all types common in laboratories, etc., this new extinguisher, less than 16 in. high, is marketed by Nu-Swift Ltd. under the registered trade name of 'Chloro-Flash.'

* * *

LATEST leaflets from A. Gallenkamp & Co. Ltd., 17-29 Sun Street, London, E.C.2, describe a glass thermostatic waterbath, with a control accuracy of $\pm 0.05°$, and an electrotitration apparatus with electron beam tuning indicator.

* * *

THE General Electric Co. Ltd. is marketing a conduit tube made in PVC which can be used for electrical installations, or parts of installations, where severe corrosive conditions exist. The tube can be manipulated and handled like steel conduit so that the wireman does not have to learn a new technique. Bends and sets can be made cold in the normal type of bending machine used by electricians and no heating is required, although a bending block is not recom-

mended as this would produce flattening. Threads can be cut with ordinary screwing tackle and no special dies need be kept for the purpose. So far as limits and size are concerned the tubing conforms to British Standard 31. When PVC tube is used a separate earth wire must be run to ensure satisfactory continuity. When it is supported by saddles these should be placed at closer intervals than for steel.

* * *

REVISED and extended to 600 pages, the British Plastics Year Book for 1954, published at 30s. by Iliffe & Sons Ltd., Dorset House, Stamford Street, London, S.E.1, remains the only classified guide to products and manufacturers in the plastics industry. Three of the nine sections are devoted to this information and also included is a list of trade and proprietary names connected with the industry, covering materials as well as finished products. A glossary of technical terms is included and among other features is a review of plastics patents.

* * *

ON its appearance for the sixth time, the Year Book of the Textile Institute includes in its 228 pages most of the features which have made it such a useful source of reference in the past. Lists of current textile literature, both of a general and of a specialised nature, are included, and standards relating to textiles are listed and described. The various tables include information on yarn count systems which has been found useful to the practical technologist. Copies of the Year Book are available to non-members of the Institute at 15s. post paid, on application to the Textile Institute, 10 Blackfriars Street, Manchester 3.

Fertiliser Advances

Developments in America

TECHNOLOGICAL and economic trends in the fertiliser industry were discussed at a symposium during the recent national meeting of the American Institute of Chemical Engineers in Washington, attended by over 1,200 members from all over the world.

Ammonium nitrate manufacture by a new process is in the pilot plant stage, according to J. J. Dorsey, Jr., of Commercial Solvents Corp., Terre Haute, Ind. The basis of the process is a reaction between preheated ammonia and nitric acid to yield a molten ammonium nitrate of the desired moisture level.

Continuous ammoniation of super-phosphate fertiliser by a new type of equipment, developed by the Tennessee Valley Authority in its research programme at Wilson Dam, Alabama, was described. The ammoniator has been successfully used with standard nitrogen solutions and with liquid and gaseous anhydrous ammonia, producing a granular product. Commercial adaptation was also said to be satisfactory.

High analysis granular mixed fertilisers of high ammonium nitrate content have also been produced by a continuous process described by S. J. Martens of E. Rauh & Sons Fertiliser Co., Indianapolis. Controlled mixing and reaction between the liquid and solid phases give a product that can be stored without caking.

Production of urea, a high-nitrogen fertiliser material, was described in a paper prepared by Lucien H. Cook, of Chemical Construction Corp., New York City. The principal features and advantages of the 'Chemico' process were said to be high efficiency of conversion of raw material into desired product and simple recovery of excess raw materials.

Factors influencing the changing technology of the fertiliser industry were outlined by F. A. Retzke, G. F. Saschsel and R. B. Filbert, Jr., of Battelle Memorial Institute, Columbus, Ohio. Improved productivity in manufacturing operations may enable the small plants of 50,000 tons annual capacity to continue as economic units, the authors implied.

German Chemical Exhibition

THE Achema Chemical Apparatus & Equipment Exhibition which is to be held in Frankfurt am Main from 14-22 May next promises to be twice as big as last year's exhibition. The exhibits will occupy all the available space in 11 halls in the Frankfurt Exhibition Grounds.

More than 600 firms from 12 countries will show their regular lines and their latest developments in the chemical apparatus and equipment field. There will be five main groups of exhibits: laboratory technique and practice; measuring control and regulating technique and practice; materials; operation and production technique; and new chemical end products.

British Chemical Prices

LONDON.—A fair demand persists in most sections of the industrial chemicals market, and the movement on home account, more especially against contracts, covers very good volumes. The supply position is without any acute problems, and buyers are having no difficulty in placing their spot requirements. With regard to prices, the only changes of note are in connection with lead compounds. The latest quotations are dry red lead £117 5s. per ton, litharge £119 5s. per ton, and dry white lead £124 5s. per ton. These prices came into operation on 23 March. Most of the coal tar products are in good demand with a fair export inquiry for creosote oil and cresylic acid.

MANCHESTER.—A fair weight of new inquiry has been dealt with on the Manchester market during the past week for the soda compounds and other leading bread-and-butter lines. Users in the textile and allied industries have been fairly prominent in this respect and other industrial outlets for heavy chemicals have also been in the market with replacement business. Contract deliveries have continued on reasonably steady lines. In the fertiliser section superphosphates and the compounds are going steadily into consumption, while in the by-products market a good demand has been reported for creosote oil, carbolic acid, and most of the light materials.

GLASGOW.—During the past week the steady trade in industrial chemicals which has been experienced over the last few weeks was maintained. Prices generally have remained steady with small increases in certain zinc and copper salts. The demand for agricultural chemicals has again been brisk and overall a very satisfactory week has been experienced.

General Chemicals

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

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

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

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

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—2 cwt. non-returnable drums ; 1 ton lots £58 per ton.

Ammonium Chloride. — Grey galvanising, £31 5s. per ton, in casks, ex wharf. Fine white 98%, £25 to £27 per ton. See also Salammoniac.

Ammonium Nitrate.—D/d, £18 to £20 per ton.

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

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

Antimony Sulphide.—Golden, d/d in 5-cwt. lots as to grade, etc., 2s. 2d. to 2s. 8d. per lb. Crimson, 3s. 4½d. to 4s. 5¼d. per lb.

Arsenic.—Per ton, £59 5s. nominal, ex store.

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

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

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

Bleaching Powder.—£21 per ton in casks (1 ton lots).

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

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

Calcium Chloride.—70/72% solid £12 10s. per ton.

Chlorine, Liquid.—£32 per ton d/d in 16/17-cwt. drums (3-drum lots).

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

Chromium Sulphate, Basic.—Crystals, £65 6s. 8d. per ton d/d U.K., in lots of 1 ton and over.

Citric Acid.—1-cwt. lots, 205s. cwt. ; 5-cwt. lots, 200s. cwt.

Cobalt Oxide.—Black, delivered, 13s. per lb.

Copper Carbonate.—MANCHESTER : 2s. 1d. per lb.

Copper Sulphate.—£74 per ton f.o.b., less 2% in 2-cwt. bags.

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

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

Formic Acid.—85%, £82 10s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G., £14 7s. 6d. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

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

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

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

Iodine.—Resublimed B.P., 16s. 4d. per lb. in 28 lb. lots.

Iodoform.—25s. 10d. per lb. in 28 lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight £122 per ton ; dark tech., 44 per cent by weight £67 per ton ex works 1-ton lots ; dark chemical quality 44 per cent by weight £109 per ton, ex works ; usual container terms.

Lead Acetate.—White : About £132 per ton.

Lead Nitrate.—About £112 per ton.

Lead, Red.—Basis prices per ton. Genuine dry red lead, £117 5s. ; orange lead, £129 5s. Ground in oil : red, £137 5s. ; orange, £149 5s.

Lead, White.—Basis prices : Dry English in 5-cwt. casks, £124 5s. per ton. Ground in oil : English, under 2 tons, £129 15s.

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

Litharge.—£119 5s. per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex works, £22 to £24.

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

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

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

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

Mercuric Chloride.—Technical Powder, 18s. 9d. per lb. in 5-cwt. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—23s. 3d. per lb., for 5-cwt. lots.

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

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

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, £127 10s. per ton, carriage paid.

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

Potash, Caustic.—Solid, £94 10s. per ton for 1-ton lots ; Liquid, £37 15s.

Potassium Carbonate.—Calcined, 96/98%, £59 10s. per ton for 1-ton lots, ex store.

Potassium Chloride.—Industrial, 96%, t-to. lots, £23 to £25 per ton.

Potassium Dichromate.—Crystals and granular, 11¾d. per lb., in 1-ton lots, d/d UK.

Potassium Iodide.—B.P., 14s. 10d. per lb. in 28-lb. lots ; 14s. 4d. in cwt. lots.

Potassium Nitrate.—Small granular crystals, 81s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 9½d. per lb. for 1-cwt. lots ; for 3 cwt. and upwards, 1s. 8½d. per lb. ; technical, £8 7s. per cwt. ; for 5-cwt. lots.

Salammoniac.—Dog-tooth crystals, £70 per ton ; medium, £67 10s. per ton ; fine white crystals, £21 10s. to £22 10s. per ton, in casks.

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

Soda Ash.—58% ex-depot or d/d, London station, about £14 3s. per ton.

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

Sodium Acetate.—About £80 per ton d/d.

Sodium Bicarbonate.—Refined, spot, £13 10s. to £15 10s. per ton, in bags.

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

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£75 15s. to £82 per ton.

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

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

Sodium Fluoride.—D/d, £4 10s. per cwt.

Sodium Hyposulphite.—Pea crystals £28 a ton ; commercial, 1-ton lots, £26 per ton carriage paid.

Sodium Iodide.—B.P., 16s. 4d. per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £127s. cwt.

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

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

Sodium Nitrite.—£31 per ton (4-ton lots).

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

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £81 ; tri-sodium, crystalline, £39 10s., anhydrous, £75 10s.

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

Sodium Silicate.—£6 to £11 per ton.

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

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

Sodium Sulphide.—Solid, 60/62%, spot, £30 17s. 6d. per ton, d/d, in drums ; broken, £31 12s. 6d. per ton, d/d, in drums.

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

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

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

Titanium Oxide.—Standard grade comm., with rutile structure £148 to £150 per ton ; standard grade comm., £135 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d : white seal, £92 10s. ; green seal, £91 10s. ; red seal, £90.

Solvents and Plasticisers

Acetone.—Small lots : 5-gal. drums, £136 per ton ; 10-gal. drums, £126 per ton. In 40/45-gal drums less than 1 ton, £101 per ton ; 1 to 9 tons, £98 per ton ; 10 to 49 tons, £96 per ton ; 50 tons and over, £95 per ton. All per ton d/d.

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

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

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

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

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

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

Diethyl Phthalate.—In drums, 10 tons, 1s. 10¼d. per lb. d/d ; 45 gal. drums, 1s. 11¾d. per lb. d/d.

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

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

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

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

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

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

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

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

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

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

Rubber Chemicals

Antimony Sulphide.—Golden, 2s. 3½d. to 3s. 1½d. per lb. Crimson, 3s. 4½d. to 4s. 5½d. per lb.

Carbon Bisulphide.—£60 to £65 per ton, according to quality.

Carbon Black.—6d. to 8d. per lb., according to packing.

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

India-rubber Substitutes.—White, 1s. 6½d. to 1s. 10½d. per lb. ; dark, 1s. 4½d. to 1s. 8d. per lb.

Lithopone.—30%, £50 per ton.

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

Sulphur Chloride.—British, £55 per ton.

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

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

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, March-June, £17 18s. 6d.

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

'Nitro-Chalk.'—£12 9s. 6d. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots, d/d nearest station, March to June, £26 12s. 6d. per ton.

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals. delivered in bulk, 90's, 4s. 10¾d. ; pure, 5s. 2d.

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

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

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

Naphtha.—Solvent, 90/160°, 4s. 10d. per gal. for 1000-gal. lots ; heavy, 90/190°, 3s. 9½d. per gal. for 1000-gal. lots, d/d. Drums extra : higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in sellers' bags, £14 12s. to £22 per ton, according to m.p. ; hot pressed, £28 per ton in bulk ex-works ; purified crystals, £53 per ton d/d.

Pitch.—Medium, soft, home trade, 160s. per ton f.o.r. suppliers' works ; export trade, 230s. per ton f.o.b. suppliers port.

Pyridine.—90/160°, 32s. 6d. to 35s. per gal. MANCHESTER : 42s. 6d. to 45s. per gal.

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

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

Intermediates and Dyes (Prices Nominal)

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

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

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

Dichloraniline.—2s. 8½d. per lb.

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

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

***p*-Nitraniline.**—4s. 5½d. per lb.

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

Nitronaphthalene.—2s. per lb.

***o*-Toluidine.**—1s. 7d. per lb., in 8/10-cwt. drums, drums extra.

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

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

Next Week's Events

MONDAY 29 MARCH

Society of Chemical Industry

Leeds: The University (Chemistry Lecture Theatre), 7 p.m. Yorkshire Section annual general meeting, followed by short papers by members.

Incorporated Plant Engineers

Leeds: The University, 7.30 p.m. West & East Yorkshire Branch meeting. Dr. K. J. Irvine: 'High Frequency Heat Treatment.'

WEDNESDAY 31 MARCH

Royal Institute of Chemistry

London: Chelsea Polytechnic, Manresa Road, S.W.3, 6.30 p.m. Joint meeting with Polytechnic Chemical Society. W. M. Lewis: 'Science in Criminal Investigation.'

THURSDAY 1 APRIL

Chemical Society

Aberdeen: Robert Gordon's College, 7.30 p.m. Joint meeting with RIC and SCI. Dr. J. R. Nicholls: 'Some Applications of the Newer Techniques in Analytical Chemistry.'

Institute of Metals

London: 4 Grosvenor Gardens, S.W.1, 6 p.m. Annual general meeting, followed by discussion on 'The Brittle Fracture of Metals.'

Institute of Welding

London: Polytechnic, Regent Street, 7 p.m. North London Branch annual general meeting.

Chatham: Sun Hotel, 7.15 p.m. Medway Section annual general meeting, followed by film display.

Incorporated Plant Engineers

Cardiff: Grand Hotel, Westgate Street, 7.30 p.m. South Wales Branch annual general meeting.

FRIDAY 2 APRIL

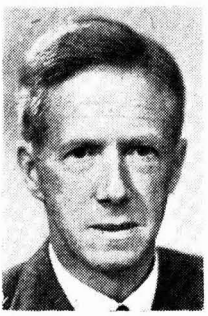
Society of Dyers & Colourists

Manchester: Textile Institute, 6.30 p.m. Manchester Section annual general meeting, followed by address by chairman, G. S. J White.

The Trade Marks, Patents and Design Federation has received a special donation of 150 guineas from the Dunlop Rubber Co. Ltd

Obituary

DR. EDWARD MORTIMER CROWTHER, head of the chemistry department of Rothamsted Experimental Station since 1927 and Deputy Director of the station since 1950, died suddenly on 17 March, aged 56. He went to Rothamsted immediately after graduating from Leeds in 1917, and was a pioneer in statistical methods of field experiment. Principally concerned with crop nutrition and soil fertility, he was largely responsible for the successful fertiliser rationing policy adopted during the last war. In addition to serving on the committees of the Ministry of Agriculture, the Agricultural Research Council and the Forestry Commission, he was a member of the Committee for Colonial Agricultural, Animal Health and Forestry Research, of the Sudan Government London Advisory Committee on Agricultural Research, and of the Research Advisory Committee of the Empire Cotton Growing Corporation. He was one of the editors of the *Journal of Agricultural Science* and the *Empire Journal of Experimental Agriculture*. In 1951 he was president of Section M (Agriculture) of the British Association, and in 1952 and 1953 of the British Society of Soil Science and of the Fertiliser Society. Only four days before he died he delivered a jubilee memorial lecture before the SCI at Cardiff.



MR. GEORGE ANDREW KEWIN DALRYMPLE, whose death has occurred at Spital, Bebington, at the age of 75, was chairman of Ayrton Saunders Ltd., manufacturing chemists, from 1946 until he retired in May, 1951. He joined the company as a director in 1925, having previously been partner in Banks & Dalrymple Ltd., Liverpool.

Change of Address

Mono Pumps Ltd. moved to larger premises on 18 March and are now located at 1 Sekforde Street, London, E.C.1. The new telephone number is Clerkenwell 8911. Telegrams should be addressed to 'Monopumps, Phone, London.'

Chemical & Allied Stocks & Shares

ACTIVITY in stock markets has not unnaturally quietened down because of the general tendency to await the Budget. The rise in British Funds, and also in many industrial shares in recent weeks, has been inspired partly by the assumption that it will be an incentive Budget bringing a cut in income tax and perhaps other tax concessions as well. It is realised that there is no large scope for tax cuts, but even minor ones would provide an impetus.

The market has been confidently predicting oversubscription of Imperial Chemical's huge £30,000,000 loan stock issue and continues to look for a premium of up to £2 over the issue price of par when dealings start. Imperial Chemical ordinary units have been active around 56s. 7½d. this week, at which there is a yield of over 5¼ per cent on the basis of the increased dividend of 15 per cent foreshadowed by the directors for the past year. Current opinion in the market is that there seems a possibility of a dividend of 9 per cent for the current year on the doubled capital that will result from the 100 per cent share bonus. When the shares go 'ex' the bonus later on, they may go over the 30s. level it is hoped in the market.

Monsanto 5s. shares have remained under the influence of the past year's results, and at 23s. 7½d. yield under 4¼ per cent, an indication of current confidence that in due course the dividend is likely to be increased further. Fisons changed hands around 44s., Yorkshire Dyeware & Chemicals 5s. shares strengthened to 8s. 9d., Reichhold 5s. shares have been firm at 8s. 4½d. while higher dividend hopes were reflected by Laporte 5s. shares at 14s. 4½d. The yield of under 3¾ per cent on Albright & Wilson 5s. shares at 20s. 4½d. was attributed to scope for a bigger dividend than last year's 15 per cent. Borax Consolidated at 46s. 6d. remained under the influence of the results and dividend increase to 11 per cent.

Hickson Welch 10s. shares were 11s. Brotherton 10s. shares showed firmness at 25s. 6d., awaiting results, while William Blythe 3s. shares changed hands around 8s. 1½d., and Greeff-Chemicals Holdings 5s. shares were 16s. 3d. Dunlop Rubber 10s. shares have strengthened to 20s. at the time of writing, following news of the company's plans for a £500,000 plant to make synthetic rubber. I.C.I. have also announced synthetic rubber plans.

The 4s. units of the Distillers Co. showed firmness at 19s. 1½d. in response to higher dividend possibilities, while United Molasses 10s. shares were 33s. 9d., Turner & Newall 74s. 6d., and elsewhere, Coalite & Chemical 2s. shares were 2s. 4½d. Plastics shares received more attention, though Bakelite 10s. shares eased to 25s. on the past year's lower profits. British Industrial Plastics 2s. shares moved up to 6s. 3d. following the full results and chairman's statement. Higher dividend possibilities put British Xylonite up to 32s. 3d.

British Glues & Chemicals 4s. shares changed hands around 11s. Triplex Glass 10s. shares kept steady at 22s. Boots Drug 5s. units were 24s. 6d. United Steel were 22s. 10½d. and became a firmer market following the chairman's annual statement which drew attention to the diversified interests and activities of this big steel group. Paint shares have failed to keep best levels, though International Paint 4s. units have been firm at 16s. 3d. on higher dividend talk, while Goodlass Wall 10s. shares held steady at 29s. 6d. for a similar reason.

Anglo-Iranian at £10⅝ have not held best levels, awaiting news of the proposed international company which will be controlled by the big oil groups and will distribute Persian oil if agreement is arranged with Persia. Market view is that the plan is that Anglo-Iranian would have a 40 per cent interest in the international company and be given compensation by the other big oil groups. It is partly because of this assumption that the market believes the long-hoped-for share bonus for Anglo-Iranian shareholders is likely this year.

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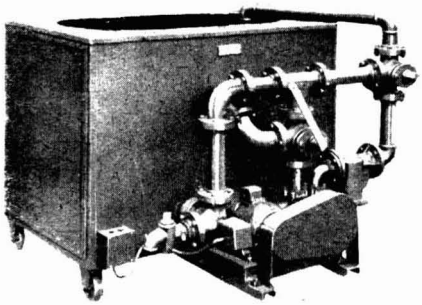

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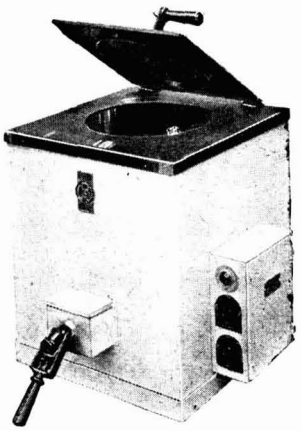

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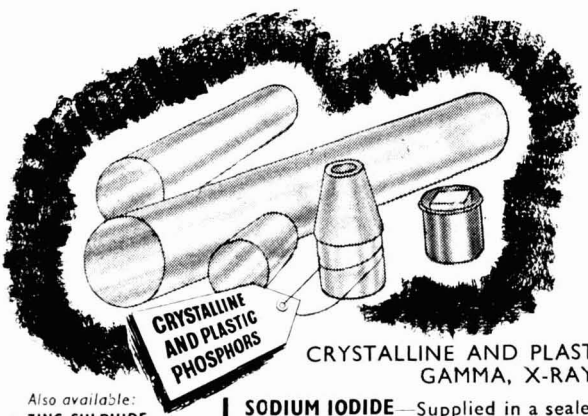

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CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

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THE Committee will, in July, allocate a limited number of Grants-in-Aid to young men and women employed in Chemical Works in or near London, who desire to extend their education for a career in Chemical Industry. Applicants must not be under 17 years of age and must have Matriculation or its equivalent.

Applications should be made as soon as possible, whereupon forms will be issued requiring particulars of age, nature of employment and the manner in which the Grant would be used.

The application forms should be received, completed, before May 31, 1954, by :—

THE CLERK OF THE SALTERS' COMPANY,
Salters' Institute of Industrial Chemistry,
36, Portland Place,
London, W.1.

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.

SENIOR SCIENTIFIC OFFICERS; SCIENTIFIC OFFICERS; PATENT EXAMINER AND PATENT OFFICER CLASSES. The Civil Service Commissioners invite applications for pensionable appointments. Applications may be accepted up to December 31, 1954, but early application is advised as an earlier closing date may eventually be announced. Interview Boards will sit at frequent intervals. The Scientific posts cover a wide range of scientific research and development in most of the major fields of fundamental and applied science. In biological subjects the number of vacancies is small; individual vacancies exist at present for candidates who have specialised in Palaeobotany, Foraminifera, Malacology and Lichenology. The Patent posts are in the Patent Office (Board of Trade), Admiralty and Ministry of Supply.

Candidates must have obtained a University Degree with First or Second Class Honours in an appropriate scientific subject (including Engineering) or in Mathematics, or an equivalent qualification; or for Scientific posts, possess high professional attainments. Candidates for Senior Scientific Officer posts must in addition have had at least three years' post-graduate or other approved experience. Candidates for Scientific Officer and Patent posts taking their degrees in 1954 may apply before the result of their degree examination is known.

AGE LIMITS.—Senior Scientific Officers, between 26 and 31, but specially suitable candidates under 26 may be admitted. For Scientific Officers and Patent Classes, between 21 and 28 during 1954 (up to 31 for permanent members of the Experimental Officer Class).

SALARY.—(London) Senior Scientific Officers : (men), £975-£1,150; (women), £845-£1,025. Scientific Officers : (men), £470-£855; (women) £470-£750. Patent Examiner and Patent Officer Classes (men), £440-£760. Women's rates under review. Somewhat lower rates in the provinces.

Further particulars from the **CIVIL SERVICE COMMISSION, SCIENTIFIC BRANCH, TRINIDAD HOUSE, OLD BURLINGTON STREET, LONDON, W.1 quoting** No. S.53/54 for Senior Scientific Officers and S.52/54, S. 128/54 for the other posts.
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ANALYTICAL CHEMIST required as Assistant in modern laboratory of works manufacturing a high quality inorganic product in Pembrokeshire. Age 25-35. Salary according to qualifications and experience. Housing assistance can be given if required. **BOX No. C.A. 3300, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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The salary range (male), is £875 to £1,033 per annum. Housing accommodation will be available within a reasonable period for the successful applicant, if married.

Application forms can be obtained from **THE ADMINISTRATIVE OFFICER, RECRUITMENT, ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, BERKS.** Please quote reference 49/W.G.E./38.

JOHNSON MATTHEY & CO., LIMITED, refiners of precious and rare metals, invite applications for the following appointments at their extraction works in the **NORTH LONDON** area.

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Write, giving full particulars of age, qualifications and experience, and salary required, to the **SECRETARY,** at **78 HATTON GARDEN, LONDON, E.C.1.**

YOUNG MEN of approximately 20 to 22 years who have completed National Service and who are in possession of Inter B.Sc., exemption in Mathematics, Physics and Chemistry, are invited to apply for interesting positions in industrial research laboratory. A limited number of vacancies occur in the fields of metallurgy and magnetic materials. The successful candidates must be prepared to work for a University Degree and should be of a standard which augers well for their gaining honours. Facilities exist for part-time study. Intending candidates should write in early since the demand for such positions is high. Apply to **STAFF MANAGER, RESEARCH LABORATORIES OF THE GENERAL ELECTRIC CO., LTD., EAST LANE, WEMBLEY, MIDDLESEX,** quoting Ref. RLS/241.

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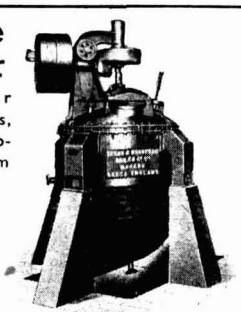

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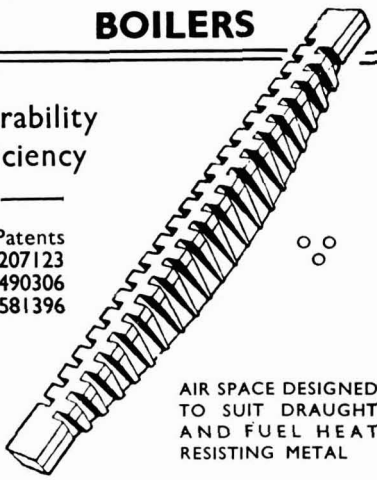

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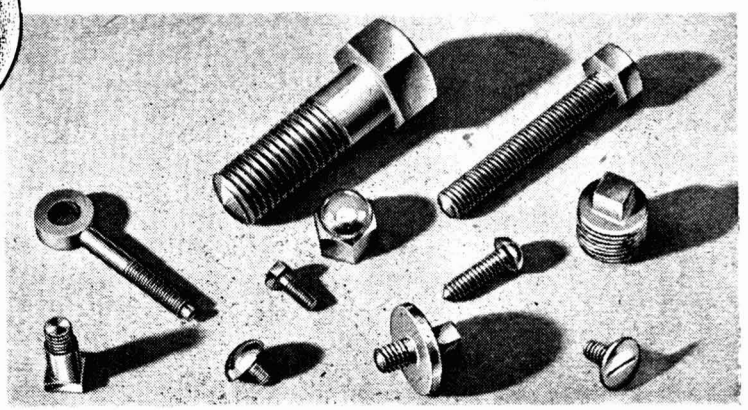

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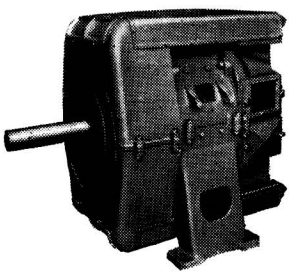

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