

# THE Chemical Age

VOL. LXXV

21 JULY 1956

No. 1932

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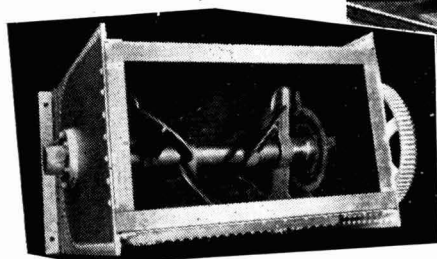
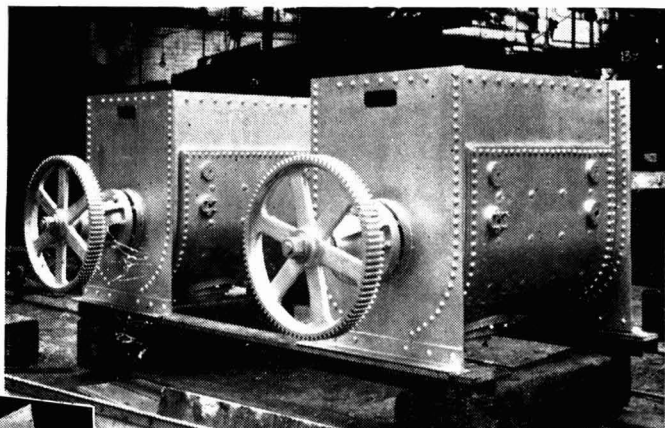
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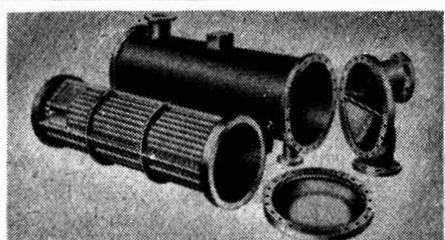
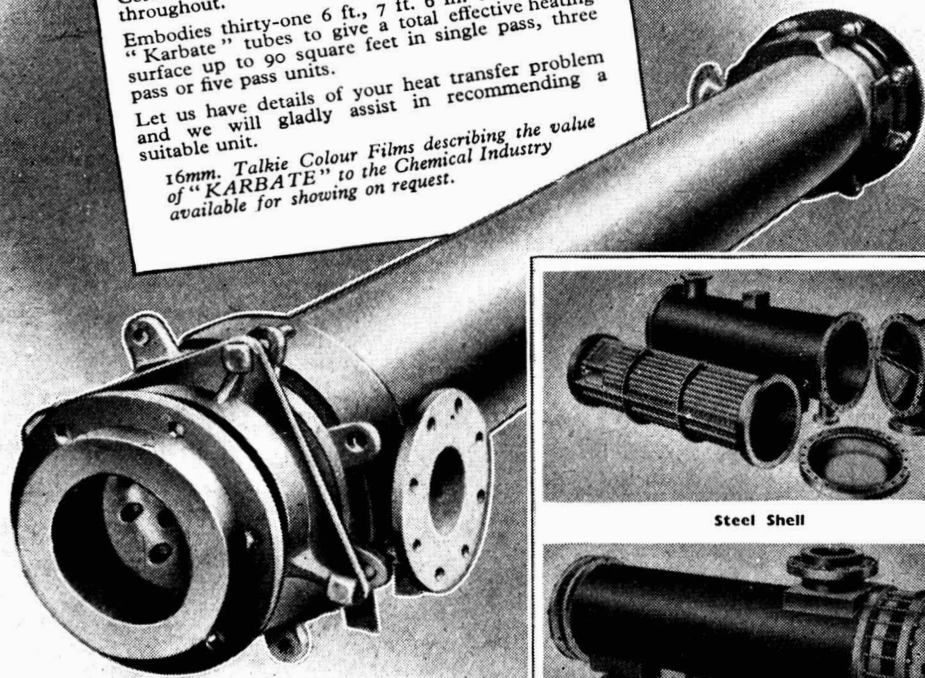
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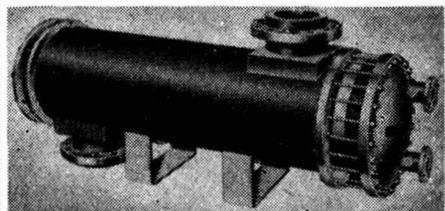
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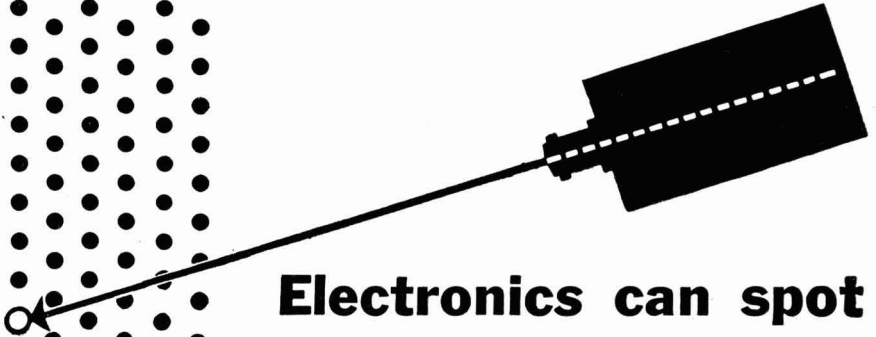
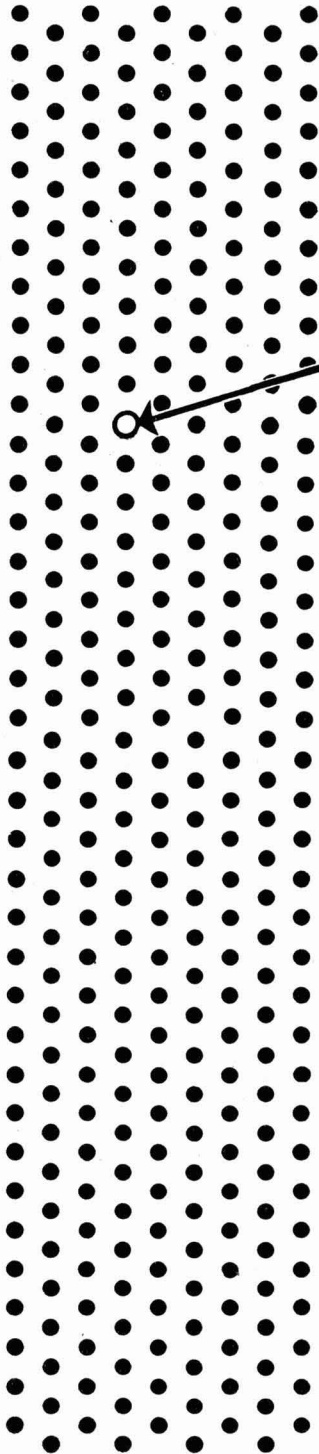
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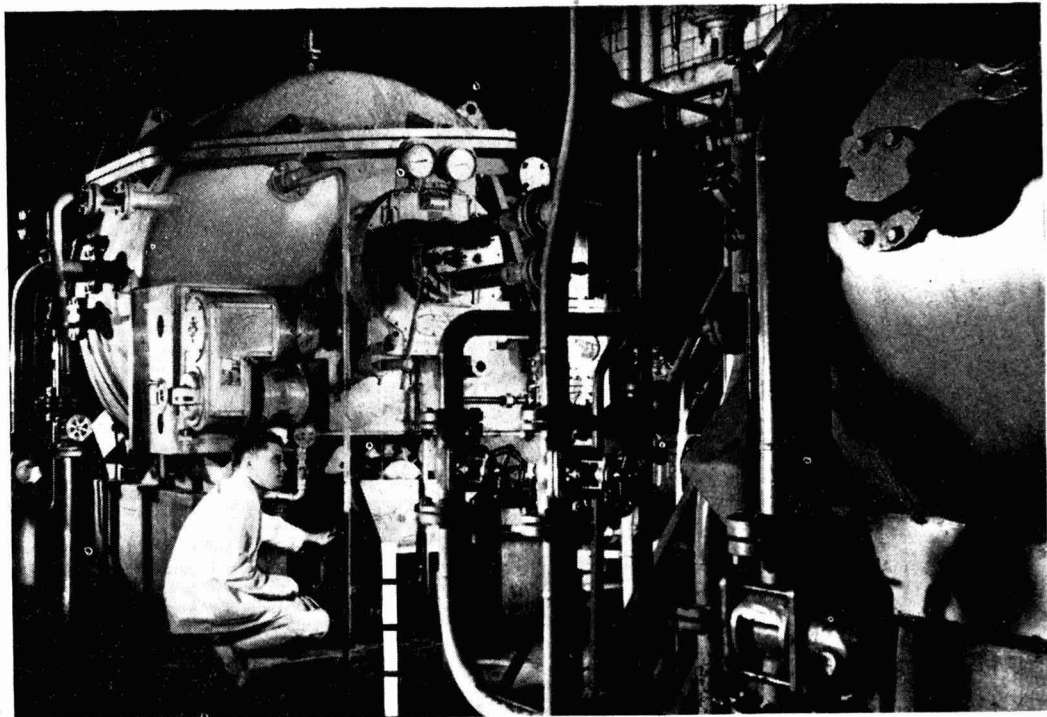
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# Automation and Auto-thinking

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IT IS a matter of urgent necessity to free the concept of automation from all the emotional flights of fancy with which it has become encrusted.' So run the opening words of the first article in the June issue of *European Productivity*, journal of OEEC European Productivity Agency. We could not agree more forcibly. Indeed, last year (THE CHEMICAL AGE, 1955, 73, 881-882) we devoted a leader to the same theme and said: 'It is the coining of a word that has brought illusion—in fact there is nothing new and certainly no date-line between a past without automation and a present suddenly blessed by it'. However, the issue of *European Productivity* referred to was a special one—an 'Automation Number'! Thus it was announced on the front-cover, and the fact stressed in colour to ensure that no one missed it. It is precisely this special treatment of automation that causes a good deal of the misunderstanding about it. Current thinking and current talking—and there is often a distinction—is frequently far more automatic than any process arrangements that are now being regarded as examples of automation.

The 'automation issue' of this OEEC publication does little as a whole to settle the confused eddies of dust. One contribution observes that 'earlier stages of mechanization may have been just as revolutionary in relation to preceding technology'. Another says that 'automation should not therefore be regarded as another form of technological progress. Actually it is a great new force whose consequences will be for good or ill according to the use made of it by mankind'. A third observes that 'automation is nonetheless a revolution . . .' Bring together these three extracts and the quotation used to start this leader and the variation of expert views could hardly be called invisible.

Sir Alexander Fleck's remarks at the annual general meeting of ICI Ltd. seem more to the point. The 'ungainly word' is new, the ideas behind it are not. 'In our industry we certainly do not regard these changes as revolutionary . . .' However, his comments have been given in these pages (THE CHEMICAL AGE, 1956, 75, 80), and it is hardly necessary to belabour the same reference. Last week when Lord Hailsbury addressed the Manchester Joint Research Council he described the term automation as nothing more than a 'verbal fad', and said that the apprehension it caused was largely due to the press and the trade unions working on each other's feelings. Any reality behind the word was simply the latest phase in a process of advancing mechanization which had been going on for 200 years.

Merely to cite all these different authorities and thus present a bewildering set of contradictory views can serve small purpose to those who are genuinely perturbed by what they have heard or read about automation. Fears, justified or not, have already germinated. It is a feature of our times that any new word has greatness—at any rate in the sense of usage—thrust upon it. Journalists, salesmen and advertisement copy-writers, politicians, radio and TV conversationalists, all, or most of them, seem readier to make a new social-economic word or phrase rapidly fashionable than models with new hat styles or new dress-lines. The damage has been done.

The twin 20th century fears are war and unemployment. The former has slightly receded during the past two years, but the latter has never been deeply buried, even during the long period of post-war labour scarcity. All the advances gained by labour (and here we use the word without its political meaning) since

1939 seem to be poised upon a fulcrum of full employment. This background to anxiety cannot be dispersed now by mixing the sermons about automation, for this will be looked upon as a capitalistic device for dividing and conquering, as a smoke-screen that covers the period during which automation can be steadily established and which, when lifted, will-reveal the *fait accompli* of unemployment.

Lord Hailsbury strenuously pleaded the cause of realism. Large-scale unemployment in the coal-mining industry between the wars was not caused by advancing mechanization in the mines. This is true enough, but it is not a deep analysis of the cause or causes of the 1930s depression and its tidal wave of unemployment. There is more justification for the view that this cycle of over-production began in Western agriculture with unsaleable surpluses of grain; this, too, had nothing to do with mechanization on the farms, or at any rate had much more to do with the economic world's arrangements for food distribution. By itself, mechanization has never created absolute unemployment. It may lead to temporary unemployment at particular factories or in particular departments, but the re-absorption of displaced man-power should not be difficult unless a country's general prosperity or industrial activity is declining. It is far more likely that such a state of decline will occur in Britain if cost-reducing introductions of mechanization are resisted so that our exported goods are unable to compete with those produced elsewhere. Why, then, is automation feared as a new threat?

Foremost cause of fear is labour's immobility. The costs of moving from one area to another are high. This cannot be complacently dismissed; few managements are unaware of it for it has been hindering the mobility of executive personnel throughout the post-war period. Can labour be readily re-employed if families cannot be readily re-housed? There is today an appalling lack of relationship between the rent payable for a council or other house covered by the Rent Restriction Acts and rents that are demanded for uncontrolled living accommodation. In this major sector of our domestic economy there is no economic

equilibrium, only a chaotic contrast between controlled and uncontrolled prices. The situation is aggravated intensely by the concentration of certain types of industry in specific areas, and the introduction of more mechanized assembly methods in areas where this kind of productive manufacture is concentrated must inevitably cause problems of re-housing as well as re-employing. The hardship in the former problem may be greater than in the latter. This finds little historical parallel. It was not the case when mechanization on a significant scale first penetrated industry. If other work elsewhere was available for redundant labour, there was little difficulty in finding suitable accommodation.

A further cause of fear is found in the relationship between age and opportunity. Middle-aged and older workers displaced at one factory by new mechanization have good reason to be apprehensive about their chances of re-employment elsewhere. The difficulties employment exchanges have faced in placing over-40's and over-50's, even during the years of acute labour scarcity, are well known, and it is hardly an exaggeration to say that this trend is nationally undesirable.

It is probably a sound argument that the increased extent of mechanization that is so alarmingly called automation will not be rapidly introduced, that its progress will be pace-determined by the supply of new capital and the supply of more highly-skilled technical operatives. But what, in brief, is bound to happen in every industrial country (except where labour is over-abundant and therefore exceptionally cheap) is that the demand to halt inflation and keep costs stable must hasten increased mechanization; any country not keeping up in this respect with the industrial Joneses will see its export trade shrink. It may be over-complacent, therefore, to believe that these changes will occur so slowly that their social and human effects can be steadily absorbed. There is an urgent need to face the irrelevant but very real problems of the re-housing factor and the age factor that stand in the way of re-employment. If these problems are evaded, there will indeed be areas of un-employment and areas of labour scarcity

# Low Pressure Polymerisation of Ethylene

A new approach to the low pressure polymerisation of ethylene has been foreshadowed in a recent note from Professor Nenitzescu and co-workers of the organic chemistry department of the RVR Academy in Bucharest, published in "Angewandte Chemie," 1956, 68, 438. This work is as

yet in a very early stage and it is not possible to say what its industrial implication may be. There is no doubt that further announcements from Professor Nenitzescu's laboratory will be awaited with interest in view of the possibility of a route to polythene, apparently independent of existing patents.

AMONG the simple olefines ethylene has the least tendency to polymerise and the older processes for polymerisation of ethylene, which is used on the production scale, requires pressures between 1,000 and 2,000 atmospheres and a temperature of about 200°C. For this reason the observation of K. Ziegler and his associates that ethylene may be polymerised at normal pressures and lower temperatures by use of aluminium alkyls is the most significant discovery which has emerged in the field of macromolecular chemistry during the last two decades.

It appeared interesting, from the theoretical standpoint, to determine the part played by the titanium tetrachloride used by Ziegler and his collaborators as an activator or co-catalyst. It seemed reasonable to suppose that an exchange reaction of the type well-known among organo-magnesium compounds took place between the aluminium alkyl and the titanium tetrachloride, with formation of an organo-titanium compound. This reaction may be formulated as follows (Ral = equivalent of aluminium alkyl):—



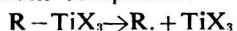
If this hypothesis were valid, then the true promotor of polymerisation would be the organo-titanium compound and the sole function of the aluminium alkyl would be to supply the alkyl radicals necessary to the formation of the titanium complex. The aluminium alkyl should then be replaceable by other reactive metallo-organic compounds. It would be the presence of a titanium compound which was essential to the polymerisation process.

In order to test this hypothesis, zinc diethyl, phenylsodium and isoamylsodium were used in that order. In all three cases a solid polythene resulted. Isoamylsodium appears to be the most efficient catalyst, though the other two alkyls were only slightly inferior. The procedure\* in the preliminary investigation was as follows.

The solvent used was a petroleum fraction with a boiling range of 150-200°C. By conventional procedure, sodium under nitrogen was finely divided in a sulphonation flask equipped with an efficient stirrer. Isoamyl chloride at a temperature of -10° was added drop by drop and cooling applied until the heat developed had dispersed. Titanium tetrachloride dissolved in the same solvent was then added slowly at about 20°C. The resulting solution was transferred to the polymerisation vessel and thinned with solvent to a volume of about 400 ml.; ethylene was then introduced. The speed at which ethylene is absorbed, itself great, is very dependent upon the efficiency of stirring. The temperature rises rapidly and is maintained by external cooling at 70°C.

In the experiments so far carried out, 0.5 g. of sodium (with other reagents in equivalent quantities) was used in 400 ml. of solvent; 125 g. of polythene were produced. The abatement in ethylene absorption towards the end of the reaction appears to be due to the highly viscous state of the reaction mass—which prevents effective stirring—rather than to decreased efficiency of the promotor. The polymerisation product was treated by addition of alcohol, followed by washing with weakly acid water and drying. The polythene obtained was a light, white, easily filterable powder.

It is not yet possible to decide whether the mechanism of the reaction is of a radical or anionic nature. In the first case, it would be presumed that free radicals and a compound of trivalent titanium would be formed by thermal decomposition of the unstable titanium compound:—



An anionic mechanism is thought to be less probable.

The detection of trivalent titanium would be an argument for the radical mechanism.

\* Patent applied for.

## Synthetic Fibres

### German Production Booms

WEST German synthetic fibre production amounted in the first four months of this year to about 85,400 tons, or 17 per cent above the figure for the last four months of 1955. In the field of fully synthetic fibres and synthetics, production was 4,900 tons, or 43 per cent above last year's figure. Despite this increase it has not been possible to fully meet the demand for the various new types of fibres.

The considerable expansion in West German production corresponds, of course, to the international trend.

Other synthetics and fully synthetic fibres have started to take their place beside the polyamides Perlon and nylon, which before the end of last year were still making up 90 per cent of the total synthetic fibre production of West Germany. Some of these fibres are the polyacrylic resin products—Pan, Dralon and Redon; the polyester synthetics and fibres, are marketed under the trade names Diolen and Trevira.

Production of synthetic fibres based on cellulose (rayon, cupra and acetate fibres) has increased by 16 per cent to 56,200 tons during the first four months of 1956 compared with the last four months of 1955. Rayon accounted for the largest proportion of this increase due to the favourable development of exports to the US. The Federal Republic and Britain are now the largest suppliers of rayon to the US.

### Rayon for Carpets

In the US, rayon is used in the production of gay-coloured tufted carpets, the manufacture of which (in pure rayon) has now been started in West Germany.

This particular application shows that the age of 'classical' synthetic fibres has by no means been passed. Again and again these fibres prove successful on the market because of constant discoveries of new fields of application.

In the case of synthetic fibres based on cellulose, increase in production during the same period was 15.4 per cent, i.e. 24,400 tons. This increase is largely due to the fact that flowing and silky materials are fashionable. Cord rayon is mainly used for tyres. Therefore its marketing prospects very much depend upon the future development of road traffic in the Federal Republic.

## Gas Analysis

### Determination of Small Quantities

DURING the course of certain experiments on fatigue and on the physiology of muscular work it became necessary to make rapid analyses of many small samples of respiratory gases (oxygen, carbon dioxide and nitrogen), says an article in the *Journal of Scientific Instruments*, July issue, by H. E. Lewis and O. C. J. Lippold of the Department of Physiology, University College, London.

Accordingly, a suitable apparatus was constructed in which a small bubble of the sample is injected into water in a chamber formed by two horizontal, parallel plates. When the bubble has formed it is accurately measured by means of an optical projection system. A suitable gas absorbent is then run into the chamber, displacing the water but not flushing out the bubble. The bubble rapidly decreases in size as the particular constituent gas is absorbed. A second determination is then made of the area of the bubble and the difference expressed as a percentage.

The optical system consists of a 12V, 36W bulb and condenser system which projects parallel light through the chamber. Above the bubble is mounted a 30mm. focal length, fully corrected lens with an aperture of  $f/1.9$ . This casts the image of the bubble onto the screen where it can be measured directly, or photographed on bromide paper.

It is claimed that this apparatus can measure volumes of the order of 0.1-0.001 ml. with an accuracy better than 0.3 volume per cent of the mixture when analysing respiratory gases.

## Coal Tar Technology

PRESENTING a broad and comprehensive picture of the field to which it is devoted and recording fresh and interesting data on a number of factors, *Review of Coal Tar Technology* (July-December 1955), Volume VII, part 2, can be recommended as a booklet well worthy of study. Published by The Coal Tar Research Association, of Oxford Road, Gomersal, near Leeds, it is available to both members and non-members of the Association, although in the latter case the price is 7s 6d. Sectionalised into two parts the volume is provided with a subject, author and patent index.

## NOTE & COMMENT

THERE IS certainly no recession in synthetic fibre output. Recent Board of Trade figures for May this year (*Board of Trade Journal*, 7 July) show a 4 per cent increase over May 1955. So far this year, however, total output is 9 per cent higher than in the same period of 1955. The expansion is largely scored by staple fibre, for continuous filament yarn has actually shown small periodic declines in 1956. These over-all figures give additional point to comments recently made by Sir John Hanbury-Williams, chairman of Courtaulds Ltd. He estimated that the newer synthetic fibres were now expanding more rapidly than rayon, that they had accounted for 10 per cent of the total man-made fibres production in 1955 as against 8 per cent in 1954. Trading profits of both Courtaulds and British Celanese fell last year, from £21.7 million to £20 million for the former and from £4.1 million to £3.3 million for the latter. This was not due to reduced sales. Markets for rayon—viscose or acetate—are still expanding. What is declining currently is the margin of profit. Rayon yarn prices have been held steady since 1951; staple rayon fibre prices have not changed since 1953 when they were reduced. Although in much the same period the price of wood pulp, rayon's primary raw material, has fallen slightly, the price of caustic soda has jumped by 40 per cent, wages by 43 per cent, and coal, of course, has risen in price several times. Obviously rayon's markets can continue to expand if its price is kept down. Cotton still enjoys four times the rayon volume of trade in the world, but were the price of rayon to rise by 3d per pound of staple fibre it would then show no price advantage over cheaper American cotton. Japanese rayon is also becoming seriously competitive—spun rayon piece goods exports from Japan have increased nearly tenfold since 1951.

Rayon has to be cheap—unlike the newer synthetic fibres with their special properties (and still much smaller volumes of sales); price cannot rise with costs without grave risk of lowered demand. Dwindling fortunes in the motor industry could be a significant blow for rayon, which is heavily used as tyre yarn. Any set-backs in that field would hardly show their effects in trading figures for the 1955-56 year, however.

### *Atmospherics*

RECENT COMMENTS on the topic of air pollution in the North-west give industrialists and management a somewhat Jekyll-and-Hyde character. The chief sanitary inspector for one borough has expressed amazement 'at the quiet manner in which this appalling and perpetual rain of filth is accepted'. Complaints from the public in a riverside factory area seem to be much less numerous than official observations of marked pollution. This, of course, is an indication that populations long used to living in industrial areas are psychologically conditioned to dirty air. Whether they are also physiologically conditioned to it is an arguable point. Most industrialists today are well aware of the importance of being good neighbours; but if they are also aware that complaints are not coming from local people nearly as much as from local officials, the desire to abate smoke or other polluting emissions may weaken in marginal cases. The same inspector refers to two factories in his borough, one of which spent large sums on measures to stop smoke pollution, the other which plans to spend heavily in the future. These costs 'in the five figure region' make 'penalties up to £50 almost a temptation to ignore notices and subsequent prosecution'. Present economic conditions, with the credit squeeze and the appeal to keep prices stable both in operation certainly add force to this temptation. However, his report includes this tribute: 'It is, therefore, more pleasing to recognise the action of firms concerned in the interest of public health.' This is said after comments on the poor quality of fuel supplied to factories in the area, a factor which often makes 'just that difference between pollution . . . or otherwise'.

## 'Obnoxious Fumes'

THERE IS SOME CONTRAST between these views and those of councillors in another North-western area where drastic action has been demanded about 'obnoxious fumes' emitted from the chimney of a chemical works. One councillor described these as 'incredibly filthy' and said that many people in the area concerned were unable to sleep at night. This highly critical statement was made during the discussion: 'We wish we were not held up to ransom and ridiculed by people who know the regulations as well as we do. People who could help us, like property owners and works managers, are not as co-operative as we would like.' As one specific chemical works was named in the debate, this type of comment is hardly helpful in the general cause of good public relations.

## Safety in Factories

IT IS NOT OFTEN that news about a proposed increase in the size of a Government department is welcome, but the statement by Mr. Robert Carr, Parliamentary Secretary, Ministry of Labour and National Service, during the House of Commons debate into the administration of the Factories Acts on 16 July, that the factory inspectorate is to be strengthened will be noted with interest and approbation. Engineering and chemical inspectors are to be increased, by stages, to at least 44, thus enabling one inspector of each section to be stationed in each division.

Moreover, the regulations dealing with the rubber and chemical industries are being revised and brought up to date which is a good thing. It is to be hoped that publication of these will not be long delayed.

In the debate a number of MPs voiced concern about the arrangements in factories for fire alarm systems and Mr. Carr said a survey of premises was being carried out and would be completed by the end of October. The arrangements in this connection were dealt with in last week's issue of *THE CHEMICAL AGE*, but it is appropriate to mention that at present insufficient use is being made of local fire brigade officers, and fire prevention officers in particular, in connec-

tion with fire alarm inspections and, for that matter, the equally important subject of means of escape in case of fire.

## Tidying Up Essential

WE ARE glad to learn that the Home Office—the department responsible for fire brigade administration—is being consulted with a view to establishing closer relationships between factory inspectors and fire prevention officers. But it seems that the whole question of industrial safety needs close study with a view to tidying up the existing organizations in Whitehall by amalgamating, if necessary, the various departments, and revising the responsibilities of local authorities in connection with means of escape. There is little point in having elaborate fire alarm systems if the means of escape and factory fire prevention and extinction methods are inadequate.

First speaker in the debate, Mr. Fred Lee, the member for Newton, said that accidents reported under the Factories Acts led to a loss of 700 workers killed, 180,000 injured a year, and 60,000 people absent from work each day. This is unpleasant, both from the humanitarian and productivity points of view.

Quite clearly, action to prevent such loss of life and waste of industrial effort is needed. The Government, managements, trade unions and local authorities must take positive steps to make our factories safe places in which to work. Too many are deathtraps, despite all the regulations which exist and all the officials whose job it is to enforce compliance therewith.

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## Factory Fire Safety

TWO new regulations imposing special obligations on factories in which processes are carried on with a high fire risk are being drafted. Factory inspectors are also to press employers to adopt the procedure of fire drills in suitable cases and to advise employers to use the services of fire brigade fire prevention officers. Publication of advisory literature on fire prevention in factories is also being discussed with the Home Office. These are some of the points made by the Government speaker in a debate on the administration of the Factories Acts in the House of Commons on 16 July.



## NEWS BRIEFS

### Telex System Installed

L. Light & Co. Ltd., organic chemicals manufacturers, of Poyle Trading Estate, Colnbrook, Bucks, announces that it has installed the Post Office Telex System to reduce telephone calls and correspondence (Telex No. 12-203). The company's telegraphic address is: Light, Colnbrook, Telex.

### S. African Contract for W. J. Fraser

W. J. Fraser & Co. Ltd. announce that, in addition to the contract recently awarded by the Shell Co. of S. Africa for a large-scale lube oil blending and packing plant at Durban, they have now been commissioned to engineer and erect a complete grease manufacturing plant alongside. Once again, Fraser's S. African associates, Fraser & Chalmers Ltd., will play an important part in controlling local operations.

### Company Expansion in Gloucester

Work has now begun on a new £½ million Gloucester factory for Permali Limited, manufacturers of densified wood laminates and bakelised paper tubes and bushings. The factory will occupy a 6½ acre site opposite the existing premises in Bristol Road and should be completed by the end of next year.

### Water Treatment Meeting

The autumn meeting of the Society for Water Treatment and Examination will be held at the University of Bristol, from 19 to 25 September. The programme will include a symposium on 'Coagulation and Flocculation', a film show, and a number of works visits.

### Telephone Number Change

Winston Electronics Limited, Govett Avenue, Shepperton, Middlesex, have changed their telephone number from Walton-on-Thames 2732 to Walton-on-Thames 6321 (5 lines). Private branch exchange.

### Harwich Explosion Inquest

Verdicts of accidental death were recorded at an inquest at Harwich on 11 July on three persons who died as a result of an explosion at the plant of Explosives & Chemical Products Ltd., Great Oakley, Essex (THE CHEMICAL AGE, 7 July).

### Nylon Yarn is 'Safe' Cargo

The cargo of nylon yarn which was recently removed, as a possible fire risk, from a liner at Tilbury, delaying her sailing for Australia, has now been proved harm-

less (THE CHEMICAL AGE, 7 July). The cargo was removed, as a precautionary measure, following a fire a few days earlier in the *Armagh* at Swansea. This ship was loaded with a mixed cargo, including nylon yarn, and circumstances were such that it was thought at first there was a possibility that the outbreak had been caused by spontaneous combustion of the nylon. Expert investigation has shown conclusively that this was not, in fact, true. It has confirmed the experience of the last 10 years that nylon is an entirely safe cargo. Normal shipments of nylon have therefore been resumed.

### Dispute at ICI Plant

Operations at the light alloy works of ICI Ltd. at Waunarllydd, Swansea, stopped on 13 July as a result of strike action by over 1,000 employees. It is understood that the strike has followed a refusal by employees of the extrusion department to accept a decision by the company that a woman inspector with special qualifications should be an exception to a seniority rule in dismissals arising from redundancy. The company have stated that they accepted the principle that the rule of 'last in, first out' should be applied, all other things being equal, but in this case there was an exceptional factor. The strike is unofficial. It was announced on Tuesday evening that the employees had voted to go back to work.

### Carriage of Dangerous Goods

The 17th list of amendments to Appendix 'A' of the 1951 Report of the Departmental Committee on the Carriage of Dangerous Goods and Explosives in Ships may now be obtained from HMSO, price 4d. Further amendments will be published as and when necessary.

### BOG Expand at Brinsworth

The capacity of the Brinsworth (Yorkshire) works of British Oxygen Gases Ltd. is being increased by the addition of a second large liquid oxygen plant to meet increased demands for oxygen in the area.

### Dehydrated Foods

Research work at the Ministry of Agriculture, Fisheries and Food's experimental station at Aberdeen has resulted in the development of dehydrated foods which, it is claimed, will keep almost indefinitely. This work has been carried out at the request of the Ministry of Defence and the main object is to produce rations for the services. Commercial applications are also envisaged.

## PEOPLE in the NEWS

MR. V. A. MALYSHEV, accompanied by members of the Russian Trade Mission, called on the President of the Board of Trade (Mr. Peter Thorneycroft) on 11 July and discussed with him the purchasing programme which was submitted to the Government during the visit of Marshal Bulganin and Mr. Khrushchev in April (*THE CHEMICAL AGE*, 7 July). The delegates will visit firms in various parts of the country.

Appointed technical assistant to the commercial manager (MR. R. T. HAYES) of United Coke & Chemicals Co. Ltd., Treeton, Rotherham, is MR. P. H. PINCHBECK. For the past eight years he has been a senior chemist with the Coal Tar Research Association at Gomersal, near Leeds, and in charge of research into the oxidation of certain hydrocarbons.

MR. FRED L. SHANKLIN has been appointed president of Union Carbide Ore Co., a division of Union Carbide & Carbon Corporation. He succeeds MR. F. S. HAGGERSON who is resigning for reasons of health.

Technical Division of Olin Mathieson Chemical Corporation now has as director MR. JOHN B. SEASTONE, who was formerly research and development manager for the Metals Division.

MR. J. B. ARCHER, production manager of Ashmore, Benson Pease and Co. Ltd., Stockton-on-Tees has retired after 49 years with the firm, and at a gathering in the firm's canteen, Major W. R. Brown, deputy chairman, presented him with a radio set.

MR. EDWARD V. BURNTHALL, formerly of Crewe and now living in Alabama, US, has been appointed senior section leader in the Chemstrand Corporation. He is in charge of the important dyeing and finishing division of the research and development department. Among American textile chemists the name of Edward V. Burnthall is well known, and as the author of numerous papers on dyeing and wool chemistry he has attained considerable fame. Mr.

Burnthall has represented the Canadian textile industry at several of the International Standards Organization conferences and was, for a number of years, an adviser to the Canadian Government Specification Board. He holds membership of the American Association of Textile Chemists and Colourists and the Society of Dyers and Colourists of England. Before joining the Chemstrand Corporation he served with Canadian companies for 20 years.

Henry Wiggin & Co. Ltd., announce that MR. H. W. G. HIGNETT has been appointed assistant managing director. He was responsible for technical (metallurgical) control and development in all Wiggin plants. Mr. Hignett was previously superintendent of the Mond Nickel Co's research laboratory at Birmingham.

DR. T. K. WALKER, a member of Manchester University staff since 1925, has been made Professor of Industrial Biochemistry in the Faculty of Technology.

DR. W. H. MILLETT has been appointed sales manager and MR. M. A. BIGELOW, JR., has been appointed assistant sales manager, Ucon Products, for Carbide and Carbon Chemicals Co., a division of Union Carbide & Carbon Corporation.

MR. M. R. NORMAN has been appointed a director of Wiggins Teape & Co. Ltd., the well-known firm of papermakers.

It is announced that MR. A. A. H. DOUGLAS is relinquishing the appointment of director and general manager of the Distingu-ton Engineering Co. Ltd. subsidiary of The United Steel Companies Ltd., at his own request. MR. G. N. F. WINGATE, at present works manager (services) at the Steel Peech & Tozer branch of The United Steel Companies Ltd., will succeed Mr. Douglas from 1 August.

MR. ALAN HUET OWEN, formerly of the BBC's European Services Division, has been appointed public relations officer to Pfizer Ltd. of Folkestone, Kent, the British subsidiary of Chas. Pfizer & Co. Inc., producers of antibiotics and discoverers of the antibiotic, Terramycin. In the BBC Mr. Owen was mainly concerned with programmes serving the large BBC audience in Germany.

# Electro-Chemical Factory

## All Activities Centred at Sheerwater

**T**HE new factory of Electro-Chemical Engineering Co. Ltd., suppliers of plant and processes for the electroplating and allied industries, at Sheerwater, near Woking, Surrey (see *THE CHEMICAL AGE*, 30 June, p. 1429) was opened last week (11 July). This move was prompted by the company's expanding business which necessitated that all activities should be operated from one centre.

Assembly and mechanical testing of Efc-Udylite automatic machines is carried out at the new factory, as well as the mixing and packaging of the range of chemicals used in the various Efc-Udylite processes. In the laboratories the routine analysis of customers' solutions is undertaken and new plating processes tried out and demonstrated.

The factory, which stands on a three-acre site, has six bays, three of which are used for chemical products and three for engineering. Each bay is 35 ft. wide; five of them are 66 ft. long and have a height to the underside of truss of 16 ft. The sixth, which has a three-ton overhead crane, is 88 ft. long and has a height to the underside of truss of 22 ft.

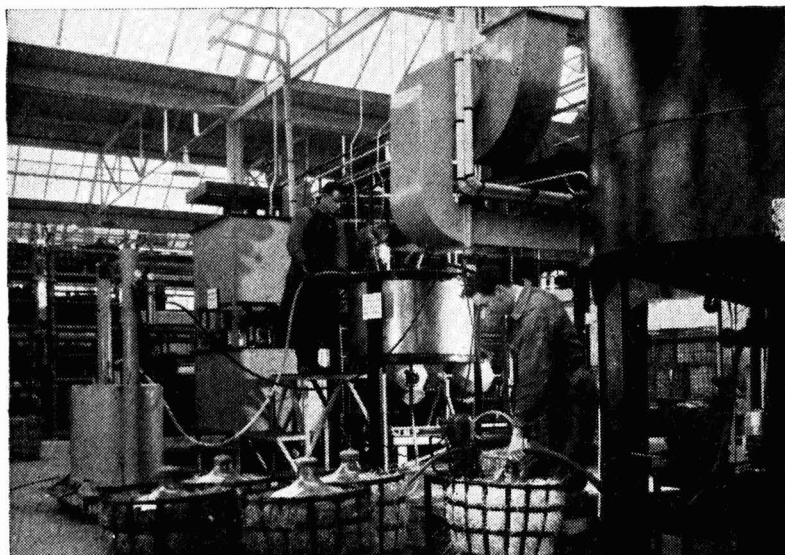
A building 20 ft. wide is connected to the main factory and runs the full width of the

six bays (210 ft.). This contains the demonstration plating shop, analytical and development laboratories and offices for chemists. To the north is a separate two-storeyed office block which is connected to the works by a covered way and provides accommodation for engineers, draughtsmen, purchasing and sales departments and administration personnel. The floor area of the factory is 21,000 sq. ft. and that of the office block 7,000 sq. ft.

The chemical mixing platform has been designed so that raw materials are brought to it by fork-lift trucks and are added to the various mixing tanks after measuring. Raw materials are stored on pallets in the works and a store for finished products and space for export packing has been provided. After stirring, solutions are filtered and pumped to storage tanks and filled into carboys. A fume extraction system has been incorporated. Special corrosion-resistant materials have been used in view of the chemicals being handled. Many of the tanks and much of the pipework are rubber lined; others are in stainless steel with ducting made of plastic material.

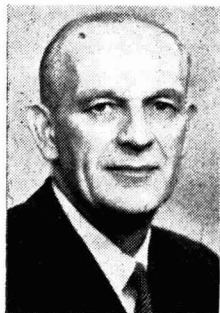
The buildings have been laid out to allow for future extensions.

*Chemical mixing operations at Electro-Chemical Engineering Co's. new factory near Woking*



# WHY TELCON MOVED

## to the new Factory at Crawley



*Mr. W. F. Randall  
managing director  
of The Telegraph  
Construction &  
Maintenance Co.  
Ltd. metals group*

**W**ELCOMING the press to the Telcon factory at Manor Royal, Crawley, Sussex, on 13 July, Mr. W. F. Randall, managing director of the Metals group of the Telegraph Construction & Maintenance Co. Ltd., spoke of the company's reasons for moving from London. After the war, he said, the need arose for extended facilities, and it was impossible to expand at the Greenwich factory.

Consequently a new factory was planned at Crawley, the foundation stone was laid in July 1953, and the first wheels turned in October 1954. It was impossible, said Mr. Randall, to fix an opening date, but it could be said that the plant was now in full operation.

The Crawley works are situated on a site of approximately 10 acres, of which 106,000 sq. ft. are devoted to factory space and 20,000 sq. ft. to offices, together with laboratories for research and development.

The Telcon metals group came into being in 1921-22 when a group of technicians, including Mr. Randall, joined the parent

company to develop magnetic materials for submarine communication cables. As a result of this work Mumetal was developed, an alloy consisting of 76 per cent nickel, 12 per cent iron, four per cent molybdenum and a balance of other essential elements.

Mumetal was followed by other well known alloys, including Radiometal and Rhometal.

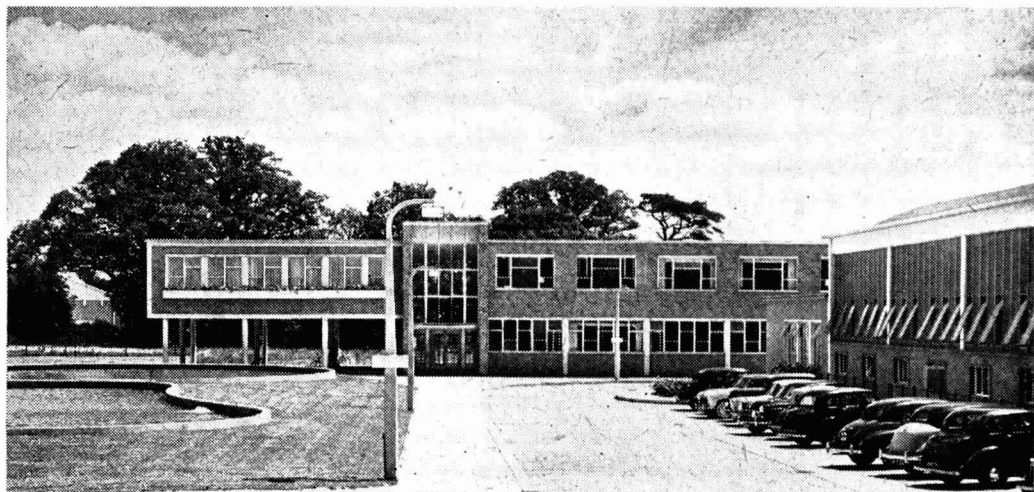
At present the Crawley works is devoted to the production of some 20 different alloys, more than half of which are magnetic materials.

The main melting plant consists of  $\frac{1}{2}$ -ton and  $\frac{1}{4}$ -ton induction furnaces, together with a  $\frac{1}{4}$ -ton vacuum melting furnace. Beryllium-copper melting will be carried out in a separate building before the end of the year. These Be-Cu alloys are used in the production of non-sparking tools and castings of which about 400 types are made by Telcon.

From the furnace the alloy is passed to the cogging and hot strip rolling mills. The cogging mill is equipped to produce either six-inch or two-inch slabs for strip or 12-inch squares for rod rolling and wire.

After leaving the mill the long strips are passed through a continuous cooling bath

*Part of the office block at Telcon Works, Crawley, showing the cooling pond on left*



and are scratched-brushed to remove all scaly and surface imperfections. They are then passed to a continuous annealing furnace, after which they are ready for breaking down by cold rolling into thinner gauges.

A battery of slitters is available for cutting the strip to widths making it suitable for the production of laminations, cores etc.

Close inspection and control is maintained over all stages of manufacture. All materials are sampled in the ingot stage and approved by chemical analysis before processing begins. In their final forms they pass through the inspection section where they are examined for surface defects, magnetic properties and, in some cases, physical characteristics such as hardness, deflection coefficients and the like.

At present housed in the administrative block is the Sankey-Telcon company which is carrying out both prototype and production work on the manufacture of castings by the 'lost mercury' process.

In this process an accurate steel die is first made and this is used to produce a casting of frozen mercury. From this mercury casting a mould is made in plaster and this is used to cast the final product. It is possible to produce by this process aluminium castings which are of such precision that machining is either avoided or reduced to a small amount. It is also possible to produce finished parts, such as choke cores, so thin that they could not be produced by other means.

Demand for these products is said to be so great that a complete factory has had to be planned for the Sankey-Telcon workshops.

## Esso Development

### £13 Million Expansion at Fawley

A FURTHER £13 million expansion programme is to be carried out at the Esso Refinery, Fawley, it was announced on 16 July. This is in addition to the £9 million project, revealed in April, to supply raw materials for the manufacture of synthetic rubber and other chemical products.

This latest development is being undertaken in order to meet the nation's rapidly increasing energy needs, which call in particular for large extra quantities of fuel oils.

When this expansion is completed, at the end of 1958, the total capital investment in the Esso refinery will amount to £68 million.

and throughput will have been raised from the current 7½ million to 10½ million tons a year.

Principal items in the programme will be:

(1) A third pipestill (crude oil distillation unit) with a capacity of 9,600 tons a day.

(2) Two new autodiesel hydrofiners which will reduce the sulphur content of diesel fuel and improve its quality. (Two hydrofiners are already in operation at Fawley, one for autodiesel, and one for white spirit).

(3) A second sulphur recovery plant, which will produce 99.9 per cent chemically pure rock sulphur. This plant will double the refinery's current annual output of 14,000 tons of sulphur, which is at present entirely taken up by the textile industry.

(4) A large additional amount of tankage for crude oil and finished products.

(5) A new jetty berth at the marine terminal. Already one of the longest oil docks in the world (3,200 ft.), a fifth berth is now to be added.

(6) A new oil and water separator plant, duplicating the existing facilities for purifying water used in refinery processes, before it is released into Southampton Water.

### British Materials

It is estimated that over 90 per cent of all materials used in the new construction will be British. It is interesting to note, by way of contrast, that during the initial expansion programme (1949-51) the corresponding figure was 66 per cent, due to the relatively long delivery dates for British materials at that time.

These extensions will involve a construction force of well over 4,000 men at the peak period, and will raise the number of regular employees at the refinery from the present figure of 3,100 to approximately 4,000.

Commenting on these plans, Sir Leonard Sinclair, chairman and managing director of Esso Petroleum Co. Ltd., said:—

'To meet the demands likely to be made upon us, my company is planning to double its present volume of business within the next five years. This new expansion programme—a total of £22 million when taken together with the £9 million chemicals-from-oil project—is an indication of the size of the task which now confronts us.

'The Esso refinery at Fawley is already saving the nation an estimated \$150 million a year in foreign exchange. This new expansion will increase that saving to a figure in excess of \$250 million a year.'

## Rubberized Roads Tests

### Development Board's Report

THE Annual Report of the Natural Rubber Development Board, just published, takes special note of progress made in expanding and developing the use of rubber in roads. It describes the full-scale experiments put in hand by the Government's road research laboratory during the year—constituting the biggest official trials of rubber in roads yet undertaken in any country.

The report also notes that sales of rubberized tar again increased and that there were many repeat orders for both rubberized tar and rubberized bitumen. The performance of existing rubberized surfacings is beginning to exert an influence, it is stated, and the laying of a rubberized air-strip at East Sale, in Victoria, Australia, is a case in point. The Australian airport authorities have now in hand a large scale programme of resurfacing air-strips and roads with rubberized materials.

The growing interest of mechanical engineering in the scientific design of rubber components is reflected in another section of the report. To cater for this interest the Rubber Board are to hold a conference for engineers during the coming autumn. During 1955 the Board continued its effort to develop further the use of latex foam in furniture by means of lecture schemes, demonstrations and publications.

### Use of Rubber in Railways

The year marked good progress in developing the use of rubber in railways. Extensive trials of rubber pads on railways in Britain and the Commonwealth have resulted in numerous enquiries from all over the world. More trials are now under consideration and fresh applications of rubber to the design of railway equipment are being worked out for such installations as bridges and gantry cranes.

The final pages of the report deal with a number of other development projects most of which are at the beginning of a promising commercial career. These include cyclized rubber (a competitive substitute for synthetic materials, suitable for shoe solings) which is now in commercial production, and latex bonded fabrics—also in commercial production for interlinings and undershirts.

## Market in Columbia

THE Commercial Secretariat of the British Embassy in Bogota are warning British exporters that although Columbia affords many attractive opportunities, it is a highly competitive industrial market involving considerable effort and expense. In a contributed article in the current issue of the *Board of Trade Journal*, the Secretariat state that Columbia's oil refinery expansion programme and its first petrochemicals development are already in hand. However, further expansion will be needed in the future. A higher rate of productivity in the output of heavy chemicals from local materials, such as salt and sulphur, is also necessary. Columbia has large coal resources which, owing to its equally large oil and hydro-electric resources, are likely to remain under-exploited as fuel. This factor raises the question of great possibilities for the production of chemicals from coal.

## Pyrethrum Dust

EXPERIMENTS reported by the Department of Agriculture for the Colony and Protectorate of Kenya in the annual report for 1955 (just published) indicate the value of synergized pyrethrum dusts for the control of *Antestia*. The best results were obtained with a dust composed of 80 per cent ground limestone and 20 per cent pyrethrum marc. The dust contained 0.2 per cent pyrethrins and 2 per cent piperonyl butoxide as a synergist. Trial results indicated that this synergized pyrethrum powder was as effective in the field as the pyrethrum powder normally used at the present time which contains more than 1 per cent pyrethrins. These results suggest that more economical pyrethrum dusts should be possible for the control of crop pests.

## Assembly Cabinets

PRESSURIZED cabinets for the assembly of precision instruments in perfect atmosphere conditions, are offered by BMB (Sales) Ltd., Boscobel, Crawley, Sussex. Cabinets are supplied either as mobile, self-contained units or in batteries suitable for production lines. 'Clean room' cabinets capable of housing operator and product are also built to customers' requirements.

# Review of Organic Phosphorus Insecticides

## VI Parts—Part VI. Classical Methods of Analysis

by R. G. BARRADAS, B.Sc., A.R.I.C., A.R.T.C., M.R.S.H.  
(Government Laboratory, Hong Kong)

IN the previous parts of this review particular emphasis was laid on the more important and successful modern methods for the analysis of organic phosphorus insecticides. It may be pertinent, however, to consider some of what appear to be comparatively less important contributions to the more classical methods of analysis. At the outset it must be stressed that too much reliance should not be placed on the determination of one or more of the constituent elements, giving by subsequent calculation a measure of the amount of organic phosphorus compound present. The main objection to the quantitative analysis of phosphorus or other elements, for example, lies in the fact that one may be determining the very same elements as are present in the soil, in the plant, and in the insecticide.

### No Definite Proof

There is as yet, no definite proof that the presence of organic phosphorus compounds in plants does not increase the natural intake of mineral phosphorus from the soil. Similarly, there is always the possibility that the absorption of phosphorus from the soil is inhibited owing to the application of these insecticides. Another and perhaps more serious objection to the quantitative determination of phosphorus as a guide to the amount of insecticide is the almost certain presence of various isomers and impurities (containing phosphorus, of course) in technical and commercial preparations of the insecticide. The uncertain nature of the decomposition products of systemic organic phosphorus insecticides in the plant stream is another influencing factor with which the analyst must contend.

There are many published methods for the determination of phosphorus, and the choice of any particular method may have to be governed by the advantages offered in respect of reliability and rapidity. Jacobson and Hall (87) examined various known methods for the determination of phosphorus in organic phosphates, and recommended a procedure for tetraethyl pyrophosphate (TEPP)

and hexaethyl tetraphosphate (HETP). The organic phosphorus compounds were converted to orthophosphates by fusion with alkali nitrate and then digestion with dilute nitric acid. They favoured a colorimetric method, which was regarded as less time-consuming than any of the available gravimetric methods.

The colorimetric method used was developed by Kitson and Mellon (88) in which the yellow molybdovanadophosphoric acid was matched by comparison with standards. The theoretical and experimental results were found to be in concordance with each other.

A study was made by Reckendorfer (89) of the identification of two organic phosphate esters in the pure form using the conventional methods of elemental analysis. The compounds investigated were *p*-nitrophenyl diethyl monothiophosphate and *p*-nitrophenyl dimethyl monothiophosphate. Sulphur was determined by oxidative decomposition in a Kjeldahl apparatus in the presence of two grammes of barium chloride, and a mixture of 15 ml. of concentrated nitric acid, 15 ml. of fuming nitric acid and 30 ml. of concentrated hydrochloric acid. Barium sulphate was precipitated, and, after the usual treatment of the suspension, was filtered and weighed.

### Determined by Decomposition

The phosphorus was determined by decomposition with nitric acid, sometimes with addition of a little hydrogen peroxide. It was precipitated as magnesium ammonium phosphate and converted to magnesium pyrophosphate. The alkoxyl groups were split off by the method of Zeisel (90), the alkyl iodide formed being passed into a solution of bromine in acetic acid containing sodium acetate, according to the method of Vieböck and Brecher (91). The iodine liberated by reacting the iodate formed with potassium iodate was titrated with standard sodium thiosulphate.

Schomberg (92) proposed a method of determining parathion based on the assay

of organic phosphorus. The sample was extracted with petroleum ether for three to four hours, and the extract was washed three times with 10 ml. portions of water. The extract was then saponified on a water-bath with alcoholic potassium hydroxide. After saponification, the solution was adjusted to the required volume and the phosphorus pentoxide was determined in an aliquot.

The remainder of the solution was evaporated to dryness and, on cooling, the organic phosphorus in the residue was oxidised with a mixture of perchloric acid and nitric acid to orthophosphate. The oxidation was repeated twice. The phosphate ion was determined by the micromethod of Lorentz and Schaffer, where the orthophosphate ion was precipitated with nitromolybdate in the accepted manner. The precipitate was determined by solution in standard potassium hydroxide and alkalimetric titration, or by micro-Kjeldahl procedure. Schomberg suggested an examination of the phosphorus to sulphur ratio if it were required to determine if other organic phosphates were present.

#### Colorimetric Method

Recently, Cavell (93) published a colorimetric method for the determination of phosphorus in plant materials, by its conversion to the yellow molybdovanadatophosphate. This method is readily adapted to the determination of elemental phosphorus in organic phosphorus compounds generally.

The ash of the plant material was moistened with hydrochloric acid, taken to dryness and the silica dehydrated at 105°C. The residue was boiled gently with another portion of hydrochloric acid for two minutes and the mixture was then diluted with water. The solution was then filtered and made up to standard volume. An aliquot of this solution was then further diluted with water and hydrochloric acid, the final acidity being kept approximately molar in strength. An aliquot of this second diluted solution was warmed on the water-bath and treated with a solution containing ammonium vanadate and ammonium molybdate. The yellow colour of the molybdovanadatophosphate was read at a wavelength of 400 m $\mu$  in a Unicam SP600 spectrophotometer.

The kinetics of the hydrolysis of certain organic phosphorus insecticides have already been discussed in this review (Part III) in connection with the titrimetric method for the analysis of demeton (45) and the colori-

## PHOSPHORUS

metric method for the analysis of Schradan (20). Mention may also be made at this stage of the very interesting work performed by Carter (94) on the analytical applications of the hydrolysis kinetics of some organic phosphorus insecticides.

The analysis of organic phosphorus compounds is often closely associated with the hydrolysis of these compounds, and Carter applied the results of hydrolysis kinetics to purity determinations on these insecticides, in particular to parathion and paraoxon. For the hydrolysis of parathion and its impurities, only alkaline conditions, in which the *p*-nitrophenolate ion is produced, are considered.

Parathion could be determined in the presence of paraoxon by assessing the different rates of hydrolysis of the two compounds. Thus, a known weight of the mixture was hydrolysed for a specified optimum reaction time in a large excess of a standard solution of sodium hydroxide at a suitable temperature, and the yellow colour of the *p*-nitrophenolate produced was matched with those given by known concentrations of *p*-nitrophenol. The hydrolysis reaction was allowed to proceed to completion and the *p*-nitrophenolate was determined.

The two determinations of the *p*-nitrophenolate ions liberated enable the percentage of phosphate esters hydrolysed during the optimum reaction time to be calculated. Reference was made to an appropriate calibration curve to obtain the composition of the mixture. The *p*-nitrophenol group was almost exclusively removed by hydrolysis and the reaction could be followed colorimetrically to within not less than 90 per cent of complete hydrolysis. Carter claimed that the reaction was probably bimolecular.

#### Injury to Plants

An important aspect of the analytical chemist's rôle in the field of organic phosphorus insecticides is the study of the causes of injury to plants arising from the application of these compounds. A notable contribution on this theme was made by Edwards and Smith (95), who examined the possible injurious agents present in technical parathion. The work of Edwards and Smith demonstrates one of the many other sidelines which provide facets of interest to the



## INSECTICIDES

chemist engaged in analytical studies of these insecticides. The importance of this work must be stressed, even at the risk of being repetitive.

Pest control has made tremendous strides through the introduction of organic phosphorus insecticides. Every effort is being made to minimise the toxicity to warm-blooded animals and to increase the effectiveness of the insecticides towards insects. The acute toxicity of some of the organic phosphorus compounds does not and should not have a deterrent effect on their use as insecticides. This is a direct result of the successful application of scientific control by the collaborative efforts of the chemist, pharmacologist, biologist, agriculturist, toxicologist, manufacturer, and others.

### Fruitful Progress

In this review of a selection of the more outstanding contributions made to the research literature on the analytical aspects of organic phosphorus compounds as insecticides, the following relevant points should perhaps be noted. Progress in this field of study has been very intensive and fruitful. Despite the existence of many elegant, accurate, and reliable methods of assay, there is still a need for methods which will combine all the excellent qualities mentioned, but which will be less time-consuming in their performance.

Biological methods of assay are generally tedious and expensive, but in some instances are the only methods available for obtaining necessary information not obtainable by chemical and physical means of examination. Of all the biological methods, special praise must be accorded to the work of Giang and Hall (55) on the enzymatic determination of the organic phosphorus insecticides.

Again, on the purely chemical side, many workers may be lauded for their excellent contributions to the subject. In this respect it will seem unfair to single out any name for special mention of credit. Collectively speaking, much has been achieved by way of increasing the sensitivity, selectivity, reliability and reproducibility of the published methods, although perhaps a greater degree of specificity is still very much to be desired in some cases.

On the physico-chemical side, much had

already been accomplished, but it is almost certain that progress will continue, particularly in the development of instrumental methods of analysis. As with analytical chemistry in general such a trend is becoming increasingly obvious.

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### New Equipment for Labs

GRIFFIN & GEORGE LTD., Ealing Road, Alperton, Middlesex, have issued leaflets describing two important pieces of laboratory equipment. Their Microid pipette filler is said to be a simple device to eliminate the sucking-up of dangerous fluids by the mouth. The bulb of the filler has a capacity of approximately 60 ml. and is fitted with a rubber three-way valve control unit containing spherical valves of plastic which are precisely controlled by light finger and thumb pressure. There are no metal parts to corrode and no fragile parts to break.

The other apparatus described is the Griffin-BDH water deionizer, a mixed resin bed ion exchange column for use in the production of water of high purity without distillation and its associated storage problems. According to the leaflet, water passed through the ion exchange column is purer than triple distilled water in respect of its low CO<sub>2</sub> content (pH7), low ammonia content and freedom from the heavy metals.

### Pfizer Expansion

AFTER a four-week business tour of Europe and Turkey, Mr. John E. McKeen, president of Chas. Pfizer & Co. Inc., is back in the US. He said on his return that Pfizer's latest plants in Italy and Turkey would strengthen the economy of those countries with continued expansion of the uses of antibiotics in agriculture as well as in human medicine. The end of this year would see additional new plants in Canada, Japan and Chile with construction under way in the Argentine, said Mr. McKeen.

## ABRAC's Expansion Plans

### Three Product Ranges to be Developed

ANNOUNCING a policy for the future development of A. Boake, Roberts & Co. (Holding) Ltd., the chairman, Mr. F. G. Pentecost, in his statement for the year ended 31 March 1956, says that three main product ranges will be expanded. They are industrial chemicals, including plasticizers and other materials used by the plastics industry; aromatic and fine chemicals; and flavouring and other materials for the food and beverage industries, and perfumery bases and compounds for the toilet and cosmetic industries.

Industrial chemicals will be developed at a site of 83 acres which the company recently purchased freehold at Widnes. Contracts have already been signed for the first project, 'a modern plant of large output for the manufacture of phthalate plasticizers at the highest chemical efficiency'. Mr. Pentecost expects this plant to be in operation towards the end of 1957.

The chairman goes on to say that the gradual concentration of industrial chemicals at Widnes will release space and facilities at the company's Stratford and Rainham sites. The main works at Stratford will be re-developed for the manufacture of aromatic and fine chemicals on a large scale, with better plant and at higher efficiencies. Some parts of the Stratford sites are unsuitable in shape and size for modern processes and plant lay-outs, and this space will be used to expand the research and development departments.

### Plans for Increasing Output

Plans are being considered for expanding the output of the company's Walthamstow factory where the manufacture of flavouring materials and perfumery bases and compounds is concentrated.

Much of the site at Rainham is surplus to the company's needs and as the Widnes site is superior in numerous ways the Rainham site will not be developed further. At some future time, says Mr. Pentecost, operations now conducted there will be transferred to Widnes.

The company has continued to simplify its product range and has ceased to manufacture several lines during the past year. 'The object', explains the chairman, 'is to

concentrate further our efforts and resources on those things which we can make best and which will yield a good return. As forecast in my previous report, we have ceased the manufacture of sulphur dioxide and certain related products. We have also discontinued our specialities for the brewing industry . . . We can now concentrate more effectively on our expanding business of chemical manufacture'.

Referring to the company's Australian subsidiary, A. Boake, Roberts & Co. (Aust) Pty. Ltd., Mr. Pentecost states that a works near Melbourne manufacturing phthalate plasticizers was recently purchased and is now operating as part of the company's Australian subsidiary. Plans for expansion of output are well advanced and there is space at the site for appreciable future development.

## Staatsmijnen Report

ACCORDING to the annual report of Staatsmijnen in Limburg, Netherlands, the production of nitrogen fertilizers in the Netherlands rose from 246,000 tons nitrogen in 1952/53 to 293,000 tons nitrogen in 1954/55. During the same period the production of nitrogen fertilizers by Staatsmijnen increased from 133,000 tons nitrogen to 149,000 tons nitrogen.

At the moment, says the company, it is proposed to raise the production capacity of the Staatsmijnen nitrogen fixation works by about 35,000 tons nitrogen a year.

As a result of an increase in the quantity of coal used for coke manufacture there was an increase in the amount of products recovered from coke oven gas. The production by the nitrogen fixation works of basic materials for plastics and synthetic fibres also went up, continues the report. The output of caprolactum in particular showed a sharp rise. Plans for the production of polythene are now being developed.

### Accident Prevention Tape

A new type of self-adhesive tape, Lasso zebra warning tape marketed by Smith & Nephew Ltd., is being used to prevent industrial accidents and injuries. Printed in vivid yellow and black diagonal stripes, the tape is used to give warning of danger points in factories, offices and workshops such as high voltage cables, fuse boxes, low girders and beams etc.

# Publications & Announcements

THE 55th edition of *Analytical Standards for M & B Laboratory Chemicals* has now been published by May & Baker Ltd., Dagenham, Essex. The foreword says that over 90 products have been added to the M & B range of laboratory chemicals and reagents in the past few years, and full details of their specifications appear for the first time in this brochure. All standards of purity have once again undergone thorough review, limits of impurities have been made more stringent and further tests have been included where it was considered that such information would be useful. About 500 substances are listed in the analytical standards section, each with its standard of purity and possible impurities. Melting and boiling points are also given where appropriate. A small section at the end contains some useful technical data, such as atomic weights, flash points, weights contained in one litre of a normal solution, and percentage composition and molalities or normalities of bench reagents.

\* \* \*

THE API title of *An Industry Within an Industry* has been given to a new publication which describes, in words and pictures, the structure, products and services of Johnson, Matthey & Co. Ltd. The primary function of this company, the booklet relates, is to refine precious metals (silver, gold and the metals of the platinum group) and to process these and certain base metals into the materials and components needed by almost every branch of industry and commerce. A group of factories employing modern production techniques, supported by the resources of one of the largest and best equipped research laboratories in this country, serves these varied requirements through the sales organisation. More than 4,000 people are employed in the United Kingdom and many more on the staffs of associated manufacturing companies operating in the United States, Canada, Australia, New Zealand and South Africa. Five distinct service divisions have been established, each closely in touch with the practices of the industries that it serves and each drawing upon the metallurgical and chemical knowledge accumulated by the company over more than a century. New industrial

developments together with changes in the needs of Johnson, Matthey clients are constantly under review and, in this way, a service above reproach is made available. Copies of the booklet can be obtained from the head offices of the firm in Hatton Garden, London, EC1.

\* \* \*

ONE of the firms working on the development of instruments which measure the change in capacitance brought about by small mechanical displacements is Fielden Electronics Ltd. of Manchester: They have now announced the production of proximity meters type PM2 and PM4. One of the many applications of these meters is as a comparator of paint thicknesses. A small flat circular electrode is connected to the proximity meter cable. This exploration head is then pressed against the specimen and the reading obtained on the meter is a measure of the paint thickness. Another use is as a micro-thermometer. A small metal tube is fitted round the stem of an ordinary mercury-in-glass thermometer. With a common laboratory thermometer, one sixteenth of an inch movement of the mercury is claimed to give full scale deflection of the instrument scale. By the choice of a thermometer with an expanded scale, readings of temperature changes as low as one thousandth of a degree centigrade, or even less, are possible.

\* \* \*

THIS year's list of approved chemicals issued by the Ministry of Agriculture, Fisheries & Food under the Crop Protection Products Approval Scheme is in a new and improved form. The changes made should enable users of the list to identify much more easily the chemical which will control the disease, pest or weed threatening a crop. Special features now included in the list are:— an introduction explaining how to use the list; an alphabetical cross index of pests, diseases and weeds together with tables relating to the control of weeds; a code key to the names of manufacturers of proprietary products, and a note of whether these products are available in small retail packs; and details of the precautions necessary when using certain chemicals, with

particular reference to those governed by statutory requirements under the Agriculture (Poisonous Substances) Act, 1952. Copies of the list may be obtained, free of charge, from the Ministry of Agriculture, Fisheries & Food (Publications), Soho Square, London W1.

\* \* \*

THE annual report of the British Coal Utilization Research Association for 1955 describes the Association's activities in the year ended 31 December 1955. The early part is devoted to a general summary of the work of BCURA and its collaboration with its member firms and outside organizations, while the main body of the report gives a detailed review of the research programmes carried out and of the information made available to members and others through the Association's publications. A financial statement is also appended. BCURA's work is divided broadly into two main categories: practical research and development applied to the domestic and industrial utilization of coal and its derivatives; and fundamental research aimed at increasing the chemical and physical knowledge of coal as a fuel and a chemical raw material. Two of the highlights of the fundamental research programme were the advances made in the knowledge of the oxygen-containing groups in coal, and of the ultrafine porous structure of coals, carbonized coals, and activated charcoals derived from them.

\* \* \*

DETAILS of the first two books published by the British Welding Research Association on the argon-arc welding of aluminium have been made available. Part I is entitled *The Principles of Argon-Arc Welding Aluminium* and is a general introduction to argon-arc welding and to the subject matter contained in the rest of the series. Part II, *Electrical Characteristics and Equipment for Argon-Arc Welding Aluminium*, discusses in detail the electrical requirements of the AC argon-arc process. The function of each item in the equipment is analysed and illustrated. Part I is price 2s 6d and Part II 5s and they can both be obtained, post free, from the Association at 29 Park Crescent, London W1. Altogether there will be six booklets in the series.

## Fuel Efficiency Exhibition

WAYS IN which industry can save up to one-fifth of fuel costs will be demonstrated at the Fuel Efficiency Exhibition to be held this year at Olympia, London, from 2-10 October. The exhibition, which will be the largest of its kind in the world, will be opened by the Minister of Fuel and Power (Mr. Aubrey Jones). About 150 firms will be exhibiting special equipment designed to produce fuel economy in all branches of industry. The equipment shown will include the latest types of fuel burning devices for both solid and liquid fuel; self-contained, automatic-controlled, oil-fired boilers; the latest developments in insulating materials; and every conceivable type of automatic control equipment. Among the exhibits will be one by the Central Electricity Authority with photographs, diagrams, and models giving details of the most recent developments in the plan to construct 12 nuclear power stations by 1965. There will be an exhibit by the UK Atomic Energy Authority illustrating the progress made in the use of nuclear power for peaceful purposes. During the course of the exhibition, the Institute of Fuel is organizing a series of talks and discussions on 'The efficient use of fuel in industry.' Many leading experts will be giving addresses, among them Mr. R. Nicholson of the Guinness brewery, and Mr. George Richardson of Shell Mex & B.P. The exhibition is under the auspices of the National Industrial Fuel Efficiency Service and the Combustion Engineering Association, and will be organized by Provincial Exhibitions Ltd.

### Germany's Share

According to the annual report presented by the board of Badische Anilin- & Soda-Fabrik AG (see p. 91 of last week's issue) West Germany's share in world chemical production in 1955 amounted to 6.1 per cent compared with 5.7 per cent in 1954. The pre-war (1938) proportion was 21.9 per cent. This latter figure presumably refers to the whole of Germany.

### Titanium Ore Forecast

Work on the titanium-bearing ore deposits in Bathurst Island, north of Darwin, Australia, should be in full swing in about 12 to 18 months' time, according to Sir Claude Auchinleck, chairman of Dowsett Holdings.

# Protecting Exposed Surfaces

## Special Treatment Developed

**E**FFICIENT protection of exposed surfaces at reasonably economic cost is a problem which architects, builders, structural engineers and maintenance engineers have closely studied for many years.

Factors of major importance contributing towards economy are that the treatment employed must be applied cold to the surface and straight from the drum with simple tools; that the treatment, when dry, should be strong yet light, and that it should be possible for the treatment to follow any contours and be finished featheredge flush with any surface. The finished surface should neither flow in extreme tropical heat nor crack under the action of severe frost. A treatment which satisfies these requirements is suitable for application to structures anywhere in the world.

### Specially Equipped Laboratories

Research and investigation into this subject in specially equipped laboratories and under practical field conditions by the technical chemists of Evode Ltd. Stafford, has led to development of a complete waterproofing treatment which is being proved successful under all known climatic conditions throughout the world. The full treatment is based on advanced scientific method and incorporates specially treated 'membranes' as essential and integral reinforcements of the finished work, giving a remarkable flexibility and permitting reasonable expansion, contraction and mechanical vibration without ill effect.

Basically, the treatment comprises an initial key with a primer applied by brush, followed by a semi-liquid material reinforced with asbestos fibre, and known as Paste I. The specially treated membranes are bedded between these and become tightly knitted when dry, giving a monolithic surface of exceptional elasticity and high strength. The type of membrane used will depend on prevailing conditions, such as the climate and type of surface.

Top coatings then follow, and whether these are applied by brush (Paste I), or steel trowel (Pastes II and III), depends on the type and nature of the main and ancillary

roofing construction and on its location. Where a water-retaining surface is treated (or flat roofs), a spirit-bound sealer is used as a water-proof finishing coat. For roof surfaces used to collect drinking water, a special grade of pure asphaltic bituminous solution applied by brush—Evode 505D—is employed.

Coloured finishes have been perfected in silver, red-brown, or green, as an alternative to a treatment which dries black. These colours are applied as a paint coat after a suitable lapse of drying time from completion of the waterproofing treatment.

For flat and even surfaces, a double processed membrane of heavy weight has been developed, whereas for corrugated or uneven surfaces, including slated roofs, membrane of medium weight has been proved most effective. For the strip treatment of corrugated and uneven surfaces, and for glazing bars, where a width of less than three feet is used, light weight membrane is sufficient. Membrane can be supplied in any width ranging from three inches to 36 inches, either for overall roof coverings, or for treatment of flashings, joints, gutters, glazing bars and so forth.

Evode insulating paste system is applicable to water-proofing. On a slated roof, missing, loose or broken slates are first replaced, then the full sandwich treatment over the entire roof area is applied. Flashings and cappings of the appropriate widths are added where necessary, with adequate lapping. The membrane is firmly pressed into the contours of the slates, avoiding pockets

### Valuable for Dampcoursing

The system has also been found valuable for horizontal and vertical dampcoursing, and for lining concrete tanks to hold cold water. For concrete roofs sandwich treatment is applied over the complete area, employing membrane of heavy weight in strips three feet wide, and separate strips to all valleys, junctions, corners and other changes of outline. Two or three brush coats of Paste I, are used as covering over the membrane sandwich for the sloping thin-shelled barrel slabs.

A further advantage of the paste treatment has been found in waterproofing roofs covered with asphalt or felt sheeting. Wide cracks in the asphalt are filled, as soon as the priming coat has dried, with a special mixture comprising one part of Paste II, a water-bound plastic material applied by trowel, and two parts, by volume, of clean sharp sand.

Full treatment is then applied over the whole roof area, using strips of heavy weight membrane three feet wide and flashings of adequate width applied where necessary, lapping on to the general treatment. A sealer finish is essential on all flat surfaces, or where static water can otherwise accumulate, unless Paste III, applied by trowel, is employed as cover-coat over the membrane sandwich.

For gutter work, especially during bad weather, Paste III is useful as top cover coating.

## US Merger Proposed

### Albright & Wilson's Subsidiary

**ALBRIGHT & WILSON LTD.** announces the signing of a preliminary letter of intent which sets out the basis of negotiations for a proposed amalgamation of its American subsidiary, Oldbury Electro-Chemical Co. of Niagara Falls, NY, with Hooker Electrochemical Co., also of Niagara Falls, NY.

Hooker Electrochemical Co. is a large and progressive American company, established in 1903, and engaged in the manufacture of a wide range of chemical products. It operates plant at Niagara Falls, NY, Tamoca, Wash., North Tonawanda, NY, Kenton, Ohio, Spokane, Wash., and Montague, Mich., and also has subsidiaries in Canada.

Oldbury Electro-Chemical Co. was founded by Albright & Wilson Ltd. in 1896 and is believed to be the first company to manufacture phosphorus in the US on a commercial scale. It is one of the main producers of sodium chlorate, which is increasingly used in bleaching paper and as a weed killer. The amalgamation with Hooker Electrochemical Co., with its large financial and technical resources, is expected to hasten the expansion of these and other activities.

It is proposed that Hooker Electrochemical Co., which at present has on issue 6,006,946 common shares of \$5 each, will allot a

further 450,000 common shares in exchange for the entire capital of Oldbury Electro-Chemical Co., consisting of 10,000 shares of \$100 each. Albright & Wilson Ltd. hold 8,400 of these shares which appear in their books at the par value of \$840,000, and were represented in the 1955 consolidated accounts by net assets of \$6,960,000. The present market price of Hooker Electrochemical Co. common shares is approximately \$49 per share, and on this basis the value of the holding to be received by Albright & Wilson Ltd. is \$18,522,000. The consent of the Bank of England and HM Treasury to the transaction has been obtained.

Following the amalgamation, Albright & Wilson Ltd. will receive dividends on the common shares of Hooker Electrochemical Co. For the first two quarters of 1956 this dividend was at the annual rate of \$1 per share net, and future dividends are likely to be greatly in excess of those which Oldbury Electro-Chemical Co. could have been expected to pay, having regard to their capital requirements.

Albright & Wilson Ltd. states that it does not intend to reduce the capital that it has invested in North America, and that the transaction in no way affects its Canadian subsidiary.

### Dipping Thermometer Standard

Following a request from the Service departments, recommendations for a single, standardised dipping thermometer are contained in a new British Standard, BS 2720. BS 2720 lays down recommendations for materials, construction and dimensions, which ensure that thermometers made to the standard are sturdily built and easy-to-read. The range must include 20° and 240° F with freezing and boiling points of water clearly marked. Where required, a brass wire guard of robust construction is suggested. Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W1, price 2s 6d.

### Whitening Agent

A new fluorescent whitening agent known as Fluolite C has been announced by Canadian Industries Ltd. This material is claimed to produce brilliant white effects on application to certain textiles. It is said to be effective for countering the tint that remains on cellulose fibres even after bleaching.



# From all Quarters



## Greek Nitrate Plant

The Greek Government is to announce international competition for the installation of a nitrate plant near Ptolemais, Greece, capable of supplying all domestic needs for fertilizers now and in the foreseeable future. Estimated cost of the plant is \$25 million. Its annual output will total nearly 300,000 tons of various ammonia fertilizers.

## New Units for Refineries

Antwerp refinery, jointly owned by The British Petroleum Co. Ltd. and Petrofina, is to have a new hydrofiner for removing sulphur from gas oil, and a catalytic reformer for producing a high-grade motor spirit component. Capacity of the hydrofiner is said to be 400,000 tons a year. The catalytic reformer capacity is 350,000 tons a year. A similar reformer is to be installed at the BP Group's refinery at Dunkirk and at the Isle of Grain refinery in Kent.

## Fortisan Protective Fabric

A fabric for tarpaulins and similar protective coverings, said to combine translucency with high strength, low weight, and weather resistance, is being introduced by Herculite Protective Fabrics Inc., of Belleville, NJ. It is made of loose mesh weave Fortisan-36 (Celanese high strength rayon) laminated between two outer vinyl coatings. The vinyl is Bakelite Krene.

## Gold Output Record

Gold output for May, announced in June by the Transvaal and Orange Free State Chamber of Mines at 1,349,598 ounces, is a record for the industry. The previous record was 1,298,432 ounces in March. Compared with April, the value of the gold output in May was £766,798 higher at £16,780,002.

## Paper Industry for Uganda?

The establishment of a paper making industry in Uganda is being investigated. A survey covering the possibilities of obtaining the necessary raw materials and marketing has been carried out by an official of the Pulp & Paper Research Co. Ltd. at the joint request of the Uganda Development Corp. Ltd. and the Government.

## Oil Refinery Plan

A plan for building a major oil refinery in Norway has been submitted to the Norwegian Government by the Standard Oil Company. The refinery would have an output of about two million tons a year and would employ about 400 workers. It is envisaged that some of the oil would be exported to Denmark and Sweden. Norwegian press reports state that if the authorities approve the plan, the refinery would probably be built at Skjebergkilen on the east side of the Oslo Fjord.

## Solartron Sales Teams

On 4 July the first of a series of resident teams of Solartron Electronic Group sales engineers arrived at Los Angeles, US. In three months' time it will be replaced by another team. Mr. I. H. Lynas, Solartron's chief instrument sales engineer, Mr. J. Morrison, one of Solartron's senior technical service engineers, and Mr. G. Rigby, senior commercial research engineer, will establish a sales base on the West Coast where they will demonstrate Solartron equipment to users.

## US Gas Production

Daily average production of natural-gas liquids in the US in April was 32.3 million gallons, 12 per cent more than in April 1955. Daily average production of liquefied gases at refineries was 6.1 million gallons, 37 per cent greater than a year ago. Daily average demand for liquefied gases for fuel and chemical uses in April was 19 per cent higher than in April 1955.

## Farbwerke Hoechst

Farbwerke Hoechst and its associated chemical companies increased their turnover by 12.7 per cent to DM 1,270 million in 1955. Profit increased from DM 22,955,526 to DM 31,756,060 in 1955, and total assets expanded from DM 992,818,788 to DM 1,343,337,294. Exports amounted to DM 380 million.

## Nigerian Salt Investigation

The Eastern Nigerian Government has set up machinery for investigating the production of salt in commercial quantities. It is intended to build a large industrial research laboratory at an early date.

## Instrument Makers' Move

AFTER 25 YEARS in the Croydon area, KDG Instruments Ltd. have moved to Manor Royal, Crawley. Mr. L. R. Pullen, sales director, told THE CHEMICAL AGE that the move became necessary through the very substantial increase in the company's range of instruments which, in turn, meant a large increase in production requirements.

New and improved methods of production layout will ensure even better quality instruments and, says Mr. Pullen: 'The increased efficiency of which we are already assured will go a long way towards stabilizing and arresting the upward trend of prices'.

KDG Instruments Ltd. offer a comprehensive range of indicating, controlling and recording instruments for liquid level and contents, pressure and temperature, together with installation of instrument panels.

## Polypropylene Pilot Plant

PRODUCTION of polypropylene by the low pressure polymerization reactions first described by Ziegler is to begin in the near future on the pilot plant belonging to Bergwerksgesellschaft-Hibernia AG at Wanne-Eickel in Germany. Capacity of the plant is understood to be 100 kg. and this quantity will be used to obtain processing data in co-operation with potential-user companies.

As polypropylene is softer and more flexible than low pressure polythene, it may be particularly suitable for the manufacture of film and for fibres which will have a wool-like appearance.

## Scholarships for Women

THE Imperial College of Science & Technology announces the institution each year, from 1957, of four scholarships reserved for women. These scholarships, which will be of a nominal value of £40 and will be supplemented by the Ministry of Education, are intended to assist the movement to increase the number of women taking up science as a career.

Up to three of the scholarships will be awarded on the college scholarship examination for those who have specialized in chemistry, physics, and mathematics. At least one scholarship will be reserved for a candidate entering the preliminary science course. This is designed for students of high calibre who have specialized in arts subjects at school but wish to change to science.

# MARKET REPORTS

LONDON.—Demand for industrial chemicals has been reasonably good for the period with deliveries to home consumers, in the aggregate, on a reduced scale. Export call is keeping up and a fair volume of enquiry is in circulation. Prices have changed very little, although the impact of higher costs has given a firm trend to quotations. The reversal in lead prices has affected the chemical compounds. White lead is currently quoted at £147 15s per ton and red lead at £142 15s per ton. In the coal-tar products market, the supply position and prices are unchanged and there has been a steady movement on home and export account.

MANCHESTER.—Contract deliveries of bleaching, dyeing and finishing chemicals during the past week have been on a fair scale notwithstanding holiday stoppages in a number of Lancashire cotton towns. The takings of most other leading users, also in spite of seasonal conditions, has been on reasonably steady lines. A fair number of fresh inquiries from home users, as well as from shipment has been reported on the Manchester market during the past week. Prices generally are maintained on a steady to firm basis. Buying interest in fertilizers is confined mainly to one or two sections. The tar products, with an odd exception, continue to move steadily.

GLASGOW.—A very busy week with a good volume of business from most sections of the industry is reported from the Scottish heavy chemical market. Deliveries against spot and contract requirements have been well maintained. A slight falling off, however, can be expected with the approaching holiday period. Prices are still showing signs of an upward tendency, and more increases have taken place this week. In regard to export the market continues fairly active.

MR. CHARLES JOHN PHILLIPS, chairman and managing director of Newbery & Phillips, manufacturing chemists and cosmetic manufacturers, left £26,916 net (duty £4,860).





**HIGH SPEED AERODYNAMICS AND JET PROPULSION.** Volume I, Thermodynamics and Physics of Matter. Editor: F. D. Rossini. Oxford University Press, London. Pp. 812. 100s.

This is the first in a series of 12 volumes dealing with aerodynamics and jet propulsion which the editors state 'will bring together in convenient, highly accurate and well organized form the basic information that has evolved in the last decade in the related fields of gas dynamics, aerodynamics, combustion and jet propulsion.' An authoritative treatment of these subjects is overdue and the publication of this series has been awaited with considerable interest.

The volume consists of 10 sections, each written by an outstanding authority on the particular subject—A, Fundamentals of Thermodynamics, Rossini; B, Fundamental Physics of Gases, Herzfeld, Griffing, Hirschfelder, Curtiss, Bird and Spatz; C, Thermodynamic Properties of Real Gases and Mixtures of Real Gases, Beattie; D, Transport Properties of Gases and Gaseous Mixtures, Hirschfelder, Curtiss, Bird and Spatz; E, Critical Phenomena, Rice; F, Properties of Liquids and Liquid Solutions, Richardson and Brinkley; G, Properties of Solids and Solid Solutions, Ewald; H, Relaxation Phenomena in Gases, Herzfeld; I, Gases at Low Densities, Estermann; J, Thermodynamics of Irreversible Processes, Curtiss. Every section is divided into chapters with separate chapter and paragraph numbering and with separate bibliographies for ease of reference. The text of a number of the sections is based on previous publications of the authors, such as Rossini's 'Chemical Thermodynamics', Hirschfelder, *et al.* "Molecular Theory of Gases and Liquids", and Beattie and Stockmayer 'Thermodynamics and Statistical Mechanics of Real Gases', etc.

Designed for research workers and post-graduate students, the book requires a sound

mathematical background for a full understanding of the text. Where advanced mathematical techniques are used, such as in the section on quantum mechanics, a brief explanation is given to permit an understanding of the text by students with the normal science degree mathematics. From such a book it is difficult to select any chapter for particular comment, but sections E, F and G, are of interest to research workers in chemical engineering and are particularly well written.

As an introduction to the series of specialists text on high speed aerodynamics the publication has collected under one cover the subject matter of a number of books, without appearing to neglect any part of the subject matter. Provided subsequent volumes maintain the same high standard of subject matter and production, the series will be an outstanding contribution to the literature on this important and expanding branch of science.—F.M.

### *West African Development*

DEVELOPMENT in West Africa is leading to increased demand for petroleum products throughout the region. As a result, oil companies operating in Nigeria, the Gold Coast and in Sierra Leone have had to step up rapidly their distribution arrangements. This has resulted in considerable work for Whessoe Ltd. of Darlington. Since 1950 the firm has erected nearly 100 storage tanks of varying sizes and types and at the moment is erecting a further 45 tanks along the Gold Coast seaboard, the coast of Nigeria and along the lines of communication to the interior. In all, Whessoe Ltd. will have used about 7,000 tons of steel plate and sections, fabricated at Darlington, in constructing these tanks. This information is given in the July issue of *Whessoe Review*, copies of which may be obtained from the company at Darlington or London.

# Commercial Intelligence

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

## Mortgages & Charges

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

**LUNEVALE PRODUCTS LTD.** Halton, Lancs, paint manufacturers etc.—20 June, mort. & deb., to District Bank Ltd. securing all moneys due or to become due to the Bank; charged on Low Mills, Halton, and a general charge. \*Nil. 3 May 1955.

**MICRO-BIOLOGICALS LTD.** London W.—20 June, £1,000 deb., part of a series already registered.

**SOUTHSEA PAINTS LTD.** London W.—18 June, £10,000 deb. to A. C. Rose, Finchley, & ano.; general charge. \*Nil. 25 May 1955.

## Increase of Capital

**PREMIER COLLOID MILLS LTD.,** Brettenham House, Lancaster Place, London WC2, increased by £10,000 in £1 ordinary shares, beyond the registered capital of £3,000.

## New Registrations

### J. Abrams Ltd.

Private company. (568,540). Registered 5 July. Capital £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris etc. The directors are: Mrs. Kate Abrahams, 83 Foulden Road, London N16, and Robert W. Leff, 43 Leadale Road, London N16. Secretary: R. W. Leff. Registered office: 146 Bishops-gate, London EC2.

### Eaton The Chemist Ltd.

Private company. (568,531). Registered 5 July. Capital £5,000 in £1 shares. Objects: To carry on the business of consulting, analytical, manufacturing, pharmaceutical and general chemists etc.

The directors are: Robert C. Eaton and Mrs. Maud L. Eaton, both of 9 Church Lane, Harlington, near Doncaster. Secretary: Maud L. Eaton. Solicitor: Mary A. Freeman, Slaithwaite. Registered office: 71/73 Doncaster Road, Goldthorpe, near Rotherham.

### Evans Medical (Services) Ltd.

Private company. (568,737). Registered 10 July. Capital £10,000 in £1 shares. Objects: To carry on business as consultants and advisers on business organization, manufacturing and engineering processes and scientific and technical methods in all or any of the following fields (inter alia) the manufacture and preparation of chemicals, drugs and chemical preparations, the business of drysalts, oil and colour men, brewers' chemists and drug-grinders, the manufacture of perfumes, soaps, cosmetics, etc. The subscribers (each with one share) are: William A. Burns and James N. Singleton, solicitors' managing clerks, of 3 Cook Street, Liverpool. The first directors are to be appointed by the subscribers. Solicitors: Whitley & Co., 3 Cook Street, Liverpool.

### Grillon & Plastic Machinery Ltd.

Private company. (568,534). Registered 5 July. Capital £1,000 in £1 shares. Objects: To carry on the business of factors, importers and exporters of and dealers in chemicals, plastics, plastics materials, machinery, electrical, chemical and engineering goods; to buy, sell, manufacture and deal in all chemicals, materials, machinery and plant used in connection with the plastics, chemical or engineering industries, etc. The subscribers (each with one share) are: Hazel K. Hebben and Elizabeth Tuck, clerks, 59/67 Gresham Street, London, EC2. The first directors are to be appointed by the subscribers. Solicitors: Linklaters & Paines, 59/67 Gresham Street, London EC2. Registered office: 59/67 Gresham Street, London EC2.

### Naylor (Chemists) Ltd.

Private company. (568,595). Registered 5 July. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturing chemists, chemists' sundriesmen etc. The

directors are: Eric J. Naylor and Mrs. Margaret J. Naylor, both of 6 Lodge Lane, Warrington. Secretary: E. J. Naylor. Solicitors: Swift, Garner & Hall, St. Helens. Registered office: 4 Froghall Lane, Warrington.

**Penelectro Ltd.**

Private company (868,861). Registered 12 July. Capital £2,000 in £1 shares. To carry on the business of manufacturers and merchants of and dealers in glass; manufacturers of and dealers in metallurgical and chemical products, metals, metallic and other ores, minerals and residuals thereof, pottery and stoneware; smelters, distillers, chemical manufacturers, metallurgists, mechanical and electrical engineers and makers of instruments and tools of all kinds etc. Subscribers (each with one share) are: H. Larry Penberthy, company director, and Pearl W. Penberthy, company secretary, both of 2317-47th St. W, Seattle 16, Washington, US. The first directors are to be appointed by the subscribers. Solicitors: Dehn & Lauderdale, London EC2. Reg. office: 85 London Wall, London EC2.

**B. J. Phillips (Chemists) Ltd.**

Private company (563,844). Registered 12 July. Capital £2,000 in £1 shares. To carry on the business of retail and wholesale pharmaceutical chemists and druggists etc. Directors: Bernard J. Phillips and Herbert L. Phillips, both of The Gables Nursing Home, 2 Pine Tree Glen, Westbourne, Bournemouth. Secretary: Herbert L. Phillips. Reg. office: 38 Poole Road, Westbourne, Bournemouth.

**Company News**

**Hardman & Holden Ltd.**

Trading profit of Hardman & Holden for the year ended 31 March 1956 was £314,986 compared with £349,007 for the previous year. This is a reduction of approximately 9 per cent. However, according to Mr. Kenneth G. Holden, the chairman, sales in terms of total value showed a small increase upon the previous year's record turnover. These results, he says, illustrate the pressure on the company's profit margins. Increased competition compelled a reduction in some sales prices, and the cost of many raw materials, fuels, services, wages and salaries continued the upward trend that had been a feature of the last few years. The chairman goes on to say: 'I referred last year to our plans



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to manufacture stabilized sulphur trioxide under the trade name of Sulfan, and I am now able to say that construction of the plant has begun and it is hoped that production of Sulfan will commence during the early part of 1957. All our experience over the last few years leads us to think that this product should prove a valuable addition to our range of chemicals.' Mr. Holden spoke of the difficulties of making an accurate forecast for the new financial year. He said that whereas they had experienced no slackening in demand for their products up to the end of March 1956, they experienced some fall in demand in April, but their total sales for May were rather higher than the monthly average for the previous financial year. The annual general meeting will be held on 27 July.

#### ICI Australia & New Zealand

ICI of Australia & New Zealand is maintaining its ordinary interim dividend at 3½ per cent for the year to 30 September 1956. For the previous year, the total was 9 per cent. Sales during the six months to 31 March 1956 are stated by the directors to have exceeded those of the corresponding period of the previous year, but operating

expenses and tax have risen considerably.

#### Shawinigan Water & Power

The Shawinigan Water and Power Company have declared a dividend of 45 cents a share on the no par value common shares of the company for the quarter ending 30 June 1956, payable 24 August to shareholders of record 13 July. In addition, dividends have been declared on the company's two issues of preferred shares for the quarter ending 30 September 1956, payable 2 October to shareholders of record 31 August. On the series 'A' 4 per cent cumulative redeemable preferred shares, the dividend was 50 cents a share and on the series 'B' 4½ per cent cumulative redeemable preferred shares, 56½ cents a share.

#### Simon-Carves Ltd.

At the annual general meeting of Simon-Carves Ltd. held on 9 July, shareholders approved the board's proposals that the capital of the company be increased to £2 million. Resolutions were also passed for the capitalization of £500,000, being part of the balance standing to the credit of the share premium account, and for the scrip issue of one new ordinary share of 5s for each two ordinary shares held on 15 June 1956.

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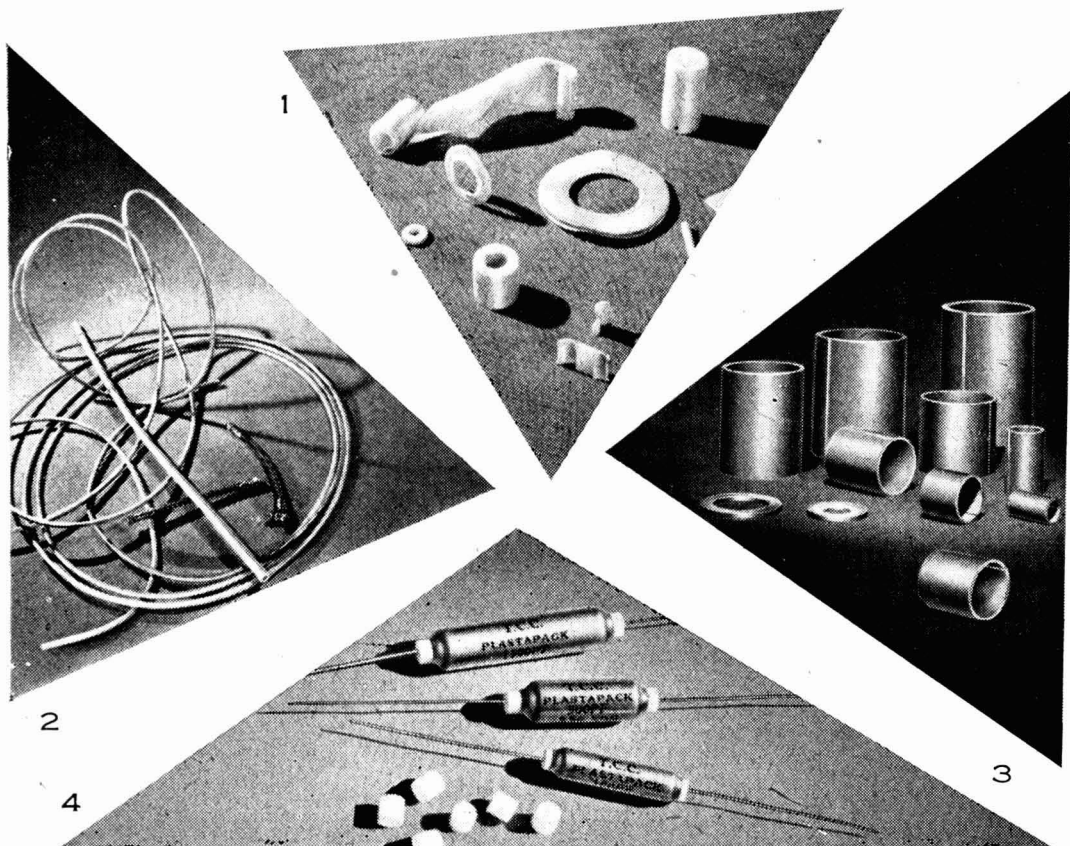
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- 3 'Fluon' has a very low coefficient of friction which is utilised in special types of light duty bearings required to work without lubrication. It is particularly suitable for use in food processing machinery, and in textile and chemical plants. (*The Glacier Metal Co. Ltd.*)
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## SITUATIONS VACANT

**CHEMIST** (Basic Grade) required by the **ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, BERKS.**

Duties will include the control (including analytical control) of water treatment plants, trade waste treatment, radio-active effluent treatment and disposal systems, a special laundry for contaminated protective clothing and the decontamination of plant and equipment. The post may involve short tours of overseas duty.

Applicants should have an honours degree in chemistry or the A.R.I.C. or equivalent qualifications and at least three years' experience in the industrial chemistry field. Experience of water treatment would be an advantage.

**SALARY:** £766 at age 25 to £1,050 at age 34 to £1,199 p.a.

Contributory Superannuation Scheme. Married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates; alternatively assistance towards legal expenses incurred in house purchase may be available; until housed a lodging allowance may be payable.

Requests for application forms by **POSTCARD** to the Senior Recruitment Officer at the above address. Quote reference A.1104/38.



have interesting and progressive post to offer with their Cables and Capacitor Development Laboratories at Helsby, near Chester, to:

**GRADUATE PHYSICISTS, CHEMISTS and ELECTRICAL ENGINEERS.**

Previous experience is not essential. Remuneration will be at competitive rates according to age, qualifications and experience.

Write to **STAFF OFFICER, B.I.C.C. LTD., PRESCOT LANCs**, quoting reference H/34/56, for further information or interview.

**ORGANIC CHEMISTS** required by a firm of insecticide and fungicide manufacturers near London, for research and development work in this field. Applicants must have at least 1st or 2nd class Honours Degree or A.R.I.C. and some post-graduate or industrial experience. The appointments are permanent and pensionable. Commencing salaries up to £1,100, progressive and according to age and experience. Write in confidence, giving full details of the qualifications and experience, to:—**BOX NO. C.A. 3485 THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

BILLINGHAM



DIVISION

ENGINEERING RESEARCH DEPARTMENT

# CHEMICAL ENGINEERS PHYSICISTS

Striking economies can be effected in chemical plant by applications of knowledge of mass transfer processes. Intensive work is for that reason being carried out in the Engineering Research Department of the Billingham Division on evaporation, absorption, distillation, etc. Some of the work is basic in character, some has direct application to plant. Publication of results is encouraged.

Applications are invited from chemical engineers and physicists for posts as Technical Officers. Candidates should have an Honours degree and be below 40 years of age.

These appointments are permanent and pensionable and good starting salaries are offered. There is a profit-sharing scheme in operation and assistance can be given towards house purchase. The Company also makes grants towards removal expenses in the case of married men.

Write, giving brief details of age, qualifications and experience to the Staff Manager, Imperial Chemical Industries Limited, Billingham Division, Billingham, Co. Durham, quoting reference W/D.7.

**LAPORTE CHEMICALS LTD.** have vacancies for **CHEMISTS and ASSISTANT CHEMISTS** for analytical and process control work at their Warrington factory. The positions are permanent and progressive and a pension scheme is in operation. Write stating age, experience and qualifications to General Manager, Laporte Chemicals Ltd., Baronet Works, Warrington.

### CHEMISTS AND CHEMICAL ENGINEERS

**VACANCIES** exist in the Research and Development Branch of the Industrial Group of the **UNITED KINGDOM ATOMIC ENERGY AUTHORITY** at Springfield Works, Salwick, Near Preston, Lancashire.

#### DUTIES:

##### Post "A" (Ref. 1479A)

Collaboration with production staff in the translation to production scale of work done in the Laboratories; the assessment and investigation of current and future production processes; and the control of development work.

##### Post "B" (Ref. 1479B)

Leader of a team of Chemical Engineers developing production processes used in the manufacture of chemical compounds connected with nuclear energy projects.

##### Post "C" (Ref. 1480)

Senior member of a section concerned with the design and improvement of the chemical processes of uranium technology. The duties will involve pilot plant operations as well as laboratory work.

##### Post "D" (Ref. 1481)

Member of the section described under Post "C". The duties may involve pilot plant operations as well as laboratory work.

##### Post "E" (Ref. 1482)

Senior member of a research section concerned with the extraction and purification of metals of interest to nuclear energy products; to lead a small team responsible for laboratory investigations; and to liaise with a similar team engaged in pilot plant operations.

#### QUALIFICATIONS AND EXPERIENCE:

Posts "A", "B" and "C". Honours degree in Chemistry or Chemical Engineering or Associate of the Royal Institute of Chemistry or Corporate Membership of the Institution of Chemical Engineers, or equivalent, together with several years' experience of production and development operations of a non-routine nature of the industrial chemical field. It is desirable that candidates for Post "B" should have had experience of fluidised solids technique.

Post "D". Higher School Certificate in science subjects, or equivalent. A University degree would be an advantage. Wide experience of laboratory or industrial operations in inorganic or physical chemistry and of the supervision and training of junior staff in laboratory work is essential. Normal minimum age 35 years.

Post "E". Second Class Honours Degree in Chemistry, or equivalent, with at least three years post-graduate experience in industrial or university laboratories, preferably in the field of inorganic or physical chemistry.

**SALARIES:** According to qualifications and experience within the undermentioned scales:—

Posts "A", "B" and "C" £1,705 to £1,980 or £1,235 to £1,655.

Post "D" £1,295 to £1,550.

Post "E" £1,155 to £1,355.

A contributory pension scheme is in operation.

Authority houses for renting by successful married candidates may be available in due course or, alternatively substantial assistance towards legal expenses incurred in private purchase may be given.

Suitably qualified persons are invited to send a Post-Card quoting the appropriate reference number(s), for application form to the Recruitment Officer, U.K.A.E.A., I.G.H.Q., Risley, Warrington, Lancashire.

Closing date: 27th July, 1956.

**CHEMIST**, 21-40, Male or Female, with B.Sc., or A.R.I.C. preferably with Industrial experience, for Analytical work in Pharmaceutical Laboratory. 5-day week. Staff canteen. Non-contributory Pension Scheme. Apply in writing to **PERSONNEL MANAGER, JOHN WYETH & BRO. LTD., 12, CHENIES ST., W.C.1.**

### Atomic Energy Research Establishment

#### HARWELL

has a vacancy in the

#### HEALTH PHYSICS DIVISION

for an officer to assist in an investigation of low level **RADIOACTIVITY IN BIOLOGICAL SYSTEMS**. The work requires a knowledge of analytical chemistry. Experience of radio-chemistry and a knowledge of experimental biology would be an advantage.

**SALARY:** The appointment will be graded as either:

(i) Scientific Officer £555-£1,000 p.a. (according to qualifications and experience)

or (ii) Assistant Experimental Officer £353 (at age 18)—£756 p.a. (Maximum starting salary £605).

For post (i) a first or good second class honours degree in chemistry is required. For (ii) minimum qualifications are G.C.E. Advanced level in two science subjects, or equivalent, but a pass degree in chemistry, or in biology with chemistry, would be an advantage.

Contributory Superannuation scheme; five day week; excellent working conditions and generous leave allowances.

Married officers living outside the Establishment's transport area will be eligible for housing under Authority arrangements, or, alternatively, substantial assistance towards legal expenses incurred in house purchase will be available.

Send **POSTCARD** for application form, which must be returned by 2nd August, 1956, to Establishment Officer, A.E.R.E., Harwell, Didcot, Berks, quoting reference 590/38.

**EXPERIMENTAL OFFICERS AND ASSISTANT EXPERIMENTAL OFFICERS** in various Government Departments. The Civil Service Commissioners invite applications for pensionable posts.

The posts are divided between following main groups and subjects (a) Mathematical and Physical Sciences, (b) Chemistry and Metallurgy, (c) Biological Sciences, (d) Engineering subjects and (e) Miscellaneous (including e.g. Geology, Library and Technical Information Services).

**AGE LIMITS:** For Experimental Officers, at least 26 and under 31 on 31st December, 1956; for Assistant Experimental Officers at least 18 and under 28 on 31st December, 1956. Extension for regular service in H.M. Forces. Candidates aged 31 or over with specialised experience for Experimental Officer posts may be admitted.

Candidates must have at least one of a number of specified qualifications. Examples are Higher School Certificate, General Certificate of Education, Scottish Leaving Certificate, Scottish Universities Preliminary Examination, Northern Ireland Senior Certificate (all in appropriate subjects and at appropriate levels), Higher National Certificate, University degree. Candidates taking their examinations in 1956 may be admitted. Candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. In general a higher standard of qualification will be looked for in the older candidates than in the younger ones.

**SALARY** (London):—

Experimental Officer £925—£1,135 (men); £836—£1,015 (women).

Assistant Experimental Officer £365 (at age 18) to £805 (men), £715 (women). Starting pay up to £655 (men) or £627 (women) at 26 or over. Somewhat lower outside London. Promotion prospects. Women's scales being improved under equal pay scheme.

Further particulars, for which you are advised to make early application, from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1., quoting No. S94-95/56.

## Situations Vacant—continued

**SCIENCE GRADUATE** required in Library Intelligence Service Department of Richard Thomas & Baldwins Ltd., London. Post involves technical and scientific abstracting, translating (German, French, etc.) and general information work. Applicants should be between 23/26 years. Apply **CENTRAL STAFFING DEPARTMENT, 47, PARK STREET, W.1.**

**SENIOR SCIENTIFIC OFFICERS: SCIENTIFIC OFFICERS.** The Civil Service Commissioners invite applications for pensionable appointments. 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 in the Natural History Museum for candidates who have special knowledge of, or who are interested in, palaeobotany, malacology, helminthology, acarology, foraminifera, mammalian taxonomy.

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 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 taking their degrees in 1956 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 between 21 and 28 during 1956 (up to 31 for permanent members of the Experimental Officer class). Salary (London) Senior Scientific Officers: (men) £1,135—£1,345; (women) £1,026—£1,240. Scientific Officers: (men) £605—£1,055; (women) £605—£962. Women's scales being improved under equal pay scheme. Somewhat lower rates in the provinces.

Further particulars, for which early application is advised, from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1., quoting No. S.53/56 for Senior Scientific Officers and S.52/56 for Scientific Officers.

**TECHNICAL REPRESENTATIVE** is required by the Chemical Division of B.X. Plastics Ltd., to initiate a sales development programme on a new project. A degree in chemistry is essential and sales experience, particularly in the paint trade, is desirable. The successful candidate will be based at Brantham and will be expected to travel widely in the United Kingdom. Applications stating age, qualifications and experience should be sent to the **PERSONNEL MANAGER, B.X. PLASTICS LTD., BRANTHAM WORKS, NR. MANNINGTREE, ESSEX.**

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- Horizontal SIFTER/MIXER** by D. Burr—trough 5 ft. by 2 ft. by 30 in. deep. Broken scroll-type agitator. Motorised.
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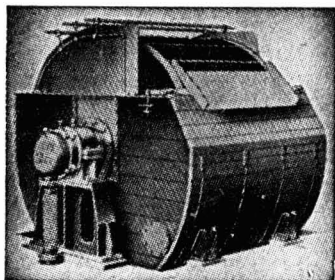
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**UNIFLOC**  
REGD. TRADEMARK

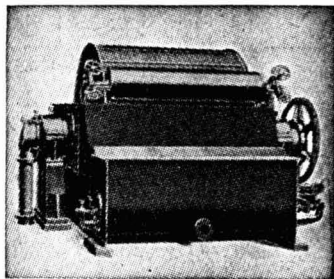
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Telegrams:  
"VULCAN"  
LOSTOCK GRALAM

**"VULCAN"**  
BRAND

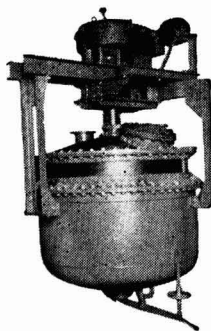
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SAFETY CRATES,  
&  
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LOSTOCK GRALAM, NORTHWICH.

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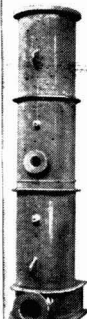


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