THE Chemical Age

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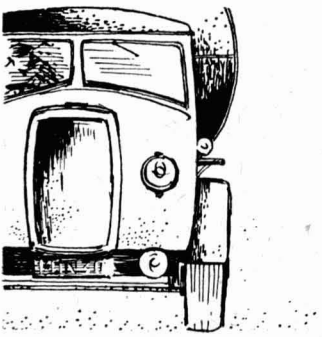

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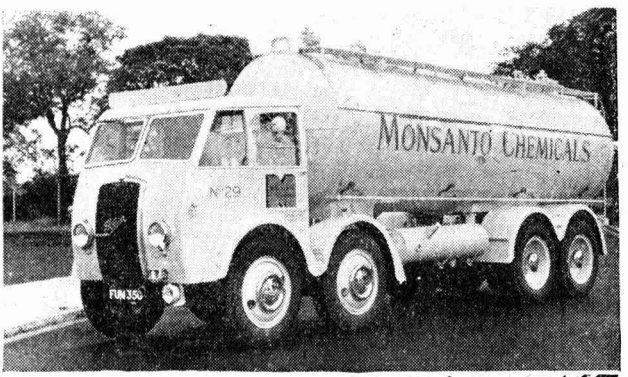

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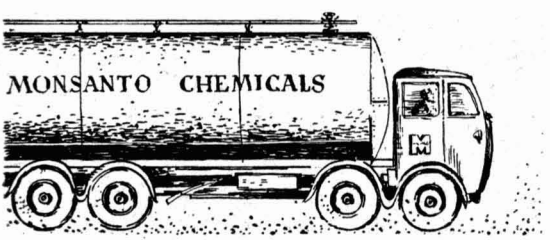

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The Harder Dollar

THE general growth of Canadian industry has been so expansive in the last decade and a half that it could be all too easy to regard the growth of Canada's chemical industry as a natural consequence. In fact, however, the rate at which this industry has grown is substantially above the general rate. Since 1939 the output of all manufacturing industries in Canada has risen by 93 per cent; but for chemical output the figure is 161 per cent. Moreover, this sharper expansion has been achieved with a smaller proportional call upon man-power. The total number of employees in all Canadian manufacturing has increased, again since 1939, by 91 per cent; superficially, a 91 per cent greater usage of labour to obtain 93 per cent more production suggests that the general productivity standard in Canada could be improved. But the chemical industry's 161 per cent increase in output has been obtained with only a 100 per cent increase in its number of employees. Another striking comparison is revealed when the increase in number of manufacturing plants is considered. For all industries the rate of new plant installation has been twice that for the Canadian chemical industry. Clearly, the trend for chemicals there has been to install larger plants rather than to install a greater number.

When that traditional barometer, sulphuric acid usage, is tapped, the signs of growth are equally impressive. Just under 300,000 tons in 1940 had become 770,653 tons by 1952—a rise of 156 per cent. Despite this, Canada is also an exporter of sulphuric acid to the annual tune of some 30,000 to 50,000 tons; before the war the tune was hardly audible, only about 2,000 tons being surplus to Canada's own and then much smaller needs.

To accept all this evidence of development as no more than the expectable surging-forward of a young country is scanty appraisal. Obviously enough, the youthfulness of industrial Canada is a most potent factor. Opportunity, room for growth, raw materials to harness for new tasks, all have been there and to an extent that they can hardly occur in older countries. But during this period of expansion, Canada's population has grown by only 24 per cent and this also allows for the accession of Newfoundland in mid-1949. To have raised output by 93 per cent when population has risen by only 24 per cent, and during the same period to have made a large man-power contribution for the whole six years of World War II, cannot be accounted for as a crest-of-youth performance. It is much more, indeed, than that.

In terms of net value, the figures of expansion are, of course, far greater. In dollars the rise has not been 93 per cent but 360 per cent; however, the cash columns of accountancy are a misleading guide in pre-war and post-war comparisons. The point is made merely to show that none of these measures of Canadian expansion owe one jot of status to the changed values of paper currencies.

To return to the particular theme of chemicals in Canada, there is yet another distinction to be found when comparison with the rest of Canadian industry is made. It has long been a weakness, perhaps more theoretical than real, that Canada exports large quantities of raw or semi-raw materials and imports proportionately high quantities of manufac-

tured goods; certainly some Canadians have regarded this as precarious economy. If they are right it is a move towards sounder trading economy if the proportion of finished or manufactured goods in total exports steadily increases. This is happening with Canadian chemicals; but it is not happening with Canadian products as a whole. In the past three years total exports from Canada have changed from 28 per cent as raw materials to 32.5 per cent; and in the same period the percentage of fully manufactured goods in all imports has risen from 65 to 73 per cent. There appears to be no similar movement towords 'greater rawness' with Canada's chemical exports nor with her chemical imports is there a tendency for increasing dependence upon other countries' refined products. However, the validity of this distinction is perhaps somewhat decided by statistical selection—for example, is newsprint or processed pulp rightly classified as a chemical or non-chemical product?

Heavy and bulk chemicals still dominate the Canadian chemical industrial picture. It could hardly be otherwise in a country where mining, agriculture and forestry dominate the total industrial picture. The stage when this kind of primary production is deemed adequate and when a sharp turn towards fuller processing becomes essential for continuing expansion does not seem to have been reached yet. Something like a third of the industrial or intermediate kinds of chemicals used in Canada is still being imported. Thus, in 1952, for every $1,000 of these chemicals made and used in Canada, $400 was spent on imports for use. This indicates that there is still plenty of scope for expanded primary chemical production in Canada.

This broad account of the present state of chemical industry in the Commonwealth sector of North America has not been compiled simply out of admiration for Canada, praiseworthy indeed though the record is. It is an account, too, of opportunity, and perhaps of fleeting opportunity to be grasped soon or lost for all time, *for Britain*. Our neglect of Canada as a dollar market for exports is remarkable. About 80 per cent of Canada's imports are admitted free of duty and where goods are dutiable preferential tariffs give the British exporter an advantage. Dollar deficiency may have prevented us from playing any truly significant part in Canada's huge post-war capital investment programme, but the trading opportunity still remains. The Canadian dollar is harder than the US dollar but there is every reason to suppose that it is an easier dollar for British exporters to earn. A rapidly expanding chemical industry requires equipment, specialised chemicals, apparatus, etc. In 1952, 92 per cent of Canada's imports of chemicals were bought from the United States, as, too, were 87 per cent of her imports in medicinal and pharmaceutical chemicals. The growth of Canada's own industry should encourage rather than deter the British exporter. It is felt that selling specialised goods to Canada is only a short-term policy because eventually her own chemical companies will manufacture these goods, how much more currently and forcibly the same argument applies to efforts to supply the American market. Nor in any case is Canadian self-sufficiency for fully manufactured goods a near-future possibility. Her present population is 15,000,000. This will rise to about 25,000,000 by 1975-80. The Canadian market for all classes of goods, has doubled itself twice in this century and it will do so again by 1975. Canadian production will never keep pace with this demand; but her economy will keep pace with it because of her wealth in raw materials. The British chemical industry should not only sell more to Canada but it should offer greater technical co-operation; for if trade no longer 'follows the flag' as once it was said to do, it is certainly likely to follow technical service and technical 'know-how.' To quote Sir William Rootes, chairman of the Dollar Exports Council: 'We must do much better in Canada, for it is a great and expanding market. Before the war we were responsible for 18 per cent of Canada's imports, whereas today, in a greatly expanded economy, this figure has fallen to 8 per cent.' There has been too long a period of neglect, and even where re-cultivation cannot bring immediate results the fullest efforts should still be made.

Notes & Comments

Instrumentally

THE president of the Instrument Society of America, Mr. Porter Hart, recently made a tour of European countries and the views he has expressed on returning to the United States seem likely to cause some heart-burning here. He considers that the instrument industry in Europe is ten years behind the USA and shows no signs of being able to catch up. 'The same is true of the use of process control instruments in European chemical works.' Much the same view was expressed, though less forthrightly, in the Heavy Chemicals Anglo-American Productivity Team's Report issued just a year ago. 'We are bound to conclude that the American heavy chemical industry made fuller use of instrumentation and automatic control . . . In our view these factors were contributing much to the productivity of the American heavy chemical industry, in particular by improving materials efficiency and the uniformity of chemical products.' It was also admitted that America had been well ahead of Britain in the dissemination of specialised knowledge on instrumentation. Indeed, it was the British team's view that 'know-how'—education and training in instrumentation—was a more serious general deficiency than instrument quality and production itself. There are undoubtedly two background factors that generate exceptionally keen US interest in control by instrumentation—the high cost of labour, and the large home market that always favours continuous rather than batch processing. Batch processing is not nearly as easily controlled by full instrumentation, but the batch method is not always operated simply because manufacturers have no appreciation that continuous production may be cheaper. It is a matter of market facts. In the long run, only a limited number of chemicals can be produced *ad lib* with a certainty that every pound or ton will find buyers. But when all these reservations have been made, there is still plenty of remaining truth in Porter Hart's verdict. The Heavy Chemicals Team made two strong recommendations on the subject—how much has been done towards implementing them?

Synthetic Organics

THE United States Synthetic Organic Chemicals Association, in presenting a report to the Randall (or Tariff) Commission, gave some exceedingly interesting figures for American imports of these materials in recent years. The four principal countries selling synthetic organics to the USA are Canada, Germany, Switzerland, and Britain, and in that order of size. From 1950 to 1953 the Canadian and Swiss shares in this dollar business have stayed much the same, Swiss sales remaining at about $6,000,000, Canadian sales rising from $14,000,000 to $18,000,000. The German and British shares have risen more sharply, Germany's from under $2,000,000 to nearly $9,000,000, ours from the same figure to about $5,750,000. However, it is only in 1952/53 that British sales made a marked improvement; in the first six months of 1953 they were greater than in any full year's total since the war.

An Even Greater Threat

ANY freer trade tendency in Washington is vigorously opposed by the Synthetic Organic Chemicals Association, whose main case would seem to be that existing tariffs do not discourage US purchases from abroad; and also that 90 out of 116 tariff rates applicable to organic chemicals have already been reduced under GATT. It would perhaps be invidious to comment upon a matter that belongs essentially to US domestic politics even though it affects many other countries. What seems more interesting to us is the fact that this rising value of organic chemical trade can be secured in a country whose own synthetic organic industry has raised output by nearly 800 per cent since 1939. If this can be done in America, how readily it should be achievable in other

markets where similar tariff rates apply both to US and to British or other European products. What is perhaps less encouraging, however, is the extent by which German sales outstrip our own; equivalent in 1950, they are 50 per cent greater now. There, far more starkly than in tariff debates, lies the biggest threat to British export trade in chemicals.

Half a Hand

HERALDED some two months ago (THE CHEMICAL AGE, 1953, **69**, 1062), the first issue of *Current Chemical Papers* has just been published by the Chemical Society, and at the same time Vol. 1 No. 1 of *Analytical Abstracts* has been issued by the Society for Analytical Cemistry. These are two of the periodicals designed to compete, like a number of local delivery services, against the streamlined pantechnicon of *Chemical Abstracts*, and it is therefore reasonable, while extending a sincere welcome to the newcomers, to consider them critically. One cannot, indeed, overcome a feeling of disapointment. '*CCP*' has arrived in its promised form: there are 1,400 entries, from journals received by the Chemical Society throughout December, each one giving the title of the paper, the author(s), journal, year, volume and pages. But it is very difficult, particularly in the organic chemistry sections, to find a paper without reading a page or two, and since the type throughout is light face, it is impossible to pick titles out at a glance. In '*AA*' this last is relatively easy, since the format is that of the late-lamented *British Abstracts* —and there are also only 218 items. These are numbered, but there are no page numbers, so that, when the indexes are published at the end of the year, finding an entry among some 3,000 will be quite an undertaking. '*CCP*,' however, has no index at all; apparently it is supposed to be referred to only once, and the indexing done by oneself. One last criticism: there appears to be no indication of the range of journals covered by *Analytical Abstracts*, or of the date from which abstracting began. Nevertheless, we are glad that a further effort is being made to keep alive the spirit of the old '*BA*.'

Carbon as a Filter Aid

THE supremacy of diatomaceous earth as a filter aid in industrial processes has never been complete. Alkaline solutions or solutions containing hydrofluoric acid or fluorinated compounds have been capable of dissolving diatomaceous earth, which is 90 per cent silica; as a result there has not been a filter aid of low cost for solutions of high *p*H. The Great Lakes Carbon Corporation has now developed industrial carbon as an inert filter aid for such cases; it is said to be manufactured from blends of petroleum coke and other unspecified carbonaceous substances by a high temperature furnace process. It is definitely stated not to be an activated carbon. It has a particle size closely similar to that of diatomaceous earth; its bulk density is 16 to 20 pounds per cubic foot. The pilot plant has an output of about six tons per day, and present indications are that the carbon filter aid is cheaper than special grades of diatomaceous earth but dearer than general grades. Its range of chemical inertness is greater than that of silica, for it can withstand most acids at high temperatures as well as the strongest alkaline solutions. It would appear to possess one other useful advantage over diatomaceous earth in easier filter-cake disposal, for it is combustible: at least this enables the bulk problem of disposal to be cheaply reduced. This could be of special application for filtration problems in the chemistry of atomic energy development or for radio-active products. A longer account of the new filter aid—christened 'Nerofil'—will be found in *Industrial & Engineering Chemistry* (1953, **45**, [12], 15A), but full details seem unlikely to be released until patent rights have been established.

Savings Achievement

Employees at the head office of Cooper, McDougall and Robertson Ltd., Berkhamsted, Bucks., who make sheep and cattle dips, disinfectants, insecticides and veterinary products, have saved more than £40,000 since 1940 through their National Savings group organisation, which is run by Mr. G. P. Lancashire.

MIDLANDS SOCIETY FOR ANALYTICAL CHEMISTRY

Analytical Chemistry of W & Mo

(With Particular Reference to Steel & Allied Materials)—Part II

AT a meeting of the Midlands Society for Analytical Chemistry held recently in Birmingham, the speaker was Mr. B. Bagshawe, Chief Chemist, The Brown-Firth Research Laboratories, Sheffield. The substance of the paper has been divided into two parts: (a) Gravimetry, (b) Colorimetry; and the first of these appeared in the issue for 23 January.

Use of dithiol

Tungsten—The problem of accurately determining tungsten in low ranges is best met by applying a colour reaction. Tungstic acid gives an extremely sensitive greenish-blue colour with toluene-3,4-dithiol[14,15,16,17].

This reaction has been developed to provide the basis for an accurate quantitative semi-micro method for steel[18]. The colour of the tungsten-dithiol complex develops at steam bath temperatures in a concentrated hydrochloric acid medium containing stannous chloride. The complex is selectively extractable in amyl acetate (the solvent used for the reagent) and in this way it may be separated from iron, chromium, nickel, etc., which remain in the acid layer.

Tungsten is retained in solution prior to the reaction as phosphotungstic acid, thus preventing initial hydrolysis losses. The sensitivity is such that not more than a 15 mg. steel fraction is required to cover the range 0-1 per cent tungsten and as little as 0.01 per cent can be detected and determined accurately. A typical Spekker calibration curve is given in Fig. 1.

Apart from molybdenum and cobalt the reaction is of much lower sensitivity, and under the conditions stated. Cobalt gives a similar green complex to tungsten but the reaction is of much lower sensitivity, and 2 per cent cobalt shows an interference equivalent to no more than 0.05 per cent tungsten. This is shown in Table VII. The effect is only important, therefore, when the method is applied to cobalt alloy steels; ordinary plain and alloy steels do not contain sufficient residual cobalt to prejudice the tungsten reaction.

Molybdenum interference is much more serious because (a) the molybdenum reaction is one of high sensitivity, (b) residual molybdenum is present in most steels. The order of molybdenum interference is shown in Table VIII. It is clear, therefore, that the method cannot be used, except in particular cases where molybdenum is known to be absent, unless provision be made for eliminating the molybdenum effect.

TABLE VII

Interference of Cobalt in Tungsten-Dithiol Reaction

Steel	Apparent % Tungsten
126 (W–Nil)	Nil
,, +2% Co	0.055
,, 4% Co	0.10
,, 6% Co	0.15
,, 8% Co	0.21
,, 10% Co	0.31

TABLE VIII

Interference of Molybdenum in Tungsten-Dithiol Reaction

Steel	% W	% Mo Added	% W Found
126	Nil	0.05	0.04
,,	Nil	0.25	0.21
127	0.12	Nil	0.12
,,	0.12	0.05	0.15
,,	0.12	0.10	0.19
,,	0.12	0.20	0.28
FST	0.78	Nil	0.78
,,	0.78	0.05	0.82
,,	0.78	0.10	0.83

This has now been achieved by applying a preferential formation of the molybdenum-

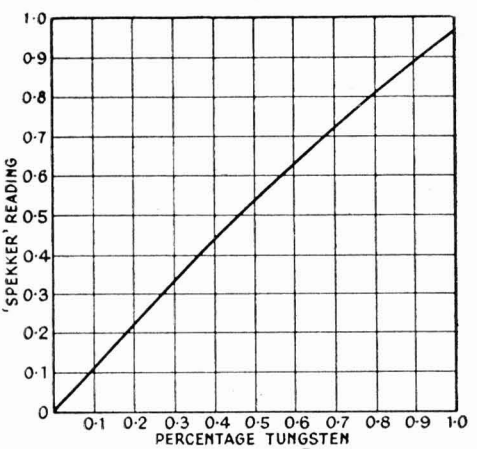

Fig. 1. A typical calibration curve for tungsten in steel

Ilford 608 Spectrum red filters + H503.
4 cm. cells. Volume = 50 ml.
15 mg. sample. Mercury lamp.

dithiol complex which occurs in cold hydrochloric acid solutions of SG. 1.06 to 1.08. In this diluted acid at normal temperatures there is no corresponding formation of the tungsten complex, which requires more concentrated acid and higher temperatures for its development. The selectively-formed molybdenum compound can, therefore, be removed by extraction with amyl acetate.

TABLE IX
Tungsten in Presence of Molybdenum ; Interference Prevented

Steel	% W	% Mo Added	% W Found
FST	0.78	Nil	0.77
,,	0.78	3.0	0.775
,,	0.78	3.0	0.77
,,	0.78	3.0	0.775

TABLE X
Molybdenum in Steel ; Dithiol Method Comparative Results

Steel	Molybdenum % Dithiol Method	Molybdenum % Thiocyanate Method
Plain carbon	0.04	0.04
,, ,, ...	0.09	0.09
,, ,, ...	0.15	0.15
Low alloy	0.06	0.06
,, ,, ...	0.24	0.22
,, ,, ...	0.24	0.24
,, ,, ...	0.30	0.31
,, ,, ...	0.32	0.34
,, ,, ...	0.51	0.52
,, ,, ...	0.68	0.68
,, ,, ...	1.71	1.68
16% Tungsten ..	0.56	0.55
High-speed steel ..	4.22	4.19
13% Cr. 1.3% Nb ..	0.01	Nil
18 Cr. 8 No	1.30	1.31
,, ,, ...	2.72	2.73
,, ,, ...	2.40	2.42
,, ,, ...	3.00	2.99

The acid layer containing the tungsten can then be adjusted to give the conditions suitable for development of the tungsten complex, the determination then being completed in the usual way. The elimination of the molybdenum interference is indicated in Table IX. With this provision for molybdenum, accurate determinations of tungsten, even in the lowest ranges, can be made on most types of alloy steel, the exception being when comparatively large amounts of cobalt are present.

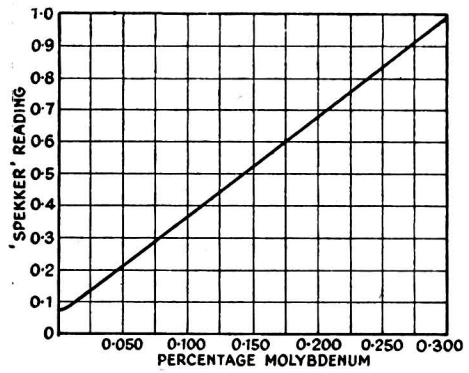

Fig. 2. A typical calibration curve for molybdenum in steel

Ilford 604 Spectrum green filters +H503.
4 cm. cells. Volume = 100 ml.
0.1 gm. sample. Mercury lamp.

Molybdenum.—The molybdenum-dithiol compound which is selectively extracted in the tungsten determination, before developing the tungsten complex, may also be used to determine molybdenum. It has been applied by Wells and Pemberton[19] as the basis of a semi-micro method for steel, working on 4 mg. of sample. Results by the procedure are given in Table X which shows a comparison of dithiol results on 4 mg. steel samples with results by the conventional thiocyanate method.

Use of Thiocyanate

Molybdenum.—The thiocyanate procedure depends on the orange-red oxythiocyanate complex produced with the thiocyanate ion and pentavalent molybdenum after reduction with stannous chloride. The corresponding red ferric thiocyanate initially formed is selectively bleached by reduction with stannous chloride and the molybdenum colour is then measured by the Spekker absorptiometer. A typical calibration curve is given in Fig. 2. There seems to be some evidence that iron is necessary for the formation of a stable molybdenum colour, and possibly iron is a component in the coloured complex. It is certain that in the complete absence of iron the molybdenum colours are weak and lead to erratic results. The bleaching of the co-generated ferric thiocyanate appears to be catalysed by the presence of molybdenum, being very rapid with high molybdenum steels and becoming much slower with steels containing only trace amounts of molybdenum. There is always a small residual ferric iron colour in the lowest ranges and this accounts for the irregularity in the curve at its point of origin.

This is shown more clearly in Fig. 3 which is restricted to the range 0-0.5 per cent molybdenum. It is clear that determinations in this extreme lower range are subject to iron blank values of comparable magnitude to the amount of molybdenum present, with the result that determinations in the region of 0.02 per cent or less are of low accuracy and may be as much as 100 per cent in error.

This residual iron colour is not of perm-

anently constant value; it is reduced by increasing the standing interval before reading and also by increasing the stannous chloride concentrations, Figs. 4 and 5. Thus, by increasing the stannous chloride to 8 gm. per 100 ml. the residual blank is reduced within 15 minutes to nearly negligible proportions, i.e. the equivalent of about 0.003 per cent molybdenum. Determinations in the short range 0-0.05 per cent molybdenum can in this way be made to an overall accuracy of about 0.005 per cent. This is normally sufficient for practical purposes.

It has recently been found that the problem of residual ferric thiocyanate can be solved more conveniently by adding a small amount of titanium salt, which apparently catalyses the reduction. The equivalent of 15 mg. of titanium is sufficient to give complete bleaching of the ferric colour and the stannous chloride concentration can be reduced to the normal level of 1 gm. This modification is incorporated in the most recent BISRA method[30]. Results by the method are shown in Table XI.

TABLE XI

Molybdenum in Steel ; Thiocyanate Method

Results by BISRA Analysis Committee

		% Mo—Sample No.				
	Operator	65	97	93	141	172
1	.. ..	0.016	0.22	0.99	2.69	5.30
2	.. ..	0.020	0.21	0.99	2.58	5.23
3	.. ..	0.028	0.21	1.01	2.66	5.30
4	.. ..	0.025	0.20	1.02	2.63	5.28
5	.. ..	0.020	0.21	0.99	2.61	5.31
6	.. ..	0.025	0.21	0.97	2.66	5.20

There is interference from copper above about 0.4 per cent owing to precipitation of cuprous thiocyanate, and such interference may occur at lower copper values, i.e. 0.1 per cent if high stannous chloride concentrations are used, as this results in marked depression of the solubility of cuprous thiocyanate. This can be offset by increasing the thiocyanate concentration, so that in effect the best compromise is made between the incidence of copper interference and residual iron blank values.

Vanadium shows a small interference, which can be allowed for by means of a correction graph, Fig. 6. Tungsten can be retained in solution as phosphotungstic acid and shows no interference.

Tungsten.—The application of the yellow tungsten-thiocyanate colour has been reported on by many investigators, but there has been much inconsistency of performance, and serious interference from vanadium and molybdenum.

The colour is developed at a much higher acidity than is used in the corresponding molybdenum determination, but complete suppression of the formation of the molybdenum colour has been the chief problem. Recent work by a BISRA Sub-Committee[31]

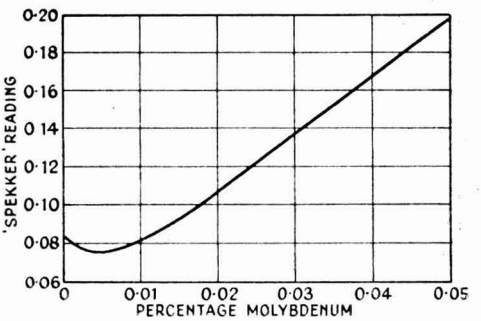

Fig. 3. Non-linear response at low molybdenum concentrations

Ilford 604 Spectrum green filters + H503.
4 cm. cells. Volume = 100 ml.
0.2 gm. sample. Mercury lamp.

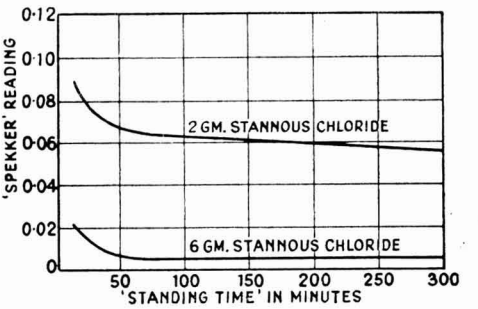

Fig. 4. Effect of standing interval on 'residual' iron blank

Ilford 604 Spectrum green filters + H503.
4 cm. cells. Volume = 100 ml.
0.2 gm. sample. Mercury lamp.

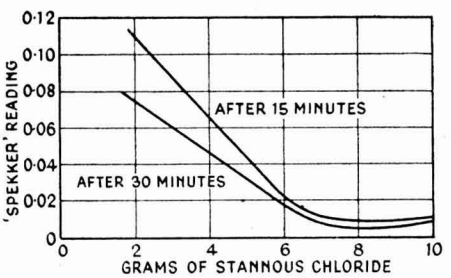

Fig. 5. Effect of varying stannous chloride concentration on residual iron colour

Ilford 604 Spectrum green filters + H503.
4 cm. cells. Volume = 100 ml.
0.2 gm. sample. Mercury lamp.

has shown that by using titanous chloride in combination with the stannous chloride reducing agent, molybdenum contents up to 4 per cent can be tolerated without significant interference.

Vanadium interferes by forming a similar yellow-coloured reduction compound and, moreover, the resultant interference is not completely independent of the tungsten content, probably owing to the formation of complex acids. This is shown in Table XII. There is, however, no serious error introduced by making a linear correction for vanadium below 0·3 per cent. Typical results by the method are shown in Table XIII.

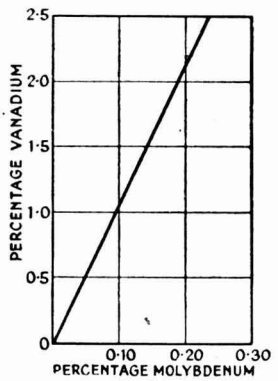

Fig. 6. Correction curve for vanadium in determination of molybdenum in steel

Ilford 604 Spectrum green filters.

TABLE XII

Tungsten in Steel ; Thiocyanate Method

Vanadium Interference at Different Tungsten Levels

% V	% W	% W Equiv. of V Colour
0.5	0.1	0.00
0.5	0.3	0.09
0.5	1.0	0.08
0.5	2.0	0.06
2.0	0.1	0.38
2.0	0.3	0.38
2.0	1.0	0.31
2.0	2.0	0.29

TABLE XIII

Tungsten in Steel ; Thiocyanate Method

Results by BISRA Analysis Committee

Operator	% W—Sample No. 124	78	128	109
1	0.19	0.55	2.20	4.70
2	0.19	0.54	2.22	4.80
3	0.20	0.55	2.20	4.69
4	0.20	0.52	2.22	4.73
5	0.18	0.55	2.22	4.67
6	0.18	0.55	2.24	4.70

Thanks are due to Dr. C. Sykes for permission to publish this report.

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Spanish Directory

GIVING comprehensive coverage of the various sections of the Spanish chemical industry, a second and revised edition of the 'Anuario de la Industria Química Española' (Year Book of the Spanish Chemical Industry) has been published by the Sindicato Vertical de Industrias Químicas, Madrid. In general, the new edition retains the same sections as its predecessors, but in order to avoid repetition of much of the statistical and legal data previously included, the first four chapters (dealing with the organisation legislation, evolution and present structure of the industry) have been brought up to date by making frequent reference to the first edition, and without reprinting that information in full.

The remainder of the volume comprises an extensive directory to the Spanish chemical industry. It includes an alphabetical list of manufacturers of chemicals and pharmaceuticals, giving details of each firm's specialities and their trade marks; classified sections providing a buyers' guide to manufacturers of chemical and allied products and of machinery and equipment for the industry; and sections listing importers, exporters and wholesalers. A useful feature is a vocabulary giving translations in French, English and German of the products listed in the classified section.

Gas from Petro-Chemicals

THE possibility of Australia's new petrochemical industry now becoming a source of supply for household gas is being considered in Sydney, New South Wales. The Gas Light Co., one of the State's main suppliers, is investigating the potentialities of the gases which are one of the by-products in the manufacture of petro-chemicals. They have a very high British thermal unit rating, and it is stated that they could be diluted with air and used by gas companies in place of orthodox coal gas.

Production of Gas from Oil

New British Plant Saves 60 Tons of Coal a Day

BY means of a new all-British process, plant installed at the South Eastern Gas Board's works at Bell Green, Lower Sydenham, London, is now producing up to 800,000 cu. ft. of gas a day from oil — a small but significant part of the Board's total gas production.

The new process, which was developed in the central laboratories of the former South Metropolitan Gas Company (now one of the London divisions of the South Eastern Gas Board), is considered to have great possibilities. With good gas-making coals becoming ever more difficult to obtain, the manufacture of gas from oil becomes increasingly important as a contribution—and a growing one—towards coal conservation.

For the beginning of this story of achievement, it is necessary to go back to the years 1945-47, when, as a result of not only gas coal but also gasmaking plant being insufficient to meet demand, the gas industry turned to the use of oil in place of coal in what plant was available. This was done with varying degrees of efficiency, but never with sufficient success to maintain supplies of gas at a critical time. In these experiences were both a warning and a promise that oil could supplement coal—at least during times of peak demand.

Suitable Catalysts Found

Recognising that this changing pattern in raw material supplies would have its influence upon the future development of the gas industry, the former South Metropolitan Gas Company, in its central laboratories in the Old Kent Road, sought means to make the best use of the new situation in the interests of its gas consumers. They found that certain catalysts were capable of so guiding the chemical reactions between steam and heavy oil that from the heavy oil could be produced a gas very similar in composition to ordinary town gas.

First news of this important discovery was given to the public in the autumn of 1950 by Mr. H. Stanier and Mr. J. B. McKean, in a paper they presented to The Institution of Gas Engineers. Since that time a team of workers in the same laboratories has shown that the same catalytic materials can be used to reform both refinery tail gases and methane. The versatility of these catalysts may be of great assistance to the gas industry in its attempts to make use of all possible raw materials for the manufacture of town gas and the saving of scarce coal.

The South Metropolitan Gas Company took these experiments as far as the first pilot plant stage, and on nationalisation the South Eastern Gas Board encouraged the work to proceed at an accelerated pace. A first large-scale unit was erected at the Old Kent Road gas works and served to show the kind of practical troubles which would be experienced in bringing the laboratory process to full operating scale.

Power-Gas Collaborated

An agreement was entered into with the Power-Gas Corporation Ltd., Stockton-on-Tees, whereby their practical experience in the design of gasmaking plant was added to the knowledge now available of the new process. A prototype commercial plant was designed jointly and installed at Sydenham, where it first started gasmaking in February, 1953. Experience was gained in the operation of the plant and the control of the process, and gradually the plant has been brought up to its present performance. It is producing 800,000 cu. ft. a day of a gas of standard quality and saving 60 tons of coal a day.

Petroleum being such a ubiquitous fuel, whereas coal is much more limited to certain areas of the world, it may be that this process will serve in many parts where gas is needed and oil, not coal, is the only raw material available.

Compared with town gas, petroleum hydrocarbons, both liquid and gaseous, contain too much carbon and too little hydrogen. The purpose of the catalytic gasification process is to cause steam to react at high temperatures with some of the excess carbon to produce hydrogen and carbon monoxide. The remainder of the excess carbon is burned to provide the necessary heat.

The plant consists of three cylindrical vessels of steel, lined with brick. In the first of these steam is heated to a high temperature by its being passed over heated

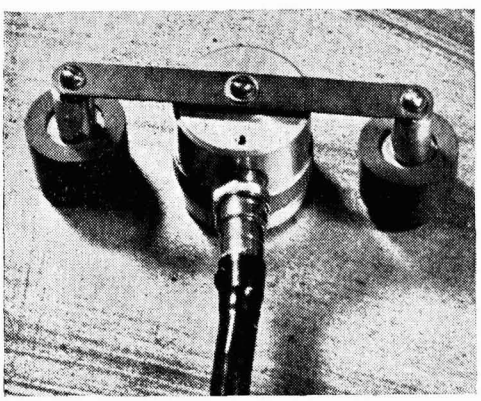
brickwork. The steam then meets a spray of oil and the mixture of oil and steam passes over the catalysts in the second vessel, where the desired reaction takes place. After this the hot gas passes over brickwork in the third vessel, heating the brickwork and becoming cooled in so doing. This flow continues for a few minutes during which heat is being absorbed and temperatures are falling in the steam preheater and catalyst bed. The steam and oil are then shut off, the gas offtake valve closed and air is then blown backwards through the plant, becoming preheated in the third vessel and burning off carbon from the catalyst and brickwork in the second and first vessels. An automatic operator opens and closes the controlling valve in the necessary sequence.

TECHNICAL DATA

Size of vessels :		
Steam preheater	8 ft. 6 in. diam.	16 ft. 6 in. high
Overall external dimensions :		
Catalyst vessel	8 ft. 6 in. diam.	16 ft. 6 in. high
Air preheater	7 ft. 9 in. diam.	21 ft. 6 in. high
Oil used, gal./hr.	.. ..	130
Steam used, lb./hr.	.. ..	2,600
Air used, lb./hr.	.. ..	9,500
Gas made per gal. of oil	.. ..	1.15 therms
Calorific value of gas	.. 480-508 B.Th.U. per cu. ft.	

Ultrasonic Testing

RECENT improvements to the Dawe ultrasonic thickness gauge (see THE CHEMICAL AGE, 1953, **68**, 968) have been announced by the manufacturers, Dawe Instruments Ltd., 83 Piccadilly, W.1. One of these is a simple fixture to hold the probe firmly against the material whose thickness is to be measured, so that the operator has both hands free to support himself. Typical is the magnetic head shown in the accompanying illustration. The two magnets are joined by a strap in the centre of which is a screw for fixing to the probe. Rubber suction pads may also be affixed for measurements on non-magnetic materials. Another improvement is a harness to carry the weight of the actual gauge to which the probe is connected. This not only reduces fatigue, but speeds up the work of taking readings.



A close up showing the two magnets attached to the vibrator probe

Uranium Oxide in Australia

PURE uranium oxide, the first to be produced in Australia, has been refined at a pilot plant at Radium Hill, South Australia. The oxide represents the last stage in the treatment of crude uranium ore before smelting into uranium metal.

In September last year the Australian Government announced that the United States Atomic Energy Commission was to ship a complete uranium-refining plant to Australia, and it is understood that this plant is now on its way to the country.

Small quantities of uranium ore were sent last year to the US to determine the type of refining plant necessary for treatment of the ore from Rum Jungle, in the Northern Territory.

Kel-F Buyers' Guide

SOURCES of 'Kel-F' polymer materials, finished products, as well as application services offered by more than 75 US and Canadian companies, are readily available in a quick reference 'Buyers' Guide' issued by the M. W. Kellogg Company, manufacturers of the fluorocarbon plastic. The products and materials listed in the new booklet are representative of those used extensively in the chemical, electronic, food, aircraft, pharmaceutical, medical, equipment and atomic energy fields. The new guide is available, without charge, from Technical Service, Chemical Manufacturing Division of The M. W. Kellogg Company, P.O. Box 469, Jersey City 3, N.J. (The term 'Kel-F' is a registered trade-mark for the M. W. Kellogg Company's trifluorochloroethylene polymer products).

Fertilisers in Brazil

Complete Change in Country's Status

BRAZIL, which has been importing over 250,000 tons of phosphates annually and large quantities of potash, will shortly be independent of foreign supplies of all fertilising materials except nitrates, and may also soon become a main fertiliser exporter.

Prior to 1950, few of Brazil's fertiliser resources were exploited. The apatite (calcium phosphate) deposits of Ipiranga, with 11-20 per cent P_2O_5, and those of Jucupiranga and Morro Serroba, with 22-28 per cent, were worked on a small scale, the reserves ranging from 500,000 to 750,000 tons. In 1950, however, Federal and State Governments began collaborating in the exploitation of the apatite deposits of Araxa, Minas Gerais, where the reserves are estimated at 100,000,000 tons.

The Brazilian Department of Mineral Production started to open up those at Camisao, Bahia, and Monteiro, Paraiba; to crush and pulverise the potassic rocks of Pocos de Caldas; to study the possibilities of recovering potassium salts as a by-product of the north-eastern salt pans and the concentration of nepheline and leucite for subsequent extraction of potassium salts. The SALTE Plan, approved in 1950, allotted £1,100,000 towards the cost of prospecting apatite deposits and installing plant for industrial exploitation.

Brazilian Subsidiary

In the same year Société Tunisienne de l'Hyperphosphate Reno founded a Brazilian subsidary to prepare hyperphosphates, and two Brazilian groups, assisted by French capitalists, organised companies to produce hyperphosphates.

In 1951, a new impetus was given to Brazil's incipient industry by the discovery of important deposits of phosphorite on two estates near Olinda, Pernambuco, with reserves of 49,000,000 tons, and a P_2O_5 content varying from six per cent to 22 per cent. Several firms combined to exploit the beds, which have an average thickness of 3.75 metres, and are easily worked. Plant is being installed to produce concentrates of phosphorite on a large scale. Also the Brazil Department of Mineral Production is now examining another valuable deposit of rock phosphate discovered recently when drilling for water on Itapecoca Island, off the coast of Pernambuco.

After this quick succession of most promising developments, thorough surveys were systematically made in several different parts of the country, as a result of which Brazil has emerged as one of the richest countries in the world in all kinds of fertilising materials.

It is now known that apatite occurs in limestone formations in Sao Paulo, Minas Gerais, Algoas, Paraiba and Bahia; phosphoric bauxite in Maranhao and on Alcatrazes Island, off the Sao Paulo coast. A deposit of calcium phosphate, with reserves of over 1,000,000 tons, exists on Rata Island, Fernando Noronha, and volcanic phosphates are found in Paros de Minas.

The potassic rocks of Pocos de Caldas, Minas Gerais, have visible reserves of 20,000,000 tons, with 10 per cent to 14 per cent potassium content. Lime is found in all but two Brazilian states, and abundant raw materials exist for the preparation of organic nitrogen.

Scholarships Abroad

THE British Council has published a booklet giving details of over 100 scholarships offered to British students by 16 foreign countries for study abroad during the academic year 1954/55. The scholarships are intended mainly for graduates and undergraduates of UK universities, but some are also open to those with non-academic professional qualifications. The awards generally provide for free tuition and maintenance, and are tenable for periods varying from four to twelve months. The closing date for receipt of applications varies for each country, the earliest date being 8 March next.

The countries offering scholarships are Austria, Belgium, Brazil, Denmark, Finland, France, Germany, Iceland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and Yugoslavia.

Full particulars and application forms may be obtained, on receipt of a stamped addressed foolscap envelope, from any British Council office in the UK, or from The Controller, Education Division, The British Council, 65 Davies Street, London, W.1.

AIC Gold Medallist

William J. Sparks to be Honoured

THE American Institute of Chemists has selected DR. WILLIAM J. SPARKS, co-inventor of butyl synthetic rubber, to receive its 1954 Gold Medal at its annual meeting at Asbury Park, New Jersey, in May.

Now director of the chemical division and co-ordinator of exploratory research for the Standard Oil Development Co. (central research and engineering affiliate of Standard Oil Co., New Jersey), Dr. Sparks has been with the Standard Oil Development Co. since 1936—except for the 1939-40 period—and it was during the early period of his experimental work with the company that he played a key rôle as co-inventor with R. M. Thomas in the development of butyl rubber.

More than 100 of Dr. Sparks' chemical inventions have been patented. During the early 1930's he made several technical discoveries which particularly stand out in the light of present-day chemistry. While investigating the chemistry of hydrogen peroxide, he discovered its profound effect upon the germination of seeds—a fundamental observation considered to be of great scientific importance. He also made basic observations on the employment of hydrogen peroxide in baking, and in his early work succeeded in making a clear, hard resin from acrolein.

Pioneered Other Polymers

The development of butyl rubber introduced to the American chemical industry a radical departure in commercial operations —a continuous polymerisation conducted at −80° in large-scale equipment. Among other polymers of note which Dr. Sparks pioneered in the late 1930's and 1940's were two types which were later to assume commercial importance. They were 'T-132,' a high-styrene-isoprene emulsion copolymer, and a thermoplastic film-forming copolymer of *iso*-butylene and styrene of low-temperature origin known as 'S-Resin.'

Since 1942 Dr. Sparks has served as National Councillor of the American Chemical Society. In 1952 he was appointed vice-chairman of the National Research Council's Division of Chemistry & Chemical Technology and chairman last year.

During the summer of 1953, Mr. Sparks spent several weeks on a scientific tour of European countries and was head of the US delegations to the International Union of Pure & Applied Chemistry in Stockholm.

Corrosion Prevention

Numerous Methods Displayed

ON Thursday, 21 January, at Battersea Polytechnic, the Corrosion Group of the Society of Chemical Industry staged an exhibition and conversazione on the subject of 'The Protection of Ferrous Metals,' and on the following day the exhibition was open to the general public. The object of the exhibition was to portray, within a narrow compass, some of the most important methods and processes for preventing the corrosion of iron and steel, the cost of protection of which by painting has been estimated at nearly £200,000,000 a year.

With the collaboration of a number of industrial concerns and research laboratories, the committee of the Group assembled a collection of nearly 40 exhibits, arranged in five sections to show: the effect of design; treatment of the corrosive medium; cathodic protection; protective coatings; and methods of testing. It was emphasised that the exhibits were intended to illustrate the type of protection involved, and not to advertise the individual products.

The importance of sensible design was illustrated by a set of photographs, which showed how the retention of water in angles and interstices should be prevented; and treatment of the corrosive medium was exemplified by air-conditioning, use of inhibitors in solution, and vapour-phase inhibitors. Cathodic protection was demonstrated, particularly as applied to ships.

The majority of exhibits were concerned with surface protection, and illustrated: preparation of the surface by gritblasting, phosphating or other methods; painting; metal coating with tin, aluminium, zinc, chromium, etc.; other coatings such as vitreous enamel, bitumen, cement, wax-grease and plastics; and temporary protectives.

Demonstrations of testing methods were given by the Armament Research Establishment, the metallurgy department of Battersea Polytechnic, BISRA, the Brown-Firth Research Laboratories, the CRL, the Paint Research Station and the Tin Research Institute.

Costs Up—Profits Down

Canadian Industry & Competition

STRONG indication of highly competitive market conditions in the Canadian chemical industry in future was referred to by Mr. A. H. Martin, president of Dominion Tar & Chemical Co., in a recent end-of-the-year review.

'During 1952 and 1953,' Mr. Martin pointed out, 'the chemical industry spent tens of millions of dollars of capital outlay on plants to produce chemicals not heretofore produced in Canada. These large projects are now practically all completed and will be producing in the 1954 period. It means, of course, that the chemical industry is not likely in 1954 or ensuing years to make nearly the same capital outlay for new plant as they have in the last two years. Nevertheless, with the introduction of new products, there is every indication that the volume of sales in 1954 should be maintained at close to the 1953 levels and, conceivably, even exceed them.

'Dollar volume of sales, however, is one thing, but the profit dollar is another. The chemical industry has been very conscientious in respect of its pricing policy for many years now, and you will find that there has not been any runaway increase. As a matter of fact, a good number of chemicals produced in Canada are now at prices lower than those quoted in the US and UK home markets.

Not True of Costs

'The same is not true of costs. In the last two or three years, the steady, and sometimes greatly accelerated rates of increases demanded by labour (and, as a net result, in the costs of raw materials going into manufacture) have substantially reduced profit margins to the point where, even with increased sales, it has not always been possible to maintain normal profit levels. This will be reflected in 1953 results, and no doubt accentuated further in 1954.

'Someone might say, "Well, why not increase prices?" To do this would have the effect of pricing many commodities out of the market. Why? The chemical industry is suffering at the present time as a result of the current tariff position. Many chemicals now made in Canada are still free of duty when entering this country from the US and Great Britain. Any recession that might occur in those countries would immediately accentuate their desire to ship their surpluses into the Canadian market.

'If the Canadian chemical industry is to survive and expand, it requires reasonable and normal protection. The US tariff on Canadian chemicals is completely prohibitive, and the UK and Commonwealth countries, due to a dollar shortage, are not in a position to do business with us. Canada can produce as cheaply as any other country, but in today's circumstances, must live off its own market, and cannot expect for some time to participate in world markets.

'Yes, 1954 will be a good year, but it will be a more difficult matter to achieve these results than it has been in past years. Marketing, not production, will be the keynote.'

Water Pollution Manuals

WELCOME developments in water pollution abatement laws are reported by the Manufacturing Chemists' Association, USA, in the third of their series of water pollution abatement manuals. The new manual, W-3, on 'Neutralisation of Acidic and Alkaline Plant Effluents,' indicates that the trend of late is toward a policy which takes into account not only the characteristics of plant effluents but also the capacity and potential use of the receiving water.

Capacity of streams to assimilate industrial waste is limited, the manual states, and indicates the need and methods to be followed in neutralising plant effluents. It describes laboratory and engineering studies to be undertaken prior to treating polluted water. General methods of treatment for acidic effluents and the equipment required are indicated. Included is a table listing various alkalis to be used in neutralising acidic effluents together with current market prices for these chemicals.

Two sections of W-3 are concerned with the process for neutralising alkaline effluents and include a description of insoluble sludges resulting from neutralisation. Safe practices to be followed in carrying out the process are indicated

Two previous manuals have been published. Manual W-1 is entitled 'Organisation and Methods for Investigating Waste in Relation to Water Pollution'; and Manual W-2, 'Insoluble and Undissolved Substances.'

Chemical Engineers

North Western Branch Annual Meeting

THE annual general meeting of the North Western Branch of the Institution of Chemical Engineers was held on 22 January at the Town Hall, Manchester.

The members were welcomed by the Lord Mayor of Manchester (Alderman A. Moss, M.A.). The chairman of the branch, Mr. P. K. Standring, thanked the Lord Mayor on behalf of the members for the privilege of holding the meeting in the Town Hall and for his hospitality.

After the normal business of the meeting had been transacted, the chairman referred to the future of the branch and its activities. The president of the Institution, Mr. S. Robson, also spoke on this topic and on the problem of recruitment for the profession of chemical engineering.

In the evening a dinner-dance was held at the Midland Hotel. The guests included Mr. S. Robson, president of the Institution of Chemical Engineers, and Mrs. Robson; Mr. H. Irwin, chairman of the North Western Branch of the Institution of Mechanical Engineers; and Dr. B. V. Bowden, principal of the College of Technology, Manchester. Dancing continued until a late hour and all present enjoyed a very pleasant evening.

The branch committee is constituted as follows:—*chairman,* Mr. P. K. Standring; *vice-chairman,* Mr. H. E. F. Pracy; *hon. secretary,* Mr. J. S. Hunter; *hon. treasurer,* Mr. J. M. Wishart; *other members,* Mr. E. C. B. Bott, Mr. B. L. Budd, Mr. G. R. Elliott, Mr. J. F. C Gartshore, Mr. H. Kaye, Mr. A. J. Moyes, Mr. J. A. Storrow and Mr. C. Toyne.

Analytical Chemists

THE 43rd ordinary meeting of the Physical Methods Group of the Society for Analytical Chemistry, will be held at 7 p.m. on Tuesday, 9 February, in the meeting room of the Chemical Society, Burlington House, Piccadilly, W.1.

The subject of the meeting will be 'Coulometric Analysis' and the following papers will be presented and discussed:—'The Principles of Coulometric Analysis,' by E. Bishop, B.Sc., A.R.T.C. A.R.I.C.; 'An Automatic Coulometric Titrimeter,' by N. Bett, B.Sc., G. Morris, Ph.D., F.Inst.P., and W. Nock, M.A., Grad.I.E.E.; and 'Some Apparatus and Techniques for Semi-Micro Coulometric Analysis,' by G. Packman, M.Sc., A.R.I.C.

Pharmaceutical Research

THE Wellcome Trust has set aside a further £10,000 for whole-time research fellowships in schools of pharmacy in Great Britain. The trustees made their first grant of £5,000 for research fellowships in 1947. They added a further £1,200 last year, when five fellowships were awarded, and the value of each was raised from £350 to £400 a year.

The awarding committee, nominated by the Wellcome Trustees and the Pharmaceutical Society of Great Britain, has discretion to award a senior research fellowship at a somewhat higher rate. Fellows must be registered pharmaceutical chemists in Great Britain, or graduates in pharmacy of a university in this country. A fellowship is tenable for two years on annual award and is renewable in exceptional circumstances for a third year.

Gammexane in the Tropics

IT has been noticed that chlorinated hydrocarbon insecticides such as Gammexane powder and DDT powder when brought into contact with some grades of polythene under exceptional conditions, such as imposed by the Bell Telephone Laboratories' environmental cracking test (see 'Environmental Cracking of Stressed Polythene' by De Coste, Malm and Wallder, Bell Telephone Laboratories Inc.) cause the polythene to disintegrate. This phenomenon applies especially to polythene of grades 7 and softer. The test is an extremely severe one and the phenomenon has not been observed where polythene insulated cable has been treated with these insecticides.

The Telegraph Construction & Maintenance Co. Ltd., are now endeavouring to ascertain whether cable users in the tropics where these insecticides are widely used have experienced any trouble with polythene-insulated cables which may have come into contact with such insecticides.

South African Newsletter

FROM OUR OWN CORRESPONDENT

THE total cost of Sasol is estimated to be £31,800,000, according to an address given by Mr. F. J. du Toit, chairman of the South African Coal, Oil and Gas Corporation Ltd., at the third annual general meeting.

The increase in capital cost, he said, was just over £12,000,000. This was mainly due to the expanded capacity of Sasol from 55,000,000 gal. a year to 71,000,000 gal. and to the need to process by-products to a further stage at which they could be marketed in South Africa.

Mr. du Toit's statement attributed part of the increase also to the rise in manufacturing costs in Germany, where most of the corporation's equipment has been purchased. Steel plate costing 243 Deutsch marks a metric ton in October, 1950, rose 100 per cent to DM. 486 by March, 1953. Tubes rose 46 per cent from DM. 735 to DM. 1,067.95, while standard labour rates increased by 25 per cent.

'Since March,' the statement continued, 'there have been small reductions in material costs, but the fact remains that Sasol was obliged to purchase the bulk of its equipment at prices greatly in excess of the original estimates.' Discussions on the sale of petrol had taken place with five of the Union's petrol and oil distributing companies. It was expected that more than half the corporation's petrol would be produced to the specifications of the companies concerned and would be sold to them. The balance, consisting of a high-quality blend, together with most of the solvents and other chemicals, would be marketed by the Sasol Marketing Company.

* * *

Representatives from mining houses, Government engineering concerns and university professors have been visiting Krugersdorp, Transvaal, to see the invention of a former mining engineer. The inventor, Mr. H. D. Walton claims that his invention is capable of saving the iron and steel industry throughout the world millions of pounds a year. After three years' research he is demonstrating a new method for removing mill scale, the iron oxide that coats iron and steel sheets during their manufacture. Unless this is removed the steel becomes pitted, will not take paint, and deterioration sets in.

Mr. Walton said that the present conventional methods, such as sand blasting, scraping, brushing and pickling steel in an acid solution were often unsatisfactory. 'In Britain alone,' he declares 'the steel industry loses 500,000 tons of steel production a year, representing about £15,000,000, through mill scale.'

With Mr. Walton's method steel is 'boiled' in a large foam bath containing a special solution. Heavy direct current is passed through the bath and this sets up gas pressure which frees the particles of scale from the metal and leaves a clean surface. He has set up his experimental plant in the Krugersdorp Engineering Works and is cleaning water and main pipes for use by the mines, the Government and various municipalities. Next year he plans to go overseas to demonstrate his invention in Britain, Europe, and also possibly America and Japan. Experts in South Africa have been favourably impressed by the potentialities of this invention.

* * *

Machinery recently landed from Europe is being installed at Coega, near Port Elizabeth, where salt, claimed to be equal in quality to any in the world, will be produced for the first time by the Vrany Chemical Corporation this year. The salt will be won from the sea. The capacity of the plant, the only one of its kind in the southern hemisphere, is 30,000 tons a year, but production is expected to be limited to 20,000 tons a year. It will provide work for about 150 people.

Heavy rain in October and early November last year, adversely affected production of salt from the Coega salt pans, but drying winds from mid-November until towards the end of the year enabled the firm to make up leeway lost because of rain. Beside the new processing plant, estimated to cost about £300,000, the Vrany Corporation will retain its present salt pans. Full production is scheduled to be under way in March. The process releases important chemical by-products from the sea.

It is claimed this process will save South Africa thousands of pounds a year in

foreign currency. This development at Coega has been made possible by an overseas group and the Vrany Corporation. Technical supervision will be by overseas experts. At present large quantities of industrial salt have to be imported.

* * *

When the South African Coal, Oil and Gas Corporation, Sasol, starts production, industrial waxes of several types will be among the by-products. Three technicians from Sasol have been seconded to the Council for Scientific and Industrial Research to study the application of such waxes. They are working in the National Research Laboratory.

Initially, they are applying analytical methods and technology in studying the application of these waxes and later on it is planned to explore possible industrial application of such waxes in South Africa. Wax for industrial purposes is at present being imported into the Union.

Testing Essential Oils

THE British Standards Institution has just published BS. 2073, 'Methods of Testing Essential Oils.' This describes the preparation of the oil for examination and gives methods of determination for the following: — Specific gravity and apparent density (weight per millilitre), optical rotation, refractive index, freezing point and melting point, solubility in alcohol, acid value and ester value, ester after acetylation, citronellal, aldehydes other than citronellal, carbon and methone and phenols. It is hoped at a later date to issue an addendum, including some of the methods which it has not been found possible to standardise at the present time. Copies of this new standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1 (4s.).

Haifa Sulphuric Acid Plant

THE sulphuric acid plant of Fertilisers and Chemicals Ltd., in Haifa Bay, which has been in operation since October, is expected to produce 80,000 tons of acid a year, using iron pyrites imported from Turkey. This is sufficent to meet all local needs (including the production of fertilisers) and also to meet export requirements of Turkey and other countries.

When the phosphoric acid plant is completed, the company will also produce enriched triple phosphate. Nitrogen fertilisers and battery acid will be produced when the synthetic ammonia plant is in operation, and anhydrous ammonia will probably be made in a year's time.

Exports from India

Government's Latest Decisions

THE Indian Government has decided that paints, varnishes and enamels shall continue to be licensed freely for export during the period January to June next.

The export of the following items is licensed freely on presentation of shipping bills which will be endosed valid for shipment till the end of June this year — sheets and circles of copper, brass and aluminium, strips, plates, bars, rods, pipes and tubes of copper and brass and copper wire.

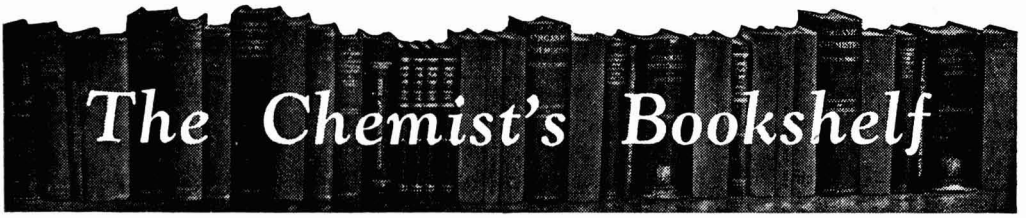
Export of the following continue also to be licensed freely until further notice: — Lead-tin-antimony alloys such as white metals, antifriction bearing metals, solder, type metal and printing metals, lead sheets and tubes, brass wire, magnesium alloy scrap, residues, ashes, drosses and concentrates of all non-ferrous metals.

The export of soda is licensed freely for shipment up to the end of August next.

The Government having reviewed the procedure for licensing export of iron and manganese ores, it has decided that exports from Calcutta during the first quarter of this year shall be regulated on the same basis as during the previous quarter.

Exports from all ports except Madras continue to be licensed as hitherto. Capacity being limited for rail movements to Madras via Guntakel and Bangalore, exports of these ores originating from Bellary-Hospet and Bangalore areas are now regulated on a quota basis. Exports of these ores originating from other areas continue to be licensed freely, even from Madras port.

Allotments of iron and manganese ores to established shippers for export from Madras during the first quarter of this year are being granted up to 20 per cent of shipments of each ore in the best year out of calendar years 1951, 52 and 53.



BRITISH VETERINARY CODEX 1953. Edited by K. R. Kapper. Published by direction of the Council of the Pharmaceutical Society of Great Britain. The Pharmaceutical Press, London. 1953. Pp. 737. 45s.

This book is to all those interested in veterinary medicine what the British Pharmaceutical Codex is to the pharmacist. In its 737 pages one will find standards for more than 800 substances and preparations which are used in the prevention or treatment of animal diseases. These substances include drugs of vegetable and animal origin, synthetic chemicals, antibiotics, hormones, antisera, vaccines, toxoids, etc.

The book is divided into three sections. Part I contains 431 monographs, covering all of the more important drugs and chemicals used in veterinary medicines. These monographs vary considerably both in content and style but the majority give the full name of the substance, its formula, synonyms, method of preparation, solubility, description, standards, action and uses, toxicity, notes on storage and method of administering and the dosage. Part II deals with antisera, vaccines and related products and contains 65 monographs. It is said that this is the first time that detailed standards for a comprehensive range of these substances have been prescribed. Part III gives formulæ for over 300 preparations commonly used by the veterinary surgeon. Sixteen appendices, a therapeutic and pharmacological index and a general index round out this book. The appendices give details of various assays and tests, methods of preparing isotonic solutions and of sterilising solutions for injection as well as the usual useful tables of weights and measures, etc.

The British Veterinary Codex was prepared by a Committee appointed by the Council of the Pharmaceutical Society and it represents the combined efforts of over 100 experts. It took more than three-and-a-half years to produce and it combines the latest knowledge from several countries, as corresponding members from Ireland, the United States and each of the Dominions collaborated with the committee and the several sub-committees. Knowing all this, what reviewer would be bold enough to criticise? The humble individual who appends his initials below, however, would like to suggest that future volumes of this magnificent work should have more uniformity in lay-out, particularly in Part I. He would like to add hastily that he welcomes the appearance of such a book and that he considers it well worth the 45s. asked for it.—A.P.B.

SIMULTANEOUS LINEAR EQUATIONS AND THE DETERMINATION OF EIGENVALUES. Edited by J. Paige and Olga Taursky. Applied Mathematics Series No. 29. National Bureau of Standards, USA. Pp. 126. $1.50.

This volume contains 19 of the papers presented at a symposium held in August, 1951, at Los Angeles. The papers are concerned with methods for getting the solution $A^{-1}b$ of a system of linear equations $Ax = b$ and for getting A^{-1}, where A is a non-singular matrix and b is a column vector and with methods for determining the eigenvalues and eigenvectors of a matrix. All the papers are by expert mathematicians, several of whom are European.

Although not many of the problems of chemistry can be formulated as systems of linear equations, one paper on the subject by G. E. Forsythe deserves special mention for the very extensive bibliography it contains. The determination of eigenvalues is a central problem of the theory of molecular structure so that the six papers on eigenvalues are of particular interest to chemists, especially one on bounds for the characteristic roots of matrices and another on variational methods. Of interest also are

the papers dealing with the application of large computing machines.

Nevertheless this collection of papers is not generally suitable for chemists since it requires a knowledge of rather advanced algebra not normally possessed by chemists —for example, a familiarity with at least the notation of the theory of Hilbert space. Even the theoretical chemist may find it occasionally difficult reading due in part to the brevity of the introductory sections of the papers.

The general presentation maintains the high standard we have come to expect from the National Bureau of Standards.—A. DALGARNO.

THE REACTIVITY OF FREE RADICALS. Discussions of the Faraday Society, No. 14. Aberdeen University Press. 1953. Pp. 256. 35s.

One of the most interesting and important fields of physicochemical research is that concerned with the production and properties of free radicals. It is not surprising, therefore, that the present topic has frequently been a subject of Faraday Society Discussions in the past. For example, full-scale discussions were those entitled 'Free Radicals' (1934) and 'The Labile Molecule' (1947); free radicals have also figured largely in other discussions on hydrocarbons, oxidation, photochemistry, polymerisation, etc.

The title of the present discussion is appropriate, for it emphasises a definite change of outlook which has recently made itself felt. During the past half dozen years attention has been focused more and more on the rates of free radical reactions themselves rather than on overall reactions with the free radical steps regarded merely as incidental stages.

The present discussion falls under two headings. (1) Reactions in the gas phase; (2) reactions in solution. Included in section 1 are: The Absorption Spectrum of Free NH_2 Radicals (Herzberg and Ramsay) Free Radicals in Explosions Studied by Flash Photolysis (Norrish); Studies of Free Radical Reactivity by Flash Photolysis (Porter and Wright); Free Radicals by Mass Spectrometry (Lossing *et al.*); The Reactions of Methyl Radicals with Hydrogen Isotopes (Majury and Steacie); The Reactions of Hydrogen Atoms with Hydrocarbons (Darwent and Roberts); The Mode of Action of Lead Tetraethyl as an Inhibitor of Combustion Processes (Chamberlain, Hoare and Walsh). In section (2) there are the following papers: The Photochemistry of Anthracene (Bowen and Rohatgi); The Kinetics of Addition of Bromotrichloro-methane to Unsaturated Compounds (Melville *et al.*); The Oxidation of Benzene by H_2O_2 and Iron Salts (Baxendale and Magee); Free Radical Reactions in Solution Initiated by Heavy Metal Ions (Bawn); The Instability of Large Free Radicals (Dainton and Ivin); The Co-Polymerisation of Styrene & Maleic Anhydride (Bamford and Barb); Partial Rate Factors for Homolytic Aromatic Substitution (Hey and Williams); Liquid Phase Reactions between Free Radicals and Aldehydes (Barrett and Waters).

One of the most important methods yet devised for the efficient production of free radicals is that of flash photolysis. By this method sufficient concentration of free radicals in the gas phase may be momentarily obtained for spectrographic investigation in the visible and ultra-violet parts of the spectrum. The papers by Norrish and Porter, who developed the method, report important conclusions based on its successful exploitation.

During the past 10 years a number of studies of reaction intermediates in gaseous reactions have been made using mass spectrometers. Important advances in this field are reported in the paper by Lossing *et al.*

An interesting aspect of free radical reactions in solution is the possibility of initiating such reactions by heavy metal ions. This subject is discussed in an illuminating way in the paper by Bawn.

These are just a few examples of the papers which particularly interested the reviewer. Many more could be selected for special mention, for the Faraday Society maintains a high standard.—H. MACKLE.

Radioactive Isotopes to Aid Industry

The largest shipment of American cobalt 60 radioactive isotopes to arrive in Australia reached Sydney recently. They are from the atomic pile at Oak Ridge, Tennessee. The shipments consisted of four 'pills' each weighing one gram. Radiations from these can penetrate steel 15 in. thick. The 'pills' will be used in many industrial projects for such purposes as the testing of welds in steel plate. A photographic film at the back of the steel is exposed as the rays penetrate the metal.

Improving Position

Third Quarterly Sulphur Survey

CONTINUING to live up to its device, 'All Over the World,' the third quarterly bulletin of the Sulphur Exploration Syndicate (35 Portland Place, London, W.1) contains comprehensive reports on the sulphur situation in Australia, Japan, USA, Italy and the UK, as well as shorter items of news from Canada, France, Norway, Iraq, Mexico, Colombia and Chile.

Australia, according to a review of that country's resources, lacks deposits of native sulphur, but possesses substantial reserves of sulphur in other forms, notably sulphide ores and gypsum. In 1952 production amounted to about 200,000 tons, of which 60,000 tons was exported in the form of zinc concentrates, principally to Belgium and the United Kingdom. Consumption is expected to reach 300,000 tons by 1955, and indigenous sulphur supplies are, by then, expected to provide at least two-thirds of requirements.

The review of the industry in Japan is limited to elemental sulphur, which is one of the most abundant resources of the country. High costs have temporarily put a check on the post-war revival of the industry, which achieved an output of 180,00 tons in 1952, but increased technical efficiency should soon bring Japan to the forefront again.

In the United States production of native sulphur in the third quarter of 1953 decreased by 4.75 per cent, while stocks increased by about 140,000 tons to 3,058,822 tons. Nevertheless, an estimated figure for the year of 5,540,000 tons sold showed an increase of nearly 6 per cent on 1952, while the production rate of 5,560,000 tons per annum was reduced by ¼ per cent.

Renewed efforts are being made in Italy to remedy the sulphur industry's troubles, and the Ente Zolfi Italiani are trying to find a way out of the present impasse. In the UK, consumption has continued at the high rate of 730,000 tons per annum, only 40 per cent of which is met by imports.

Change of Name

The following change of name has been announced: Godwin & Clark Ltd., to L. J. Godwin (Droxford) Ltd., on 17 December, 1953.

New Sulphur Plants

SULPHUR deposits in lower California will soon be extracted commercially by the Texas International Sulphur Co. of Houston. The company announced recently that it had acquired mining rights and planned to erect a plant for the extraction of crude sulphur near San Felipe, lower California.

Sulphur deposits have been known to exist in the San Felipe area for about 40 years, but no practical processing and marketing facilities had been established. New transport, together with the new processing plant, have now made the deposits of commercial value. A company official said that the San Felipe deposits were expected to produce 'commercial grade crude sulphur to sell profitably in Northern Mexico and in the world export market.'

Another new sulphur venture was launched by the Standard Sulphur Co. in Texan soil recently. Standard, the first new company to produce commercial sulphur in Texas since 1935, announced initial production of approximately 200 tons per day from a new well near Houston.

First Nickel Shipment

FROM its Port Colborne refinery, the International Nickel Company of Canada Ltd. has just made the first shipment of metallic nickel, under a contract calling for quick delivery of 120,000,000 lb. of the metal to the United States government over a five-year period ending in 1958. Deliveries will be made at a monthly rate of 2,000,000 lb. until the contract is completed. With an additional output of 24,000,000 lb. annually, International Nickel's rate of nickel production is now approximately 275,000,000 lb. per year. When the signing of the contract with the Defence Materials Procurement Agency of the US government was announced on 1 June, 1953, Edmund F. Mansure, then administrator of the agency, noted that 'from the standpoint of the quantities (of nickel) firmly committed and the rate of delivery, the Inco contract is by far the largest of those signed.' The additional 2,000,000 lb. per month production was made possible by completion by Inco in 1953 of certain mining and metallurgical developments, the result of years of planning and research.

HOME

London Office

Hess Products Ltd. have opened a London office at 11a Curzon Street, W.1 (Tel.: GROsvenor 7382).

Biggest Oil Dock

To serve the Stanlow Refinery, what is claimed to be Britain's largest oil dock has been completed at Eastham, Cheshire. Known as the Queen Elizabeth II Dock, it was officially opened last week, when the 28,000-ton Shell tanker *Valletia* cut a ribbon and entered the dock, bringing 26,000 tons of oil from the Persian Gulf.

High Polymer Fellowship

A grant of £2,000 a year for the next seven years is being made to Birmingham University by the Dunlop Rubber Company, partly for general purposes but mainly to establish a Dunlop Fellowship for research work on the chemistry of high polymers, including natural and synthetic rubbers; provision for technical assistance; and the purchase of apparatus not normally available.

British Chemical Exports

Although considerably better than during the corresponding period of 1952 (£11,401,904 as compared with £9,768,935) the value of chemical exports from the United Kingdom in December did not maintain the promising rise shown during November, and the total value for the year was £129,992,537, as against £138,080,474 for the previous year. Ammonium nitrate and sulphate showed a very considerable falling-off during the month, and the total for the year was well below that for 1952. The same applied to copper sulphate and sodium carbonate, but caustic soda rose slightly on last month and compared favourably with December, 1952, although the year's total showed a marked decrease. The value of drug exports remained relatively stationary, and although dyestuffs exports for the month were slightly less than for November, there was a promising improvement over last year. In general there was a falling-off in exports to African territories, a marked decrease in exports to Pakistan, New Zealand, Spain, Egypt, Iraq, China, the United States and Brazil, and considerable improvements in exports to Italy, Denmark, Ceylon, Canada, Eire, the Netherlands and Belgium.

Change of Address

Elliott Brothers (London) Ltd., manufacturers of electrical, electronic and process control instruments, have transferred their Manchester branch office to 66 Deansgate, Manchester 3. (Tel.: Blackfriars 7752). Fisher Governor Co. Ltd., manufacturers of automatic control specialities, who are associates of Elliott Brothers, will also operate in the Manchester area from that address.

Atomic Energy Book

The book published by HMSO, 'Britain's Atomic Factories' (see THE CHEMICAL AGE last week, p. 275) has proved a 'best seller.' The first print of 12,500 copies sold so quickly that it has been necessary to order a reprint of 10,000 copies.

Chemical Information Services

Visitors will be welcome, when Mr E. H. G. Sargent (formerly information officer, Reckitt & Colman Ltd.) lectures on 'Chemical Information Services' at the Wellcome Research Institute, 183 Euston Road, London, N.W.1, at 7 p.m. on 3 February, under the auspices of the British Association of Chemists (London Section).

Safety of Synthetic Detergents

Asked in the House of Commons what further inquiries he had made into the safety of synthetic detergents used by housewives, the Minister of Housing and Local Government, Mr. Harold Macmillan said that before making any statement he must await the report of the Committee on Synthetic Detergents, whose appointment he announced last May.

Ultrasonic Testing

The F.E.18 Ultrasonic Panel of the British Welding Research Association is considering the need for a standard, single-hole, steel reference block for use in ultrasonic testing. Such blocks would need to be commercially available and should bear a mark showing that they are of approved design and quality. All firms and individuals interested in this possibility are asked to communicate with the Secretary, the F.E.18 Committee, British Welding Research Association, Abington Hall, Abington, Cambridge, from whom further information may be obtained.

• PERSONAL •

MR. H. S. STOTT has been appointed secretary of Borax Consolidated Ltd.

MR. A. B. OWLES, divisional chemist with the North-Western Division of the British Electricity Authority in Manchester, is to retire after 43 years in electricity supply work.

SIR ROBERT ROBINSON, Professor of Chemistry at Oxford University and winner of the Nobel prize in 1947, has been made an associate member of the Japanese Academy.

MR. C. J. GOODWIN, the internationally-known London consultant, is sailing from Le Havre for New York on 16 April abroad the French liner "Liberté." During the several weeks he will be in the United States and Canada, Mr. Goodwin will visit Montreal, Toronto, Niagara Falls and Chicago and then may visit chemical manufacturing centres in the Southern States before flying back to Britain.

MR. A. J. MILNE has resigned the managing directorships of Alumilite & Alzak Ltd., Mertone Metal Craft Ltd., Metal Chemical Treatments Ltd., and United Anodising Ltd., and has joined the board of Reginald Corfield Ltd., aluminium, tin and paper printers, etc., as managing director. Mr. Milne personally negotiated with the Ministry of Supply for an award of £169,000 for wartime use of inventions.

DR. J. W. ARMIT, who has been chairman of the Wilton Council of Imperial Chemical Industries Ltd., since 1946, is retiring on 31 March after being with ICI and its predecessors more than 30 years. He will be succeeded by MR. C. M. WRIGHT, who is now personnel director of the Billingham Division, a position to which he was appointed in 1952.

During his chairmanship of the Wilton Council, Dr. Armit supervised the successive stages of development of the I.C.I. new factories and schemes at Wilton, until the 2,000 acre site on the south bank of the River Tees is now the biggest single project in British chemical history, forming with the companion works at Billingham one of the greatest concentrations of chemical industry in the world. In 1945 Dr. Armit was appointed chairman of the ICI Leathercloth Division at Hyde, Cheshire.

For his services as Director-General of Explosives and Chemical Supplies at the Ministry of Supply during the war, Dr. Armit was awarded the Medal of Merit by the US Government.

MR. E. M. FRASER, C.B.E., has been appointed chairman of Plant Protection Ltd., in sucession to MR. T. AINSLIE ROBERTSON, who is retiring on 31 March 1954. Mr. Fraser will continue as sales controller of Imperial Chemical Industries Ltd., a position he has held since 1945. Mr. Robertson, who is a director of Cooper, McDougall & Robertson Ltd., has been chairman of Plant Protection since 1943.

Mr. Eric Malcolm Fraser was educated at Edinburgh Academy and Oriel College, Oxford. After war service in the Seaforth Highlanders, he joined Brunner, Mond & Co., Ltd., in 1919. On the formation of I.C.I. in 1926, he became assistant to the commercial director. Then, after service as commercial director of I.C.I.'s Dyestuffs Division and later of the Billingham Division, he was, in 1934, appointed manager of the South Eastern Sales Division, an office he held until the Second World War.

At the outbreak of war, Mr. Fraser was appointed Director of Investigation and Statistics at the War Office. Subsequently, he was transferred to a Director-Generalship in the Ministry of Aircraft Production. After a period as Director-General of Equipment Production, he became, in 1943, Director-General of Aircraft Production. He received the C.B.E. for his war-time services. Mr. Fraser returned to I.C.I. in 1945, and in October of that year, was appointed sales controller.

Mr. Fraser is a member of the council of the Association of British Chemical Manufacturers, a member of the council and executive of the British Institute of Management and, until 31 December, 1953, was a member of Television Advisory Com-

mittee set up to advise the Postmaster-General on developments in television and sound radio. He has been a director of Plant Protection Ltd., since 1946.

Mr. T. Ainslie Robertson was educated at Merchiston Castle School, Edinburgh, and St. John's College, Oxford. His first post was that of private secretary to Sir John Brunner, founder of Brunner, Mond & Co., Ltd. He was subsequently in Government service as private secretary to the Governor of North Borneo.

After the war, Mr. Robertson joined the family business of Alex Robertson & Sons, which subsequently became part of Cooper, McDougall & Robertson Ltd., which he represented as managing director of their South African company from 1928 to 1933. He was largely responsible for the agreement between I.C.I. and Cooper, McDougall & Roberston which resulted in the formation of Plant Protection Ltd., in 1937.

Mr. Robertson was managing director of Plant Protection Ltd., from 1937 to 1943, when he became chairman. He has been personally responsible for a large part of the company's recent expansion overseas, particularly in Canada and the United States and also in France and Italy. Mr. Robertson recently accepted the invitation to be the first chairman of the governing body of the new Glasshouse Crops Research Institute and will continue in that office.

Oxford University has conferred an honorary M.A. degree on LADY ROBINSON, wife of SIR ROBERT ROBINSON, Waynflete Professor of Chemistry. The Public Orator, MR. T. F. HIGHAM, introduced Lady Robinson as a wife married to 'a mighty man of mind,' who deserved praise, not only for the help she gave him as hostess to fellow-scientists from many countries, but for sharing his professional interests in the laboratory. She was to be praised, too, for her own discoveries and for 'adding a subtle flavour of informality and charm to the high seriousness which chemical study demands.'

DR. MILLER W. SWANEY has been appointed director of a new laboratories unit established by Standard Oil Development Co. According to MR. O. V. TRACY, president of Enjay Company, Inc., the new division (which will be known as Enjay Laboratories Division) has been formed to meet the greater need for sales technical service in the increasingly competitive and rapidly expanding petrochemicals industry. It will be responsible for work on petroleum additives, solvents, chemicals and polymers marketed nationally by the Enjay Company.

Dr. Swaney, who joined the Standard Oil Development Company's chemical division in 1939, has served as assistant director of the division in Linden, New Jersey, since 1947. He holds more than 35 patents and is the author of three scientific books.

MR. CLEVELAND LANE, formerly manager of public relations of the Pennsylvania Salt Manufacturing Co., has been appointed assistant to the president of the Manufacturing Chemists' Association, Inc., Washington, USA. As Pennsalt's public relations manager. Mr. Lane has served on the Public Relations Advisory Committee of MCA for several years and for the past two months has been on loan from Pennsalt as acting director for MCA's public relations.

Obituary

SIR JOHN TRAILL CARGILL, BT., whose death has occurred at the age of 87, took an active part in the development of the oil industry in Burma and Persia. Born in Glasgow, he was a son of the late Mr. David S. Cargill, one of the founders of the Burmah Oil Company, and subsequently succeeded him as chairman of that company. Later he became chairman of the Assam Oil Co. Ltd., and of Scottish Oils Ltd. Keenly interested in commercial education, Sir John (who received his baronetcy in 1920) gave £20,000 to the University of Glasgow to found the 'Cargill Chair of Applied Physics.' He also made several gifts to Cambridge University for chemistry research. He was an LL.D. of Rangoon and Glasgow Universities.

MR. A. E. PICKARD, general manager of Semtex Ltd. since 1950, has died in London at the age of 47. He joined the Dunlop Rubber Co. (of which Semtex is a subsidiary) as a junior clerk. In 1948 he became assistant chief accountant at Fort Dunlop and a year later was appointed assistant general manager of Semtex Ltd.

OVERSEAS

DDT Praised

Since it came into common use about ten years ago, DDT has prevented 5,000,000 deaths and 100,000,000 serious illnesses according to Dr. Edward F. Kniplinger, president of the American Association of Economic Entomologists.

Chile Sulphur Exports

A total of 10,000 tons of sulphur is to be exported from Chile to Germany. Shipments will be carried from the port of Antofagasta by German ships, which are now reinstated on a regular service to Chile.

South African Titanium

It is becoming increasingly probable that South Africa may be a leading supplier of titanium compounds. The rutile-ilmenite-zircon deposit discovered near Durban has proved to be far larger than was at first believed; it is now valued at over £40,000,000. Commercial production will be under way before the end of the year on a schedule calling for a yearly output of 60,000 tons of ilmenite, 6,000 tons of zircon and 3,500 tons of rutile. Minimum life of the high-grade deposit is 36 years; estimated total life is 94 years.

Plans for Japanese Petrochemicals

The Royal Dutch/Shell group is planning to enter into agreements with Japanese petroleum firms to develop a petrochemical industry in Japan. At the present level of crude oil consumption—about 100,000 barrels a day—the demand is not great enough to warrant the construction of the 25,000 barrel-a-day refinery necessary to support a petrochemical plant. But the market is expanding and preparations are being made to develop the industry within the next few years.

MCA Moves to New Headquarters

The Manufacturing Chemists' Association Inc. has moved its offices from the Woodward Building in Washington to the Cafritz Building at 1625 Eye Street, N.W. The MCA is occupying somewhat larger quarters in the new location to make room for expanded activities and the centralisation of other activities formerly carried out in New York. The telephone number, NATional 8-2588, remains unchanged.

Swedish Explosion

Four people were killed and 11 injured when an explosion occurred at a nitroglycerine factory at Gyttorp, in Sweden. Sabotage is not suspected.

US Industrial Waste Conference

It has been announced from Purdue University, Lafayette, Indiana, that the 9th Purdue Industrial Waste Conference will be held from 10-12 May next. Approximately 50 papers will be presented on subjects dealing with industrial wastes and their treatment.

Australian Uranium Project

A new company—Uranium Oxide NL—is being formed in Sydney by three companies to exploit the Yenberry uranium discovery in the northern territory. The companies concerned are the Australian Mining Co. NL, Pioneer Mines NL and Poseidon NL.

Germanium Available in Belgium

We have been informed by the Société des Mines et Fonderies de Zinc de la Vieille-Montagne, Angleur, near Liège, Belgium, that they are producing germanium dioxide and germanium metal on such a large scale that both commodities can be supplied in any required quantity. The firm's reserves of germanium bearing materials are such that customers can be assured of a regular supply.

Turkish Cement

Plant expansion is expected to increase Turkey's annual cement production from 1,025,000 to 1,245,000 metric tons. Plans are also under way for 14 new cement plants in various parts of the country, with a total capacity of 1,500,000 tons a year. This increased cement production is planned because of the extensive road-building and construction projects now being carried on in Turkey. Consumption requirements for 1953 are estimated at about 1,700,000 tons, as compared with 500,000 tons in 1950. Recent imports have averaged about 400,000 tons a year, mainly from Greece, Italy, Germany, Sweden, Yugoslavia and Israel.

Chemical & Allied Stocks & Shares

AFTER a further strong upward movement, profit-taking developed in stock markets, but in the industrial sections only a small part of earlier gains was lost. Buyers have been showing a good deal more caution, partly because of the higher wage demands and other factors threatening rising costs which could have serious repercussions on our export trade. Railway freight charges seem likely to rise, and in many quarters it is thought that the price of coal may be increased later in the year. It is realised that industrial shares have already risen to levels which discount rather fully the prospects of higher dividends. It is widely assumed that many more companies are likely to adopt a less conservative dividend policy this year.

Hopes of Kind Budget

These hopes have been based in a large measure on the belief that the Budget will bring further tax reductions. The City has been talking already of another 6d. off income tax and revision of the profits tax. On the other hand, the annual speeches of the chairmen of the big five banks have made it clear that the bankers do not think any major tax reductions are possible until Government spending is reduced, and the latter seems unlikely unless there is agreement between the West and Russia which could justify scaling down the rearmament programme.

Shares of chemical and kindred companies have attracted rather more attention, though in line with the general trend in stock markets, best levels touched have not been held. Sentiment was helped by continued reports of improved conditions in some sections of the industry. Imperial Chemical, after reaching the new high level of 55s. 7½d. have eased to 54s. 6d. at the time of writing. Nevertheless the market is continuing to talk of prospects of a higher dividend (an increase from 13 per cent to 15 per cent is widely expected in the City), and also of the possibility of a share bonus to bring issued capital more into line with the value of assets. There have been suggestions in some quarters that the Terylene and other synthetic textile interests of I.C.I. might be taken over by a new subsidiary and the shares distributed as a bonus to I.C.I. shareholders; but this is not generally considered a likely development. Monsanto 5s. shares at 24s. 7½d. have also moved in favour of holders, while Laporte 5s. shares strengthened to 13s. 3d., and helped by higher dividend hopes, Albright & Wilson 5s. shares at 18s. 4½d. have been a firm feature again. Yorkshire Dyeware & Chemical 5s. shares at 8s. 3d. held their earlier rise. Hickson & Welch 10s. shares were 9s. 4½d., British Chrome Chemicals 5s. shares 17s. 6d., and British Glues 4s. shares showed steadiness at 11s. 6d. 'ex' the interim divend. In other directions, William Blythe 3s. shares held firm at 6s. 6d., Greeff-Chemicals 5s. shares moved up to 16s. 3d., while Brotherton 10s. shares strengthened to 25s., W. J. Bush were 52s. 6d., and elsewhere there were higher prices for plastics shares with British Xylonite up 30s. 9d. on market hopes of a bigger dividend. Bakelite 10s. shares were 25s. 9d., and British Industrial Plastics 2s. shares 5s. 7½d.

In other directions, Fisons were prominent with a rise to 40s., and Pest Control 5s. shares have moved up to 6s. 9d. following the news of negotiations for a possible take-over offer by Fisons. Boake, Roberts 5s. shares were 10s., and Hardman & Holden 5s. shares 10s. 3d. Borax Consolidated remained active, but at 38s. failed to hold best levels. Reichhold Chemical 5s. shares strengthened further to 8s. 1½d. and Coalite & Chemical 2s. shares changed hands around 2s. 4½d.

Unilever's Move Upwards

Unilever at 59s. moved higher on balance, as did United Molasses at 34s. 9d., and the 4s. units of the Distillers Co. have strengthened to 18s. 1½d. Boots Drug 5s. shares at 24s. 3d. were higher on balance, and Triplex Glass attracted buyers up to 23s. 7½d. Paint shares were generally a little firmer with Pinchin Johnson 10s. units at 33s. Oils did not keep best levels, sentiment having remained under the influence of the unchanged Shell interim dividend. Shell were 96s. 10½d. and Anglo-Iranian £8⅞. Lobitos Oil have risen to 51s. 10½d. since the share bonus and higher dividend announcement.

Publications & Announcements

A NEW range of electro-magnetic percolators manufactured by Rapid Magnetic Machines Ltd., Lombard Street, Birmingham, 12, is described in that company's Publication No. 115R. These percolators may be used for the extraction of fine iron particles and magnetic oxides from potters' slip, glaze, vitreous enamels, chemicals and other fluids which are to be freed from ferrous contamination. They are the outcome of more than 50 years' experience and the manufacturers state that only the finest laboratory-tested materials are used in their construction. This, it is claimed, combined with the skill of craftsmen, ensures high functional efficiency, long life and negligible maintenance.

* * *

THE only British firm specialising exclusively in the manufacture of wooden vats is Carty & Son, Ltd., Harders Road, Peckham, S.E.15, which came into existence in 1766. A brochure just published by the company, describing its wide range of vats, refers to the different usages of wooden vessels in the chemical industry. It points out that wood is a natural resistant to chemicals, but it must be the right kind of timber for the job, well selected and seasoned, and the vat must be made by skilled and experienced craftsmen. 'Our natural modesty,' states the brochure, 'prevents us from saying that that inevitably means a Carty vat. We are quite content with the number of customers who say it for us.'

* * *

INTRODUCED at the Chemical Plant Exhibition (THE CHEMICAL AGE, 1953, **69**, 425) 'Isodrum' heaters are now available in a range of sizes and vertical, horizontal and base heater specifications. A leaflet describing these mantles may be obtained from the manufacturers, Isopad Ltd., 30-32 Rosemont Road, London, N.W.3.

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PUBLISHED weekly by the Technical Information Co., Newton House, Mount Street, Liverpool 1, is the *Patent Abstracts Journal*. In three sections, General and Mechanical, Chemical and Electrical, abstracts are given of all new British patents published the previous week. Subscription is £18 a year, single copies 7s. each.

A NEW formulation which has wide applications in industry was used recently to remove heavy sludge formation from an oil bunker tank at a considerable saving in the cost and labour. The manufacturers, XZIT(GB) Ltd., used 'Vantri' (a combination of active organic solvents) and 'SSR' (soot and sludge remover) to remove a constant 3½ tons of fuel sludge from a 15-ton tank. The entire operation took only seven weeks, and the sludge was dispersed and burnt at a cost of about £50, a high standard of combustion being maintained. Had the sludge been removed manually, the cost would have been well over £80, and the heating plant would have had to be partly closed down.

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AN illustrated description of a unique large scale experiment in lining a reservoir with rubber is contained in 'Wiggins Nickel Alloys' No. 24. Other articles deal with Monel ragbolts, pipelines of uniform wall thickness, pickling chains, a machine for degreasing skins, marine chronometers and electrical instruments; the high speed cutting of the Nimonic alloys and the production of oxy-insulated Brightray resistance wire are also described. Copies may be obtained, free of charge, from Messrs. Henry Wiggin & Co. Ltd., Thames House, Millbank, London, S.W.1.

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METHYL AMYL ACETATE is fully described in a new technical bulletin just released by Carbide and Carbon Chemicals Company. Physical and physiological properties, specifications and shipping data, resin solubilities, data on the performance of methyl amyl acetate in nitrocellulose lacquers, and other methyl amyl acetate uses are discussed. Methyl amyl acetate is a high-boiling, slow-evaporating solvent used in general-purpose spray lacquers and also in brushing and dipping lacquers. In the pharmaceutical industry, methy amyl acetate is used for the concentration and purification of antibiotics. For example, it is an extractant in the purification of penicillin. Copies of this technical bulletin (F-6264) are available on request from Carbide and Carbon Chemicals Company, 30 East 42nd Street, New York 17, New York.

THE December issue of *Chemische Industrie* contains a review of the 'European Chemical Market—a step towards world economic integration.' Articles on national chemical industries are contributed, supplied by representatives of the industries in Belgium, Denmark, Western Germany, Finland, France, Great Britain, Holland, Italy, Norway, Austria, Portugal, Sweden, Switzerland and Spain, and there is a concluding note on the duties and problems of the European chemical trade.

* * *

THIRTY years' experience of air filtration problems and a considerable amount of experiment have combined to produce the Visco 'Reciprojet' Self-cleaning Air Filter, which is described in Publication No. 541 of the Visco Engineering Co. Ltd., Stafford Road, Croydon. This filter—a development of the company's 'Standard' and 'Oilspray' types of filter—is designed for use in situations where the atmosphere has an exceptional dust load. Principal features are: automatic operation controlled by time switch, ensuring that each cell is thoroughly cleaned at regular and frequent intervals; double stage filtration, ensuring high efficiency of air cleaning; positive cleaning of the filter cells without removal by the use of non-choking oil jets; definite elimination of oil carry-over; and continuous cleaning of the oil in the system.

* * *

TWO lists—one describing pharmaceutical and tableting equipment and the other filling equipment—have recently been issued by the Arthur Colton Company, of Detroit, Michigan. Among the equipment described in the former is the Colton No. 901 Capsule Filler, widely used for capsule filling up to '000' size of powdered materials which will pack readily. Completely automatic, it requires only one operator, who merely fills the hopper with empty capsules and places the material on a rotary table. Also of particular interest is the Colton Automatic Pill Machine No. 820, which, in conjunction with the Colton No. 800 Ball Cutter, makes a complete pill producing unit. The sole UK agents for the Arthur Colton Company are Griffin & Tatlock Ltd., Kemble Street, Kingsway, London, W.C.2, who point out that while the possibility of obtaining import licences is somewhat remote, they can obtain licences if the equipment is not available in this country.

ADVANTAGES claimed for the Rotoklene Strainer in the straining of fluids are detailed in a brochure issued by the manufacturers, Ashworth & Parker Ltd., Riverside Works, Bury, Lancashire. Of simple design, this strainer has few parts and these are so substantial that they are not liable to failure from corrosion or weakness. It is strongly constructed and has ample wearing surfaces, so that it can be operated continuously by belt or motor drive where constant cleaning is necessary. Straining down to 0.002 in. can be obtained without diminution of strength.

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THE rôle of zinc sulphide pigments in the development of water paints and their value in modern emulsion paints is fully described in a technical article included in Zinc Bulletin No. 11, published by Zinc Development Association, Lincoln House, Turl Street, Oxford. This issue also draws attention to the capacity of modern hot dip galvanising plant in conferring the protection of a zinc coating to exceptionally large steel constructional work, while an illustrated article on industrial design describes the particular merits claimed for the zinc alloy die casting process.

* * *

LATEST publication of the Croydon Precision Instrument Co., 116 Windmill Road, Croydon, Surrey, is Leaflet No. 53, which illustrates and describes a comprehensive range of instruments. Among these are the Lloyd Fisher square, type L.F.1; tuning fork, type T.F.1; calibrating potentiometer, type P.6; resistance standard, type R.S.2; precision Wheatstone bridge, type W.S.1; plug bridge (Post Office pattern), type P.O.1; and resistance boxes, types R.B.A.4 and R.B.C.4.

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AN illustrated booklet published by Cuprocyl Ltd., 230 York Way, Kings Cross, London, N.1, points out that they are coppersmiths and sheet metal workers and while specialising in the fabrication of copper they are in a position to undertake work in other non-ferrous metals, such as aluminium bronze, the copper nickel range of metals, etc. They specialise in all welding techniques and can undertake the manufacture (or replacement where required) of any parts of plant for the chemical, varnish, oil and other industries.

British Chemical Prices

LONDON.—A steady demand is reported from most sections of the industrial chemicals market and contract delivery specifications cover good quantities. However, the market is without special feature and there has been no noticeable change in the trend of export inquiry. Further reductions in the basis prices for white lead, red lead and litharge have been notified; the last change operating from 22 January. Among other price alterations acetic anhydride is reduced by £8 per ton, while higher rates are ruling for barium carbonate, barium sulphate and sulphur. The coal tar products market is again firm and the volume of inquiry continues on a good scale.

MANCHESTER.—Contract deliveries of the alkalis and other leading heavy chemical products to the main industrial outlets in the Lancashire area, including the textile and allied trades, have been steadily maintained during the past week and prices are still mostly on a firm basis. A fair number of fresh inquiries have also been reported on the Manchester market. In the fertiliser section there is a continued steady demand for basic slag and the compounds are also moving in fair quantities. Tar products values are well held and both the light and heavy materials are mostly going into consumption at a satisfactory rate.

GLASGOW.—Trade on the whole has been on a satisfactory scale, although during the earlier part of the week demand for certain lead products was erratic due to the uncertain state of the market. Prices mainly have remained steady with a little variation in regard to some solvents.

General Chemicals

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

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

Acetone.—Small lots : 5 gal. drums, £143 per ton ; 10 gal. drums, £125 per ton. In 40/50 gal. drums less than 1 ton, £108 per ton ; 1 to 9 tons, £105 per ton ; 10 to 49 tons, to £103 per ton ; 50 tons and over, £102 per ton.

Alcohol BSS, Butyl.—£161 per ton in 10-ton lots.

Alcohol, Ethyl.—300,000 gal. lots, d/d., 2s. 9d. per proof gallon ; 100,000 and less than 200,000 gal. lots, d/d, 2s. 10d. per proof gallon.

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

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

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

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

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

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

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

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £93 and £91 10s. per ton.

Antimony Sulphide.—Golden, d/d in 5-cwt. lots as to grade, etc., 2s. 2d. to 2s. 8d. per lb. Crimson, 3s. 4½d. to 4s. 5½d. per lb.

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

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

Barium Chloride.—£42 5s. per ton in 2-ton lots.

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

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

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

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

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

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

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

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

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

Chromic Acid.—£220 13s. 6d. per ton, less 2½%, d/d U.K., in 1-ton lots.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Lead Acetate.—White : About £136 per ton.

Lead Nitrate.—About £116 per ton.

Lead, Red.—Basis prices per ton. Genuine dry red lead, £113 10s. ; orange lead, £125 10s. Ground in oil : red, £136 5s. ; orange £148 5s.

Lead, White.—Basis prices : Dry English in 5-cwt. casks, £119 5s. per ton. Ground in oil : English, under 2 tons, £126 5s.

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

Litharge.—£113 10s. per ton, in 5-ton lots.

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

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

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

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

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

Mercuric Chloride.—Technical Powder, 17s. 6d. per lb. in 5-cwt. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—22s. 3d. per lb., for 5-cwt. lots.

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

Methylated Spirit.—Industrial 66° O.P. 100 gals., 5s. 2d. per gal. ; pyridinised 64° O.P. 100 gal., 5s. 4½d. per gal.

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

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

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

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

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

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £87 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.

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

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

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

Potassium Dichromate.—Crystals and granular, 11§d. per lb., in 1-ton lots, d/d UK.

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

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

Potassium Permanganate.—B.P., 1s. 9½d. per lb. for 1-cwt. lots ; for 3 cwt. and upwards, 1s. 8½d. per lb. ; technical, £8 11s. 6d. per cwt. ; for 5 cwt. lots.

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

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

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

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

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

Sodium Acetate.—£70 to £75 per ton d/d.

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

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

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

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

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

Sodium Dichromate.—Crystals, cake and powder, £91 per ton, d/d UK, minimum 1-ton lots ; anhydrous, £105 per ton, d/d UK, minimum 1-ton lots.

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

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

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

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £123 ton.

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

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

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

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

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £78 10s. ; tri-sodium, crystalline, £39 10s., anhydrous, £75 10s.

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

Sodium Silicate.—£6 to £11 per ton.

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

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

Sodium Sulphide.—Solid, 60/62%, spot, £31 per ton, d/d, in drums ; broken, £32 per ton, d/d, in drums.

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

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

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

Titanium Oxide.—Standard grade comm., with rutile structure £143 per ton ; standard grade comm., £130 per ton.

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

Rubber Chemicals

Antimony Sulphide.—Golden, 2s. 3¼d. to 3s. 1½d. per lb. Crimson, 3s. 4¼d. to 4s. 5¼d. per lb.

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

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

Carbon Tetrachloride.—Ton lots, £74 10s. per ton.

India-rubber Substitutes.—White, 1s. 6¾d. to 1s. 10¼d. per lb. ; dark, 1s. 4½d. to 1s. 8d. per lb.

Lithopone.—30%, £50 per ton.

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

Sulphur Chloride.—British, £55 per ton.

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

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

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, £16 2s. 6d.

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

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

Sodium Nitrate.—Chilean agricultural for 6-ton lots, d/d nearest station, July to September, £26 5s. per ton ; October to November, £26 7s. 6d. per ton.

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals. ex-works, 90's, 4s. 10¾d. ; pure, 5s. 2d.

Carbolic Acid.—Crystals, 1s. 4d. to 1s. 6¼d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 4½d. to 1s. 6½d. per lb., d/d crude, 8s. naked, at works.

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

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

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

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

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

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

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

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

Intermediates and Dyes (Prices Nominal)

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

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

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

Dichloraniline.—2s. 8½d. per lb.

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

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

***p*-Nitraniline.**—4s. 5½d. per lb.

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

Nitronaphthalene.—2s. per lb.

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

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

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

Law & Company News

Commercial Intelligence

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

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, 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.)

WELWYN PLASTICS LTD., Welwyn North. 19 December, 1953, £15,000 debentures, to East Anglia Plastics Ltd.; general charge. *Nil. 19 June, 1951.

Release of Receiverships

Mr. Percy Phillips ceased to act as receiver and/or manager of Silverwood Chemicals Ltd. on 28 December, 1953; Mr. Arthur M. Hobbs ceased to act as receiver of Holders Soap Works Ltd. on 23 December, 1953.

Increases of Capital

The following increases of capital have been announced:—GEORGE RIGG LTD., from £1,000 to £3,000; INDUSTRIAL CHEMICALS LTD., from £10,000 to £60,000; KNIGHTS (MFG. CHEMISTS), LTD., from £3,500 to £15,000.

New Registrations

H. Windsor & Co. (Basalt) Ltd.

Private company. (528,050.) Capital £1,000. Manufacturers and general agents and merchants, dealers in basalt and other allied materials used for resisting, preventing or minimising corrosion or abrasion by water, acid, liquids and solids, etc. Directors: Alfred H. Foxworthy-Windsor and Ellen W. Foxworthy-Windsor. Reg. office: 748 Fulham Road, London, S.W.6.

Clay & Abraham (Manufacturing) Ltd.

Private company. (528,065.) Capital £6,500. Manufacturing chemists, etc. Directors: John Rae and Mrs. Edith M. Rae, and John D. Clark. Reg. office: 2 Upper Duke Street, Liverpool 1.

International Carl Still Ltd.

Private company. (528,235.) Capital £100,000. Manufacturers of and dealers in coke, coal, tar, pitch, oil, ammoniacal liquors and other residual products, petroleum and petroleum products, chemicals, etc. Directors: Fredk. G. Penny and Frank Taylor. Reg. office: 19 Woburn Place, London, W.1.

London Aluminium (Containers) Ltd.

Private company. (527,938.) Capital £10,000. Manufacturers of and dealers in pressure-tight aerosol containers and containers of all kinds, etc. First directors are not named. Solicitors: Stephenson Harwood & Tatham, 16 Old Broad Street, London, E.C.2.

Agricultural Services Ltd.

Private company. (14,896.) Capital £20,000. Manufacturers and producers of chemicals and manures, etc. Directors: Walter M. Hutton, Richard J. Williams, Henry L. Egan, Lt.-Col. William Bolton, Patrick Bradish and Matthew J. G. Minch. (Registered in Dublin).

Joseph Rowley Ltd.

Private company. (527,992.) Capital £5,000. Chemists' warehousemen and sundriesmen, manufacturing, dispensing and analytical chemists and druggists, etc. First director: Joseph Rowley. Reg. office: Bennett Avenue, Trading Estate, Bridgend.

Walker Richards Ltd.

Private company. (527,670.) Capital £1,000. Makers of explosives; makers of plant and machinery used by colliery and quarry owners, civil engineers and contractors, etc. Directors: Dorothy M. Walker, Elizabeth S. Glenn, Gordon A. Richards and Clifford G. Marshall. Reg. office: Guildhall Buildings, Navigation Street, Birmingham.

Company News

Pest Control Ltd.

An announcement has been made by Pest Control Ltd. that the directors had begun preliminary discussions with Fisons Ltd. which might lead to an offer being made to the former company's ordinary shareholders. It was emphasised that 'the whole matter is in a preliminary stage and

no commitments have been entered into on either side. A further announcement will be made when it appears that further negotiations are likely to reach a satisfactory conclusions, or are to be discontinued.'

Negretti & Zambra Ltd.

The directors of Negretti & Zambra Ltd. report net profit of £108,650 for the year ended 30 September last and they recommend a final ordinary dividend of 17½ per cent, less tax, making 22½ per cent for the year. Following the annual meeting on 5 February, there will be an extraordinary meeting at which the shareholders will be asked to consent to an increase of the company's capital to bring it more into line with the money actually employed in the business.

F. W. Berk & Co. Ltd.

F. W. Berk & Co. Ltd. announce that the half-yearly dividend on the 4½ per cent cumulative preference shares will be paid on 1 March.

Censuses of Production

AT the request of the Committee on Censuses of Production & Distribution, the Institute of Cost & Works Accountants recently carried out an investigation into the use made of such census information for management purposes. Information was sought from a number of members associated with both large and small firms, so that an adequate cross-section of British industry should be covered. Eight per cent of the accountants approached were associated with the chemical industry.

Half of the total number of members approached stated that they experienced difficulties in completing the annual census returns. The usual complaint was that extra clerical or machine time was needed, meaning, in some instances, extra work for a senior member of the staff at a time which frequently coincided with the essential end-of-the-financial year work.

It was also felt that most firms already produce suitable information for management purposes and only 8 per cent of the people approached said they found the censuses of use. Many felt that the figures produced were of academic interest only, and a small number said that the figures helped the very large firm to compete with the small firm, the latter not being able to use the figures but having to pay for them.

Chemistry in Yugoslavia

USING rich pyritic ore deposits as well as pyrites obtained as by-product in the metallurgical industry, the chemical industry in Yugoslavia was founded to manufacture sulphuric and hydrochloric acids; and since the war capacity is said to have been increased by about 300 per cent.

Entirely new in Yugoslavia is the manufacture of polyvinyl products from raw materials found in the country. The 'Jugovinil' plant in Split, which came into service in 1950 is said to be able to meet fully all requirements of the country. In Bosnia is another new plant for sulphite cellulose which has been in operation since 1950, and now has a large surplus for export purposes.

Owing to the fact that about 33 per cent of the country's area is covered with forest, Yugoslavia has built up its colophony and turpentine industries, closely linked with forest resources. These industries have now increased their production by 70 times the pre-war production, it is reported.

London Buffet Dance

A buffet dance will be held by the London Section of the Society of Chemical Industry and the London Section of the Royal Institute of Chemistry, at Caxton Hall, Caxton Street, London, S.W.1, on Saturday, 27 February, 1954, from 7.45 to 11.45 p.m. (Dinner jacket or lounge suit). Early application for tickets (12s. 6d. each) should be made to the assistant secretary, Society of Chemical Industry, 56 Victoria Street, London, S.W.1, or to Dr. W. D. Raymond, The Colonial Products Advisory Bureau, Imperial Institute, South Kensington, S.W.7.

Oil & Colour Chemists

The biennial dinner-dance organised by the Oil and Colour Chemists' Association will be held at the Savoy Hotel, London, W.C.2, on Friday, 12 March. The reception will be held at 7 p.m. and, after dinner, there will be a few short speeches so that dancing may begin as soon as possible and continue until 1 a.m. Forms of application for tickets for non-members of the association are obtainable from the general secretary, Oil & Colour Chemists' Association, Memorial Hall, Farringdon Street, London, E.C.4.

Long Service Recognised

TWENTY-FIVE YEARS' service with Benn Brothers Ltd., publishers of THE CHEMICAL AGE, were recognised when Commander A. O. Gillett, R.N., a managing director of the company, was entertained at a luncheon in his honour at Grosvenor House, London, on Tuesday. Mr. Glanvill Benn, chairman, presided at the luncheon, and on behalf of the company presented Commander Gillett with a pair of Georgian silver salvers.

Mr. E. H. Lever, chairman of the Steel Company of Wales Ltd., who received a knighthood in the New Year Honours, and Mr. Glanvill Benn proposed the toast of Commander Gillett. Commander Gillett proposed the health of the guests.

Responding to the toast of 'The Guests,' Mr. J. F. Carpenter, chairman of the National Hardware Alliance, mourned the passing of Sir Ernest Benn—'A friend of all of us in the trade and a worthy upholder of what we all stand for today in the way of private enterprise.'

Commander Gillett entered the Royal Navy from Dartmouth during the 1914-18 war, later joining the publishing firm of William Agnew & Son Ltd., publishers of *The British Trade Journal*. After that business was acquired by Benn Brothers Ltd. he became manager of *The Hardware Trade Journal*.

He was called up for Reserve Fleet exercises in July, 1939, and during the early years of the war served at sea. Commander Gillett spent the last three years of the war in the Mediterranean, and while out there—in 1943—was elected to the board of Benn Brothers Ltd.

European Productivity

THE first year's programme of work of the European Productivity Agency, which was set up by decision of the Council of the Organisation for European Economic Co-operation in May last year, has just been published by the Organisation. The programme is divided into six main sections—specific economic and legal problems; technical and administrative problems of industry and commerce; human factors of management and labour; applied research and technology; food and agriculture; and information and general services. The Agency will carry out its programme by collating existing knowledge; by disseminating or exchanging that knowledge; and by stimulating the necessary action.

Fertiliser Plant Expanded

An expansion programme costing about $1,500,000 has recently been completed by the Mathieson Chemical Corporation, of Baltimore, Maryland, USA, at its Pasadena plants, and commercial production has been started of chemical fertiliser of the high analysis, pelletised type. Modifications of the existing sulphuric acid plant and fertiliser plant at Pasadena, costing more than $400,000, have also been completed recently. Although the new fertiliser unit will produce the same grades of fertiliser as hitherto, certain process improvements have been incorporated.

Standard for Weighing Pipettes

British Standard BS. 2058:1953 covers the conventional Lunge-Rey weighing pipette with one bulb and two stopcocks and another pattern of pipette with two bulbs and three stopcocks especially suitable for the analysis of ammonia solutions. Alternative cylindrical and conical cover tubes fitted with interchangeable joints are included for the Lunge-Rey pipette. The material, construction, overall height, maximum weight and inscriptions are specified, and other dimensions included for the guidance of manufacturers. Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1, price 2s.

Iron Deficiency in Soils

Iron tetrine, the iron complex of ethylenediamine tetraacetic acid, cures and prevents iron deficiencies in agricultural crops. It has produced sensational results in the Florida acid soils. Iron tetrine contains 12 per cent iron and is a free-flowing powder. It is not hygroscopic and can be spread readily by itself, blended with carriers, or mixed with fertilisers. Additional information may be obtained from Glyco Products Co. Inc., Brooklyn 1, New York.

Next Week's Events

MONDAY 1 FEBRUARY

Royal Institute of Chemistry

Oxford: Physical Chemistry Laboratory, 8.15 p.m. Joint meeting with Alembic Club. A. R. Powell: 'The Platinum Metals.'

Society of Chemical Industry

London: Chemical Society's rooms, Burlington House, Piccadilly, 6.30 p.m. Dr. J. W. Barrett: 'Production & Development of Chemicals for the Rubber Industry.'

TUESDAY 2 FEBRUARY

Institution of Chemical Engineers

London: Geological Society's rooms, Burlington House, Piccadilly, 5.30 p.m. J. F. Richardson and N. W. Zaki: 'Sedimentation & Fluidisation.'

Chemical Society

Edinburgh: Biochemistry Lecture Theatre, Teviot Place, 7 p.m. Joint meeting with RIC, SCI and University Chemical Society. Professor H. W. Melville: 'New Kinds of Big Molecules.'

Society of Chemical Industry

Huddersfield: Technical College, 6 p.m. Yorkshire Section meeting. Dr. F. J. Dent: 'Modern Methods of Gasification.'

Edinburgh: 25 Charlotte Street, 7 p.m. H. E. Partridge: 'The Efficiency of a Modern Steam Plant.'

Midlands Society for Analytical Chemistry

Birmingham: The University, Edmund Street, 7 p.m. W. J. Gooderham: 'The Use of Soap Films in Gas Analysis & Calorimetry.'

Incorporated Plant Engineers

London Royal Society of Arts, John Adam Street, Adelphi, Strand, 7 p.m. Open forum.

WEDNESDAY 3 FEBRUARY

Society of Chemical Industry

Wigan: Mining & Technical College, 7 p.m. Liverpool Section meeting. J. G. Reynolds: 'The Development of Infra-red Analysis.'

Institute of Fuel

Sheffield: The University, 6.30 p.m. Yorkshire Section meeting. G. J. Collin: 'Fuel Oil & Oil Firing.'

Incorporated Plant Engineers

Southampton: Polygon Hotel, 7.30 p.m. Oliver Lyle: 'Heat Pumps.'

THURSDAY 4 FEBRUARY

Chemical Society

London: Burlington House, Piccadilly, 2.30 and 7.30 p.m. Symposium: 'Kinetics & Mechanism of Inorganic Reactions in Solution: A Survey of Recent Work.'

Bristol: The University (Department of Chemistry), 7 p.m. Joint meeting with RIC and SCI. Dr. W. P. Grove: 'The Radiochemical Centre at Amersham.'

Society of Chemical Industry

Nottingham: Nottingham & District Technical College, 7.30 p.m. Joint meeting of Nottingham Section with Oils & Fats Group. G. W. Scott Blair: 'Rheology of Fats.'

Institute of Metals

London: 4 Grosvenor Gardens, S.W.1. 6.30 p.m. R. W. Douglas: 'Germanium & Silicon.'

Institute of Fuel

Speke: Works of Distillers Biochemicals Ltd., 2.30 p.m. Visit by North Western Section members.

Incorporated Plant Engineers

Peterborough: Eastern Gas Board demonstration theatre, Church Street, 7.30 p.m. Hector Taylor: 'Feed Water Treatment.'

Leeds Metallurgical Society

Leeds: The University (Chemistry Dept.). 7.15 p.m. J. H. O. Varley: 'Nucleation in Metals & Alloys.'

FRIDAY 5 FEBRUARY

Chemical Society

Cambridge: The University (Chemistry Laboratory), 8.30 p.m. Joint meeting with University Chemical Society. Dr. C. C. Addison: 'Reactions in Liquid Dinitrogen Tetroxide.'

St. Andrew's: United College (Chemistry Department), 5.15 p.m. Joint meeting with University Chemical Society. H. M. Powell: 'Atoms & Molecules in Cages.'

Society of Chemical Industry

Glasgow: Royal Technical College, 7.15 p.m. Jubilee Memorial Lecture by Dr. E. M. Crowther: 'The Production & Use of Fertilisers—Some Current Trends & Problems.'

Institute of Fuel

Cardiff: South Wales Institute of Engineers, Park Road, 6 p.m. South Wales Section meeting. R. J. Jarvis: 'The Railways & Coal.'

Incorporated Plant Engineers

Manchester: Cafe Royal. Ladies' evening (dinner and dance).

CLASSIFIED ADVERTISEMENTS

SITUATION VACANT

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

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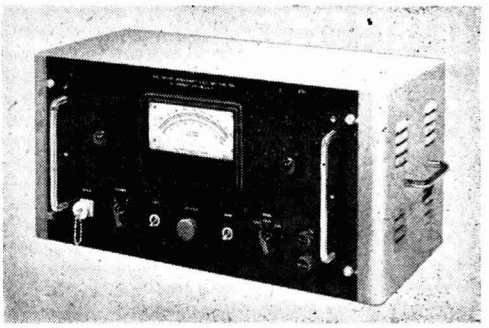

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