THE Chemical Age

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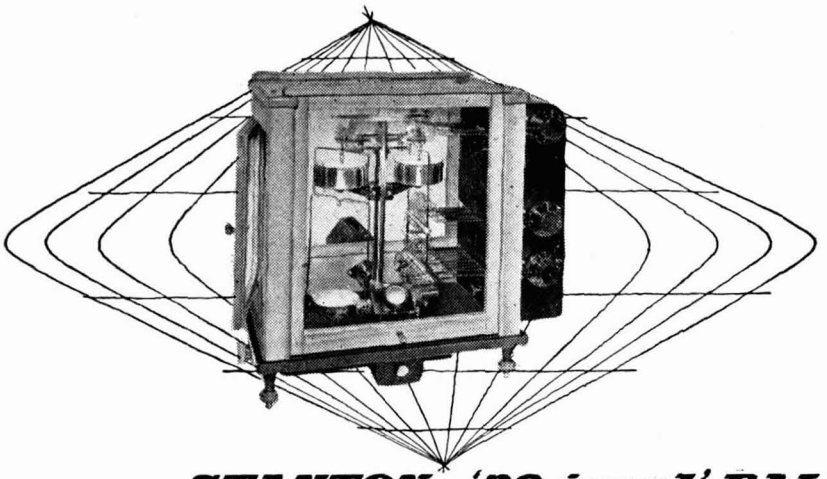

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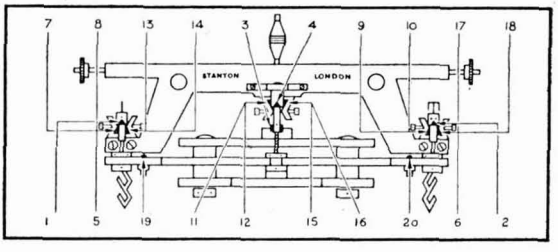

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American Trends—II

REPORTS of the 126th National ACS Meeting in New York this autumn have now reached this country, out-dating our preview comments five weeks ago (see THE CHEMICAL AGE, 1954, **71**, 633-634). The attendance broke the previous record of 1951 with the huge registration figure of 13,514. Why do so many people make what is a considerable personal effort to form this vast chemical crowd? If what we are told about late-summer temperatures in New York is true, the 'unofficial-holiday' motive for attending a conference hardly provides a sound explanation. Nor is New York a particularly central venue; a high proportion of the 13,514 chemists and students must have had to travel great distances. The writer of the leading editorial in *Chemical & Engineering News* (1954, **32**, 3821) is unable to find particularly dominant reasons why these post-war national meetings of the ACS are being so expansively supported. Rather, there are a number of reasons because the meetings 'mean different things to different people', but this would not be the case if the meetings were not planned to offer such a wide coverage of chemists' interests, academic, industrial, and commercial. Every conceivable subject with a chemical background has its showing. The American capacity for doing things on a grandiose scale is exemplified.

One does not have to be unduly cynical to realise that total attendance at conferences and conventions is one thing and attendance at its non-social meetings another. At the ACS meeting, however, meeting rooms were filled to overflowing for the presentation of all the outstanding papers and despite substantial overlapping in a busy week's congested schedule. An interesting sidelight is that 11 per cent of those present were there 'as employers looking for likely candidates or applicants looking for first positions or better ones'. At any rate, 734 employers and 782 applicants registered at the Employment Clearing House. We might guess, perhaps, that 'labour exchange' was a primary motive in only about one-half or one-third of this total of 1,516; however, some 4,000 interviews took place during the single week of the meeting.

There is certainly much to be said for the idea of associating employment bureau facilities with national scientific meetings. Could 4,000 interviews between prospective employers and employees have been so conveniently and economically achieved in any other way? In many cases, the interview would not have taken place at all except through the agency of the ACS meeting, and the contact, if any, between employer and applicant would have faded away after an interchange of letters. In such matters nothing effectively substitutes for personal contact and discussion.

Another sidelight of significance is that America's more important newspapers gave adequate space to the chemical topics discussed at the meeting. In this country, only the annual meeting of the British Association is able to make similar claims. Science news reporting is still a young development in daily journalism, and the few people here who

have had what might be called expert experience in it seem firmly agreed that the faults and mistakes are to be blamed as much upon scientists' shyness and caution as upon the 'sins' of a popular Press. The ACS obviously fosters press interest in its national meetings and the results of this policy are good both in volume and quality of reportage. To quote from *Chemical and Engineering News*: 'The public at large today is cognisant of current developments in the field of science to a far greater degree than ever before. We feel that the national meetings have contributed in no small way to this development.'

British chemistry—and by this we do not mean chemical industry alone—might draw with considerable profit upon these modern American efforts and experiences. It is true to the point of being tritely obvious that the more intelligent section of the US public is far more aware of the contributions of chemistry and chemists than is a similar section of the British public. It does not require a survey of newspapers to establish this point—it requires only the ventilation of a modern chemical topic in a cross-section sample of people in a club or hotel lounge. Indeed, conversational experiments of this kind are well worth attempting here, but the results tend to be depressing.

The President of the US Manufacturing Chemists' Association said during the ACS meeting: 'Managements of our chemical companies have a deep appreciation of the vital role of the chemist and chemical engineer. They want the public to know more about the men and women who are doing so much for the welfare and security of this country and its citizens.' The remarks on the subject of incentives for middle and top management made by Mr. Worboys at the ABCM annual dinner this month (see THE CHEMICAL AGE, 1954, **71**, 877) can be interestingly compared with this American approach to the problem of reward and self-justification. Salary cheques and the deductions of high taxation are not the whole story and never can be. Mr. Worboys's statement that 'it is becoming more and more common to encounter cases where young men decline promotion and increased responsibility' reveals a symptom of malaise that Britain cannot afford. Is it also becoming 'more and more common' in the United States? It is a question we cannot answer with certainty, but we doubt whether high taxation or greater inflation in America has produced a similar reluctance in younger chemists there.

The ACS has not been slow or backward in reporting its own meeting. The major part of two issues of its weekly publication (*Chemical & Engineering News*, 1954, **32**, [39] and [40]) has been devoted to generous summaries of the papers and discussions at all divisional sessions. These issues were published in America on 27 September and 4 October; the meeting took place between 12 and 17 September. Such speedy publication of well-detailed technical reports should not be taken for granted. It must have depended not only upon the efficiency of editorial staff, but upon the co-operation of the many chemists who presented papers at the meeting. It converts a national meeting into one of international importance, a point we should be churlish not to make.

Nearly 1,500 papers were read in the 21 divisions, and it is clear that advances in chemical knowledge were revealed in a substantial proportion of them. Where there are new commercial possibilities to be developed or indications of future probabilities, such rapid summary-reporting in a journal of world-wide circulation is an act of international generosity. It may be often said that American chemical industry is more fiercely competitive than any other, but the out-dated fetish for secrecy, still so markedly displayed in Europe, has been largely discarded. American companies do not waste time and energy trying to create and maintain scientific monopolies; they are content to concentrate upon getting ahead with a good start and keeping ahead with steadily advancing 'know-how.'

'Know-how,' indeed, is an apt phrase to apply to the 1954 autumn meeting of the ACS—in getting together and putting chemistry over, our colleagues across the Atlantic have developed an enviable amount of 'know-how.'

Notes & Comments

Work Study in Chemicals

AN article of unusual importance to the chemical industry is to be found in the current (October) issue of the *FBI Review*, for in it Mr. Bertram White, deputy managing director of Messrs. A. Boake, Roberts & Co. Ltd., describes the initial results of applying modern work study technique to a chemical business with diverse interests. One result quoted is the reduction of 111 separate operations in a process to only 31; if this was somewhat fortuitously secured because the plant had to be transferred to a new site (thus creating a favourable opportunity for complete redesign in lay-out), it nevertheless shows that the 'why-is-this-necessary?' approach of work study can pay unexpectedly large dividends. In addition to reducing the number of operations, three-shift production was converted into one-shift production, and appreciable economies in steam, water, and raw materials are also being shown. A distillation unit had long been bottlenecked by stills capacity, but work study investigations showed how improved planning for longer runs could raise the capacity of the stills without plant additions. On another plant of restricted output, work study led to a re-organisation that raised output by 40 per cent in as little as six months.

Historical Event

IT should be emphasised that the idea and principles of work study were carefully explained to the staff before it was applied. Confidence, especially with key workers, was won by persuasion rather than by high-pressure onslaught. Suitable members of the staff were sent on courses of training and higher-level training help was given by I.C.I. whose own successful applications of work study have already been reported. Too often it is assumed that these modern operations in productivity are mainly applicable or perhaps only applicable to the repetition processes of engineering and standard unit manufacture, and management in chemical factories has usually taken the view that work study is something that helps other people. Journals which publish case-history articles or papers on this theme rarely cite chemical factories. That the first case-history article in a new *FBI Review* series on 'Productivity in Practice' should deal with a well-known chemical firm of medium size is certainly notable.

Estimating Plant Costs

HOW can the costs of projected chemical plant installations or of a complete chemical works be estimated in Britain where there are practically no published data on chemical plant costs? Mr. R. Edgeworth Johnstone put forward some answers to this poser at a recent meeting of the Institution of Chemical Engineers. One method is to assess the weight of the plant and then to apply a factor, or appropriate factors, for 'cost per ton.' This method seems more suitable for plant units than for complete works. For predicting the likely costs of new works, multiplying the expected output (as £-value) by a factor known to relate capital cost and output in other already existent works is one method. Another is to assume that the annual value of output is of the same order of magnitude as works capital cost; though here the order of magnitude may vary from being one-half, about equal, or twice. The roughness of these methods may shock practitioners of pure chemistry. No one, however, would pretend that a really accurate estimate could be arrived at save by chance—these approaches settle the tens of thousands, perhaps, but cannot hope to predict the thousands (and for large works, read 'tens' as 'hundreds'). Even so, any guidance that these methods can give depends upon the reliability of the factors applied, factors which must express substantial past experience in plant or works costs. When prices are changing or when new constructional materials are being introduced, there must be many allowances and adjustments. Is there so much costs

data available about plant already installed? Except to the large organisation which has already installed and paid for several plant outfits or new works, cost figures for existent erections would seem as lacking as costs for projected ones. This is not said to belittle Mr. Edgeworth Johnstone's suggestions; rather, their roughness and small hope of real accuracy show how truly dark and uninformed this sector of chemical knowledge is. The supply of good data about plant costs is much more plentiful in the United States. Remedying the deficiency here could be the responsibility of the British Chemical Plant Manufacturers' Association.

IN THE EDITOR'S POST

US Phosphate Rock

Sir,—It is with great interest that we receive and read THE CHEMICAL AGE every week. However, as the London subsidiary of International Minerals & Chemical Corporation, Chicago, the largest producers of Florida pebble phosphate and also producers of Tennessee and Western States phosphate, we feel that we should correct the general impression given in the paragraph 'Phosphate Rock in the USA' on page 736 of your 2 October issue.

The impression given to those on this side of the Atlantic who are not well versed in US phosphate matters is that a total of 40,000,000 tons of phosphate was mined during 1953 for use. This is not correct. It is true that 40,000,000 tons of crude matrix was mined, but in Florida, where the largest tonnage is mined, only about 30 per cent is recovered from the matrix as a marketable product. Of the balance 30 per cent is slime and 40 per cent. flotation tailings (silica). From Tennessee phosphate about 45 per cent/50 per cent of the weight of the matrix is recovered as a marketable product with 50 per cent/55 per cent slime. The recovery from western phosphate fields is probably 75 per cent or more by weight.

The total marketable product from the three US phosphate fields amounts to only just over 30 per cent of the total phosphate rock ore or matrix mined, and according to the US Bureau of Mines for 1953 this totalled 12,503,830 long tons, and the actual tonnage sold or used during 1953 amounted to 12,517,923 long tons. In our opinion, either of these two figures would give a truer picture and be of more interest to those who want information about phosphate.

We pass this information to you in case you wish to use it in a future edition.

Yours very truly,

H. A. Voss

Director,
International Minerals & Chemicals Ltd.,
London.

Coryton Refinery Sold

SOCONY-Vacuum Oil Company Inc., of New York, and Powell Duffryn Limited announce that they have signed an agreement under which Socony-Vacuum will acquire the 6,276,179 ordinary shares of £1 each held by the Powell Duffryn Group, and the latter will receive £7,250,000 5 per cent Vacuum Loan Stock 1960/85 which will be guaranteed as to principal and interest by Socony-Vacuum. Since 1950 the ordinary share capital of the Vacuum Oil Company Limited, which operates the Coryton refinery, has been jointly held by Socony-Vacuum and Powell Duffryn.

In a statement to stockholders, Sir Herbert Merrett, chairman of Powell Duffryn, says this represents a great change in the group's original intentions announced more than 4½ years ago. The short-term impact of delay in building the Coryton refinery, its increased cost over the original estimate, heavier charges for depreciation and interest on borrowed money and adverse trading conditions have, says Sir Herbert, produced a net loss of some £750,000 in the Vacuum accounts for 1953 and a continuance of losses during the current year. Demand for capital by Vacuum Oil has proved to be much greater than expected and is by no means at an end, and the earning of profits will be later than expected and on a reduced scale.

The board of Powell Duffryn have regretfully come to the conclusion that they must try in one way or another to obtain some early return on the present large investment in Vacuum Oil, and they could not justify to shareholders the further investment of funds required to meet the substantial additional capital expenditure which now appears to be inevitable.

The Export Situation

Chemical Industry's Struggle to Maintain Lead

SOME of the most consistent increases in exports during the past two years have been recorded for chemicals and refined petroleum. In the first half of 1953 these accounted altogether for exports valued at just over £19,500,000 a month, or 9.5 per cent of all UK exports. The total has increased steadily until in the third quarter of this year it mounted to almost £24,000,000 a month, nearly 11 per cent of all exports. Between these periods chemical exports increased by over £3,000,000 a month (nearly 22 per cent), and refined petroleum by over £1,000,000 a month, about 21 per cent.

This expansion has been one result of capital investment in these industries since the war and the exploitation of technological advances in many fields. In the case of refined petroleum it has followed the establishment of a virtually new industry in this country. These developments have led to an increase in production in the chemical and allied trades greater than in any other of the main division of industry. According to the latest available figures the level of production is about two-thirds higher than in 1948 for chemicals, compared with less than one-third for industry as a whole.

Although a large part of the new production has been exported it has formed only part of a greatly expanded volume of world trade in chemicals. Indeed, UK exports of chemicals—not including refined petroleum—have contributed a decreasing proportion of world trade in chemicals since the beginning of 1952. This has been largely due to a very great increase (about 60 per cent between 1952 and the first half of 1954) in exports of chemicals by Western Germany, which are now almost as much in value as our own, and are otherwise exceeded only by the US.

The increase in UK chemical exports has been well distributed by commodity, although much the largest proportionate increases have been in shipments of synthetic organic dyestuffs, which have increased by one-half, nearly £300,000 a month, and of plastics materials, which have gone up by one-third or £500,000 a month, between the first half of 1953 and the third quarter of 1954. Almost half the UK chemical exports go to the sterling area, but exports to the other main currency areas except the dollar area have shown a fairly

TABLE 1

VALUE OF EXPORTS IN £ : PRINCIPAL COMMODITIES

	Sept. 1954	Aug. 1954	Sept. 1953
Acids, inorganic ..	69,025	45,487	45,002
Copper sulphate ..	47,052	138,000	190,871
Sodium hydroxide ..	387,470	575,083	395,623
Sodium carbonate ..	226,976	246,625	293,182
Aluminium oxide, anhydrous	42,497	884	2,275
Aluminium sulphate	36,845	37,253	41,991
Ammonia	30,960	30,856	41,660
Ammonium chloride	35,407	41,421	31,057
Bismuth compounds	16,782	30,878	16,516
Bleaching powder ..	46,185	39,143	26,552
Hydrosulphite ..	56,991	57,455	40,235
Calcium compounds, inorganic	59,381	46,297	65,612
Lead compounds, inorganic	32,513	35,225	25,342
Magnesium compounds	73,933	35,904	59,002
Nickel salts	36,149	58,547	67,602
Ethyl, methyl, etc., alcohols	132,745	91,922	125,346
Acetone	38,825	38,055	61,443
Glycerine	20,222	16,980	97,760
Lead tetra-ethyl ..	869,295	806,379	107,570
Total for chemical elements and compounds	**4,769,771**	**4,792,060**	**4,276,171**
Coal tar	158,449	55,225	47,394
Cresylic acids ..	37,328	49,303	56,875
Benzole	215	750	1,911
Creosote oil	59,674	240,237	203,910
Total from coal tar, etc.	**309,134**	**392,637**	**359,154**
Indigo, synthetic ..	64,863	77,191	79,227
Total for synthetic dyestuffs ..	**683,654**	**892,065**	**686,663**
Medicinal and pharmaceutical products, total ..	**2,759,881**	**2,802,140**	**2,350,105**
Essential oils :			
Natural	37,274	20,478	35,530
Synthetic	74,503	60,539	40,378
Flavouring essences, etc.	87,162	80,333	75,441
Total for essential oils, perfumes, etc.	**1,742,367**	**1,694,406**	**1,402,318**
Ammonium nitrate ..	34,115	17,163	51,053
Ammonium sulphate	494,451	628,274	494,603
Total for all fertilisers	**554,854**	**670,819**	**568,102**
Paints, pigments and tannins, total ..	**1,386,409**	**1,508,525**	**1,296,270**
Plastics materials, total	**2,044,626**	**1,910,930**	**1,573,957**

steady expansion. For refined petroleum, principal markets are among the OEEC countries and their possessions, which take over half.

The horizon is further darkened by the fall in chemical exports during September. Despite the staggering of summer holidays, September does not really count as a holiday month, yet the total value of chemical exports was at its lowest since April. All classes showed decreases except essential oils and plastics; the latter reached a record figure of £2,044,626.

Alkalis fell but acids rose; aluminium oxide made one of its upward fluctuations, and magnesium compounds were remarkably high. The lessening production of arms is reflected in the falling-off in demand for glycerine and acetone, but the alcohols continue good business, and lead tetra-ethyl, although a little below June's figure, is still doing very well.

Fluctuations continue also in coal tar chemicals: coal tar itself rose and partially compensated for the fall in creosote oil, but the demand for benzole is still on its downward trend. Even synthetic dyestuffs, backbone of the expansion, have shown a falling-off during September.

Trade with Commonwealth countries continues steady, the high value of exports to Australia and New Zealand being particularly welcome. Exports to NATO countries are also good, but cannot offset the continuing decrease in trade with the dollar area. The increasing importance of South America as an export market should be noted, however.

TABLE 2

VALUE OF EXPORTS IN £: PRINCIPAL CUSTOMERS

	Sept. 1954	Aug. 1954	Sept. 1953
Gold Coast	307,278	232,445	208,666
Nigeria	261,380	296,078	257,161
South Africa	614,784	786,035	788,027
India	1,133,010	1,588,772	1,142,605
Pakistan	304,189	196,541	250,963
Singapore	330,749	329,738	270,060
Malaya	243,600	270,294	193,87[illegible]
Ceylon	289,980	299,895	224,7[illegible]
Hong Kong	269,946	331,534	1[illegible],596
Australia	1,832,565	1,407,761	1,059,994
New Zealand ..	642,636	600,640	440,647
Canada	418,577	540,719	556,129
Eire	495,463	457,894	475,553
Finland	208,446	335,961	171,520
Sweden	441,229	469,033	384,182
Norway	290,633	200,995	190,805
Denmark	293,496	293,544	238,770
Western Germany ..	391,642	410,468	233,080
Netherlands	595,127	468,969	544,542
Belgium	357,540	298,372	362,657
France	443,797	340,010	363,519
Switzerland	224,791	246,859	134,967
Italy	377,945	339,776	240,867
Egypt	239,684	312,850	213,094
Burma	204,359	257,073	203,792
US	558,887	624,938	724,806
Venezuela	223,056	92,920	74,767
Argentina	325,876	388,241	416,436
Total value of chemical exports	**16,511,697**	**16,642,186**	**14,213,814**

Hydroformer for Fawley

Esso Plans £10,000,000 Expansion

ADDRESSING members of the Press at Fawley, near Southampton, on Tuesday 26 October, Mr. G. Noble, O.B.E., a director of Esso Petroleum Co. Ltd., said that the present high level of taxation on petrol and some middle distillates was a very real barrier to the development of the use of fuel oil in the UK. His firm, however, did not accept the fact that the vicious circle could not be at least cracked and they were planning to construct a new plant, a Hydroformer, which would be the first of its kind in a British refinery. This plant would process crude oil fractions by means of a catalyst and hydrogen to produce high quality petrol. This would mean that less of the middle distillates (for which the demand was increasing) would have to be used as feedstock for the cat-cracker.

In reply to questioning it was said that the Hydroformer would cost approximately £4,000,000 and would take two years to construct. It would be the fourth plant of this kind to be built by the Esso organisation, one being in the US, one in South America and one in Italy. It would, however, be the second largest. It was also revealed that a total of £10,000,000 is to be spent over a period of years in expanding the Fawley refinery.

In reply to another question, Mr. D. A. C. Dewdney, assistant refinery manager, said that Esso had not, at the moment, any concrete plans to embark upon the production of petrochemicals. He personally was pleased that this was the case because the pace at the present time was rather hot. The organisation, thanks mainly to its American connections, had all the technical knowledge available and could embark upon a full programme of chemical production if it should be decided that such action was advisable.

I.C.I.'s Canadian Subsidiary*

C-I-L (1954) is Dominion's Largest Producer

THERE are over 1,100 plants in Canada producing chemicals at the present moment. The US is said to have approximately £100,000,000 invested in roughly 300 of these plants and Great Britain has only about £25,000,000 tied-up in some 40 plants. In recent years British investment in Canada's rapidly growing chemical industry has been only one-seventh that of the US.

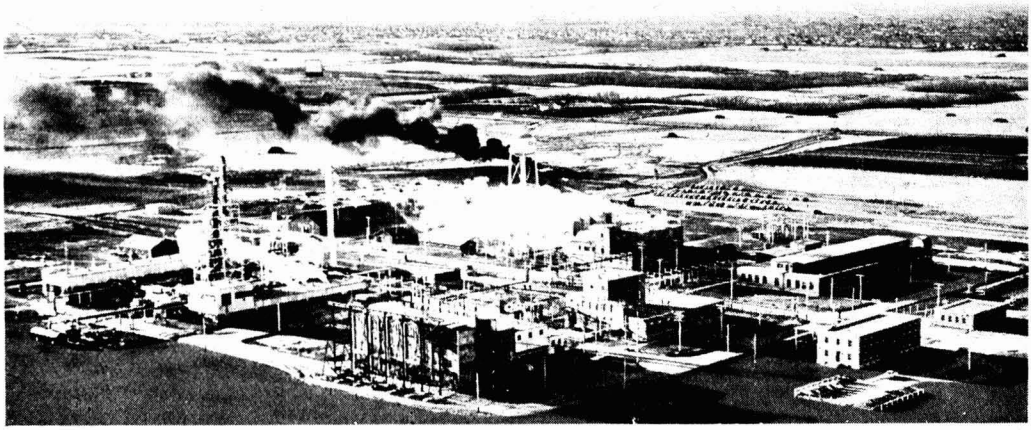
Up until a few months ago the largest single producer of chemicals was Canadian Industries Ltd., the principal shareholders in which were the British firm, Imperial Chemical Industries Ltd., and E. I. du Pont de Nemours & Co. of the US. On 1 July, however, the operations and business of C-I-L was divided between two separate companies: Canadian Industries (1954) Ltd. and Du Pont Company of Canada Ltd. The first of these is a subsidiary of Imperial Chemical Industries and was allotted a much larger number of plants and products and a larger total of fixed assets than Du Pont Co. of Canada. It is now the largest unit in the Canadian chemical industry.

Britain's rôle, therefore, is not so unimportant as appears at first sight. Furthermore, the recent announcement that C-I-L (1954) is to spend approximately £23,000,000 on expansion, development and improvement during the next three or four years proves that I.C.I.'s Canadian subsidiary does not intend to lose its leading position. As a matter of fact when this amount has been expended the fixed assets of C-I-L (1954) will be approximately the same as those of the old C-I-L before division took place. At the present moment the company has the largest research and development organisation in Canadian industry.

Commenting on the division of interests soon after it had taken place, the chairman of Imperial Chemical Industries, Dr. Alexander Fleck, said: 'I.C.I. is deeply committed to Canada and therefore we intend to pay a great deal of attention to it so that our interests will prosper and grow.'

The history of C-I-L is interesting for it gives an excellent indication of the lusty

* *The fourth in a series of articles on the Canadian chemical industry written by the editor following an extensive tour of the Dominion this summer. Previous articles appeared in our issues of* 25 *August,* 11 *September and* 9 *October.*



The polythene plant of Canadian Industries (1954) Ltd. near Edmonton

energy of Canada's chemical industry; and the whole purpose of this series of articles has been to show the strength and vigour of the industry in the largest and most prosperous of the Dominions.

In 1876 Dr. T. C. Brainerd went to Canada on behalf of the Gunpowder Export Co., of which he was president and Lammot du Pont was vice-president. In 1878, with the financial assistance of his family and of Mr. du Pont he purchased the 16-year-old Hamilton Powder Co., and a programme of expansion began immediately. Several small powder plants were purchased and a dynamite plant was built at Beloeil in Quebec Province.

Nobel's Enter Field

In 1871 Nobel's Explosive Co. was formed in Scotland and soon afterwards dynamite and explosives were exported to Canada. A storage magazine was built by the British company near Brownsburg, Quebec, on property owned by the Hamilton Powder Co. The Dominion Cartridge Co. was formed in 1886 with a plant at Brownsburg and two years later Dr. Brainerd became president. The rapid expansion of Canada's railways (and particular their extension through the Rocky Mountains) resulted in a tremendous increase in the demand for explosives. As a result several small explosive plants sprang up in various parts of the country. By 1899 Nobel's had acquired a controlling interest in the Hamilton Powder Co.

In 1910 the Du Pont Company and Nobel's merged their interests in several small Canadian powder and explosives companies and a new company, Canadian Explosives Ltd., was formed, Du Pont and Nobel's having equal interests. Reorganisation and expansion followed shortly afterwards, some plants being purchased and others being built. World War I gave the new company a great push forward.

In 1919 three Canadian branches of Du Pont-controlled concerns were taken over and operated as subsidiaries. These were for the manufacture of leathercloth and rubber-coated fabrics, nitro-cellulose and acetate plastic articles, and paints and varnishes including a new nitrocellulose finish (Duco) which was revolutionising the automobile industry in America. Manufacturing facilities for acid and fertilisers were increased on the Pacific coast.

In 1925 Mr. Arthur B. Purvis, representing Nobel's, became president of C-X-L and he was largely responsible for the company's accelerated growth. Mr. Purvis (who was tragically killed in an aeroplane accident when visiting Britain in 1941 as chairman of the British Supply Council in North America) was a man of exceptional ability, as all who knew him recognised. His death was a serious loss not only to the allied war effort but to the company and to the chemical world as a whole.

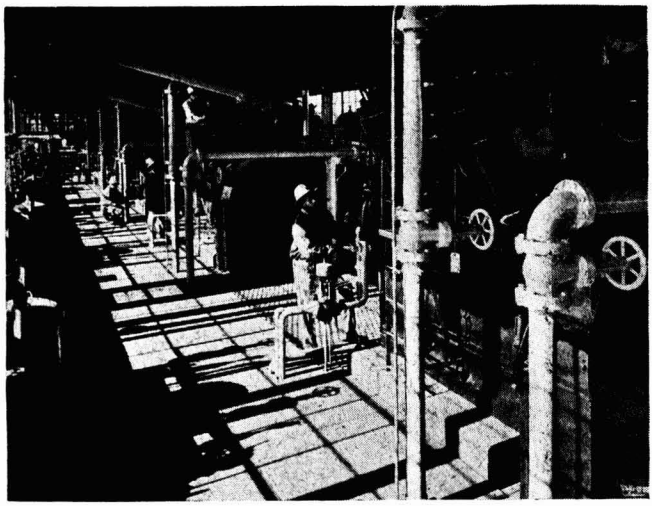
After the merging of Nobel and Brunner Mond into Imperial Chemical Industries Ltd. in 1926 it was felt that C-X-L should develop along as many lines as possible and in 1927 the name was changed to Canadian Industries Ltd. In 1928 C-I-L embarked upon a programme of development which brought it further into the manufacture of acids, alkalis, and other heavy chemicals. Several companies were bought out and several plants were built across the Dominion. Ammonia, salt, chlorine, caustic soda, fertilisers, commercial acids, nitre cake, trichloroethylene, cellulose film, aluminates, paints and hydrogen peroxide were some of the products which were being produced on a large scale in the late 1930s. In addition, the list of products imported from the US and the UK for sale in Canada grew at an equally impressive rate. These included nylon monofilament and yarn.

When war broke out in 1939 the Canadian Government asked the company to erect and operate government-owned plants to manufacture the chemicals, high explosives, and propellants needed for its war effort. The wholly-owned subsidiary Defence Industries Ltd. was formed, and during the first three years of the war DIL grew to be one of the largest industrial management enterprises ever undertaken in Canada. Construction and production on behalf of the Canadian Government involved an expenditure of about $1,000,000,000 between 1940 and 1945.

Chlorine & Caustic

Because of increasing demand a chlorine and caustic soda plant at Shawinigan Falls, Quebec, was brought into operation late in 1939 and in 1940 Canadian manufacture of ammonium chloride, sodium sulphite and zinc chloride was begun in Hamilton, Ontario. In the same year C-I-L undertook management of a new company whose main product was carbon disulphide. In 1942 nylon production commenced at Kingston.

Ethylene compressors in the polythene plant at Edmonton



Ontario, and the capacity was increased several times in succeeding years.

In 1947 a new paint and varnish works was constructed at Toronto; in 1948 a new sulphuric acid plant began production at Hamilton and in the following year a pesticides plant came into operation. During 1950 manufacture of polythene sheeting commenced at Shawinigan Falls, and construction of a new explosives factory near Calgary was started to meet the growing demand from Western Canada's oil and mining developments. Two years later this plant introduced to North America the first continuous process for the nitration of glycerine.

By the end of 1953 two of the largest plants ever built by C-I-L had been brought on stream; the nylon intermediates plant at Maitland, Ontario, and a $13,000,000 polythene resin plant at Edmonton, Alberta. The larger of these, the Maitland plant, cost three times more than the largest previous project. Adipic acid and hexamethylenediamine were manufactured, replacing materials which had been imported. In the same year a new sulphur dioxide plant went into production at Copper Cliff, Ontario, and early in 1954 a $500,000 extension to the Central Research Laboratory at Beloeil was occupied.

In the brief period since 1910 C-I-L had grown from an explosives manufacturing company with six small plants and less than 1,000 employees to a Dominion-wide organisation with 24 plants producing a very wide range of products and employing over 9,000. At the time of its division the company had a turnover of $153,000,000 (approximately £56,000,000) per year. Fixed assets amounted to $131,000,000 and its balance sheet totalled more than $175,000,000 I.C.I. and Du Pont each held 41.8 per cent of the ordinary capital, the remaining 16.4 per cent being held by some 3,000 individuals, mostly Canadians.

The division which took place on 1 July resulted from the 1952 US court judgment that the association of these two companies was contrary to America's anti-trust laws. (See THE CHEMICAL AGE, 1952, **67**, 325.) The plan of division took several months to work out and more than 1,500,000 documents were handled. Costs arising from the division were borne by the two principal shareholders.

Canadian Industries (1954) Ltd. was allotted fixed assets amounting to $72,000,000 and 20 out of the 24 plants, and Du Pont of Canada $59,000,000. C-I-L (1954), however, ended up with larger current liabilities and depreciation reserves, and no capital surplus against one of $13,700,000 retained by the American company's subsidiary.

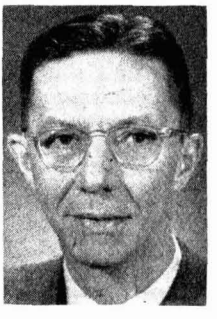
C-I-L (1954) took over the chemicals, agricultural chemicals, explosives, ammunition, paints and coated fabrics and plastics departments of the former organisation, and the resale rights to acrylic sheeting, polyvinyl chloride, Plaskon melamine, urea and alkyd plastics; fungicides; mercurial wettable sprays and seed disinfectants. The plants are located at Halifax, Nova Scotia;

Shawinigan Falls, Brownburg, Montreal and Beloeil, Quebec; Cornwall, Copper Cliff, Hamilton, Toronto, New Toronto and Nobel in Ontario; Brainerd, Manitoba; Calgary and Edmonton, Alberta; and James Island, British Columbia. A few weeks ago the company announced that it was purchasing the new $20,000,000 Terylene plant belonging to Imperial Chemical Industries of Canada Ltd. (See THE CHEMICAL AGE, 1954, **71**, 762.) It also announced a considerable increase in facilities to produce caustic soda and chlorine, enlargement of the paint works at Toronto, and additions to research and development facilities at Edmonton, Toronto and Beloeil.

Du Pont of Canada took over the cellulose, polythene and nylon plants at Shawinigan Falls, Maitland and Kingston. Resale products include Orlon, pesticides, dyestuffs, X-ray film, tetraethyl lead, Freon refrigerants and propellants and neoprene synthetic rubber. Early this month it was announced that the company was building a large new research centre at Kingston and a plant for the manufacture of Freons at Maitland.

C-I-L (1954) has approximately 6,500 employees and Du Pont of Canada 3,000.

Mr. H. Greville Smith, president of C-I-L, became president of Canadian Industries (1954) Ltd., and Mr. Leonard Hynes and Mr. W. T. D. Ross vice-presidents. Mr. Herbert H. Lank became president of Du Pont of Canada and Mr. R. C. Beck vice-president.



The Board of C-I-L (1954). Top left: Mr. H. Greville Smith; Above: Mr. W. T. D. Ross and, left: Mr. Leonard Hynes

Mr. Smith is a Sheffield man who left Billingham for I.C.I. (New York) in 1929 and became manager of the Chemical Development Department of C-I-L in 1932. Later he became manager of the Cellulose Products Group and in 1939 he was made a vice-president. He was appointed a director in 1940 and elected vice-chairman of the executive committee in 1949. During the war he was vice-president and general manager of Defence Industries Ltd. and in recognition of his outstanding service in war industry was made a C.B.E. in 1944.

Earlier in this article we quoted I.C.I. chairman Dr. Fleck. He concluded his remarks with these words: 'Canada has often been called a land of freedom and opportunity. This is even truer today than it was in the past. I feel sure that the I.C.I. influence through its associated companies there will continue to grow in this great and commercially expanding territory.'

Every day we were in Canada during our recent visit we grew increasingly enthusiastic about the Dominion's future—not only as a great consumer of chemicals but also as a great producer of these products. From many quarters we heard expressed the disappointment which Canadians feel that Britain is not investing capital in their country at anything like the same rate as the flow from the US. Dr. Fleck's remarks must have been welcomed by many people in Canada as well as by your writer.—E.A.R.

Acknowledgment: The author would like to express his gratitude to Mr. M. Berger, Head of the Public Relations Department of C-I-L (1954), and his assistant, Mr. W. H. Craig, for the kindness shown to him during his visit to Montreal. Without their help this article would not have been possible.

Transfusion Gelatine

A scheme for setting up an experimental production unit for preparation of transfusion gelatine has been sanctioned by the Indian National Research Development Corporation. Transfusion gelatine is a new substitute for blood plasma evolved by the Indian National Chemical Laboratory.

Semi-Micro Apparatus for Organic Preparative Work

By J. T. STOCK, M.Sc., Ph.D., F.R.I.C., and M. A. FILL, F.R.I.C.
(Norwood Technical College, London, S.E.27)

WHEN corrosive substances are not involved and the nature of the work is not critical, many of the advantages of ground-jointed apparatus may be achieved very simply by standardising neck and stem diameters of the basic components. A single size of cork, pre-bored with a single size of borer, may then be used interchangeably.[1] This makes for great rapidity both in assembly and changeover, particularly if simple spring clamps are used for mounting[2]; for example, the simple distillation apparatus, shown at (a) in Fig. 1 may be put together in a matter of moments.

By mere interchange of cold-finger condenser and cork carrying thermometer, the assembly is converted for refluxing. Alternatively, changeover to assembly (b), so useful for evaporating off small quantities of unwanted solvent in a current of air, may be accomplished in a very short time. This, in turn, may be converted into continuous extraction apparatus (c), and so on.

Since the corks are intended to be used repeatedly, selection, softening and boring should be carefully carried out. A minor refinement is to cut the smaller end at an angle, as shown at (a) in Fig. 2, so that natural drainage to the wall of the vessel occurs. If this treatment is adopted, the cut must be a clean one.

The thimbles used in the extraction apparatus are either commercial ones or those made from filter paper. Home-made thimbles are formed by crimping a 9-cm. circle round the end of a piece of 8 mm. diameter rod or tubing, as shown at (b), (c), (d), (e), (f) and (g) in Fig. 2. When slipped into place, the thimble 'uncrimps' a little, gripping the walls of the thimble-holder. The latter, of test-tube like form, has a 5 mm. diameter hole in the bottom. Three small equally-spaced beads are fused on near the top and another three near the bottom, so that ample vapour-space between holder and vapour jacket is provided.

Conventionally used for the micro-extraction of fats, etc., from seeds, leaf materials and the like, the device may sometimes be put to good use as a means of slowly adding reagents in organic synthesis. The following modification of the Walker method for the preparation of ethyl iodide[3] is an example of this. A paper thimble is not used in this

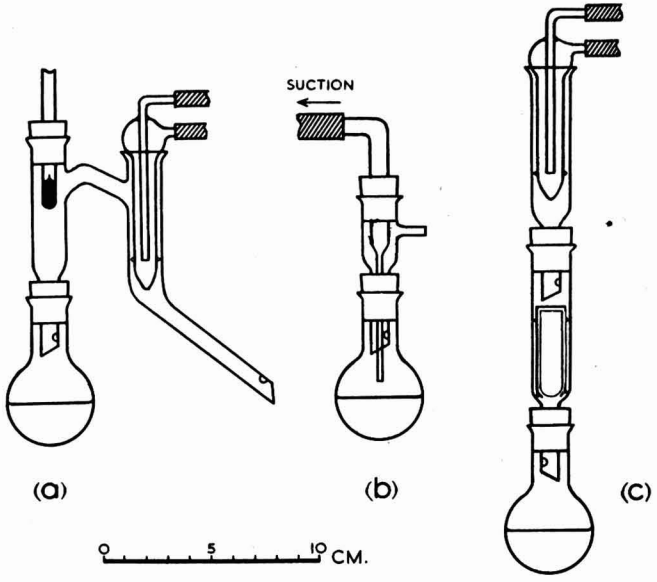


Fig. 1—Simple micro-assemblies for organic syntheses (a) reflux or distil apparatus, (b) arrangement for removal of solvent, (c) continuous extraction apparatus

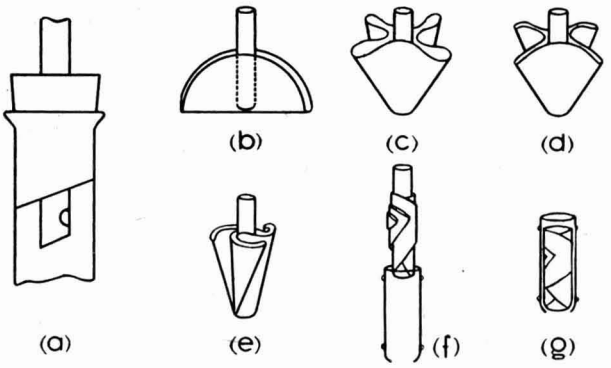


Fig. 2—(a) Chamfered cork, (b) (c) (d) (e) (f) and (g) stages in forming an extraction thimble from a filter-disc

case, the lower end of the holder being closed with a plug of glass wool.

Place 0.5 g. of red phosphorus and 2.5 ml. of absolute alcohol in the flask and, having introduced 4 g. of iodine into the plugged holder, assemble the apparatus. Reflux *very gently* on a water bath, so that transfer of iodine to the flask extends over 25 to 30 minutes. Allow to cool, add 8 to 10 drops of water, then change over for distillation as shown at (a) in Fig. 1. Distil slowly, collecting the fraction boiling between 69° and 74° C. Just decolorise by dropwise addition of dilute sodium hydroxide, shaking after each drop. Using a teat pipette, remove the upper (aqueous) layer, then wash the oil with 1 ml. of water and reject the washings. Dry over a few granules of fused calcium chloride and redistil.

The semi-micro steam distillation apparatus shown in Fig. 3 is a further development of the forms previously described.[4] It may be used for corrosive mixtures, since the only departure from all-glass construction occurs in the steam line. The use of rubber joint piece A is deliberate; it allows a degree of tolerance in the dimensions of the parts, permits easy dismantling for cleaning and avoids risk of falling apart when the assembly is picked up by head B.

The large space within the head acts as a safety trap, preventing the mixture being distilled from being sucked over into the jacket C, should the source of heat fail. Under such circumstances, the mixture is drawn up into the head-space, the remaining partial vacuum being destroyed by rise of air bubbles through the mixture. When heating is resumed, the mixture returns to its normal place.

As shown, a male size 10 joint may be provided for the attachment of a miniature Liebig-type condenser. If C-type joints, having a rather limited gripping area, are used, it is suggested that single hooks, between which a small rubber band is stretched, should be sealed to the parts to be joined. Alternatively, a sealed-on chamber for the insertion of a cold-finger condenser may be provided, as shown at (a).

The following semi-micro preparation of *ortho*-nitrophenol is described to illustrate

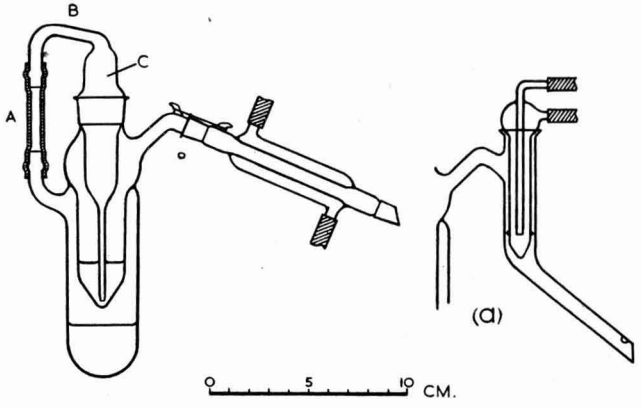


Fig. 3—Semi-micro steam-distillation apparatus, (a) alternate arrangement for condenser

the use of the apparatus. Cool in an ice bath a mixture of 5.7 ml. of water and 1.8 ml. of concentrated nitric acid. Warm 1.4 g. of phenol with 1 ml. of water and emulsify the mixture by vigorous shaking. Using a warmed teat pipette add the emulsion in drops to the cold acid, stirring continuously; during this stage, the temperature should not rise above 30°C. Remove from the ice bath and stir at intervals during the next hour; although the temperature may rise, it must be prevented from exceeding 55°C.

If possible, allow the mixture to stand overnight before working up. Then add 7 ml. of water, stir, allow the oil to settle and reject the aqueous layer. Repeat with a further three 7 ml. portions of water. Add about 2.5 g. of kieselguhr and work the oil into a stiff paste. Break the latter into small pellets and transfer to the steam-distillation apparatus, completing the transfer with a further 0.1 g. of powder. Steam-distil until the nitrophenol ceases to separate from the cold distillate; should partial solidification occur in the condenser, at once shut off the supply of cooling water. Cool the distillate in ice and isolate the crystals by filtration.

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[1] Stock, J. T., & Fill, M. A., *J. Chem. Ed.*, 1953, **30**, 296.
[2] Stock, J. T., & Fill, M. A., *School Science Rev.*, 1952, **33**, 331.
[3] Walker, J., *Trans. Chem. Soc.*, 1892, 1971.
[4] Stock, J. T., & Fill, M. A., *J. Chem. Ed.*, 1954, **31**, 144.

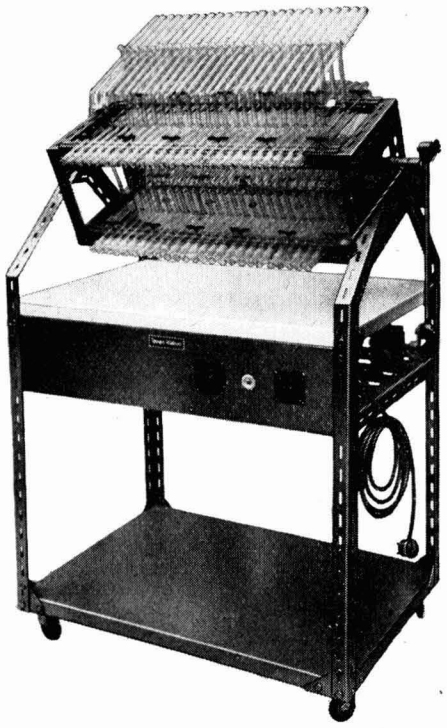
Countercurrent Extraction

Towers Market Versatile Apparatus

THE technique of countercurrent distribution between two liquid phases is now accepted as a valuable aid in synthetic and analytical chemistry. It has been used with great success for the separation of complex mixtures of antibiotics, peptides, alkaloids, inorganic substances, etc.

Now being marketed by J. W. Towers & Co. Ltd. of Widnes is the Gilson-Wright semi-automatic countercurrent apparatus. This is approximately three feet long, and has two banks of tubes. These are made in units of 3, 4 or 5 tubes; they are connected by means of ball-joints and are completely interchangeable. A ¼ HP motor and gearbox give steady and adjustable shaking.

A 15 minute time switch controls the shaking period, and a bell or buzzer indicates when the pre-determined settling period has elapsed. Tipping to effect transfer of top phase is done manually and on returning the tubes to the horizontal position an automatic dispenser adds an accurately measured portion of top phase to the first tube. The same stand accommodates tubes with bottom phase volumes ranging from 10 to 250 ml., and it is claimed that bottom phase volumes are accurate to within ± 1 per cent.



To increase the number of tubes, an extension apparatus, similar in design to the main apparatus but without the mechanical drive, is available for direct coupling. In addition, for work involving very large numbers of transfers, where fully automatic operation is an advantage, a robot drive unit will shortly be available.

Dates of International Congress

The dates of the 14th International Congress of Pure and Applied Chemistry, and the 18th Conference of the International Union, both of which will be held in Zurich, are 21-27 July and 20-28 July respectively, and not the other way about, as in THE CHEMICAL AGE, 1954, **71**, 778.

Drunkenness

The Value of Chemical Tests

AT a meeting of the Midlands Society for Analytical Chemistry in Birmingham on 12 October, Dr. D. W. Kent-Jones gave a talk on 'The Value of Chemical Tests in Determining Drunkenness.' After pointing out that there were at present no regulations defining intoxication in terms of a specified concentration of alcohol in the body fluids, Dr. Kent-Jones discussed the various concentrations which had been specified in other countries. These range from 50 mg. per 100 ml. blood (equivalent to 66 mg. per 100 ml. urine) in Norway, to 150 mg. (equivalent to 200 mg. in urine) in some states in the US.

It is about the latter figure that legal arguments centre in Great Britain, and after outlining the methods of analysis recommended in the BMA booklet 'The Recognition of Intoxication' Dr. Kent-Jones gave details of the conversion tables which have been drawn up to give judges and magistrates an idea of the quantities of common drinks equivalent to various levels of alcohol in the urine. These figures are actually the minimum amount that could have been drunk to obtain the given analysis, as it was considered that this would be of the greatest value.

A Fairly Close Relationship

Discussing the value of chemical tests in determining drunkenness, Dr. Kent-Jones continued: 'It should be remembered that what we are concerned with is the amount of alcohol circulating in the body, i.e., in the blood stream and hence to be found in the urine. Except in exceptional circumstances there is a fairly close fixed relationship between the alcohol in the blood and that in the urine. The analyst is not concerned with what alcohol there is in the stomach. There, it does no damage except that sooner or later much of it will enter the blood and hence the urine. The concentration in the body fluids will depend on the rate at which the alcohol enters the blood.

'There seems little doubt that the heavy sober drinker is less likely to get a high concentration of alcohol in his blood than the person unaccustomed to drinking. In the case of the latter person, the alcohol is likely to shoot quickly into the blood stream and hence on a comparatively small intake of alcohol he or she will have a high alcohol in blood or urine. Indeed, it is my experience that, if by any chance the heavy drinker does get a high concentration of alcohol in his blood, he is as likely to be as "tight" as anyone else, although in rare circumstances there may be exceptions to this. It is probable that heavy drinkers have, in some way or other, an abnormally high rate of alcohol metabolism and thus again are less likely to acquire in their blood and/or urine a high alcohol level.

'The rate at which alcohol enters the blood varies. It is well known that if the stomach is comparatively empty, the absorption into the blood stream will be much faster than if the stomach is reasonably full. There is also good reason to believe that the more concentrated the alcohol in the drink, the faster it will pass into the blood and hence into the urine, and so the greater will be the concentration. There is scentific foundation for the advice "Take more water with it."'

Glassware Makers Dinner

THE annual dinner of the British Lamp-blown Scientific Glassware Manufacturers' Association was held at Plantation House on Wednesday 13 October, 140 guests attending. The principal guest, Sir Harry Pilkington, said that he welcomed the opportunity of speaking, as he termed it 'among the family.' Although glassmakers made a variety of products, their problems were similar and any good that an individual did helped other members of the industry.

The chief problem of glass manufacturers today was that of keeping technically up to date. In the past 40 years inventions had followed one after another and it was important to be aware of all that was happening both in this country and abroad. We could not lead in everything, and the price of leadership technically was extremely high, but not as high as that of not leading, which might well be complete failure.

Replying to Sir Harry Pilkington, the president of the association, Mr. H. H. Zeal, said that the association was an association of craftsmen and one of their major problems was that of recruitment and training. The standard of accuracy in making their products was exceedingly high and this entailed a long training period for the craftsmen.

Plastics in Advertising

I.C.I. Holds Exhibition in London

AN exhibition, 'Plastics in Advertising and Display'—the first of its kind in this country—was held at The Tea Centre, London S.W.1, 25-30 October, by Imperial Chemical Industries Limited. The exhibition featured new colour and lighting effects and new uses of Perspex and rigid PVC. The display signs exhibited covered a wide range of retail trades and many of them were especially designed and built for the exhibition. In addition there were some interesting models (such as a cut-away model of a benzene distillaton plant) and at least one excellent example of sculpture in Perspex by Dr. A. Fleischmann.

In opening the exhibition Lt.-Col. A. M. Wilkinson, President of the Institute of Incorporated Practitioners in Advertising and director of London Press Exchange Ltd., said that it had surprised him to learn the enormous rate of expansion which had taken place in the plastics field. The Plastics Division of I.C.I., for instance, had started from scratch only 21 years ago but now employed some 4,500 people.

Parks the Inventor

From his researches he had learned that the original inventor of plastics was an Englishman named Parks who some 70 odd years ago had produced a type of celluloid which was called Parksite. The British were an extraordinary people—truly the most inventive of all races. In recent years Sir Robert Watson-Watt had invented radar and Sir Frank Whittle had invented the jet engine. He believed that in the field of atomic research the British contribution had been as great as that from any other country.

The optical qualities of Perspex were surely one of its special attractions for signs, both outdoor and in the shop window or on the counter, and gave great opportunities to the artist and designer for expressing his art in a new medium.

The exhibition, he said, illustrated a variety of ways in which Perspex could be used, and he was sure that I.C.I. were very wise in trying to educate people in the special advantages which Perspex offered.

The scientist or the engineer produced some new product and then, quite rightly, the salesman tried to improve it and beautify it and called in the artist to make it more generally acceptable to the public. He thought those in advertising had a great responsibility there. They should always take care that whatever they put before the public was pleasing to the eye as well as interesting or informative.

Purifying Water

PURE water will be made more easily available to outlying communities in many parts of the world if a new British development finds favour. The development is a floating purification plant which takes in water from the river on which it floats and pumps the purified water to nearby villages by pipeline.

It may prove of particular value to Middle Eastern peoples, some of whose engineers will have an opportunity of seeing a model of the plant on the I.C.I. stand at the British Trade Fair in Baghdad (25 October to 8 November).

A feature of the unit, which is constructed of light aluminium alloy, is its mobility. It can be towed up or downstream to supply the village or area most in need of its services. The first full-scale plant, which has a capacity of 2,400 gallons per hour against a 70-foot head, will arrive in Iraq towards the end of the year.

Marston Excelsior Ltd., a subsidiary company of Imperial Chemical Industries Ltd., have constructed the plant in conjunction with a consulting engineer well acquainted with water problems in the Middle East.

Industrial Leadership

A SERIES of five lectures on 'New Developments in Industrial Leadership' will start on 5 November at Fyvie Hall, 309 Regent Street, London, W.1. They are to be held under the auspices of the Department of Management Studies, Regent Street Polytechnic, and their purpose is to provide directors and senior executives with a chance to compare the latest trends in industrial leadership in Great Britain, the United States, France and Germany.

The lectures will start at 6.30 p.m. and will be held weekly, on Fridays. The fee for the series is £1 10s. and applicants for enrolment should be addressed to the Registrar of the Department of Management Studies, St. Katharine's House, 194 Albany Street, N.W.1. Tel.: EUSton 6763.

Record Crude Production

Petroleum Canada's Chief Mineral

CANADIAN crude oil production in 1953 totalled 80,904,402 barrels, valued at $197,294,232, an increase of 19,667,080 barrels over 1952. Average daily output was 221,656 barrels compared with 167,773 barrels in 1952, and potential output was estimated at 345,000 barrels a day, an increase of about 63,000 barrels a day.

In value of production crude petroleum became Canada's leading mineral, replacing gold which had held this position over 20 years.

During 1953 the 718-mile trans-mountain pipe line from Edmonton to Vancouver was completed, and the inter-provincial pipe line from Edmonton to Superior, Wisconsin, was extended 643 miles to Sarnia, Ontario, making the 1,765-mile line the world's longest oil pipe line.

Canadian refinery capacity was increased 70,250 barrels to 528,650 barrels a day, double that of 1947. Although most of western Canada's drilling continued to be carried out in Alberta, there were marked increases in exploratory and development activity in Saskatchewan and Manitoba. In all, 2,222 wells were drilled in western Canada in 1953 resulting in 1,300 oil wells, 90 gas wells, and 832 dry holes.

The Canadian Petroleum Association estimated proven reserves of crude oil in Canada at the end of 1953 to be 1,845,422,000 barrels, an increase of 165,913,000 barrels over 1952. Canada's output of crude petroleum in the first half of 1954 climbed to a new peak of 42,233,000 barrels. This was 26.5 per cent above the preceding year's 33,391,000 barrels.

Citric Acid

British Interest in Canadian Company

TO meet the increasing world demand for citric acid a British and a Canadian chemical firm have announced the joint formation of a new company in Canada, known as Sturge (Canada) Ltd. Manufacturing plant for the new company is now under construction at Valleyfield, Quebec, and is expected to be in production early next year.

The British firm, John & E. Sturge Ltd., of Birmingham and Selby, Yorkshire, were founded in 1823 and have experience of citric acid manufacture dating back nearly 130 years. In 1930 they were the first British firm to operate successfully a fermentation process for the production of citric acid from sugar. The Canadian partner in the new company is Merck & Co. Ltd., the world-famous chemical, pharmaceutical and antibiotic manufacturers.

Citric acid is used widely in a variety of industries, including the manufacture of soft drinks, preserves, pharmaceutical products, confectionery and flavourings. Tests are also being carried out by various authorities using a weak solution of citric acid as a decontaminating agent in the treatment of people and substances which have been exposed to radio-activity.

The output from the new plant will be distributed mainly through the present Canadian agents of John & E. Sturge Ltd.—Dillons Chemical Co. Ltd.—and through Merck & Co. Ltd.

Pay Dispute at Prudhoe

A dispute at the Prudhoe (Northumberland) factory of Imperial Chemical Industries Ltd., over the rates of pay for fitters' mates, has been referred to a national conference. The men, it is understood, are claiming the same rates of pay as men at the Billingham-on-Tees works of I.C.I. The decision to refer the matter to a national conference was taken after unsuccessful attempts to settle the matter locally.

New Acetate Fibre

Sampling quantities of its new fibre—'Tricel'—can now be delivered by British Celanese Ltd. It is in the form of an acetate staple made from cellulose triacetate. Its price has not yet been announced, but it will be more than that of regular acetate staple, although considerably less than that of the present synthetic staples. The Celanese Corporation of America recently announced that it had begun commercial production of a new textile fibre, 'Arnel', which is based on cellulose triacetate.

Pain-Relieving Drug

A new drug capable of relieving pain for long periods has been developed by three Melbourne University scientists. At present unnamed, the drug is for use with morphine. It is derived from thiazone.

Battelle Jubilee

Two European Branches Opened

ON 1 October this year Battelle Institute, Columbus (Ohio), completed its 25th year of service. Founded to conduct research on a non-profit basis, Battelle began operations in 1929 just as the great industrial boom of the late twenties was coming to an end.

The staff, originally 30, now numbers over 2,600. The Institute to-day is known and respected throughout the world of research and engineering. The founder, Gordon Battelle, an American industrialist, left his estate for the building and endowment of an institute 'for the purpose of education . . . the encouragement of research . . . and the making of discoveries and inventions for industry.' In order to carry out the will of the founder, Battelle has provided its unique 'Research for Industry plan.'

In this cooperative activity the Institute provides the physical plant, equipment, and personnel for conducting research. Industrial concerns, groups of companies or individuals contract with the Institute for its research services. They are known as 'sponsors.' All results from research, which are completely confidential, become the exclusive property of the sponsor, for which he is billed at the cost price, plus a proportionate share of undistributed expenses. The amount of money thus annually invested in sponsored research projects at Battelle increased from $80,000 in 1933 to $15,000,000 by 1954.

Laboratories at Frankfurt & Geneva

The 25th anniversary has a significance important to Battelle as during this year the European laboratories at Frankfurt and Geneva have come into full operation for the benefit of European industries. A number of projects have already been completed for European sponsors. It has been proved that the need for the type of teamwork research on contract basis handled by Battelle is extremely high.

Two thirds of the Battelle staff members are scientifically trained research men and technicians. Battelle conducts research in practically all fields of technology: chemistry, metallurgy, industrial physics, fuels and combustion, ceramics, mineral processing, chemical engineering, petroleum and petrol chemicals technology, electrochemistry, plastics, rubber, and paints, electrics, theoretical and applied mechanics, welding technology, graphic arts, engineering economics, agricultural sciences and biochemistry.

In 25 years Battelle staff members have published more than 2,000 articles, books and papers reporting their research results.

To complement the laboratories in Columbus, Geneva and Frankfurt, there exist offices in Paris, London, Milan and Madrid. Battelle has obtained, by handling more than 2,500 major research problems, an unusually broad understanding of the technical needs and requirements of industry and has made an important contribution to industrial progress.

Teleflo Indicators

LIQUID Systems Limited, Craig's Court House, 25 Whitehall, London S.W.1, have signed a contract with Bowser International Inc., USA, Bowser International Limited, London, and Rubery Owen & Co. Limited, Darlaston, to manufacture and distribute under licence their Bowser filtration and lubricating systems and accessories.

They are already in production with the Bowser Teleflo Indicator and will continually add to their range until they have covered the whole field of Bowser industrial lubrication equipment granted them by the contract.

The Bowser Teleflo Indicators are of the vane-actuated dial type for use with many liquids, and particularly useful where the liquids are dark coloured or opaque. The easy-to-read graduated dial and the dial pointer are built into a separate compartment away from liquid pressure. The dial pointer, connected through a leak tight rotary seal to the spring-actuated vane, moves forward as the liquid pressure is exerted on the vane, thus providing an approximate indication of the amount of liquid flowing through the pipe line. It can be used in vertical or horizontal pipe lines with flows from right to left, upward or downward. The metal dial cover is equipped with an unbreakable window.

Kwinana Plant Handed Over

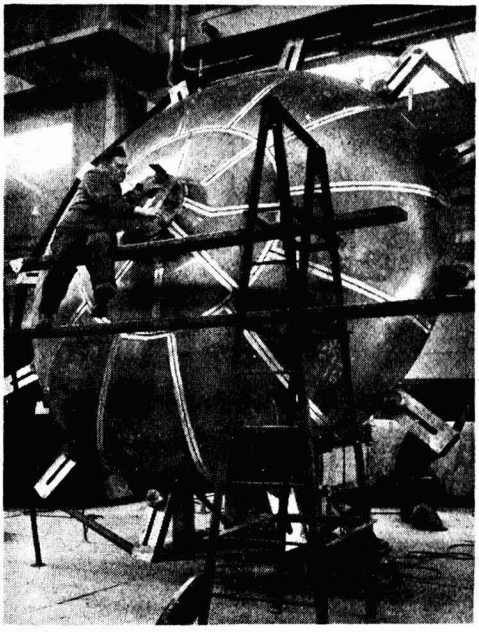
The first refining plant at Kwinana, Western Australia, has been handed over by the contractors to Australasian Petroleum Refinery, an associate of Anglo-Iranian Oil Company.

Expansion at Stockton

THE second stage of development at the South Works of The Power-Gas Corporation Limited and Ashmore, Benson, Pease & Co. of Stockton-on-Tees has just been completed. (It will be remembered that the first stage of development was completed in 1951 when The Power-Gas Corporation celebrated its golden jubilee.)

In the constructional shops two transverse bays 85 ft. wide and 250 ft. long have been added. Each bay has a 10-ton and a 20-ton crane, the crane tracks being 30 ft. from the ground. The two longitudinal 65 ft. wide bays which were originally 342 ft. long have been extended by 170 ft. They are 50 ft. high to crane tracks. As a result of this development the floor area has been increased by 50 per cent to 215,600 sq. ft.

The assembly area has been increased 130 per cent. Various items of manipulating equipment have been installed to deal with the many types of work undertaken in mild steel, stainless steel, nickel, nickel-clad steel, Inconel, Monel, etc. Welding is done up to Lloyds Class I standard and is examined radiographically, using modern X-ray equipment or radio-active elements.



Chemical plant in pure nickel under construction in the newly extended works at Stockton

The new machine shop is 112 ft. wide—130 ft. if the annexe is included—and 250 ft. long with provision for an extension to 700 ft. It is 50 ft. to crane tracks and 75 ft. to the apex of the building.

The shop has a floor area of 32,500 sq. ft. and the concrete floor has an oil- and dust-proof surface. There is road and rail access to the shop. There is a 50-ton electric travelling crane with a 10-ton auxiliary hoist and a 15-ton crane will be erected in November.

Tanks Replace Drums

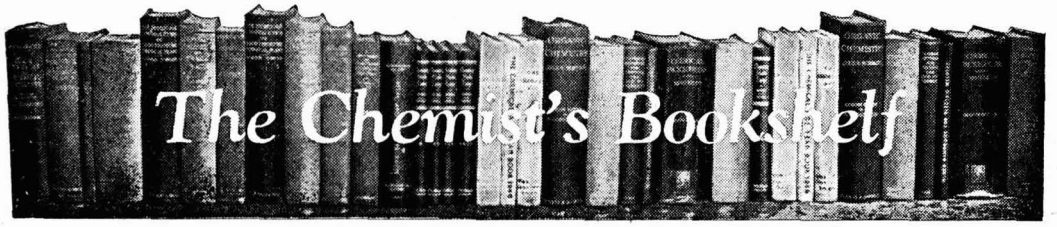
PROBLEMS associated with the delivery of bitumen to customers have been solved in Australia by the Vacuum Oil Company Pty. Ltd., of Melbourne. Bitumen was originally marketed in a solid state, in steel drums which had to be smashed open by the customer and the bitumen melted down. The drums also presented storage problems, and 90 per cent of their economic value was wasted once the material had been extracted from them.

A new system eliminates the use of the drums, and makes it possible for large quantities of bitumen to be delivered hundreds of miles from the refinery and ready for immediate use. Bitumen, in thin liquid form, is now transported in 10,000 gallon insulated railway tank cars, specially designed, with heavy rolled plate interiors.

The interiors also have a three-inch depth of standard insulation and this is kept in place by an outer skin of lighter steel sheet. The insulation keeps the temperature drop so small that the bitumen remains fluid and pumpable after its delivery.

Record Order for British Glassware

A record order for British industrial glassware has been placed by the University of California. The order, valued at about $10,000, is for 18 in. diameter glass pipeline to be used for research purposes. An official of QVF Ltd. said that this was in fact the first shipment of 18 in. glass pipeline to the US. The American glass industry does not produce pipeline more than 6 in. in diameter. The QVF pipeline ranks as the world's largest glass pipeline and is extensively used in this country in the manufacture of heavy and fine chemicals.



DESIGN & ANALYSIS OF INDUSTRIAL EXPERIMENTS. By Owen L. Davies. Oliver & Boyd Ltd., Edinburgh. (For Imperial Chemical Industries Ltd.). 1954. Pp. 636. 63s.

Though it has long been recognised that the use of statistical methods is in general essential for the proper analysis of experimental data, that it has similar importance for the rational design of experiments has been slow in gaining acceptance (except perhaps in the case of agricultural research). It is worth while stressing here that whenever their use is practicable statistical methods are always to be preferred to individual judgments; whereas the latter are subject to unknown variations and result in conclusions of arguable significance, statistical methods provide a rigorous and consistent discipline leading to conclusions whose level of significance can be accurately calculated.

The 'Design & Analysis of Industrial Experiments' is concerned mainly with the rational design of experimental work, any description of analysis of data being given only in relation to the experimental design. It is written by a group of chemists and statisticians who, by a lengthy series of examples, taken usually from actual practice in the chemical industries, describe the use of statistics in selecting that arrangement of the separate items constituting any complex experiment which is most suitable for any given purpose.

In an early chapter the fundamental principles of the planning of experiments are discussed at some length, the remainder of the book being in effect applications and extensions of this chapter to a variety of experimental conditions. The most frequent type of industrial experiment is probably a sequential one and considerable space is given to a description of such experiments together with the appropriate tests of significance. The investigation of sampling and testing methods and the use of randomised blocks, both complete and incomplete, and latin squares in the comparison of a number of experimental treatments are dealt with comprehensively and throughout considerable attention is paid to the important problem of deciding upon the number of experiments which should be performed in order that significant results may be obtained without undue repetition; that is, so that over-design may be avoided. A useful list of randomised block designs is given which is sufficiently general to cover most purposes. When an experimental investigation requires the examination of the effects of varying several factors, experiments of the so-called factorial type are required. Such cases are fully discussed both in the particular case when the factors are investigated at only two levels and in the general—and much more complicated—case of more than two levels. This is then extended to cases where uniform conditions cannot be maintained during the experiments and the principle of confounding, by which unimportant comparisons are confused so that the more important comparisons may be assessed more precisely, is described. This process must be used whenever the number of observations which can be made under comparable conditions is less than the number required for the whole design. The last chapter considers the determination of optimum conditions for the operation of a particular process in terms of some feature such as yield, purity or cost. It describes in simple terms the mathematical techniques of the Path of Steepest Ascent and Local Exploration and illustrates how they are readily applicable to experimental design.

It is difficult to overstress the importance of the methods described in the last chapter and indeed in the whole book, which deserves wide attention. It contains only very elementary mathematics whose use is made obvious by a very large number of practical examples which are worked out in complete detail. There is at least one example for each type of experimental condition. Although the examples are taken from the chemical industry, the methods described are

of equal importance in other industries and may well find application even in business administration. The book is a convenient source of examples for teachers of statistics who need no longer cling with such determination to mortality tables.

Some minor criticisms may be made. The notation used in the tables is neither always uniform nor always adequately described and the index is by no mean complete. The book occasionally makes very tedious reading; this may be inevitable since it attempts to discuss mathematical methods in non-mathematical terms. By present day standards, the price is not unreasonable.—A. DALGARNO.

BREAD. By Lord Horder, Sir Charles Dodds and T. Moran. Constable & Co. Ltd., London. 1954. Pp. 186. 18s.

This book, which deals with the chemistry and nutrition of flour and bread, has been written by three outstanding experts. Lord Horder is medical adviser to the Minister of Food and one of Britain's greatest physicians; Sir Charles Dodds is Courtauld Professor of Biochemistry in the University of London, Director of the Courtauld Institute at Middlesex Hospital Medical School and indisputably one of the world's most brilliant biochemists; Dr. Moran is Director of Research for the Research Association of British Flour Millers and was Director of Research and Deputy Scientific Adviser to the Ministry of Food 1940-1946. Furthermore, the authors have had the assistance of several other recognised experts including members of the research staff at the Cereals Research Station at St. Albans which is generally recognised as being the finest of its kind in the world.

The book was not written for the cereal or food chemist but 'mainly for that section of the public which possesses some scientific background—a section which includes the doctor, the science teacher, the social worker and the dietician.' After reading this statement on the dust jacket one could not expect 'Bread' to contain a great deal of information not already known to the scientist working in either the milling or bread industries. On the whole this proves to be the case. On the other hand its 186 pages are packed with easily digestible facts and figures and nearly all of the useful references are given. 'Bread' may be read with advantage by most people.

The book deals with the history of bread; the wheats of the world; the chemistry of wheat, flour and bread; the main features of the milling and baking processes; improving agents; the digestion of bread; bread and nutrition; flour and bread enrichment and bread and health. The expert may feel that some chapters are much too condensed to be useful and that some could easily have been omitted, but it should be remembered that the book was not written for the experienced but for the educated layman. If one remembers this one must admit that the book serves a most useful purpose and fills a real need. It is a constant source of amazement to the reviewer how ignorant people are concerning our most important food.

One point must be mentioned. Surely it is customary to give the publisher's name when quoting a book as a reference?—E.S.

A FRENCH-ENGLISH DICTIONARY FOR CHEMISTS. By Austin M. Paterson. John Wiley & Sons Inc., New York; Chapman & Hall Ltd., London. 2nd Edition. 1954. Pp. xiv + 476. 52s.

French is not a difficult language to read, but, as in English, highly technical phrases are sometimes disarmingly constructed of everyday words, or of words which are misleadingly like others. To translate *eaux des villes* (sewage) as town's water need not have serious consequences, but an *arbre à noyau* (core spindle) never rooted in the floor of a foundry, and a *clef à vis* (screw wrench) will not—legally—open the door of the house opposite.

Even those who consider themselves familiar with technical French find a dictionary essential on occasion, and it is remarkable that this, generally agreed to be one of the best, should be brought out in a new edition no less than 33 years after its first appearance. It is, however, a very welcome re-appearance, and the vocabulary has grown from 35,000 terms to 42,000 in spite of the omission of many terms which have the same spelling and meaning as in English.

This dictionary has a number of unusual and admirable features. Of these the most valuable and important is undoubtedly the inclusion of irregular verb forms under their own spellings, and not 'safely concealed under the parent verb.' A section on organic nomenclature is also very useful, and the dictionary should prove as successful as its companion German-English dictionary.—B.I.

HOME

Lennig Build in Jarrow

Part of the premises of the former Palmers Shipbuilding & Iron Co. Ltd., Jarrow-on-Tyne, is to be taken over by Charles Lennig & Co. (Great Britain) Ltd. as a chemical factory. The company is a subsidiary of Rohm & Haas, of Philadelphia. A substantial order for plant for the new factory has been placed with Ashmore Benson Pease & Co. Ltd., Stockton-on-Tees. No official details have been announced as to the number of workers the new premises will employ, but it is expected to be about 200.

Pollution Protest

A resolution urging that more urgent steps be taken to abolish chemical pollution of the air was carried by an overwhelming majority at the half-yearly council meeting of the Cheshire Federation of Women's Institutes at Wilmslow on 19 October. The proposers urged that a vigorous drive should be made to force manufacturers to stop this 'fouling of air' and if necessary to enforce laws by which severe penalties could be imposed on any company that issued foul smells or poisonous gases into 'the fresh air which should be everyone's right by law.'

'Spansules'

Menley & James Ltd., manufacturing chemists of Coldharbour Lane, London S.E.5, have produced a new way to take drugs, known as 'Spansule' capsules. The drugs are distributed among a number of tiny pellets contained in a capsule, and they are prepared so that the dose is released a little at a time throughout the day. The first drug to be made available in 'Spansule' form is phenobarbitone.

Fumes from Chemical Works Alleged

Middlesbrough Sanitary Committee recently heard complaints that sulphur dioxide fumes, alleged to be coming from Sadler & Co. Ltd.'s works at North Ormesby, were affecting men working nearby. It was decided to draw the firm's attention to the matter. Mr. T. E. Peterson, deputy chief sanitary inspector, told the committee that the alkali inspector had said that a new plant was involved and that there might be fumes at first but it would 'settle down'.

Tungsten Ores

The Government price for standard grade tungsten ores has been increased by 2s. 6d. to 205s. per long ton unit for both wolframite and scheelite.

Natural Gas Prospects

The search for natural gas at four sites in Britain, in Yorkshire, Lincolnshire, Sussex and Midlothian, has proved so encouraging that Sir Harold Smith, chairman of the Gas Council, recently visited Northern Italy, where it has been found in large quantities, to study the use being made of it. The £1,000,000 exploration plan for natural gas covers only the cost of survey work and experimental drilling over the next five years. If sufficient quantities are found, large capital development will be required.

Chemical Engineering Conference

A conference on 'The Functions and Education of the Chemical Engineer in Europe' organised by the Institution of Chemical Engineers for OEEC is to be held in London from 21 to 23 March 1955. The object of the conference is to draw attention to the need for more chemical engineers, more financial aid for chemical engineering research and a more general recognition of the part that chemical engineering is playing in industry.

Gifts to Leeds University

Among the donations acknowledged by the University of Leeds at a meeting of the Council on 20 October were the following: For the Department of Colour Chemistry and Dyeing, £1,000 a year for two years from the Bradford Dyers' Association Ltd., being a renewal of a grant for a research fellowship. For the Department of Inorganic and Structural Chemistry, £150 from Monsanto Chemicals Ltd., London, for research. For the Department of Physical Chemistry, £550 from Thomas Hedley & Co. Ltd., Newcastle-upon-Tyne, for research into the chemistry on long chain compounds. For the Department of Textile Industries, £1,100 a year for two years from the Bradford Dyers' Association Ltd., being a renewal of a grant for a research fellowship.

OVERSEAS

Groundnut Oil

The Indian Government have decided to release a further quantity of groundnut oil for export by established shippers.

Oil & Gas Project in Queensland

Associated Australian Oilfields NL, a Queensland oil prospecting company, is raising a sum of £A350,000 for prospecting and states that subsidiary companies will be formed later to develop the selected areas. The money will be used in four areas, and additional wells will be drilled on the Roma field to assess petroliferous gas and oil accumulations.

Petrochemical Plant Changes Hands

Union Carbide of Canada has acquired the Montreal East petrochemical plant of Dominion Tar & Chemical Company, which has been operated for the recovery of ethylene from gases obtained from Montreal oil refineries and production of ethylene oxide, ethylene glycol and diethylene glycol. The company plans to convert the plant to produce ethylene glycol by its direct oxidation process and add facilities for producing polyethylene and related chemicals.

New Norwegian Aluminium Plant

The Oslo firm AS Elektrokemisk is reported to be planning to build an aluminium plant at Mosjöen, in Nordland Province, North Norway. It will have a production of 20,000 tons of aluminium a year. Total Norwegian aluminium output last year was 56,000 tons, and should amount to about 100,000 tons next year when the new Sunndalsöra aluminium plant is in full production. The Mosjöen plant now planned will increase that amount by a further 20 per cent, but it is not expected that it will start production until about 1957.

NZ Fertiliser Works Opened

The New Zealand Minister of Agriculture, the Rt. Hon. K. J. Holyoake, recently opened at Napier a new fertiliser works which has a designed capacity of about 120,000 tons a year. The new works will serve the Hawke's Bay and Gisborne areas, as well as parts of the Wairarapa, where already nearly 1,000,000 acres of pasture are top-dressed each year.

Dutch Chemical Firm to Expand

The Ketjen sulphuric acid firm of Amsterdam is to build a second factory for catalysers for oil refineries. The firm will raise funds by doubling its present capital of Fls.10,271,250 (£966,000).

Metal Trades Session

Practical methods of labour-management co-operation in metal-working plants and regularisation of production and employment are among the items on the agenda of the fifth session of the metal trades committee of the ILO which opened in Geneva on 25 October and continues until 6 November. British delegates include representatives of the Government, the employers and the workers.

Polystyrene Factory for Australia

A new factory to produce polystyrene is being built by CSR Chemicals in Rhodes, Australia, and is expected to be finished early next year. CSR Chemicals began operations at Rhodes a year ago with a £4,500,000 industrial plant and produce cellulose acetate and other raw materials for producing rayon.

Greek Oil Refinery

The results have been announced in Athens of the international tenders for the construction of an oil refinery in Greece. Of 12 tenders submitted by foreign firms, five satisfied the necessary conditions. They were submitted by the American firms Socony and Foster Wheeler, and by the German firms Hydrocarbon, Gute Hoffnunggeschafte and Friedrich Unde. The Committee appointed to study the tenders is to select one of these five.

Iron Ore in S.W. Africa

Two vast deposits of iron ore have been discovered in the Kaoko-veld, S.W. Africa. It is estimated that this ore should support mining activity for 75 years at a rate of 3,000,000 tons a year. Several tons of the ore have been shipped to the United States to investigate the possibility of removing a number of impurities economically. If these investigations are successful, the Bethlehem Steel Corporation intend to construct an entirely new harbour at Rocky Point. From there they will build a 110 miles railway.

PERSONAL

MR. C. R. HINDS HOWELL, C.A., chairman and managing director, and MAJOR M. N. T. GUBBINS, O.B.E., M.C., a director, have both resigned from the board of Willows Francis Pharmaceutical Products Limited. MR. A. W. CORNFORTH has been elected chairman of the company.

MR. GEORGE HEYWOOD, for 35 years chairman and a director for 53 years of United Indigo & Chemical Co., Manchester, has resigned from the board for health reasons. MR. JAMES BRUNDET has been appointed chairman of the company.

MR. J. L. HARVEY, MR. J. JONES and MR. W. T. RAIKES have been elected to the board of Laporte Industries Ltd.

DR. N. W. CUSA has been appointed manager of the Patents Department of the Dyestuffs Division of I.C.I. in succession to MR. W. A. SILVESTER, retired. During the past three months, people of long service who joined the company about the time of the formation of the British Dyestuffs Corporation, and in some cases before the amalgamation of Levinstein Ltd. and British Dyes Ltd., have retired. Five who recently said farewell are MISS G. JORDINSON and MR. D. SKEEN, of Huddersfield Works, and DR. J. ANDERSON, MR. F. P. EVANS and MR. R. POLLARD, of the Hexagon Area, who have a combined total of 180 years' service.

MR. R. H. S. ROBERTSON, M.A., F.G.S., the Glasgow consultant on raw material development, lectured to the Dust Group of the Verein Deutsche Ingenieure on the Biogeochemistry of Diatomite in Essen on 21 October. The research work he described had been done in collaboration with Dr.-Ing. R. Meldau and A. E. Twedily.

The following have passed the examination for the Fellowship of the Royal Institute of Chemistry, August-September, 1954: Branch E (The chemistry, including microscopy, of food and drugs and of water), JOHN BARRY ALDRED, M.A., OLIVE LUCY DRAGE, B.Sc., PHILIP SYDNEY HALL, B.Sc., BRIAN HULME, B.Sc., ROY ALBERT KNIGHT, B.Sc.; Branch H (General analytical chemistry), GERALD RUSSELL.

The following appointments at Leeds University have been announced: DR. R. B. CUNDALL as Brotherton Research Fellow in Physical Chemistry in the Department of Colour Chemistry and Dyeing; DR. J. H. ROBERTSON as Brotherton Lecturer in the Department of Inorganic and Structural Chemistry; DR. P. FELTHAM as Lecturer in Metallurgy in the Department of Coal Gas and Fuel Industries with Metallurgy and Chemical Engineering; DR. R. SHUTTLEWORTH (at present I.C.I. Fellow in Metallurgy) also as a Lecturer in Metallurgy; and MR. D. PAYNE (at present Research Assistant in Agricultural Chemistry) as Lecturer in Agricultural Chemistry.

The Textile Institute announces that PERCIVAL WILLIAM CARLENE, B.Sc., Ph.D., F.R.I.C., has been elected a Fellow. Dr. Carlene, who lives at Harrogate, is Section Leader of the Technical Service Department of the I.C.I. Terylene Council. He is a member of the Journal Publication and Technical Committees of the Textile Institute and until recently served on the Institute's Textile Terms and Definitions Committee. He is also a member of the Publications and Review of Textile Progress Committees of the Society of Dyers and Colourists.

Imperial Chemical Industries Ltd. announce that DR. RICHARD BEECHING has been appointed chairman of the Metals Division in succession to MR. C. E. PROSSER, and DR. JAMES CRAIK chairman of the Nobel Division in succession to DR. W. J. JENKINS. Dr. Beeching, who was deputy chief of the Armaments Design Department of the Ministry of Supply during the war, joined I.C.I. in 1948 and became technical member of the Terylene Council in 1951. As a director of I.C.I. of Canada Ltd. since 1953, he has been responsible for the development of the new Terylene plant at Millhaven, Ontario. Dr. Craik joined I.C.I. in 1927, after two years of research at Cornell University, USA. After serving in the Propulsion Department, Ardeer, he went to the Nobel Division of which he became a director in 1948. He was later appointed joint managing director.

PROFESSOR R. V. CHRISTIE, M.D., M.Sc., D.Sc., F.R.C.P., of the Department of Medicine, St. Bartholomew's Hospital, left London on 23 October for Washington to participate in the Second Annual Symposium on Antibiotics, sponsored by the Food and Drug Administration of the United States Department of Health, Education and Welfare. Professor Christie was chosen to attend the Symposium as the representative of the Minister of Health. The only designated delegate from Great Britain, he is one of 35 representatives of democratic countries present. After attending the Washington meeting (24-29 October), Professor Christie has been invited to New York for the Antibiotics Symposium on Achromycin sponsored by Lederle Laboratories Division of the American Cyanamid Company.

MR. G. F. WHITBY has been appointed a joint managing director of the Terylene Council of Imperial Chemical Industries Ltd., with special interests on the technical side. Mr. Whitby joined the Billingham Division of I.C.I. in 1934 and worked on the design, construction and operation of chemical and refinery plants. During the war he was seconded to the Ministry of Supply, returning to I.C.I. in 1945 as assistant to the technical director. In January 1948 he became deputy chief engineer of Wilton Works, a post he relinquished three years later on his appointment as engineering member of the Terylene Council.

The Oil & Colour Chemists' Association announce that J. E. ARNOLD, Ph.D., F.R.I.C., A.Inst.P., of the London Section, has been appointed acting honorary secretary of the association. Although MR. R. S. LAW allowed his name to go forward as honorary secretary at the annual general meeting, he pointed out that he could only continue serving until a successor had been found. Dr. Arnold has published various papers in the association's *Journal* and other publications and has served on the Council of the Research Association of British Paint, Colour and Varnish Manufacturers. Since November 1950 he has been technical director at Indestructible Paint Co. Ltd. and associate companies and before that was with Titanine Ltd.

A new organic research section has recently been established at North Acton by The Crookes Laboratories Ltd. In charge of it is the Swiss chemist, DR. HENRY RINDERKNECHT, who has already started work upon the synthesis of new pharmaceuticals. While with another British company during the war, 41-years-old Dr. Rinderknecht, who came to this country in 1937, was chiefly responsible for the synthesis of the new drug, pethidine. He is a native of Zurich and has 30 technical papers and 20 patents to his credit.

The companies of Associated Electrical Industries Limited have been reorganised into four groups. The chairman of AEI is chairman of each of the groups, and the group managing directors are: BTH, MR. E. H. BALL; Ediswan-Hotpoint, MR. A. N. E. MCHAFFIE; M-VE, DR. C. DANNATT; Overseas, DR. I. R. COX. With the chairman, the group managing directors form the executive committee of the AEI board. MR. G. A. CHEETHAM, managing director of Ferguson Pailin, joins the board of Metropolitan-Vickers, while retaining his former appointment.

Obituary

We regret to announce the death of LADY HEILBRON, wife of Professor Sir Ian Heilbron, Director of Research, the Brewing Industry Research Foundation at Nutfield, Surrey, and one of Britain's most eminent organic chemists. Lady Heilbron was a daughter of the late H. J. Davis, of Liverpool.

MR. ALEC NATHAN, founder of Glaxo Laboratories and its former chairman, died in London on 18 October. Born in New Zealand in 1872, Mr. Nathan came to England in 1908 to develop the use of dried milk as an infant food and succeeded in establishing Glaxo not only in the United Kingdom but also in various world markets. He became chairman of the company in 1927 and retired in 1945. In 1941 he was awarded the Bledisloe Gold Medal.

$35,000,000 Needed for Refinery

At the end of a fortnight's survey, technicians of the international oil consortium which will operate the Persian oil industry if the Majlis ratifies the recent agreement have announced they would need $35,000,000 to restore the Abadan refinery to full capacity. The refinery is due to start operations on 1 November.

British Chemical Prices

LONDON.—A steady demand on home account has been maintained in most sections of the industrial chemicals market and the volume of inquiry for shipment has been on a fair scale. However, the movement of supplies, particularly for export, is becoming increasingly difficult owing to the London dock strike, and delivery delays of imported raw materials have put extreme pressure on available spot supplies. Prices for the most part continue at recent levels. A good home trade demand is reported for the coal tar products, and export inquiry for pitch is moderately good while the demand for cresylic acids is a little better than of late.

MANCHESTER.—Business in chemicals on the Manchester market during the past week has proceeded on reasonably steady lines, though some traders state that the takings of the cotton textile and allied industries have been on a somewhat smaller scale. A fair number of fresh inquiries on both home and export accounts have been dealt with, though so far as actual overseas shipments are concerned the chemical trade in common with others has experienced the adverse effects of the dock strikes. Prices generally are maintained on a steady basis. A moderate aggregate weight of business is reported in fertilisers, with a good demand continuing for most of the tar products.

GLASGOW.—An exceptionally busy week has been experienced by most sections of the trade, although, unfortunately, the output in many cases has been disrupted due to delays in delivery, undoubtedly caused by the labour unrest in the South. Prices for basic chemicals have been steady, although there has been a definite increase over the last few days in cases where supplies are becoming scarce. With regard to export, there have been some interesting orders placed for prompt delivery.

General Chemicals

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

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

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

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

Ammonia, Anhydrous.—1s. 1d. to 1s. 3½d. 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, £33 per ton.

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

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

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

Arsenic.—Per ton, £45 to £50 ex store.

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

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

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

Bleaching Powder.—£27 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 ; BP, 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. ; BP, granular, £80 ; crystal, £84 10s. ; powder, £87 ; extra fine powder, £86 10s.

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

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

Chromic Acid.—2s. 0⅜d. per lb., less 2½%, d/d UK, in 1-ton lots.

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

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

Cobalt Oxide.—Black, delivered, bulk quantities, 13s. 2d. per lb.

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

Copper Sulphate.—£88 17s. 6d. per ton f.o.b., less 2% in 2-cwt. bags.

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

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

Formic Acid.—85%, £86 10s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G., £13 3s. 6d. to £13 14s. 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., 15s. 4d. per lb. in 28 lb. lots.

Iodoform.—24s. 4d. 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 £73 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 £147 to £149 per ton.

Lead Nitrate.—About £120-£125, 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red lead, £138 10s.; orange lead, £150 10s. Ground in oil : red, £155 ; orange, £167.

Lead, White.—Basis prices : Dry English in 5-cwt. casks, £143 per ton. Ground in oil : English, 1-cwt. lots, 178s. per cwt.

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

Litharge.—£131 10s. per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex works, about £28 per ton.

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, 28s. 9d. per lb. in 5-cwt. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—31s. 3d. per lb., for 5-cwt. lots.

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

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

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, about £131 per ton, carriage paid.

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

Potash, Caustic.—Solid, £94 10s. per ton for 1-ton lots ; Liquid, £37 5s.

Potassium Carbonate. — Calcined, 96/98%, about £63 per ton for 1-ton lots, ex-store.

Potassium Chloride.—Industrial, 96%, 1-ton lots, about £22 per ton.

Potassium Dichromate.—Crystals and granular, 11½d. per lb., in 1-ton lots, d/d UK.

Potassium Iodide.—B.P., 12s. 4d. per lb. in 28-lb. lots ; 12s. 7d. in cwt. lots.

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

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

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

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

Soda Ash.—58% ex-depot or d/d, London station, about £15 5s. 6d. per ton, 1-ton lots.

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

Sodium Acetate.—Commercial crystals, £80 to £85 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.—£74 to £78 per ton, according to quantity.

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

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

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

Sodium Hyposulphite.—Pea crystals £34 a ton ; commercial, 1-ton lots, £28 per ton carriage paid.

Sodium Iodide.—BP, 15s. 1d. per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £127 per ton.

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

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

Sodium Nitrite.—£32 per ton (4-ton lots).

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

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £81 ; tri-sodium, crystalline, £39 10s., anhydrous, £79.

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

Sodium Silicate.—£6 to £11 per ton.

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

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

Sodium Sulphide.—Solid, 60/62%, spot, £32 2s. 6d. per ton, d/d, in drums ; broken, £33 2s. 6d. per ton, d/d, in drums.

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

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

Tartaric Acid.—Per cwt. : 10 cwt. or more, £11 10s.

Titanium Oxide.—Standard grade comm., with rutile structure, £155 per ton ; standard grade comm., £135 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d : white seal, £98 10s. ; green seal, £97 10s. ; red seal, £96.

Solvents and Plasticisers

Acetone.—Small lots : 5-gal. drums, £129 per ton ; 10-gal. drums, £119 per ton. In 40/45-gal. drums less than 1 ton, £94 per ton ; 1 to 9 tons, £91 per ton ; 10 to 49 tons, £89 per ton ; 50 tons and over, £88 per ton. All per ton d/d.

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

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

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

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

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

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

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

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

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

Ether BSS.—In 1 ton lots, 1s. 11d. per lb ; drums extra.

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

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

Methanol.—Pure synthetic, d/d, £43 15s. per ton.

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

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

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

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

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

Rubber Chemicals

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

Carbon Bisulphide.—£61 to £67 per ton, according to quality.

Carbon Black.—8d. to 1s. per lb., according to packing.

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

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

Lithopone.—30%, about £54 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, October £17 17s. 6d. ; November £17 10s.

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

'Nitro-Chalk.'—£15 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots, d/d nearest station, October to November £26 per ton.

Coal-Tar Products

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

Carbolic Acid.—Crystals, 1s. 4d. to 1s. 6¼d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 4½d. to 1s. 6¼d. 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°, 5s. 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, £15 1s. 9d. to £22 per ton, according to m.p. ; hot pressed, £34 10s. per ton in bulk ex-works ; purified crystals, £58 per ton d/d.

Pitch.—Medium, soft, home trade, 180s. per ton f.o.r. suppliers' works ; export trade about 230s. per ton f.o.b. suppliers port.

Pyridine.—90/160°, 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.—3s. 6d. 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. 9d. 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.

Chemical & Allied Stocks & Shares

THE big upswing in stock markets, which has carried many leading industrial shares to fresh high levels, received a moderate check early this week when sentiment was affected by the dock strike. Share values reflected a little selling, but declines generally were not more than a few pence, and it was not long before renewed buying was in evidence. The remarkable rise in share values this year has, of course, been inspired by the many dividend increases and free scrip issues made by well-known companies in nearly all industries. It is, however, the beliefs that profits are running at a higher level and that further dividend increases can be expected next year which explain the continued steady buying in stock markets.

Continued Strength

Chemical and kindred shares participated in the continued strength of stock markets. Sentiment has been influenced by the news of important mergers and acquisitions in the industry. The assumption is that this tendency is likely to continue because the trend is to larger scale production and output now that competition both at home and abroad is increasing. Imperial Chemical were, as usual, an active feature, the interim dividend having increased the view in the City that the year's total dividend on the doubled capital is likely to be 10 per cent. I.C.I. shares in fact touched the new high level of 43s. 9d., but have since eased to 43s. 6d.; this, however, compares with 38s. 3d. a month ago. Albright & Wilson 5s. shares rose on balance from 26s. 6d. to 28s. 3d. and the progressive policy indicated by the company's acquisitions drew renewed attention to Laporte 5s. shares, which have advanced to 18s. 9d. compared with 17s. 10½d. a month ago.

Borax Consolidated deferred units were an outstanding feature following the news that an American group wants to obtain control. Another statement from the company is imminent. It has not yet been disclosed what price the Americans are willing to bid for the shares, nor whether they already have acquired a holding by buying in the market. A month ago Borax shares were 59s. They have since been up to 92s. 6d. and are 83s. 9d. at the time of writing. The City view is that, based on the present-day value of the company's assets, the shares must be worth much more than their current market price.

Monsanto 5s. shares strengthened from 28s. 3d. to 28s. 9d. Reichhold Chemical 5s. shares were 15s. compared with 13s. 7½d. a month ago. Higher dividend hopes put Fisons up from 58s. 9d. to 59s. 6d. William Blythe 3s. shares remained an active feature and, though best levels were not held, have risen on the month from 18s. to 21s. Coalite & Chemical 2s. shares moved up from 3s. 3d. to 3s. 7d. Hickson & Welch 10s. shares were up to 18s. 6d., and Boake Roberts 5s. shares held steady at 12s. 6d. British Glues & Chemicals 4s. units rose on the month from 12s. to 13s. 10½d. Glaxo were a strong feature, helped by the results, and have risen to 71s., which compares with 56s. 9d. a month ago. Boots Drug 5s. units advanced from 25s. 9d. to 29s. 10½d. Unilever were prominent on hopes of a coming free scrip issue, and were 97s. compared with 83s. 6d. a month ago. The 4s. units of the Distillers Co. advanced from 22s. 4½d. to 25s. 7½d.

Plastics shares also moved in favour of holders. British Xylonite were 46s., a gain of 4s. on the month, while Bakelite 10s. shares rose 2s. 6d. at 28s. 6d. British Industrial Plastics 2s. shares were 5s. 4½d. In response to the latest news from the company indicating that a future return of capital to shareholders is to be considered, Powell Duffryn have risen from 33s. 6d. to 39s. Oils were prominent. Anglo-Iranian went ahead to the new peak level of £18 5/16 before easing to £17⅞. A month ago they were £15½. Shell have advanced on balance from 98s. 1½d. to £5 13/16.

Australian Steel Dearer

Although the steel output of Broken Hill Pty. Co. Ltd. for the year was higher than in the previous 12 months, increased costs of production and distribution mean that an increase in the selling price will be necessary. Stating this at the company's annual meeting in Melbourne recently, the chairman, Mr. C. Y. Syme, said that because of inflation and its effect on costs, the price of Australian steel had increased threefold since 1939.

Law & Company News

Commercial Intelligence

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

Mortgages & Charges

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

E. H. THOMPSON & SON (LONDON) LTD., scientific instrument manufacturers, etc. 17 September, charge to Barclays Bank Ltd., securing all moneys due or to become due to the bank; charged on 16 and 16a Chaucer Road, and yard, Forest Gate, London E. *Nil. 14 October, 1953.

Receiverships (Appointment or Release)

BOGART MANUFACTURING CO. LTD., manufacturers of and dealers in wood, timber, plywood, cellulose, wood pulp, plastics, paper, chemicals, etc., 625 High Road, London N.12. Albert F. Charlton, of 4 Courtfield Road, S.W.7, ceased to act as Receiver on 7 October, 1953 (Notice filed 30 September, 1954).

Company News

George Cohen Sons & Co. Ltd.

The directors of George Cohen Sons & Co. Ltd. announce that applications for the £1,000,000 4¼ per cent Unsecured Loan stock 1965/70, offered to Preference and Ordinary stockholders at 97 per cent amounted to approximately £33,000,000. Every application has been given an allotment, and preference has been given as far as possible to the smaller applicants.

Oxley Engineering Co. Ltd.

Good results are reported in a preliminary statement issued by Oxley Engineering Co. Ltd. for the year ended 30 June. Gross profits have risen from £114,700 to £133,200, and the net group surplus is £61,000 against £46,300. The distribution is unchanged at 17½ per cent, but it is now in dividend form only, whereas in the past two years it has been 15 per cent in dividend and 2½ per cent as cash bonus.

Geo. Adlam & Sons Ltd.

At the 47th ordinary general meeting of Geo. Adlam & Sons Ltd. on 22 October, the chairman, Mr. W. Walker, said the trading results showed a further improvement, with net profit before taxation for the year ended 31 March of £38,762, against £27,192. Mr. Walker said steps were being taken to abolish the office of technical director, thus putting all directors on the same level, and the automatic retirement provision at the age of 70, to stabilise the chairman's fees for five years and to give the directors the necessary powers to make capital distributions.

Laporte Industries Ltd.

The directors of Laporte Industries Ltd. announce that they have received acceptances totalling over 90 per cent of each class of capital from members of the Fullers' Earth Union. The offer is now unconditional.

Major & Co. Ltd.

Competition in the sale of petroleum products has been intensified, says the chairman of Major & Co. Ltd., Mr. E. Hotham, in his annual report. In the year ended 31 March, group assets fell to £569,372 from £591,832, including cash of £98,898 (£69,712). The annual meeting is on 16 November.

Sangers Ltd.

Although sales are still increasing, mounting overheads and 'the crushing burden of taxation' are bound to have their effect on the profits, Mr. John G. Sanger, chairman, reported at the annual general meeting of Sangers Ltd. on 12 October. Net group profit before deduction of income tax was £340,117, against £379,776. Taxation amounted to £202,133.

Canadian Industries (1954) Ltd.

Canadian Industries (1954) Ltd. plan to finance about $51,000,000 through the sale of debentures and the issue of new common shares. These will be offered at $18.50 a share to holders on record on 29 October on the basis of one for each five held. Arrangements are also being made to issue $25,000,000 sinking fund debentures. Through Imperial Chemical Industries of Canada Ltd., I.C.I. own about 80 per cent of the existing common shares.

Next Week's Events

MONDAY 1 NOVEMBER

The Chemical Society

Belfast: Chemistry Lecture Theatre, Queen's University, 7.45 p.m. 'The Polymerisation of Sulphur' by Professor G. Gee. Joint meeting with the Royal Institute of Chemistry and the Society of Chemical Industry.

Society of Chemical Industry

London: Chemical Society's Rooms, Burlington House, Piccadilly, 6.30 p.m. 'Newer Aspects of Cider Research' by Dr. A. Pollard and 'Problems Involved in the Isolation and Classification of Cider Micro-organisms' by F. W. Beech and J. G. Carr. Joint meeting of London Section and Food and Microbiology Groups.

The Institute of Fuel

Glasgow: Royal Technical College, 7 p.m. 'The Constitution of Coal Tar' by Dr. D. McNeil.

TUESDAY 2 NOVEMBER

The Chemical Society

Leeds: Chemistry Lecture Theatre, the University, 6.30 p.m. 'The Mechanism of Some Electron-transfer Reactions' by Professor C. E. H. Bawn.

The Royal Institution

London: 21 Albemarle Street, W.1, 6 p.m. 'Dislocations and Plastic Flow—Successes and Difficulties of the Theory' by Dr. N. F. Mott.

The British Ceramic Society

London: Library of the Royal Sanitary Institute, 90 Buckingham Palace Road, S.W.1, 10.30 a.m. Meeting of the Building Materials Section (all day).

The Institute of Metals

Oxford: Cadena Café, Cornmarket Street, 7 p.m. 'Ceramics' by Dr. J. White.

Incorporated Plant Engineers

London: Royal Society of Arts, John Adam Street, Adelphi, W.C.2, 7 p.m. 'The Science of Applied Chromatics' by E. M. Barford.

WEDNESDAY 3 NOVEMBER

The Royal Institute of Chemistry

Kingston, Surrey: Technical College, Fassett Road, 7 p.m. 'The Physics and Chemistry of Detergent Solutions' by Dr. K. G. A. Pankhurst.

The Society for Analytical Chemistry

London: Chemical Society Meeting Room, Burlington House, Piccadilly, 6.45 p.m. Meeting organised by the Biological Methods Group on 'The Biological Evaluation of the Purity of Water and Effluents.'

The British Ceramic Society

London: Eccleston Bridge, S.W.1, 9.30 a.m. Transport for works visits by members attending the Building Materials Section meeting.

Incorporated Plant Engineers

Leicester: College of Art and Technology, the Newarkes, 6.30 p.m. 'Process and Industrial Heating' by J. C. Edwards.

THURSDAY 4 NOVEMBER

The Chemical Society

Bristol: Department of Chemistry, the University, 7 p.m. 'Melting and Crystal Structures' by Professor A. R. Ubbelohde. Joint meeting with the Royal Institute of Chemistry and the Society of Chemical Industry.

London: Large Chemistry Lecture Theatre, Imperial College of Science and Technology, S.W.7, 7.30 p.m. 'On Open and Closed Sequences in Reaction Kinetics' by Professor J. A. Christiansen.

The Royal Institution

London: 21 Albemarle Street, W.1, 6 p.m. 'Some Aspects of Geophysics—the Internal Constitution of the Earth' by Dr. J. McG. Bruckshaw.

The Royal Institute of Chemistry

Bolton: Municipal Technical College, 7.30 p.m. 'Chemotherapy' by Dr. F. L. Rose.

The Institute of Metals

Birmingham: James Watt Memorial Institute, Great Charles Street, 6.30 p.m. 'Metallurgical Research in the Electrical Industries' by Dr. Ivor Jenkins.

Institute of Metal Finishing

Manchester: The Engineers' Club, Albert Square, 7.30 p.m. 'Heavy Electro-deposits for Engineering Purposes' by A. W. Wallbank.

Society of Chemical Industry

Manchester: The University, 6.30 p.m. 'The Progressing of New Projects from the Laboratory to the Plant' by Dr. James Taylor.

FRIDAY 5 NOVEMBER

Association of British Chemical Manufacturers

Harrogate: Opening of Works Safety Conference (until 7 November).

The Institute of Fuel

Swansea: YMCA, Kingsway, 6 p.m. 'Back-pressure Regeneration' by C. Ungoed.

Shortage in South Africa

GIVING the opening address at a symposium organised by the Transvaal Chemical Manufacturers' Association in Johannesburg recently, Dr. W. S. Rapson, director of the South African National Chemical Research Laboratory, said there was a danger that the chemical industry in the Union was outgrowing its ability to recruit operating and research staff. He continued: 'There is a lack of chemical engineers, a lack of graduates with research training, and, perhaps most serious of all, a lack of technologists with background and training such as that provided by various diploma courses in technological high schools in Europe.' This serious situation was unlikely to get the attention it deserved, he said, unless the industry took positive steps to promote chemical training and increase the output of chemists and engineers. Up to 15 years ago the industry was mostly concerned with meeting the needs of agriculture and mining, but it now stood on the verge of developments which would make it one of the greatest industrial groups in the country. One of the objects of the symposium was to emphasise this complete change.

New Murex Electrode

A NEW continuous electrode for automatic arc welding has been developed by Murex Welding Processes Ltd., Waltham Cross, Herts. This electrode, known as 'Coilex,' is double-wire wound flux extruded and it is suitable for use with all types of DC automatic welding machines designed for continuous coated electrodes.

'Coilex' has been developed for the welding of mild and medium tensile steels and it can be used for either butt or gravity fillet welds in all classes of steelwork normally considered suitable for welding. The flux is of the 'basic' type and thus the electrode can also be used for the welding of 'difficult' steels or for making joints in mild steel under conditions of contraction restraint.

Among the many special features of the 'Coilex' electrode are a high rate of deposition and deep penetration, consistent 'burn off', good weld appearance and easy striking. Good radiographic results can also be obtained.

The electrode has a special robust construction. Instead of following a conventional helix, the outer wire winding is applied with a series of definite 'sets' to form a number of minor projections above the surface of the extruded flux so that good electrical contact with the jaws of the welding head can be maintained. This form of construction also allows a greater quantity of flux to be more firmly held to the core wire and assists in reducing splay at the arc.

'Coilex' has already been approved by a number of Classification Societies and other approval tests are at present in progress. The electrode is now in full scale production.

Dampcoat For Lubrication

DAMPCOAT, an anti-corrosive coating which is also an effective lubricant, is being used by F. W. Berk & Co. Ltd., New Oxford Street, London W.C., for the lubrication of studs securing the lids of vessels subjected to high temperature heating. Dampcoat is one of the products of Xzit (G.B.) Ltd.

The vessels are made from special manganese steel and are used as containers for chemicals heated over gas burners for periods of 15 hours. Oxygen is applied under high pressure through a threaded inlet at the top during the heating process. The vessels are circular and the lids are secured by 16 studs around the circumference.

Dampcoat is brushed on to the threads of the studs before each heating operation. The Dampcoat used previously is brushed and cleaned off before each fresh application. During the operation hot gases rise round the vessels from the gas burner and escape up an overhanging flue. The minimum temperature of the lids and studs is 500° C. and the temperature of the chemicals at the base of the vessels is 800° C.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

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

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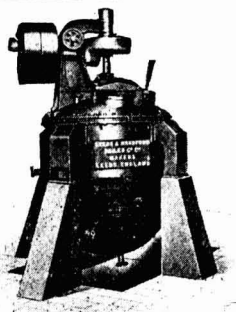

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