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The DSIR Report

EACH time that we make the DSIR Annual Report the subject of editorial comment, we find ourselves flung not so much into science or industry as into economics, and there is undoubtedly a 'Dear Sir, Unless . . .' atmosphere about DSIR prospects. This time last year when we studied the 1953/54 Report, every major point we felt obliged to make was a matter of £000s. For the 1954/55 Report it is *plus ça change, plus c'est la même chose.*

The latest report covers the completion of the first year of expansion under the five-year plan. Anybody who supposed that the announcement two or so years ago of this plan for better DSIR support represented either generosity or extravagance can forget all qualms. DSIR annual expenditure (net) is running to schedule—the estimate for 1955/56 is £6,528,160 as against last year's £6,267,210, and these figures follow the original dictum (see 1952/53 Report or THE CHEMICAL AGE, 1954, **70**, 715) that the annual cost of the Department during 1954-59 may rise to 'rather more than £6,000,000'. Even so, the Advisory Council's own report reveals a great deal of resource-rationing, more politely described as 'allocation'. Certainly the Council is able to report that the provision of resources as planned 'has proceeded smoothly', but this presumably means that the Treasury has paid up as promised, just that and little more. The Council's pleasure in reporting this can be a little misleading. After all, the ultimate test is not accountancy by £ s d audit, but the amount of research effort that the money secures. Here inflation is bedevilling the better intentions of 1953. Inflation, now the universal enemy of all projects of expansion and enterprise in this country, is whittling down the paper benefits of larger DSIR income. 'During the year there have been brought to our notice from almost every corner of the Department pleas that the resources available for particular purposes are in fact inadequate or likely soon to be inadequate.'

This extract from the Advisory Council's Report is the heart of the matter, and it shows that scientific effort, if worth making at all, cannot be 'run on the cheap'. Financially, the DSIR can be compared to a walker in difficult country using a map whose scale is five miles to an inch instead of one mile to an inch. When the DSIR's annual funds were permitted to rise to something above £6,000,000, this seemed then a promising advance upon vast provision. But now it is clear that it was no more than a jump ahead on the old inadequate scale. Let us assume that in two years' time the DSIR's net cost will rise to £7,000,000 per annum. What is £7,000,000 for such a widespread effort in research when this sum is set against other items of State expenditure? It is trivial. And with inflation adding to every kind of running cost the triviality becomes even more disconcerting.

The Advisory Council's own comments upon this theme seem to us to be dangerously complacent. The utmost sympathy is expressed with all the pleas for more funds that the Council has

received. The Council are neither surprised by these pleas, nor suspicious that any of them is unjustified. They reach this conclusion: 'if the five-year plan may sometimes appear as a prison, though one with expanding walls, we nevertheless continue in the belief that it is a major advantage in the administration of the Department's work'. To re-use our analogy, a map on the five-miles-per-inch scale may be better than none at all and a walker could make some progress with it; but to call its possession a 'major advantage' is glossing reality when the proper need is a map on a far larger scale.

DSIR staff has not been enlarged by recruitment to the extent expected. 'It is disappointing that the net gain has not been larger, despite continuous and expanded efforts to recruit, and the availability of authority and financial resources adequate for the objective'. The five-year plan envisaged an annual rate of increase of 200; last year the gain was 147, this year of report it was 159. The Council's view is that this reflects the general problem of scientific staff recruitment, that the major cause is short supply of suitable man-power, that competition in remuneration with other forms of employment is no more than a smaller, partial cause. However, it is only too clear from the Report that the allocations of extra staff to the various DSIR sections have had to be frugal, and that most Directors have been disappointed. None of us can evade conditions of our times, and it may be that DSIR research, however lavishly funded, must still in this age of scientific expansion endure persistent man-power deficiency.

What cannot be deduced from the Report is whether this state of deficiency is worse than, or about the same as, the deficiency in private research. If it is worse, then the effort that is possible at DSIR establishments is bound to be clouded by frustration, and this must insiduously deter rather than encourage future recruitment. The suggestion that the five-year plan seems sometimes to be a prison with expanding walls is surely a strange piece of comparison unless the Advisory Council felt it desirable to give a gentle hint that a mood of frustration exists in the DSIR.

Much more attention is paid in the Council's Report to Research Association economies. Here the increased willingness of post-war industry to support collective research gives a total picture which is pleasingly expansive. The income of all research associations advanced from just under £1,000,000 in 1943 to not much less than £5,000,000 in 1954. Of these amounts, DSIR grants have risen from about £250,000 in 1943 to about £1,300,000, and this includes, of course, the formation of numerous new associations. Almost paradoxically, the Council seem less complacent about this vigorous situation. The effect of inflation is discussed with sensible realism —fixed Government grants decline in value, and industry, though able to maintain real support through higher turnover in a period of inflation, tends to lag behind in raising subscriptions to offset inflationary effects. The conclusion is firmly reached that the funds at present expected to be available under the five-year plan are far from adequate to obtain the hoped amount of expansion in industrial research association development. Though it is strange that the Advisory Council recognize this inadequacy while seeming to tolerate the other more glaring inadequacy—the prison with expanding walls—it is at least commendable that some effort to obtain more financial backing for research is being made.

However, there is a practical reason for the difference. There is a special provision in the five-year plan for readjusting financial awards to take account of changes in prices; the Council appear to believe there is a stronger chance of Treasury agreement if the cause is that of the joint industry-DSIR research associations. This can be read between the lines of the Report; if correct as a deduction, it deserves praise for 'political' shrewdness.

It is regrettable that all the space available for comment has again had to be devoted to £ s d. But if any intelligent citizen doubts whether DSIR activities ought to be put upon a much more generously conceived financial basis, let him study the rest of this annual report and thus obtain an overall picture of the width and variety of DSIR work.

Notes & Comments

The Analyst Analysed

THE Hinchley Memorial Address (BAC) delivered by T. McLachlan, president of the Association of Public Analysts, has focused timely light upon the least recognized of all chemists, the general yet specialized analyst who acts as the public's watch-dog. At one time the lay public thought in terms of two kinds of chemist, the seller and dispenser of drugs or the analytical chemist. Indeed, any chemist who in ordinary conversation tried to make it clear that he was not what the Americans sensibly call a druggist could be certain to hear somebody remark, 'Oh, an analytical chemist'. There has been enough publicity now about chemists in industry and research for this automatic thinking to have disappeared. That this has entailed some loss of respect for the analyst seems almost certain. Mr. McLachlan deplored the fact that analysis is now looked upon as a technology rather than a science. More and more research papers are published today in which the analytical work reported—sometimes comprising in effect all the data given—is a matter of grateful acknowledgment. So both by the public and by other chemists the man or woman who has specialized in accurate analysis is increasingly 'taken for granted'.

Infallible Profession

MR. MCLACHLAN rightly pointed out that analysts are expected to be infallible to an extent required from no other profession. Yet the remuneration usually offered by a local or civic authority to the public analyst bears small relation to the vast amount of knowledge and skill needed. The public analyst's legal responsibilities are heavy and complex; at the same time he is looked upon as a scientific adviser to his public employers. Industry is in general far more appreciative of analytical skill although when working for a firm the analyst usually operates within a much narrower field; as a result, younger analysts are tempted to leave public service—indeed, at least one company states preference in its advertisements for chemists who have worked in a public analyst's laboratory. Furthermore, the teaching of analytical chemistry *per se* at our universities is in eclipse, far more so than on the Continent or in America. Mr. McLachlan's warning is not an exaggeration. We are paying much too little attention and respect to analysis. Although Mr. McLachlan deprecates the view that analysis is a technology, it may well be that the advent of technological education will be able to recapture the interest that universities seem to have discarded. In a sense analysis is a true technology—for who can deny that the really good analyst is something of an artist?

Pipe Corrosion

PROTECTING underground pipes from corrosion is basically a matter of preventing contact with moisture. This is the view taken in a paper presented recently in America to the National Association of Corrosion Engineers (see *Chemical & Engineering News*, 1956, **34**, 1132). One method of protecting such pipes from moisture contact is to coat outer surfaces with a microcrystalline wax and then cover the wax with polyvinylidene chloride film—a system known commercially as 'Mummy-Wrap.' Excellent anti-corrosion results have been secured for periods up to six years. The wax used is a mixture of *n*-paraffins, *iso*paraffins, and naphthenes; in liquid form, these waxes have low surface tension and a near-water viscosity, properties that enable the waxes to wet the metal surfaces thoroughly and invade the surface pores. This is claimed to exclude all water. The outer cover of a plastics film is needed to prevent the waxes from being displaced by soil pressures. Possibly the waxes might also be attacked by soil organisms—however, this point is not made in the report, the principal danger to the waxes being regarded as physical. Polyvinylidene

chloride film has been chosen for the outer 'wrap' because it is exceptionally inert both to soil chemicals and hydrocarbons. The waxes are applied after pre-heating to 275-325° F and at this temperature range they can be flooded on to the metal surfaces. The plastics film is applied as a spiral bandage, and the heat of the cooling wax shrinks the film to produce good tightness. No information is given as to the costs of this anti-corrosion treatment. The time so far available for testing the method has not, of course, been long enough for full evaluation.

University of Leeds

IT was announced at a meeting of the Council of the University of Leeds on 21 March that following the special Treasury grant to the University announced in July 1954 for the development of higher technical education, seven new posts for lecturers were provided for that purpose. They were lectureships in physics, mechanical engineering, mining (surveying), chemical engineering, textile industries, and leather industries, and an assistant lectureship in textile industries.

Among the gifts acknowledged were the following:—

For North Block 1 (fuel) Building Fund—£200 from Coalite and Chemical Products Ltd., £250 from Staveley Iron and Chemical Co. Ltd., £52 10s from Parkinson and Cowan, Ltd., £250 from Barnsley District Coking Co. Ltd. and £200 from Magnesium Electron Ltd., Manchester.

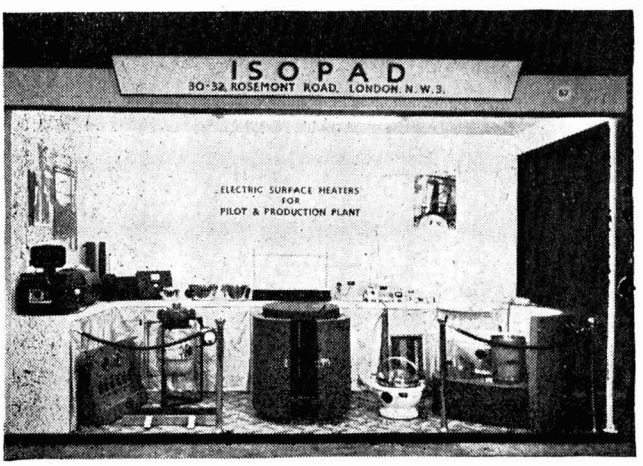
Department of Inorganic and Structural Chemistry—£1,500 from the Royal Society.

Department of Engineering: £21 from Sir Arnold Hall for books; Department of Textile Industries: £1,350 from Courtaulds Ltd., for scholarship and research; Department of Coal, Gas and Fuel Industries—£5 from T. and R. Boote Ltd., Burslem; Department of Colour Chemistry and Dyeing—£250 from Courtaulds Ltd.

Dispersal Chimney Row

DESCRIBING a proposal to build a 300-feet brick-built chimney to disperse smoke fumes at the works of Associated Lead Manufacturers Ltd., at Broughton, Chester, as 'an isolated example of sacrificing amenity on the alter of commercial convenience', Mr. E. W. Spencer, representing the Cheshire County Council, said that a chimney of that height was not the way to solve the problem of alleged offensive fumes.

Mr. D. M. Kermode, deputy town clerk of Chester, said that in such areas as Widnes and St. Helens it would doubtless be vital to erect such a chimney. 'But we are dealing with Chester', he added. Mr. Michael Rowe, Q.C., for Associated Lead Manufacturers Ltd., said that the company were willing to make alterations to the chimney which would improve its appearance. It would be impossible for the company to carry on, he stated, if the smelting plant was separated from the other processes. The inquiry was closed.



The stand of Isopad Ltd., at the Eighth Technical Exhibition which was organized by the London Section of the Oil & Colour Chemists' Association and staged at the Horticultural Society's New Hall, London, 20-22 March

Chemical Exports for February

India Becomes Principal Buyer

BRITISH chemical exports in February increased from £18,575,408 in the corresponding month last year to £20,185,830. India, which has been steadily increasing its import of chemicals from this country, became the principal buyer. In January, India spent £1,416,109 on chemicals from Britain; in February the total rose to over £2,000,000. A noticeable decrease was that of Pakistan whose imports fell from £445,134 in January to £108,046. Demand for most commodities remained steady, although sales of ammonium sulphate increased fourfold over the previous month. Sodium hydroxide was another chemical in demand and the total sales of fertilizers during the month showed a sharp upward trend. In February last year the export for all types of fertilizers totalled £248,872; this year in the corresponding month the total value increased by more than three times to £749,677.

EXPORTS: PRINCIPAL COMMODITIES

	Feb. 1956	Jan. 1956	Feb. 1955
Acids, inorganic (cwt.)	15,214	17,231	18,373
Copper sulphate (tons)	7,464	3,007	5,487
Sodium hydroxide (cwt.)	570,601	467,274	350,221
Sodium carbonate (cwt.)	392,380	370,269	494,908
Aluminium oxide (tons)	1,523	1,346	4,467
Aluminium sulphate (tons)	3,554	2,844	2,398
Ammonia (cwt.)	8,515	8,662	6,955
Bismuth compounds (lb.)	24,078	34,787	25,115
Bleaching powder (cwt.)	30,431	52,943	25,308
Hydrosulphite (cwt.)	3,124	3,949	9,317
Calcium compounds inorganic (cwt.)	24,142	31,391	32,187
Lead compounds inorganic (cwt.)	3,022	2,951	3,948
Magnesium compounds (tons)	1,099	1,087	1,466
Nickel salts (cwt.)	5,042	4,750	5,540
Potassium compounds (cwt.)	3,683	3,858	4,122
Acids, organic & derivatives (value in £'s)	118,162	106,682	70,547
Ethyl, methyl, etc., alcohols (value in £'s)	108,896	87,349	90,382
Acetone (cwt.)	12,392	18,941	28,823
Citric acid (cwt.)	2,670	2,714	2,820
Sulphonamides unprepared (lb.)	67,094	79,746	158,618
Dyestuffs intermediates (cwt.)	7,584	5,142	5,361
Total for elements & compounds in £s	**5,190,396**	**4,602,282**	**4,694,509**
Coal tar (tons	15,157	4 897	7,589
Cresylic acid (gal.)	205,884	266,259	225,655
Creosote oil (gal.)	1,031,364	1,281,517	789,761
Total for tar products in £s	**329,119**	**248,960**	**250,359**
Total for synthetic dyestuffs (cwt.)	**20,094**	**16,144**	**17,898**
Total for paints, pigments & tannins in £s	**1,888,779**	**1,827,808**	**1,641,488**
Total for medicinal & pharmaceutical products in £s	**2,745,397**	**3,269,874**	**2,764,464**
Total for essential oils, perfumes, etc. in £s	**2,095,527**	**2,238,610**	**1,879,841**
Ammonium nitrate (tons)	617	548	127
Ammonium sulphate (tons)	35,891	8,698	13,017
Total for all fertilizers in £s	**749,677**	**287,829**	**284,872**
Total for plastics materials (cwt.)	**143,330**	**156,169**	**126,694**
Disinfectants etc. (cwt.)	8,967	13,905	19,433
Insecticides, fungicides & rodenticides (cwt.)	39,659	43,997	27,773
Weedkillers (cwt.)	3,393	12,876	6,137
Lead tetra-ethyl (gal.)	413,581	406,883	447,257

VALUE OF EXPORTS IN £S: PRINCIPAL BUYERS OF CHEMICALS

	Feb. 1956	Jan. 1956	Feb. 1955
India	2,062,180	1,416,109	1,272,812
Australia	1,462,651	1,665,646	1,688,897
South Africa	1,059,596	1,211,368	820,422
United States	812,152	636,527	526,400
Italy	756,416	688,145	519,288
Netherlands	645,051	762,712	571,436
New Zealand	612,094	572,730	530,708
Eire	605,975	636,370	530,088
Canada	552,186	421,766	483,297
Belgium	544,390	342,473	453,327
France	456,268	525.649	619,342
Western Germany	442,247	463,503	425,205
Nigeria	438,906	536,512	358,294
Singapore	411,127	284,070	290,417
Denmark	403,362	310,439	291,731
Gold Coast	381,636	293,761	398,808
Sweden	341,759	557,423	478,480
Egypt	316,013	396,905	391,503
Malaya	288,463	320,349	201,101
Norway	279,833	314,118	350,021
Iraq	276,543	256,979	258,862
Iran	239,646	247,280	131,352
Finland	230,631	259,094	235,927
Hong Kong	224,588	272,090	281,464
Burma	212,656	257,937	255,163
Indonesia	191,458	373,828	184,245
Kenya	173,419	266,663	186,246
Pakistan	108,046	445,134	140,008
Total value of chemical exports	**20,185,830**	**20,165,782**	**18,575,408**

Unique Scholarship Scheme

ICI Hopes to Increase Flow of Science Graduates

DETAILS of a scheme for granting about 50 scholarships of a new type per year were announced by Dr. J. Holroyd, Research Director of Imperial Chemical Industries Ltd., on Friday 23 March. The scheme, which is to cost ICI approximately £35,000 per year, will enable students who have not specialized in science at school to commence serious study of science at one of five universities—Oxford; Cambridge; Imperial College, London; King's College, Durham (Newcastle); and Liverpool. The scheme has the full support of the Ministry of Education and of the universities and colleges concerned.

The scholarships, to be known as ICI Transfer Scholarships, will be available for the first time during 1956/57 and their value will be based on State Scholarship rates. They will make it possible for students to take a preliminary science course of one year's duration and then go on to take normal Honours Science courses. There will be continuing small awards of £30-£50 per year to scholars who successfully pass on to take Honours Science courses.

Nucleus of Students

Entry into Honours School of Science and Technology in English universities has become almost entirely restricted to students who have specialized in science subjects at school from the age of about 15. ICI believes that there are considerable numbers of capable people who have not specialized who would do well honouring in chemistry, physics, engineering etc., if there were suitable preliminary courses in the universities and if they could afford to pay for an additional year of university attendance. They have, therefore, arranged for these scholarships so that five universities will have a nucleus of students for such transfer courses.

In announcing the plan Dr. Holroyd expressed the hope that other people would follow ICI's example and that the scheme would grow so that more people would be available to the universities arranging these transfer courses. If the UK hoped to compete with the US, Germany and the USSR, he said, it must have more and more scientists. More and more students must be encouraged to stay on and enter university and more and more of those who did must be persuaded to study science. It was estimated, he said, that 50 per cent of those entering the universities had no definite leaning towards either arts or science but because they had been forced to make a decision when they were only 15 many were obliged to study arts subjects rather than science. It was the aim of his company to see that a greater proportion of this group became scientists.

The scholarships, he said, were expected to produce 40 to 50 additional scientists or technologists per year but that would be only a part, and probably a small part, of their influence if they served to encourage a wider provision of elementary science courses in the universities. The scheme would run for at least the next three years and in subsequent years it might be possible to arrange for some extension to the list of co-operating universities.

The election of scholars, together with the advertising of vacancies and of the terms of the scholarships, will be the responsibility of the universities concerned and all enquiries should be addressed to the appropriate university or college authority.

Dyers' Essay Competition

To mark the centenary of Sir William Perkin's discovery of the first coal-tar dyestuff, the London Section of the Society of Dyers and Colourists is offering a prize of twenty-five guineas for the best essay on 'The Influence of Perkin's Discovery, and of the Synthetic Dyestuffs which Followed It, on any trade of the candidate's choice'. The money has been donated by an anonymous member of the Society. Competitors need not be members of the Society, but must live, work or study in the area covered by the Society's London Section which is south of a line joining Great Yarmouth and Gloucester and must not have reached the age of 26 years on 31 December 1956. Full deails can be obtained from the Honorary Secretary of the Section, Mr. H. W. Taylor, 10 Milton Avenue, Sutton, Surrey.

Important Dyeing Anniversary

Sundour Fabrics Celebrate Golden Jubilee

AN EVENT of considerable importance took place 50 years ago when Sundour fabrics were first placed on the market—the first fabrics in the world to be sold with a guarantee against fading. As mentioned briefly in our last issue Morton Sundour Fabrics Ltd. recently celebrated this golden jubilee with two cocktail parties and a dinner.

In 1902 Sir James Morton saw some of the tapestries which he himself had designed in a shop window in London and was appalled by the manner in which the colours had faded after only a week's exposure to direct sunlight. With the help of a young chemist, John F. Christie of United Turkey Red, he instituted an extensive research programme which resulted in the finding of a modest range of colours which were completely fast to light and washing. In 1906 the brand or trade name Sundour was adopted by Alexander Morton & Co. and the guarantee was issued that the firm would replace any goods bearing this mark if they faded or failed to withstand laundering during the lifetime of the fabric.

Still not satisfied with things Morton continued to study the problems which remained and in 1909 he acquired the services of Dr. Teltscher, a graduate of Heidelberg University. With his collaboration a special process for the application of vat and other colours to plain cloth was developed and from the Morton Sundour factory at Carlisle the first whole or plain vat-dyed goods in the world were sold. This gave a tremendous boost to the Lancashire and Yorkshire textile industries as well as to German dyemakers. Dr. Bohn of the Badische works at Ludwigshafen is said to have stated that it was to Sir James Morton that the commercial development of vat colours was largely due.

War Stopped Supplies

The outbreak of the first World War deprived the firm of the materials which had made it famous and to make matters worse no one in this country had any knowledge of how these dyes were made. As a matter of fact few people even knew what the substances were. The head dyer of Morton Sundour, Rudolph Hubner, was not a graduate chemist but he was able to work out the synthesis of the two colours most difficult to replace (blues and yellows) and it was found that they were both derived from 2-amino-anthraquinone. The blue that had been coming from Germany was apparently got by fusing this with caustic potash and the yellow by treating it with antimony pentachloride in nitrobenzene.

Quick Success

As no British firm could be found which was interested or able to make vat dyes Sir James decided he would have to make his own. The first 2-amino-anthraquinone was produced within a very short time and within three months of the declaration of war a few grammes of both Indanthrene Yellow G and Indanthrene Blue had been produced from information gained by studying patent specifications. Plant suitable for the difficult processes involved was not available but after a long search and much study at the London Patents Office suitable equipment was got together and put to work. So modest were the beginnings of this business that the whole plant cost only a few hundred pounds.

It soon became obvious that anthraquinone-2-sulphonic acid sodium salt—the starting material for these dyes—would not be available for very long and plans were laid to produce finished dyestuffs from commercial anthracene of only 40 per cent purity. By dint of hard work and perseverence eventually new buildings and plant were erected and gradually several young men with chemical training (including A. H. Davies and R. Fraser Thomson) were brought into the new venture and research work began in the firm's own laboratories.

By 1916 Alizarine Sapphirole—one of the sulphonated amino anthraquinones, containing hydroxyl groups—was produced in small quantities. Following this the Bradford Dyers' Association became interested and a useful collaboration was begun.

Although no advertising was undertaken inquiries for colours from users all over the UK began to pour in and production was multiplied as quickly as conditions would

permit. By 1918 half the total of pre-war imports of Indanthrene Blue were being produced and by 1919, 50 per cent more than the total pre-war imports.

With orders coming in from outside textile firms it was decided to detach the dye-making section of the business from the remainder. It was first run under the name of 'Solway Dyes Company' although it was owned and operated entirely by the parent company. Accommodation in the textile area became insufficient and Grangemouth was chosen as a suitable area for the building of a new works. It was here that Scottish Dyes Ltd. came into being, the firm which eventually became part of Imperial Chemical Industries.

Anhydride from Naphthalene

In 1919 Sir James visited America and there acquired the British rights of a new American process for the production of phthalic anhydride from naphthalene by air-oxidation. This made it possible for Scottish Dyes to switch from anthracene to naphthalene as a basic material and placed the firm on a much safer basis.

During the lean years which hit the British dyestuffs industry in the early 1920s Scottish Dyes did not lay off a single chemist but instead pushed forward with an intensive research programme. Within a short time it had become possible for the firm to produce its anthraquinine from naphthalene at a lower price than it could be made from the more limited anthracene. New and important derivatives of anthraquinone by shortened routes were also found.

An outstanding result of this research was a vat blue colouring which was the fastest blue on the market. Later came Caledon Jade Green which made Scottish Dyes world famous. This was produced by oxidising dibenzanthrone to the hydroxy-derivative by means of manganese dioxide and sulphuric acid, and then methylating with dimethyl sulphate. This new dye was the fastest colour made anywhere and firmly established Britain as world leaders in the dyestuffs industry.

In January 1925 Caledon Jade Green in a soluble form was issued from the Grangemouth works; this was the first Soledon Dyestuff and was the first anthraquinone vat dyestuff to be put on the market by any firm in soluble form.

In the year 1926 a controlling interest in Scottish Dyes was acquired by the British Dyestuffs Corporation—one of the original members of Imperial Chemical Industries—and in 1928 ICI acquired the outstanding shares in the company and it became part of ICI.

Mr. W. Kilby, B.Sc., F.S.D.C., chief chemist of Morton Sundour, director and chief chemist Standfast Dyers & Printers Ltd., joined the company as a boy and played a part in the manufacture of the first anthraquinone to be made in the UK. He was the co-inventor of the Standfast molten dyeing process for which he received the Gold Medal of the Society of Dyers and Colourists in 1952.

Speaking at the dinner mentioned above Sir Alexander Fleck, chairman of Imperial Chemical Industries Ltd., said (in part):

'It would seem that much of the spirit and ideals that had been working in the Scotland of the 18th century had come to rest, and from resting had come to germinate through Alexander Morton into the James Morton whose memory we honour this evening. . . .

'In 1914, when he found himself suddenly deprived of the precious fast dyestuffs from Germany and the then British dyestuffs makers couldn't or wouldn't help him, he elected to manufacture them himself. He was roused: "Begad," he said, "I will let that man see yet whether weavers can make dyes." That he certainly did and in a field where the manufacturing operations involved were by no means of the easiest. As he said himself afterwards, it was perhaps as well that all the difficulties which were to confront the new venture in British dyestuffs making were not apparent at the time. . . .

Prodigious Memory

'Sir James himself was no chemist, but he had a prodigious memory and kept himself well-informed. He knew exactly what he wanted and, being held in great veneration, dare I use the word awe, by his employees, I can well understand that very few people dared to argue with him. However, he recognized the force of superior technical knowledge, and he had the greatest respect for the organic chemists he had gathered round him. Indeed, he had the greatest respect for organic chemists as a whole and regarded them as indispensable to the welfare of the country.

'His faith in his chemists, and in his own beliefs, was well demonstrated during the bitter wind which blew over the infant dyestuffs industry following the famous Sankey judgment of 1919. During the next two years, German dyestuffs flooded the country, and in the face of merciless competition the trade of Scottish Dyes Ltd. dwindled to nothing. It has been said that he didn't dispense with a single chemist during the period. Certainly it is true that the entire technical resources of the company were turned from production to research, in the belief that it would emerge all the stronger from its period of adversity.

Numerous Achievements

'This combination of strength of character and appreciation of the worth of others contributed immeasurably to the success of Scottish Dyes Limited, and one realises how successful they were when one considers their achievements over relatively few years, the initial success in the difficult field of anthraquinone dyestuffs manufacture; the discovery of Caledon Jade Green; the Soledon range of dyestuffs and contributions to the practical catalytic air oxidation of naphthalene to phthalic anhydride.

'I cannot forbear to quote from the first annual meeting of Scottish Dyes Ltd., when Morton was able to announce the discovery of Caledon Jade Green—

> "... One great defect in the pre-war German vat colours was the absence of a fast bright green. We were much handicapped in former times by the want of such a colour, and I was repeatedly told by the German makers that there was little hope of making it. I put this problem to our staff as soon as I saw there was opportunity. We have been working at it for two years or more, and I am glad to say that we have at last produced a new green that is not only of a beautiful pure quality, but is perhaps superior to any vat colour ever produced in all the necessary properties. It is very soluble, is fast to light and washing and excellent to open bleaching."

'Looking back we see that everything he claimed for it was fulfilled in overflowing measure. The way that Caledon Jade Green was manufactured and acclaimed the wide world over was a source of financial strength to Scottish Dyes and its successors. It has been acknowledged a triumph, not only as James Morton said for the research staff of Scottish Dyes, but it has added lustre to the reputation of British organic chemistry.

'Morton's outlook was summed up in what he said in 1930 and I quote it with the warmest approbation—it has never been more true than it is today:

> "It is essential for the future of the industrial existence of this country that we should have the largest possible body of young men with training such as is derived from a thorough grounding in organic chemistry. It is the fibre we most need through the whole texture of our industries. Dyes is the natural training ground, but the value and influence of a large body of experienced organic chemists such as this industry gives would be felt by and would flow over to other branches, and to none more so than to textiles. It is precisely the kind of qualities developed by chemists of a dye industry that are most needed for the problems of the textile industry. It would be a bad day for textiles if they took any step that would in the slightest degree retard the growth of an accumulating experience and knowledge of organic chemistry and its personnel in this country. It is even worth much temporary sacrifice."

'Meeting as we do in 1956, the year that is the centenary year of the discovery by Perkin of Mauveine, the first of the so-called aniline dyestuffs, let us recognize that in James Morton, a man of entirely different characteristics, Perkin's work was extended and elaborated in a manner worthy of the highest traditions of scientific work and thought.'

Nitrogen Products

NORTH American Cyanamid Ltd., is boosting manufacturing capacity of two of its major chemical products, Aminol nitrogen solutions and anhydrous ammonia. Expanding demand for both products—particularly from Ontario farmers—has justified the expansion in facilities at the company's Welland, Ont., plant.

Facilities for production of the nitrogen solutions used as agricultural fertilizers will be doubled this year. The Welland plant was first in this country to start production of these solutions, all products formerly being imported from US.

Canadian Research

Trailing Behind US & UK

THE comparatively limited research effort on the part of the Canadian chemical industry was one of the factors influencing its growth, Dr. R. S. Jane, president of Shawinigan Chemicals Ltd., told the Commission on Canada's Economic Prospects. Other factors were the small domestic market and retarded development of chemical consuming secondary industries.

Such factors, said Dr. Jane, would continue to play an important role in the industry's expansion over the next 25 years. He added that 'it would be quite unrealistic,' in attempting to appraise Canada's long-term economic prospects, 'to predicate our industrial future on an expansion of our export trade.'

Selective Tariffs

He advocated the adoption of an intelligent policy of 'selective tariffs for a relatively few products,' and a complete revision of the present practice of allowing products to enter duty-free for special purposes.

Discussing research, Dr. Jane said that apart from the excellent work of the National Research Council and some Canadian universities, the research effort in Canada 'has not been commensurate with Canada's industrial potential. On a *per capita* basis, we trail the US and the UK by some distance.'

Dr. Jane said the same considerations which governed marketing of chemicals in Canada applied in the case of research. The cost of taking the project from 'test tube to tank car' usually ran into several million dollars, and it was a matter of simple arithmetic to show that in order to justify the expenditure, a market of a certain minimum size should be available. Only in exceptional cases did such a market exist in Canada.

Furthermore, Dr. Jane continued, a chemical company offering a new product of unknown use was at a disadvantage in Canada as it had to rely on research staffs of consumer or secondary industries to find uses for the new material.

'This type of research is almost non-existent in Canada, and if the product is a new chemical intermediate, it falls on rather barren ground,' he said. 'In the United States, on the other hand, chemical corporations frequently spend upwards of $20,000,000 in research, plant and market development on a new product before receiving a cent of revenue. But these companies proceed in the knowledge that they can create a market, and that there are hundreds of chemists and research engineers in the secondary industries who are ready and willing to investigate uses for the new material.

'Proof of this may be found in the US patent records, where there are scores of patents describing new applications for such materials as nylon, polyester resins, acrylonitrile etc.'

Dr. Jane said it was true that Shawinigan Chemicals was held up as an example of a company wholly owned in Canada which had benefited greatly from its own research. It had to be admitted, however, that the most important new processes and products discovered had to be exploited outside of Canada in order to justify expenditure on research and development.

Flameproof Annunciator

PRELIMINARY warning of a possible undesirable condition arising in a plant is provided by the Flameproof Annunciator designed by Siemens-Schuckert (Great Britain) Ltd. In this equipment a double warning is given by means of two lights and a horn before the failure occurs.

When conditions are normal both lights are off and the horn is silent. Should a fault occur in the plant a contact (outside the Annunciator unit) is made to open resulting in both lights coming on and the horn sounding. The switch is then turned manually to the 'fault' position; this puts out the right hand light and silences the horn. The left hand light remains on as a warning that the fault remains although it is being attended to.

When the fault has been cleared the left hand light goes off, the right hand light comes on and the horn sounds again. The switch is then returned manually to the 'normal' position.

The equipment is contained in a cast aluminium box and is certified flameproof. It is covered by certificates FLP 3604 for group I and FLP 3605 for groups II and III.

Variations are available with three lights of different colours in which the preliminary warning is given by a flashing light as well as by the horn.

The Application of Fluidization Techniques to Nuclear Reactors

This is a summary of a paper given before The Institution of Chemical Engineers at The Royal Institution, London W1, on 20 March. The paper considers critically the possibilities of applying fluidization techniques to nuclear reactors and discusses the advantages and disadvantages of various systems. The conclusion is drawn that the standard of engineering required will be much higher than present industrial practice. The authors, who are all members of the Atomic Energy Research Establishment, Harwell, are J. B. Morris, Ph.D., A.R.I.C., C. M. Nicholls, B.Sc., A.R.I.C., and F. W. Fenning, B.A.

FLUIDIZATION techniques have been applied with success in the chemical industry to processes where temperature control and heat removal are important. Nuclear fission is a highly exothermic process and it is therefore of interest to examine the possibilities of fluidization techniques in nuclear reactor practice. Attractive features are:—

(1) Favourable heat transfer.
(2) Even temperature throughout the reactor.
(3) The possibility of avoiding costly fuel fabrication techniques.

Features that might be suspect are:—

(1) The safety of the system.
(2) Erosion and corrosion.
(3) The investment in fuel: this may be high either in the reactor in the case of a batch fluidized bed or in the reactor and heat-exchangers if the fuel is transported as well as fluidized.

A nuclear reactor is a complex arrangement of materials in which the spatial relationships are important. The delicate neutron balance must be maintained and controlled with safety. Considerable quantities of heat have to be removed from the reactor and used to produce power. The materials used must be physically and chemically stable and the operators must be protected from the effects of the intense radiation.

For some time to come slow neutron reactors will be more important than fast reactors because the capital cost will be lower. Furthermore, in fluidized systems the fuel will generally be diluted more by the coolant and moderator than in a solid fuel element reactor. If fluidization techniques are to be used there is, therefore, a strong tendency to look at slow neutron systems first. There are four basic types of fluidized nuclear reactors, which are set out in the table.

TABLE 1

Classification of possible systems for fluidized thermal nuclear reactors

Reactor type	I	II	III	IV
Solid	M	F+M	F	I
Fluid	F	I	M	F+M

M = moderator; F = fissile fuel; I = inert material

A fifth type is possible in which the moderator would be completely outside the fluidized bed, and would consist of a block pierced by a number of vertical channels. It can be shown, however, that this type of reactor would have to be many times larger than any of the four types shown in table I.

Table II gives a selection of possible gases and liquids for use in the four types of reactor listed in table I.

TABLE II

Reactor type	*Type of fluid*	*Possible fluids* Liquid†	Gas
I	F	Solution of U in Bi	UF^6
II	I	Na, Bi, Li,	CO_2, H_2O, H_2, He
III	M	H_2O, NaOH, Dowtherm, terphenyl	(CO_2, H_2O, H_2)*
IV	F+M	Solution of U in in H_2O	None known which are feasible

**These would be gaseous moderators and are included for completeness rather than feasibility.*
†D_2O could be substituted for H_2O in this column and NaOD for NaOH.

For chemical reasons it may not be

possible to combine all the above specific fluids with suitable solids for fluidization.

If an ever-increasing flow of gas is passed through a bed of powdered solids resting on a support plate a point is eventually reached when the bed can no longer remain stable as a static entity. At this particular gas velocity the individual particles loosen themselves from permanent contact with each other and become freely supported on the rising current of gas.

A liquid can also be used as the fluidizing system, although at present this is of less commercial importance.

It is convenient to consider first simplified models of fluidized beds for nuclear reactors which will meet the following requirements:—

(1) The fluid must have sufficient velocity to support the bed without unwanted settling.
(2) Heat must be removed from the reactor. A knowledge of the xepansions and contractions of the bed will be necessary.

The limiting velocities of the fluidized state are of interest in nuclear reaction applications. It can be shown that as high a velocity of the fluidizing medium as possible will be required. In the absence of other information it will be assumed that a working velocity of one half of the terminal velocity is tolerable.

No discussion of bed expansion for gaseous fluidization is attempted because of the absence of reliable experimental data.

The transport of solids in the form of slurries has often been proposed for nuclear reactors. Here the fluid velocities are very much higher than considered previously, the upper limit being set by the need to restrict corrosion of piping and vessels, the lower limit by the necessity of avoiding settling of solids.

To determine realistic velocities in any cases worth further study, experimental work would have to be done.

Gradients of temperature and concentration within a fluidized bed are very small, even at high rates of mass and heat transfer. Thus, at a first approximation, the temperature throughout the bed of a fluidized reactor can be regarded as constant.

One of the first factors to be evaluated in considering the feasibility of a proposed system is the rate of heat generation per unit volume. Since they have widely different heat removing capacities, gas and liquid fluidizing systems are considered separately.

In gas fluidized systems there are three mechanisms to be considered. In the first of these the heat is removed by the fluidizing gas. An examination of the method shows that a useful amount of heat can be extracted from a gas only if powders coarser than has been normal in industry are use, and if gas under pressure is employed. The choice of operating gas velocity will be dictated by heat removal rather than by the minimum velocity required to produce fluidization.

Heat may be removed from a fluidized bed by the use of a heat exchanger situated within the bed. Calculations are based on the use of the calandria type of heat exchanger. To give a maximum heat rating it is best to employ a calandria of narrow tubes spaced close together. It is anticipated that the upper limit with close spaced tubes is not likely to be more than 50 kw per cubic foot.

The third method of heat removal is that obtained by circulation of solids in a closed cycle from the fluidized bed of the reactor to a heat exchanger, and then back again. Disadvantages of this method are that if the maximum rate of flow permissible is exceeded, the high solid rate will probably destroy the existing fluidization. Extreme wear and tear is also to be expected in plant circulating solids at high temperatures, and there is also the hazard that would result if dust escaped into the air.

Only Two Methods

Only two methods of heat removal are of interest in liquid systems.

Possible liquids include water, bismuth, lithium-7, sodium, caustic soda, Dowtherm A and *p*-terphenyl. Restricting conditions to non-pressurized systems (i.e. excluding water and Dowtherm) the best liquid is found to be lithium.

The structure assumed for an internal heat exchanger in liquid fluidized system is the same as considered for the analogous gas system.

Another possible fluidized system for a nuclear is one in which gaseous fluidization is employed, but useful heat is extracted from the gas both as sensible and as latent heat. The gas leaving the reactor is either passed through a working cycle in which it is fully condensed at the working end,

or alternatively it is fully condensed in an intermediate heat exchanger. The liquid stream is then returned to the reactor where it is injected directly into the fluidized bed.

The rapid mixing in the fluidized bed should promote flash evaporation more or less uniformly throughout the bed. Water is the obvious fluid for this mixed phase application.

The above treatment of the removal of heat from fluidized reactors is based on published information on heat transfer. The energy arising from fission appears initially mainly as the kinetic energy of two recoiling fission fragments, but some also occurs as kinetic energy of neutrons, as β-rays and as δ-rays.

Most of the heat which is generated appears in the particle in which fission took place. Most published work on fluidization refers to heat transferred between fluidized beds and containing walls and very little work has been done on the problem of heat transfer from self-heating solid particles to a fluid coolant in direct contact with the very large surfaces of the particles. This field requires further investigation.

The correct control of a nuclear reaction requires that the neutron balance shown mathematically below is maintained at a given level to quite high precision at all times.

$$(Y-1) = Z + K + L$$

where Y = the neutron yield

Z = the neutron loss to fission products, moderator, constructional materials and coolant;

K = the number of neutrons absorbed in U-238 or Th-232 (the conversion factor);

L = the neutron leakage loss; all referred to the destruction of one fissile nucleus.

The degree of unbalance is usually termed the reactivity. Conditions which cause a positive change in reactivity are important because a potentially dangerous runaway condition could arise from a small disturbance of the neutron balance.

This preliminary survey leads to several conclusions regarding the possible nuclear reactors employing the fluidization technique.

Fuel investment considerations lead the authors to favour reactors working with 'thermal' rather than 'fast' neutrons for initial study.

While the neutron balance can be disturbed by changes in temperature and pressure, the most sensitive variable in a fluidized system will be the concentration of the moderator and fuel in the volume of the fluidized bed. Gradients of temperature will be very small within the bed. Very little is known about the variations of average bed density and this will require detailed study. Particular care will have to be taken in devising systems in which the nuclear reactivity is stable and safe.

The large amount of heat that accompanies nuclear fission brings limitations to the types of fluidization systems that are feasible. Based on nuclear-physics considerations only, a number of systems can be postulated which are worthy of further study. The heat removal characteristics of these systems is the first point to examine in the selection of promising lines of development.

Simple Gas Cooling

A useful amount of heat can be extracted from a fluidized bed by simple gas cooling only if powders are used that are coarser than the sizes which have hitherto been normal in industrial practice (1 mm. or larger) and if gas under pressure ($\sim$100 atmospheres) is employed. While hydrogen is the most favourable gas for use with coarse solids, the differences between the gases considered are so slight that a final choice would probably be made on grounds other than heat removal, *e.g.* safety, cost, and the method of power generation favoured, whether open or closed cycle gas turbines or, with steam turbines by way of a heat exchanger.

Of the cases considered for liquid fluidization, pressurized water has the best heat transport capacity for a given size of particle and temperature rise. In non-pressurized systems the liquid metals sodium and lithium give the best heat removal over the whole range of solid densities. Since the temperature rise which can be tolerated for pressurized water is much lower than for liquid metals, the latter give the more favourable overall heat removal (transfer plus transport). When the solids are transported by the fluid, as in the case of slurries, the fluid velocities required are much higher than in the fluidized beds and hence greater amounts of heat can be transported.

A mixed phase system would give favourable heat removal.

Whichever system was selected, a very large effort would have to be expended on design calculations and on research before it could be decided that such a system was feasible. Research would have to cover the following fields:

(1) The fluidization characteristics of the selected system. Flow velocities of fluidizing media would have to be determined and the entrainment of solids measured. Little has been published on liquid fluidization and nothing on the use of liquid metals in these applications. The transient density behaviour would have to be studied, as would the heat transfer and erosion, corrosion and attrition characteristics of the system selected. In a fluidized nuclear reactor the heat would be generated within the particles of solid if they contained the fissile material. Heat transfer from the surface of particles to the coolant would require study in some of the systems suggested above.

(2) Nuclear safety. Attention would have to be focused on safety aspects, particularly on the effect of coolant failure.

(3) Containment. Because of the extreme toxicity of the materials being handled, methods would have to be devised to ensure that no dusts or liquid sprays could escape into the atmosphere around the reactor.

These are formidable problems and aspects other than heat removal will rule out some systems which appear at first sight attractive. Any fluidized system that is to be developed beyond the research stage will require engineering to a standard not dreamt of in present industrial practice.

Exhibition Records

RECORD attendances were features of the Eighth Technical Exhibition and the Exhibition Luncheon organized by the London Section of the Oil and Colour Chemists' Association. Nearly 5,000 persons visited the exhibition during the three days 20-22 March and 350 members and guests attended the luncheon on the opening day. Visitors from 15 overseas countries, including India, the US and USSR, signed the book at the information centre at the exhibition which was held at the Royal Horticultural Hall in London. This was the first year that this site had been used and it proved a big improvement over previous ones from every aspect.

Level Indication

Unique Features Claimed by Hall Ltd.

A FLOW and level detecting device which is claimed to be unique because supervisory signals and alarms can be any distance from the controlled point, has been designed by J. Edward Hall Ltd. of Leeds. This equipment was on show at the recent Electrical Engineers Exhibition at Earls Court (20-24 March).

Known as the Proxicon Capacity Switch, this equipment consists of a controller (single or dual), which can give visual and sound warnings, and a separate electrode unit or units. Operation of the Proxicon depends upon a change in electrode capacitance consequent on the movement of the material in proximity. By means of an electronic circuit this change is made to operate a relay. This relay can be made to operate alarms, motor starters, brakes etc. when material reaches—or fails to reach —specified levels or points.

Electrodes are available in a variety of forms to suit various purposes. For applications where high temperatures and corrosive substances are involved a Fluon coated electrode has been produced. A feature of the equipment as a whole is the robust construction employed throughout.

The unit is being used by one company for level control of copper sulphate crystals in a small sheet steel hopper at a temperature of approximately 200°C. The electrodes used on this installation are steel with a Pyrex glass envelope and a sealing gland washer of silicone rubber.

The heat insulation problem of the electrode heads has been met by dispensing with the co-axial link cable in the high temperature area. Instead a short length of small section copper conductor insulated with ceramic beads has been used as far as a junction box. From there the normal co-axial cable is used to the controller.

The Proxicon can be used for high and low level control in vats and for the continuous indication of the contents of any storage unit. By using a level controller it is possible to monitor simultaneously the various feeds from a number of hoppers.

Federation Meetings

Forthcoming Events, 1956-1958

DETAILS of meetings to be held by the European Federation of Chemical Engineering during 1956, 1957 and 1958 have recently been released as follows:

7-8 June 1956. Frankfurt am Main. 31st Annual Conference of the DECHEMA. The principal theme of this congress will be 'The Basic Principles of Chemical Engineering as Applied to Chemical Reactions on a Large Scale'. The ninth meeting of the European Federation of Chemical Engineering will be held during this period.

1-3 October 1956. Hamburg. Annual Meeting of Process Engineers. Organized by the Process Engineering Section of the VDI, Frankfurt am Main, the Plant and Equipment Section of the VDMA, Dusseldorf, and the Society for Process Engineering Control, Cologne. The 10th meeting of the European Federation of Chemical Engineering will also be held during this period.

22-24 November 1956. Paris. Symposium on special themes in connection with the Chemical Engineering Convention held on the occasion of the IV^e Salon de la Chimie, du Caoutchouc et des Matieres Plastiques, which will take place in Paris during the period 22 November to 3 December 1956. This event will be organized and carried out by the Societe de Chimie Industrielle, Paris. The 11th meeting of the European Federation of Chemical Engineering will be held during this period.

Spring 1957. Symposium on a Special Theme. Organized by the Koninkijk Instituut van Ingenieurs (Royal Society of Engineers) and Koninkijk Nederlandse Chemische Vereniging (Royal Dutch Chemical Society), both of The Hague. The 12th meeting of the European Federation of Chemical Engineering will be held during this period.

Autumn 1957. Zurich. Joint Congress on a theme, details of which are unknown at present. Organized by the Schweizerischen Gesellschaft für Chemische Industrie (Swiss Society for Chemical Engineering and Industry), the Schweizerischer Chemiker Verband (Society of Swiss Chemists) and the Schweizerischen Ingenieur und Architekten Verein (Swiss Society of Engineers and Architects), all of whom are located in Zurich. The 13th meeting of the European Federation of Chemical Engineering will be held during this period.

31 May-8 June 1958. Second Congress of the European Federation of Chemical Engineering. Preparatory work is being carried out by DECHEMA, Frankfurt am Main and the Society de Chimie Industrielle, Paris. The 14th meeting of the European Federation of Chemical Engineering will be held during this period.

The European Federation of Chemical Engineering was formed in 1953 and consists of 24 member societies from 13 European countries. The first congress was held in 1955 in Frankfurt am Main and was attended by 12,150 visitors from 53 countries.

Application should be made to the organizing bodies for further details of the events listed above.

Instrumentation Analysis

A POST-ADVANCED course of eight lectures on intrumental methods in chemical analysis, arranged by the Bradford Further Education Sub-Committee in conjunction with the Yorkshire Council for Further Education, will be held at Bradford Technical College on Wednesdays at 7 p.m., beginning 2 May, 1956.

The aim of the course is to present some modern methods of chemical analysis depending on the measurement of physical properties by instrumental methods. Attention will be given to the scope and limitation of such methods and to their application to industrial and research problems. Treatment will, as far as possible, be descriptive and lectures will be followed by demonstrations or practical work. The course is particularly designed to be of value to industrial chemists and others interested in the use of instrumental methods in routine and specific analyses.

Lectures will be given by Dr. W. R. Moore, B.Sc., Ph.D., F.R.I.C., senior lecturer in physical chemistry in the college, Mr. R. B. Bentley, B.Sc., A.R.I.C., lecturer in chemistry, and Dr. R. C. Kaye, B.Pharm., Ph.D., F.P.S., senior lecturer in pharmacy.

The fee for the course is £1 10s and applications for enrolment should be made to the principal of the Technical College, Bradford 7.

Effluent Disposal

I.Chem.E. Symposium

A SYMPOSIUM on recent developments in effluent disposal will be held by the Graduates' and Students' Section of the Institution of Chemical Engineers on 19 and 20 April, 1956, at Nutford House, Brown Street, London W1.

The following papers will be delivered and discussed: 'General Principles of Liquid Effluent Disposal Illustrated by Recent Developments in the Oil Industry' by J. J. Darley, chief process engineer, British Petroleum Co.; 'Some Soluble Effluents' by R. J. Barritt, managing director, Metallurgical Equipment Export Co. Ltd.; 'Some Studies by the Central Electricity Authority of Smoke Emission' by H. E. Crossley, scientific adviser to the Central Electricity Authority; 'Some Gaseous Effluents Encountered in the Fertilizer Industry' by K. A. Sherwin, Fisons Ltd.; 'Airborne Solids' by C. J. Stairmand, Engineering Research Department, ICI Billingham; and 'Handling of Suspensions, Sludges and Slurries' by C. J. Smith, Dorr-Oliver & Co. Ltd. Professor D. M. Newitt, Courtaulds Professor of Chemical Engineering, Imperial College of Science, will make the closing speech.

It is hoped to arrange parties to visit a research institution interested in the prevention of atmospheric pollution, a modern sewage works, a power station, a chemical works, a cement works, and a margarine works.

The section's annual dinner and dance will be held at 7.30 p.m. on 20 April at The Refectory, University College, Gower Street, London WC1.

Registration forms are obtainable from the symposium secretary, Graduates' and Students' Section, The Institution of Chemical Engineers, 56 Victoria Street, London SW1.

H_2S Corrosion

CORROSION by hydrogen sulphide was the subject of a lecture given before the National Association of Corrosion Engineers in New York on 15 March. Gerald Sorell and W. B. Hoyt of the M. W. Kellogg Company pointed out that certain operating equipment of petroleum refineries had been experiencing severe corrosion attack under conditions under which little or no corrosion was anticipated.

The reason for this unexpected corrosion problem was thought by the speakers to be the presence of hydrogen sulphide gas at high temperatures and pressures. These conditions were encountered in catalytic reforming. This problem was also met with in catalytic desulphurization type units which had been finding wide application for 'sweetening' high sulphur content feed stocks.

The authors indicated that the only economic materials capable of withstanding this type of attack appeared to be chrome-nickel stainless steels and aluminium coatings. They developed corrosion summary charts for equipment design that predict the variation of corrosion rate with temperature, hydrogen sulphide partial pressure and alloy content.

Compiling, correlating and reviewing this mass of material to help simplify design engineering problems is a special project of the authors who are part of the development division recently instituted by M. W. Kellogg to deal with such problems.

Glassware Reductions

PRICE reductions in their range of glass laboratory apparatus are announced by Quickfit & Quartz, Ltd. Some prices have been almost halved and are now lower than they were pre-war. Announcing this Mr. E. L. Harrison, sales director, said: 'We anticipate higher production and increased sales through advertising, better salesmanship, and more effective distribution and increased exports'.

Large reductions have been made in the price of British Standard specification ground-glass joints, which are now being sold at or below pre-war prices. Copies of the price list may be obtained from Quickfit & Quartz Ltd., Stone, Staffs.

Southern Rhodesian Lithium

The Fort Victoria district produced nearly all the lithium ore mined in Southern Rhodesia in 1955. Only 2,000 tons of the 82,000 tons came from other parts of the country. The ore was valued at £328,442. Fort Victoria ranks as one of the world's most important areas for the supply of lithium minerals.

Canadian Chemicals

Commission Hears CIL President

A MODERATE degree of tariff protection for secondary industries would result in encouragement of a more balanced growth, both for chemicals and other manufactured products, Mr. H. Greville Smith, president of Canadian Industries Ltd., told the Commission on Canada's Economic Prospects. Such assistance, he added, would make a worthwhile contribution to Canada's progress toward economic maturity without any adverse effect upon continued development of the primary export industries, including agriculture.

He pointed out that since the 1920s the volume of output of chemicals had increased fivefold, although manufacturing as a whole had increased only threefold. This expansion had emphasized products related to the development of natural resources and, as the economy expanded, these customers of the chemical industry would need steadily increasing amounts of heavy chemicals.

He described the outlook for large-volume industrial chemicals as 'most favourable' However, to make the fullest contribution to the Canadian standard of living and to national development over the next 25 years, there should be greater diversification in the newer synthetic chemicals derived from research. These were the medium and small volume chemicals, mainly organic, and included such products as primary plastics.

Organic Chemicals Lag

'Despite the past expansion of the chemical industry, it is still not as large in relation to the economy as a whole, as it is in many other countries,' he maintained. The disparity was 'almost entirely attributable to lower production of organic chemicals in this country,' he said.

Mr. Smith held that the factor retarding the growth of organic chemicals in Canada was the limited domestic market available owing to the less developed state of Canada's secondary industries which are principal consumers of organics.

'The next step in the chemical industry's growth should logically be into organic chemicals,' he maintained. According to the CIL brief, progress in this direction will be slow because these bear a lower rate of duty than that available for most inorganic chemicals, and they have no automatic provision for a higher rate once their domestic manufacture is started.

Significantly, however, tariffs charged by the US on most of the synthetic organics range from 25 per cent to 45 per cent *ad valorem*. This compares with 7½ per cent or less on imports of most of these items into Canada.

Speaking of the regional location of Canada's chemical industry, he said that in 1954 two provinces—Quebec and Ontario—accounted for 89 per cent of the whole, as compared with six per cent for British Columbia, the next largest area. New chemical developments based on Alberta natural gas, however, tended to increase slightly the importance of the Prairie.

Quebec and Ontario were likely to continue in this dominant role for many years, due mainly to the concentration of industry in those provinces. As dispersion occurred, it would do so largely in association with natural resources development and in the heavy chemicals field, rather than through diversification into the newer synthetic organic chemicals, Mr. Smith claimed.

US Chemical Construction

ACCORDING to a survey made by the Manufacturing Chemistry's Association of the US $1,600,000,000 will be spent on new chemical construction during 1956 and 1957. This survey also disclosed that privately financed chemical construction projects completed during 1955 totalled $772,000,000.

The survey covered 599 projects, 269 of which were completed during 1955. The additional 246 projects now under construction will cost an estimated $1,100,000,000. The survey also reported 84 projects definitely committed which will cost an estimated $507,000,000.

The total of projects completed in 1955 plus those under construction or definitely planned for the next two years, reaches $2,300,000,000.

Dividing the US into smaller sections, Texas, which is currently the third ranking chemical producing state, led the way in new chemical construction with 66 projects costing an estimated $414,800,000. California was second with 49 projects at an estimated value of $185,800,000. Ohio, with 38 construction projects amounting to $152,600,000, was third. Louisiana, West Virginia and Georgia showed chemical investments of more than $100,000,000 each.

Meat Preservation

Use of Antibiotics Being Investigated

ANTIBIOTICS like penicillin are being used for the preservation of slaughtered meat. It has been found that in tropical countries without refrigeration the injection of an antibiotic into an animal just before it is slaughtered has enabled its carcase to be kept for several days in conditions where is could normally be kept for only one day of two.

It has been reported from the US that the storage life of chicken carcases, under normal conditions of handling, can at least be doubled. Experiments are now in progress at the Low Temperature Research Station, Cambridge, to see whether procedures analogous to those used with meat animals might extend the life of chicken carcases in the somewhat different conditions of handling prevailing in Britain.

Laboratory experiments at the Torry Research Station, Aberdeen, have confirmed and extended investigations in Canada which showed that the storage life of fish could be greatly extended by similar means. In the laboratory at Aberdeen, haddock and cod have kept in good condition for seven to 10 days longer than usual by adding a few parts per million of antibiotic to the ice in which the fish is packed.

So far the best results have been obtained with an antibiotic called chlortetracycline which possesses the advantage that it is rapidly destroyed when the food is cooked. Unfortunately this drug is widely used in medicine under the name of aureomycin and, although the quantities used in food preservation are very small, there are strong medical reasons for avoiding the widespread and general use of a drug which is a powerful weapon in combating disease.

However, many similar substances are known which are not in use therapeutically and a search has begun to see whether there are any of them which are equally effective for food preservation.

In the present state of the law the use of any antibiotic as a food preserver would be illegal in this country. A regulation permitting their use in a strictly limited application has just been made in the US. Before any similar application could be made in Britain the health authorities would have to be satisfied that the procedure proposed is safe.

Polythene for Building

POLYTHENE film is being offered to the building and construction industry for the first time by Olin Mathieson Chemical Corp. of New York. Expecting that the building trade will develop into a major market, the company is setting up distributors in the North East, Middle West, Middle Atlantic States, and the South. It will also launch a major sales promotion effort aimed at acquainting the trade with its plastics film.

Called Olin polyethylene, the film is sold by the corporation's film division. This division also distributes Olin Cellophane. The film is being offered in two, four and six mil. gauges, and in widths up to 16½ ft.

Mr. Arthur T. Stafford, Jr., the company's sales manager, said recently that 'the excellent results obtained by builders in using polythene as a moisture and vapour barrier encourage us to expect more and more of them to use polythene'.

In addition to acting as a moisture and vapour barrier, polythene can be used for protecting workers from bad weather by enclosing buildings. The sheeting can also be used for protecting materials and equipment from the weather.

Polythene is said to have the property of preventing rapid moisture loss. This, it is claimed, acts as an aid in curing cement or bricks to achieve maximum cured strength in a minimum amount of time and at less cost.

Kent Refinery Contract

THE contract for the off-site facilities required in connection with the £26,000,000 expansion scheme recently announced by BP has been awarded to the Power Gas Corporation Ltd., and W. J. Fraser & Co. Ltd., who have set up a joint office at the Kent Oil Refinery.

The expansion scheme includes the aviation gasoline plant and a programme for increasing the processing rate of crude oil at the Kent Refinery from 4,000,000 tons to 7,000,000 tons a year. The value of the work to be undertaken by these two companies is about £8,000,000. Part of it involves the conveyance of crude oil to new distillation equipment and removing the products to intermediate storage and to other specialized plant for further processing.

• HOME •

Visit to Brewing Foundation

A party of members of the Parliamentary & Scientific Committee will visit the Brewing Industry Research Foundation, Nutfield, Redhill, Surrey, on 2 May.

Light Oil Deputation

Sir Edward Boyle, MP, The Economic Secretary to the Treasury, recently received a deputation from the Industrial Light Oils Committee which sought the repeal of the 2s 6d a gallon duty on light hydrocarbon oils used for industrial processes of which approximately 100 million gallons are consumed annually. The Economic Secretary will convey the deputation's representations to the Chancellor.

Uranium Mill Order

W. H. A. Robertson & Co., of Bedford, a subsidiary of Tube Investments Ltd., has received an order from A. B. Atom Energi, the Swedish atomic energy authority, for the supply of a specialized mill for rolling uranium. The company built the first specialized mill of this type of which a number are in production for the UK Atomic Energy Authority.

Harwell 'Open Days'

The Atomic Energy Research Establishment at Harwell is to hold a series of 'open days' to mark its 10th anniversary in the week ending 2 June.

Underground Gasification

Replying to a question in Parliament on 19 March the Minister of Fuel and Power said that a demonstration on a site in Worcestershire, concluding the first six years of experimental work on underground gasification of coal, was successfully completed at the end of last year. This work had not so far included construction of pilot plant but the next stage of development was now being discussed with the National Coal Board and the Central Electricity Authority.

Corrosion Group Meeting

The Corrosion Group of the Society of Chemical Industry will hold its annual general meeting and spring lecture, 'Pitting & Cracking' by Dr. U. R. Evans, F.R.S., at The Chemical Society, Burlington House, London, on 18 April at 6.30 p.m.

Sufficient Titanium

United Kingdom output of titanium was more than sufficient to meet our needs said the President of the Board of Trade in answer to a question in the House of Commons on 22 March. He understood that producers were actively engaged on developing exports.

Chemical Engineers' Dinner

The 34th annual corporate meeting and annual dinner of the Institution of Chemical Engineers will be held at the May Fair Hotel, London, on 24 April when the principal guest will be Lord Tedder of Glenguin. At 11 a.m. in the Garden Suite the annual corporate meeting will be held followed at 12 noon by the president's address 'The Technological Awakening'. Tickets for the dinner are 30s each, not including wines.

Textile Scholarships

Applications are invited for the Textile Institute Scholarship, offered under the terms of a grant from the Cotton Industry War Memorial Trust, and for the Peter Coats Scholarship, administered by the Institute under the terms of a grant from the Peter Coats Trust. The Institute scholarship is of a total value of £950 over a period of three years, while the Peter Coats Scholarship is for not more than £100 per annum and may be granted for two or three years.

Apprenticeship Scheme

Imperial Chemical Industries Ltd., Billingham-on-Tees, have prepared an improved apprenticeship training scheme aimed at meeting the firm's personnel needs. The scheme which will operate in conjunction with the craft apprenticeship scheme, will provide training in 15 different trades, and offer promotion to supervisory levels or to the chief engineers' department. Boys who have gained the GCE will be selected by means of a test. They must be between the ages of 15 years 9 months and 18 years 3 months and on completion of their training will be offered permanent employment with the company. New schools will be opened in September.

• OVERSEAS •

Kanite in Sicily

The Montecatini Company of Italy has found a deposit of 25,000,000 tons of kanite, a form of potassium sulphate with various other associated minerals, at Bosco, near Serra di Falco in Sicily.

Standard Oil in Rotterdam

The management of Esso Netherlands NV says that the Standard Oil Company of New Jersey is contemplating building a refinery in Rotterdam.

Titanium Oxide Plant

Canada's first titanium oxide plant is now under construction at Varennes, Quebec, for Canadian Titanium Pigments Ltd. This $15,000,000 plant is scheduled to be completed in the spring of 1957.

Egyptian Plant Contract

Egyptian vice-premier, Wing Commander Gamal Salem recently signed a contract for a £22,500,000 chemical fertilizer plant to be built by a consortium of French and West German firms at Aswan.

Detergent Alkylate Plant

Imperial Oil Ltd. have announced a plan for a $3,800,000 plant to be built at Sarnia, Ontario, for manufacturing a cleaning ingredient of household detergent alkylate. The plant, when completed in mid-1957, will have a capacity of 30,000,000 pounds yearly.

Canadian Orlon Plant

An $8,000,000 plant for the manufacture of Orlon acrylic staple fibre is to be built at Maitland, Ontario, by Du Pont Co. of Canada. The new plant is to be built beside the company's nylon intermediates plant and is expected to be in operation by mid-1957.

New Austrian Drugs

The pharmaceutical department of the Austrian Nitric Corporation, which has developed many new markets for its fertilizer production in recent years, has also produced a number of new drugs during the second half of 1955. They include Bonacoid, for stomach ailments, Cetazin eye-ointment, and Adermykon powder, a preventative against fungus infections.

Synthetic Rubber in Demand

Mr. J. D. Barrington, president of the crown-owned Polymer Corp., when announcing the expenditure of $5,600,000 in new capital works at Sarnia, Ontario, recently, said that the steady expansion and usage of synthetic rubber had exceeded all forecasts.

Lead Consumption

Consumption of lead in the US during December totalled 103,000 short tons, according to the Bureau of Mines, US Department of the Interior. Although this was 4 per cent less than November and 9 per cent less than the peak consumption of 113,700 tons in October, it was still one of the high consumption months of the year.

Petrofina Announcement

At an extra-ordinary meeting of the Belgina oil financing company, Petrofina, it was announced that three new refineries will be built at Nülhein, Rome and Loandra. It was also announced that the company has discovered large oil concentrations in Egypt, and that negotiations are now in progress with the Egyptian Government.

Israel Plant in Operation

The $3,000,000 factory of the Electrochemical Industries (Frutarom) Ltd., located in the Haifa Bayside area, south of Acre, Israel, began the production of chlorine, caustic soda, and insecticides at the end of March. Founded by, and amalgamated with the Palestine Frutarom Ltd., of Haifa, the company is a joint venture of Israel and American capital and Franco-Swiss technology.

Football Pool Profit

The Norwegian football pool Norsk Tipping A/S made a net profit of £1,500,000 last year. In accordance with the terms of the Act of Parliament which established the pool, the entire profit is being distributed to sport and science. Science will get £1,000,000 of this figure. Norsk Tipping A/S has now been operating for eight years, during which time science and sport have benefited to the extent of several million pounds.

• PERSONAL •

MR. S. A. BRAZIER, technical manager of Dunlop's general rubber goods division in Manchester, has retired after 37 years in the rubber industry. Mr. Brazier is chairman of the Council of the Institution of the Rubber Industry who have awarded him the Colwyn gold medal for his services to the industry. Born in Birmingham, Mr. Brazier became a lecturer in the chemistry department of the Municipal College of Technology there after graduating with a M.Sc. at Birmingham University. On demobilization from the 1914 war, in which he served in the RNAS and RNVR, Mr. Brazier joined Dunlop's technical staff as deputy to their chief chemist, the late DR. T. F. TWISS, with whom he was joint author of a number of papers giving the results of this research. When the Macintosh group of companies were merged with Dunlop in 1926, Mr. Brazier was appointed chief chemist to Charles Macintosh & Co.

MR. D. K. COUTTS, M.Sc., A.R.I.C., has been appointed manager of the technical office of The Mond Nickel Co. Ltd. in Bombay from 1 March 1956. He succeeds the late MR. J. MCNEIL. Mr. Coutts obtained his B.Sc., with honours in chemical technology, at Queen's University, Belfast. From 1935 to 1943 he was with Harland & Wolff Ltd., until appointed chief metallurgist of the Skefko Ball Bearing Company's factory in Northern Ireland. In 1945 he went to India, and until 1947 he was assistant inspector of metal and steel in the Government of India Defence Department. Mr. Coutts joined The Mond Nickel Company Ltd., in 1952 as assistant manager of the technical office in Bombay.

At the recent annual general meeting of the British Disinfectant Manufacturers' Association in London, the following officers and executive committee were elected:— *chairman*, MR. W. MITCHELL (Hull Chemical Works Ltd.); *vice-chairman*, MR. W. A. C. HALL (Prince Regent Tar Co. Ltd.); *honorary treasurer*, MR. VICTOR G. GIBBS (William Pearson Ltd.); *executive committee*, MR. H. C. ASKEW (Reckitt & Colman Ltd.); MR. A. J. BLACK (Lehn & Fink Products Ltd.); MR. H. IBBETSON (A. Ibbetson & Co. Ltd.); MR. C. W. RICHARDS (ICI Ltd.); MR. J. MOFFAT SCOTT (Cooper, McDougall & Robertson Ltd.); MR. S. L. WAIDE (Newton Chambers & Co. Ltd.); *honorary auditors*, MR. R. E. DEXTER (The Sanitas Co. Ltd.); and MR. F. C. SEAGER (William Pearson Ltd.); *secretary*, MR. W. A. WILLIAMS, M.B.E., B.Sc., 86 Strand, London WC2.

MR. W. W. WATT, who has been a managing director of The British Oxygen Co. since 1938, retires to-day, 31 March, having reached the age of 65. During his period of office British Oxygen have expanded continuously and Mr. Watt has from time to time visited all the company's interests at home and abroad. Born in Glasgow, Mr. Watt spent 33 years in the soap industry being chairman and managing director of Ogston & Tennant Ltd., of Scotland, and later vice-chairman of Port Sunlight for three years before joining BOC as a managing director. He has been a president of the Institute of Welding and of the British Acetylene Association, and is a past member of the Council of the British Welding Research Association. Mr. Watt will remain active in his retirement, having been appointed to an Admiralty Commission to examine requirements for materials for research and construction, and civilian and naval staffing.

DR. R. S. JANE has been elected president of Shawinigan Chemicals Ltd., in succession to MR. VICTOR G. BARTRAM, who has retired as president and been elected chairman of the board. Dr. Jane was previously executive vice-president. Mr. Bartram has also retired as president of Canadian Resins & Chemicals Ltd., BA-Shawinigan Ltd., and St. Maurice Chemicals Ltd., all companies associated with Shawinigan. He remains a director of the three companies. Mr. Bartram is being succeeded by MR. R. J. SOUTHWELL as president of Canadian Resins & Chemicals Ltd., and by Dr. Jane as president of BA-Shawinigan and St. Maurice Chemicals. Mr. Bartram has been a member of the Shawinigan orgainzation since 1915. He became president of

Shawinigan Chemicals Ltd., in 1940, president of Canadian Resins & Chemicals on its inception in 1941, president of BA-Shawinigan on its formation in 1951, and president of St. Maurice Chemicals on its formation in 1953.

DR. CARL SHIPP MARVEL, research professor in the Noyes Chemical Laboratory of the University of Illinois and an authority on synthetic polymers, will receive the 1956 Priestley Medal of the American Chemical Society on April 9 at the society's national meeting at Dallas, Texas. The medal is presented annually by the society for 'outstanding services to chemistry'. Dr. Marvel, in his Priestley Medal address, will speak on the 'Responsibilities of American Chemists Today'.

Two members of the staff of the University of Winconsin's Institute for Enzyme Research, PROFESSOR D. E. GREEN, and PROFFESOR HENRY LARDY, have been accorded distinctions for their work. Professor Green, who was the principal speaker at the conference of enzyme chemists in Ghent, Belgium, last summer, has been elected a foreign associate of the Royal Flemish Academy of Sciences, Letters and Arts. Professor Lardy has been nominated to receive this year's Carl Neuberg Medal of the American Society of European Chemists. He will be the first American to have received the award.

MR. C. C. LAST, a director of Bakelite Ltd., has been elected chairman of the British Plastics Federation in succession to MR. A. E. SKAN, a director of Tufnol Ltd. Mr. Last was the founder president of the Plastics Institute, and vice-chairman of the British Plastics Federation since 1954.

MR. E. RONALD CRAMMOND has been appointed executive chairman of the board of British Industrial Plastics.

MR. T. ADAMSON has been appointed a director of Wailes Dove Bitumastic Ltd.

MR. J. IVAN SPENS has been appointed to the board of Esperanza Copper & Sulphur Co. Ltd., and appointed chairman in place of MR. A. HADLEY WILLIAMS, who remains managing director. MR. WILLIAM MURE and MR. W. M. WARREN have also joined the Board.

MR. REGINALD S. MEDLOCK, B.Sc., A.R.I.C., A.M.I.E.E., A.M.I.Mech.E., has been appointed to the board of George Kent Ltd. Mr. Medlock, who is head of the Kent research & development department, graduated from London University with a degree in chemistry in 1935. He joined Kent's in the same year as a chemist specializing in electrochemical measurement. He held various technical positions with the company before entering the research group in 1947. He became head of the newly constituted combined Research & Development Department in 1951. He was a member of one of the BIOS teams investigating the German instrument industry at the end of the war.

SIR HENRY TIZARD, G.C.B., A.F.C., F.R.S., has been appointed to the board of Marchon Products Ltd. Already a director of Solway Chemicals Ltd., Sir Henry Tizard is also a director of Albright & Wilson Ltd., and a member of the National Research Development Corp.

DR. WEIDLEIN who has been actively identified with the Mellon Institute for over 40 years, serving as a senior Fellow from 1912 to 1916, and then as an executive staff member from 1916 to 1951, when he was made president of the scientific research organization, has retired. Dr. Weidlein, known as a scientist, research administrator and author, will spend several months in Europe on a Federal Government mission. He will continue to remain on the Board of Trustees of the Mellon Institute and will be available in an advisory capacity in the administration of the Institute's research. His successor as head of the Institute's research executive has yet to be announced.

DR. DAVID C. LEA has been appointed research and development manager of the Forest Products Division of Olin Mathieson Chemical Corp., West Monroe, Louisiana. Dr. Lea joins Olin Mathieson from Potlatch Forests Inc., Lewiston, Idaho, where he was technical director.

Obituary

MR. STANLEY GRAY WALKER, founder of Stanley G. Walker & Co. Ltd., chemical colour manufacturers, of Manorgate Road, Kingston-on-Thames, Surrey, has died.

Publications & Announcements

A SERVICE rendered by the Patents Office is the publication of abridgements of patent specifications. These give the essential particulars of the patent in a concise form with line drawings where necessary. They aim to provide a quick and ready means of enabling inventors to find out whether their ideas have been anticipated. During the war the publication of abridgements had to be suspended but the Board of Trade have announced that group sales of specifications accepted during the war are now on sale. The abridgements are published in series of 20,000 specifications divided into 44 groups, each group covering a field of invention. Initially they are sold in sets of sheets, each part consisting of 16 pages and containing about 50 abridgements. The groups of greatest interest to chemists are: III Chemistry, Inorganic, Distillation, Oils, Paints; IV (a) Synthetic Resins, Cellulose; IV (b) General Organic Chemistry; IV (c) Dyes and Dyeing. The volumes in bound and sheet form can be obtained from the Sale Branch, Patent Office, 25 Southampton Buildings, Chancery Lane, London WC2, at prices varying from £1 1s to £1 10s per group.

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A TOTAL of 2,482 research references published between 1945 and 1952 and covering the properties of deuterium and tritium compounds are contained in 'Bibliography of Research on Deuterium and Tritium Compounds 1945 to 1952' Circular 562, by Lawrence M. Brown, Abraham S. Friedman and Charles W. Beckett, issued 27 January 1956, 85 pages, 50c. The circular is divided into three sections: the first contains a bibliography and author index, the second the subject index, and the third contains deuterium and tritium compound indexes. The circular should prove useful to scientists concerned with research in areas involving these compounds. Copies should be ordered from the Government Printing Office, Washington 25, DC. Foreign remittances must be in US exchange and should include an additional one third of the publication price to cover postage costs.

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SIR Bernard Keen, D.Sc., F.Inst.P., F.R.S., who has joined the staff of Baird & Tatlock (London) Ltd. as scientific advisor is available for consultation by arrangement at the company's offices, 14-17 St. Cross Street, London EC1, says the January issue of the BTL *Bulletin and Laboratory Notes*. Sir Bernard has been successively: Assistant Director and head of the soil physics department, Rothamsted Experimental Station; Director of the Central Agricultural Research Institute, India; and for the part eight years Director of the new East African Agriculture and Forestry Organization. During the war he was scientific advisor to the joint Anglo-American Middle East Supply Centre. The BTL Allweight balance which is described in this issue is the leader of a series of balances in which, it is claimed, many new features have been incorporated. A beam design has been produced which reduces internal stresses to a minimum and virtually eliminates flexure under load. As is common practice to-day this balance does away with the need for fractional weights, the whole operation being controlled by two dials at the side of the cabinet. Other articles contained in this issue include: The Mercury Cathode Electrolytic Analysis Apparatus as Applied to Ferrous Materials, The Rapid Micro-Combustion Procedure, Beckman Spectrophotometers, and Indicators for Metals.

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INFORMATION Bulletin No. 2, 'The Properties of Aluminium and Its Alloys' (December 1955) has just been published by the Aluminium Development Association. 33 Grosvenor Street, London W1, price 7s 6d. This book has been increased in size from 56 to 204 pages and is related to the 1955 revision of British Standards for aluminium and aluminium alloys for general engineering purposes, and also includes data as specified for aircraft use. This revision also includes for the first time the proprietary names under which many combinations are supplied. Tabulated data begin with the physical properties of aluminium and its alloys, and in this section are included weight calculations and factors. Notes on characteristics affecting design include brief data on elasticity, strength in compression, shear stress, bearing and fatigue strengths. Data on the properties of aluminium at elevated temperatures are included.

Chemical & Allied Stocks & Shares

STOCK markets have been inclined to fluctuate in accordance with conflicting views as to the forthcoming Budget. Earlier this month the prevailing belief was that a tough Budget was probable. In fact in some quarters there was talk of a possible increase in the standard rate of income tax to 9s in the pound. Later, however, a more hopeful view gained ground and stock markets regained part of an earlier decline. It is now apparently being assumed that the Budget may not bring any heavy increase in taxation, but may instead give an incentive of some kind with a view to stimulate national savings on a large scale.

Wait & See

Those who take this view argue that Mr. Macmillan is in a position to wait and see how effective his existing measures against inflation are proving, and that if necessary, the question of higher taxation can be decided in another Budget in the autumn. It has to be admitted, however, that there are very conflicting assumptions as to the Chancellor's plans, and it is recognized that it is extremely difficult to assess the outlook for markets until after the April Budget.

As was to be expected, chemical and allied shares have moved very closely with the surrounding trend on the Stock Exchange. Earlier declines in share values were more than regained. Imperial Chemical, for instance, were 44s 1½d, compared with only 42s a month ago. There is general confidence in the City that the ICI dividend will be maintained at 10 per cent, though it is felt that the policy of reducing prices which ICI is following may result in lower profits. From the long-term point of view, this should benefit turnover and export trade.

Elsewhere, Monsanto 5s shares were 24s 3d, xd, compared with 25s 6d a month ago. Hardman & Holden 5s shares eased from 11s 6d to 10s 6d, but Hickson & Welch remained under the influence of the financial results, and these 10s shares were 28s 9d a rise of 1s 3d compared with a month ago. Elsewhere, Albright & Wilson 5s shares were also in better demand, and have moved up to 19s 10½d, which compares with 18s 6d a month ago.

Reichhold Chemical 5s shares strengthened 3d to 19s, but in other directions, Fisons eased on the month from 51s 6d to 50s 6d. Laporte 5s shares have been more active, and at 16s 1½d compared with 15s 7½d a month ago. Anchor Chemical 5s shares came back to 13s 6d and F. W. Berk 5s shares lost a few pence at 7s 9d. Business around 1s 4½d was recorded in Ashe Chemical 1s shares, while in other directions, Brotherton 10s shares have come back from 33s 6d to 32s 3d.

Lawes Chemical 10s shares receded to 15s. British Glues 4s shares were 9s 'ex' the free scrip issue, and show a yield of over six per cent. Coalite & Chemical 2s shares changed hands around 3s 7½d. On the other hand, there has been some selling of plastics shares. British Xylonite, for example, were 36s, compared with 38s a month ago, and Bakelite 10s shares 27s, compared with 31s 3d. British Industrial Plastics 2s shares, however, moved up to 5s 10½d, compared with 5s 1½d a month ago.

Among other shares the 4s units of the Distillers Co. were 21s 6d, against 22s 10½d a month ago. Boots Drug 5s shares were 16s, compared with 15s 3d. The 10s shares of the United Molasses Co. at 36s were within a few pence of the price a month ago. Unilever have advanced on the month from 63s 3d to 75s 3d helped by the record financial results. British Oxygen were 56s 6d. British Chrome Chemicals 5s shares were 11s 6d.

Oils displayed considerable activity, and after dropping sharply on political developments in the Middle East, rallied. BP were 103s 7½d. or only slightly better on balance, but Shell have moved up from 130s 7½d to 145s on revived talk of a possible free scrip issue.

Textile Institute

The 41st annual conference of the Textile Institute will be held in Blackpool from 22 to 25 May. The subject for discussion is 'New Yarns and Fabrics'. On Tuesday evening 22 May there will be a civic reception for those attending the conference. A mannequin parade has been arranged for the Wednesday and the institute's annual dinner has been arranged for Thursday evening 24 May. This will be the first time since 1937 that the conference has been held in Lancashire.

British Chemical Prices

(These prices are checked with the manufacturers, but it must be pointed out that in many cases there are variations according to quantity, quality, place of delivery, etc.)

LONDON.—There have been no major alterations in prices on the industrial chemicals market, and firm conditions prevail generally. Demand on home account is quieter than of late due to seasonal influences which also affect contract deliveries to the chief consuming industries. Export enquiry remains good though buyers are seeking competitive offers. There is a ready outlet for most of the coal-tar products with naphthalene continuing in brisk demand.

MANCHESTER.—Traders this week have reported a fairly steady movement of the leading heavy chemicals against contracts, though quieter conditions for a spell were looked for in consequence of the holidays. On the whole consumers are experiencing no difficulty in covering their full requirements. Quotations generally continue on a steady to firm basis. Superphosphates, sulphate ammonia and nitro-chalk are meeting with a steady demand, as are also the leading light and heavy tar products.

GLASGOW.—Continued activity in the Scottish heavy chemical market has been the trend during the past week and demands have covered quite a varied range of chemicals. On the whole prices have been steady although in some instances slight increases have to be reported. The demand for fertilizers still continues to show improvement with a good volume of business placed for forward delivery. The export market has also shown improvement with the usual varied range of enquiries being received.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 10 tons, £83 ; 80% pure, 10 tons, £89 ; commercial glacial, 10 tons, £91 ; delivered buyers' premises in returnable barrels (technical acid barrels free) ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £123 per ton.

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

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

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

Ammonium Bicarbonate.—2-cwt. non-returnable drums, 1-cwt. non-returnable kegs ; 1-ton lots, £50 5s per ton.

Ammonium Chloride.—Per ton lot, in non-returnable packaging, £27 17s 6d.

Ammonium Nitrate.—D/d, £31 per ton (in 4-ton lots).

Ammonium Persulphate. — MANCHESTER : £6 2s 6d per cwt., in 1-cwt. lots, delivered. £112 10s per ton, in minimum 1-ton lots, delivered.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £101 and £97 10s per ton.

Antimony Sulphide.—Crimson, 4s 4d to 4s 9½d ; golden, 2s 7½d to 4s 0¾d ; all per lb., delivered UK in minimum 1-ton lots.

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

Barium Carbonate.—Precip., d/d ; 4-ton lots, £41 per ton ; 2-ton lots, £41 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.—£28 12 6d per ton in returnable casks, carriage paid station, in 4-ton lots.

Borax.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, anhydrous, £61 10s ; granular, £41 ; crystal, £43 10s ; powder, £44 10s ; extra fine powder, £45 10s ; BP, granular, £50 ; crystal, £52 10s ; powder, £53 10s ; extra fine powder, £54 10s.

Boric Acid.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, granular, £70 ; crystal, £78 ; powder, £75 10s ; extra fine powder, £77 10s ; BP granular, £83 ; crystal, £90 ; powder, £87 10s ; extra fine powder, £89 10s.

Calcium Chloride.—Per ton lots, in non-returnable packaging : solid, £15 ; flake, £16.

Chlorine, Liquid.— £37 10s per ton, in returnable 16-17-cwt. drums, delivered address in 3-drum lots.

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

Chromium Sulphate, Basic.—Crystals, 7⅞d per lb. delivered (£73 10s per ton).

Citric Acid.—1-cwt. lots, £10 5s cwt.

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

Copper Carbonate.—3s 3d per lb.

Copper Sulphate.—£125 per ton f.o.b., less 2% in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £11 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., £12 9s 0d 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 6d per lb.

Hydrogen Peroxide.—27.5% wt., £128 10s per ton. 35% wt., £158 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 17s 7d per lb., in 28-lb. lots.

Iodoform.—£1 6s 7d per lb., in 28-lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight, 14d per lb. ; dark tech., 44 per cent by weight, 9d per lb., ex-works ; chemical quality, 44 per cent by weight, 12¼d per lb., ex-works ; 1-ton lots, usual container terms.

Lead Acetate.—White : About £150 per ton.

Lead Nitrate.—About £135 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red, £148 10s ; orange lead, £160 10s. Ground in oil : red, £167 5s ; orange, £179 5s.

Lead, White.—Basis prices : Dry English in 5-cwt. casks £152 15s per ton. Ground in oil : English, 1-cwt. lots 194s per cwt.

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

Litharge.—£150 10s per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex-works, about £21 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), £16 per ton.

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

Magnesium Sulphate.—Crystals, £16 per ton.

Mercuric Chloride.—Technical Powder, £1 4s 6d per lb., in 5-cwt. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—£1 9s 3d per lb., for 5-cwt. lots.

Nickel Sulphate.—D/d, buyers UK £170 per ton. Nominal.

Nitric Acid.—80° Tw., £35 per ton.

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, about £130 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, £93 10s per ton for 1-ton lots ; Liquid, £36 5s.

Potassium Carbonate. — Calcined, 96/98%, about £74 10s per ton for 1-ton lots, ex-store.

Potassium Chloride.—Industrial, 96%, 1-ton lots, about £24 per ton.

Potassium Dichromate.—Crystals and granular, 1s 1d per lb., in 5-cwt. to 1-ton lots, d/d UK.

Potassium Iodide.—B.P., 14s 1d per lb. in 28-lb. lots ; 13s 7d in cwt. lots.

Potassium Nitrate.—In 4-ton lots, in non-returnable packaging, paid address, £63 10s per ton.

Potassium Permanganate.—BP, 1-cwt. lots, 1s 9d per lb. ; 3-cwt. lots, 1s 8½d per lb. ; 5-cwt. lots, 1s 8d per lb. ; 1-ton lots, 1s 7¾d per lb. ; 5-ton lots, 1s 7½d per lb. ; Tech., 5-cwt. packed in 1-cwt. drums, £8 14s 6d per cwt. ; packed in 1 drum, £8 9s. 6d per cwt.

Salammoniac.—Per ton lot, in non-returnable packaging, £45 10s.

Salicylic Acid. — MANCHESTER : Technical 2s 7½d 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, £30 to £32 per ton d/d (4 ton lots).

Sodium Acetate.—Commercial crystals, £91 per ton d/d.

Sodium Bicarbonate.—Per ton lot, in non-returnable packaging, £15 10s.

Sodium Bisulphite. — Powder, 60/62%, £42 15s d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—Per ton lot, in non-returnable packaging, paid address, £59 5s.

Sodium Chlorate.—About £80 per ton in 1-cwt. drums, carriage paid station, in 4-ton lots.

Sodium Cyanide.—96/98%, £113 5s per ton lot in 1-cwt. drums.

Sodium Dichromate.—Crystals, cake and powder, 10¾d per lb. Net d/d UK, anhydrous, 1s 0½d per lb. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride.—Delivered, 1-ton lots and over, £5 per cwt. ; 1-cwt. lots, £5 10s per cwt.

Sodium Hyposulphite.—Pea crystals £35 15s a ton ; commercial, 1-ton lots, £32 10s per ton, carriage paid.

Sodium Iodide.—BP, 17s 1d per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £133 per ton.

Sodium Metasilicate.—£25 per ton, d/d UK in ton lots, loaned bags.

Sodium Nitrate.—Chilean refined granulated over 98% 6-ton lots, d/d station, £28 10s.

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

Sodium Percarbonate.—12½% available oxygen, £8 6s 9d per cwt. in 1-cwt. kegs.

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £38 10s, anhydrous, £84 ; tri-sodium, crystalline, £39 10s, anhydrous, £82.

Sodium Silicate.—75-84° Tw. Lancashire and Cheshire, 4-ton lots, d/d station in loaned drums, £10 15s per ton ; Dorset, Somerset and Devon, £3 17s 6d per ton extra ; Scotland and S. Wales, £3 per ton extra. Elsewhere in England, excluding Cornwall, and Wales, £1 12s 6d per ton extra.

Sodium Sulphate (Desiccated Glauber's Salts).—d/d in bags ton, £18.

Sodium Sulphate (Glauber's Salt).—£9 5s to £10 5s 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, £33 2s 6d per ton, d/d, in drums in 1-ton lots ; broken, £34 2s 6d per ton, d/d, in drums in 1-ton lots.

Sodium Sulphite.—Anhydrous, £66 5s per ton ; commercial, £25 5s to £27 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £20 to £22, according to fineness.

Sulphuric Acid.—Net, naked at works, 168° Tw. according to quality, per ton, £10 7s 6d to £12 ; 140° Tw., arsenic free, per ton, £8 12s 6d ; 140° Tw., arsenious, per ton, £8 4s 6d.

Tartaric Acid.—Per cwt. : 10 cwt. or more £13 10s, one cwt. £13 15s.

Titanium Oxide.—Standard grade comm., with rutile structure, £172 per ton ; standard grade comm., £152 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d, white seal, £119 ; green seal, £117 ; red seal, 2-ton lots, £114 per ton.

Solvents & Plasticizers

Acetone.—Small lots : In 5-gal. cans : 5-gal., £125, 10-gal. and upward, £115, cans included. In 40/45 gal. returnable drums, spot : Less than 1 ton, £90 ; 1 to less than 5 tons, £87 ; 5 to less than 10 tons, £86 ; 10 tons and upward, £85. In tank wagons, spot : 1 to less than 5 tons (min. 400 gal.), £85 ; 5 to less than 10 tons (1,500 gal.), £84 ; 10 tons and upward (2,500 gal.), £83 ; contract rebate, £2. All per ton d/d.

Butyl Acetate BSS.—£159 per ton, in 10-ton lots.

***n*-Butyl alcohol, BSS.**—10 tons, in drums, £143 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 £119 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 1½d per lb. d/d.

Diethyl Phthalate.—In drums, 10 tons, 1s 11½d per lb. d/d ; 45 gal. drums, 2s 1d per lb. d/d.

Dimethyl Phthalate.—In drums, 10 tons, 1s 9d per lb. d/d ; 45 gal. drums, 1s 10½d 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, £128 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, £133 per ton d/d ; 100-ton lots, £131 per ton d/d.

Methyl *iso*Butyl Ketone.—10 tons and over £159 per ton.

***iso*Propyl Acetate.**—In drums, 10 tons, £123 per ton d/d ; 45 gal. drums, £129 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

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

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

Carbon Tetrachloride.—Ton lots, £79 10s per ton.

India-Rubber Substitutes.—White, 1s 5¾d to 1s 9½d per lb. ; dark, 1s 4d to 1s 6¾d per lb. delivered free to customers' works.

Lithopone.—30%, about £55 per ton.

Mineral Black.—£7 10s to £10 per ton.

Sulphur Chloride.—British, about £50 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.

Coal-Tar Products

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

Carbolic Acid.—Crystals, minimum price 1s 4d to 1s 7d per lb. delivered in bulk, ½d per lb. extra in 40/50 gal. returnable drums. Crude, 60's, 8s per gal. Manchester : Crystals, 1s 4d to 1s 7d per lb., d/d crude, 8s naked, at works.

Creosote.—Home trade, 1s to 1s. 9d per gal. according to quality, f.o.r. maker's works. MANCHESTER : 1s to 1s 8d per gal.

Cresylic Acid.—Pale 99/100%, 6s 4d per gal. ; 99.5/100%, 6s 6d per gal. D/d UK in bulk : Pale A.D.F. from 6s 5d per imperial gallon f.o.b. UK, 95 cents per US gallon, c.i.f. NY.

Naphtha.—Solvent, 90/160°, 5s per gal ; heavy, 90/190°, 3s 11d per gal. for bulk 1000-gal. lots, d/d. Drums extra ; higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in buyers' bags, £18 1s 6d to £29 12s per ton nominal, according to m.p. ; hot pressed, £41 10s 6d per ton in bulk ex-works ; refined crystals, £60 10s per ton d/d min. 4-ton lots.

Pitch.—Medium, soft, home trade, £9 per ton f.o.r. suppliers' works ; export trade about £10 10s per ton f.o.b. suppliers' port.

Pyridine.—90/160, 20/- to £1 2s 6d per gal.

Toluole.—Pure, 5s 9d ; 90's 5s 0d per gal. d/d. 1000 gal. lots in bulk. MANCHESTER : Pure, 5s 7d per gal. naked.

Xylole.—5s 10d to 6s 3½d per gal., according to grade, in 1000 gal. lots d/d London area in bulk.

Intermediates & Dyes (Prices Nominal)

***m*-Cresol** 98/100%.—4s 9d per lb. d/d.

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

***p*-Cresol** 34/35° C.—4s 9d per lb. d/d.

Dichloraniline.—4s 3½d per lb.

Dinitrobenzene.—88/99° C., 2s per lb.

Dinitrotoluene.— S.P. 15° C., 2s 0½d per lb. ; S.P. 26° C., 1s 4d per lb. ; S.P. 33° C., 1s 2d per lb. ; S.P. 66/68° C., 1s 10d per lb. Drums extra.

***p*-Nitraniline.**—4s 10d per lb.

Nitrobenzene.—Spot, 10d per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—2s 4d per lb.

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

***p*-Toluidine.**—5s 9½d per lb., in casks.

Dimethylaniline.—3s 3d per lb., drums extra, carriage paid.

Law & Company News

Commercial Intelligence

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

Mortgages & Charges

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

DIAC LTD., New Addington, plastic manufacturers.—17 February, charge, to Westminster Bank Ltd. securing all moneys due or to become due to the bank; charged on factory at King Henry's Drive and Vulcan Way, New Addington. *£18,718. 31 December, 1954.

Satisfactions

'LIMAX' LTD., Maidstone, fertilizer manufacturers etc.—Satisfaction 29 February, of series of debentures registered 11 August, 1939 and 15 September, 1941.

WALTER CARSON & SONS (DUBLIN) LTD., paint etc. manufacturers.—Satisfaction 21 February of mortgage registered 20 May, 1947.

New Registrations

Private company. (563,066). Registered 21 March. Capital £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in gelatines, gelatine sheets, glues, adhesives, gums, etc. Subscribers (each with one share) William J. F. Hillier, 15 Devonshire Gardens, London, N21, and Douglas E. Challis, 52 Inverness Ave, Enfield, Middlesex. William J. F. Hillier is the first director.

F. Kanematsu & Co. Ltd.

Particulars filed 17 March 1956 pursuant to Section 407 of the Companies Act 1948. Capital 24,000,000 shares of Y 50 each. Registered in Japan, to carry on international trade sale and purchase of commodities, import, sale and purchase of fertilizers, scales, measures and meters, medicines, chemicals, etc. British address: 12-13 Copthall Court, EC2. Kazumi Sene of 64 Whiteland House, Cheltenham Terrace, Chelsea, SW3, is authorized to accept service of process and notices. Directors are:— Toyoki Oki, Saburo Yamamoto, Tokutare Morwaki and 11 others, all resident in Japan.

Rustat Pharmaceuticals Ltd.

Private company (563,200). Capital £100. To carry on the business of manufacturing chemists and druggists etc. Directors: Arthur Firth and Doris W. Day. Reg. office: 203 Whitchurch Lane, Edgware, Middlesex.

Agprolin Ltd.

Private company (563,137). Capital £1,000. To carry on the business of manufacturers of and dealers in chemical gases, drugs, medicines, plaster of paris, gypsum, plasters, disinfectants etc. Directors: John F. Anderton and Joseph McMurray. Reg office: 1 Central Street, Manchester 2.

Company News

British Industrial Plastics Ltd.

Net profit of the group, before taxation, was £669,464, compared with £571,257 for the previous year, which was then a record. The directors recommend a final dividend on the ordinary shares of 12½ per cent, making with the interim dividend of 7½ per cent, already paid, a total of 20 per cent for the year. During the year the manufacture and sale of the products of the group's chemical factories were transferred to a new subsidiary company, BIP Chemicals Ltd. Since 1951 the Group's chemical sales have remained remarkably stable. Three of the retiring directors, Dr. W. Blakey, Major W. I. Anderson, and Sir A. P. M. Fleming were re-elected.

Aluminium Ltd.

Net income of the company for 1955, after depreciation and dividends on preferred shares of subsidiaries, was $48,193,952, or the equivalent of $4.83 per share on the 9,975,690 shares outstanding at the end of the year. During the year the company's principal subsidiary, Aluminium Co. of Canada Ltd., produced a record of 607,700 short tons of primary aluminium,

an increase of eight per cent over the previous year. The annual general meeting of the company will be held in Montreal on 26 April.

Next Week's Events

WEDNESDAY 4 APRIL

Society for Analytical Chemistry

London: Meeting Room of The Chemical Society, 7 p.m. Meeting for the reading of original papers. 'The Determination of 4-Chloro-2-Methylphenoxyacetic Acid in MPCA by a Differential Refractometric Method' by R. Hill, B.Sc., A.R.I.C., and 'Paper Chromatography With Continuous Change in Solvent Composition. Part I 'Separation of Fatty Acids'. Part II 'Separation of Surface Active Agents' by F. Franks, B.Sc., A.R.I.C.

SCI (South Wales)

Newport: Technical College, 7 p.m. 'Atmospheric Pollution' by D. R. Booth.

Institute of Fuel

London: Institution of Civil Engineers, Great George Street SW1, 5.30 p.m. 'Fuel & Power Surveys' by L. Clegg, M.B.E.

THURSDAY 5 APRIL

SCI (Fine Chemicals Group)

London: The Wellcome Building, 183-193 Euston Road NW1. Two-day symposium on 'Hypotensive Drugs & the Control of Vascular Tone in Hypertension'. Thursday morning: 'Chemical & Biochemical Aspects'. Afternoon: 'The Pharmocology of Hypotensive Drugs'. Friday morning: 'Clinical Applications of Hypotensive Drugs'. Afternoon: 'The Control of Vascular Tone in Hypertension'.

Institution of Chemical Engineers

London: The Institution of Electrical Engineers, Victoria Embankment SW1, 5.30 p.m. British Nuclear Energy Conference for presentation of papers, 'The Control & Instrumentation of a Nuclear Reactor'; 'The Control of Nuclear Reactors'; 'Reactor Control Ionization Chambers'; and 'Some Design Aspects of Nuclear Reactor Control Mechanisms'.

FRIDAY 6 APRIL

RIC (London)

Harwell: Cockcroft Hall, AERE, 7 p.m. Tour of establishment and paper 'Age Determinations' by L. H. Ahrens, M.A., B.Sc., D.Sc., F.R.I.C.

Society of Instrument Technology

Fawley: Copthorne House, 7 p.m. Annual general meeting.

SCI (Manchester)

Manchester: The University, 6 p.m. 'Manchester & the Origins of the Dyestuffs Industry' by R. Brightman.

Appeal for Rubber Technologists

An appeal for more students to become technologists was made by Mr. John H. Lord, Dunlop director and a past president of the Federation of Rubber Manufacturers, when presenting diplomas and prizes at the National College of Rubber Technology in London. 'Rubber', he said, 'would always play an important rôle in the economy of the world, but so would man-made plastics'.

Osaka Trade Fair

Terylene is being displayed for the first time in Japan at the Osaka Trade Fair from 18 to 22 April. Ardil is also being shown, together with a range of ICI dyestuffs. The exhibits include fabrics and garments made from Terylene and Ardil.

Brotherton Centenary

NO pupil of Roscoe did more for the chemical industry than Edward Allen Brotherton, who was born 100 years ago. Lord Brotherton is remembered by his gifts to Leeds University, where he built and maintained a large library at great cost. But the chemical industry remembers him as a founder of works in Wakefield, Leeds, Liverpool, Birmingham, Glasgow and elsewhere, for producing tar-free ammonia liquors for wool-washing, and pure ammonia for the Mond ammonia-soda process.

Brotherton brought efficiency to the old haphazard production of ammonia liquor. Since ammonia was also needed for cyanide production, Brotherton became interested in the Cassel Cyanide Company. In 1901 he acquired the Mersey Chemical Company and there manufactured sodium hydrosulphite for vat colours, in addition to his main interest of producing 10,000 tons a year of 25 per cent ammonia together with carbolic oils, creosote, naphthalene, anthracene and other tar products.

Early in his career Brotherton foresaw that the chemical industry would depend on a liaison between chemistry, engineering and economics, a point of view that he kept successfully and which foreshadowed chemical engineering. Brotherton, a Messel medallist, was created a baron in 1928. He died in 1930 at Kirkham Abbey in Yorkshire.

Challenge to Britain

Sir Alexander Fleck, chairman of ICI, speaking to Widnes Chamber of Commerce on 19 March, said that if Britain were to meet the challenges to her economy she would not only have to be competitive in the price and quality of goods exported, but also in servicing and delivery. The best way to ensure that goods were competitive was to have expanding and efficient industries. They would have to keep pace with scientific developments, which was primarily a matter of research. This country's future depended on exporting capital goods, rather than on mass-produced textiles and cheap metal goods, with which this country built up its exports in the nineteenth century.

Will

MR. G. E. THOMPSON, of James Miller, Son & Co. Ltd., chemical merchants, of Glasgow, left £42,253 gross.

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

PETROCHEMICALS LIMITED, subsidiary of Shell Chemical Company Limited invite applications for the position of **CHEMICAL ENGINEER** in the recently formed Partington Research Laboratories near Manchester. Applicants should possess an Honours Degree in Chemical Engineering or equivalent qualification. Previous industrial experience would be an advantage. The successful candidate will carry out design work and participate in the operation of Pilot Plants for recently discovered polymerization processes. Please write giving details of age, qualifications and experience to:—**THE LABORATORY MANAGER, PETROCHEMICALS LIMITED, PARTINGTON INDUSTRIAL ESTATE, URMSTON, MANCHESTER.**

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HORIZONTAL Three-Throw Hydraulic Pump by Davy Bros. Rams 2½ in. diam. by 6 in. stroke; capacity 18 gal. per minute, with 30 h.p. squirrel-cage motor and starter (oil immersed), 1,520 lb. per sq. in. w.p.

Inspection here.

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(Two) 5,500 gall. 18 ' × 8 'CYL. TANKS. S.S. EMULSIFIERS or MIXING ARMS ¼, ½, 1 and 2 H.P. A.C. (Unused) ELEC. STIRRING ARMS ½ H.P./350 R.P.M./A.C. 2,400 gall. CYL. GLASS LINED TANK. S.S. JAC. MIXERS 39" × 32" and 40" × 24". OVENS, AUTOCLAVES, CONDENSERS, MIXERS, PUMPS, PANS. HYDRO'S etc. HARRY H. GARDAM & CO. LTD

HARRISON CARTER 5 FT. EDGE RUNNER MILL, with granite bed and rolls 2 ft. 6 in. diam. by 8½ in. fall. With reduction drive gear and 6 h.p. motor for 400/3/50. Excellent condition. **F. J. EDWARDS, LTD., 359 EUSTON ROAD, LONDON, N.W.1.**

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Stainless Steel **TROUGHS, TANKS** and **CYLINDERS** made to requirements.

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100g., 150g., and 200g., new in mild steel, for 100 lb. p.s.i. w.p.—with or without mixing gear.

3 cwt. **TROUGH MIXERS** by **CHALMERS** and **GARDNER** —stainless steel lined troughs.

50g., 75g. and 100 g. heavy duty **MIXERS** by **FALLOWS** and **BATES.** Agitators driven through bevel gears from fast and loose pulley.

200g. cast-iron **JACKETED MIXING VESSEL** with nickel-chrome impellor type agitator driven through bevel gears from fast and loose pulley.

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600

DRYING PLANT. Rotary Kiln by Krupp 197 ft. by 9 ft. 10 in. i.d. construction ¾ in. plate, lined 9 in. thick alumina brick, 4 roller paths. Drive by 120 h.p. Brook slipring **MOTOR** 400/3/50, through Reduction Gear and 3 sets open gears to firth gear.

ROTARY OIL FIRED KILN by Edgar Allen, 53 ft. by 6 ft. 7 in. diam., riveted steel construction. Drive through girth gear from 24 h.p. Slipring induction **MOTOR** 400/3/50, through Radicon Reduction Gear. Accessories include Kiln with feed and retractable firing hoods mounted on four bogies and track, cyclone 12 ft. on straight by 8 ft. diam.

ROTARY COOLER. 22 ft. 9½ in. by 4 ft. 8½ in. diam., construction ¾ in. plate. Chain driven by 20 h.p. Brook slipring motor 400/3/50, through Radicon Reduction Gear.

Double Tube **ROTARY DRYER** by Newell. 40 ft. by 6 ft. diam., internal flights. External flights 5 ft. diam., by 45 ft. Motorized 10 h.p. 400/3/50, through Reduction Gear.

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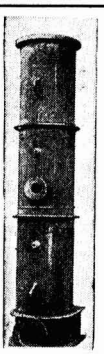

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