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Showmanship

SHOWMANSHIP and science may seem strange associates, but if science maintains 100 per cent objectivity in all its forms of expression, then science must inevitably become in the public eye one of the dullest of all subjects. However, more than a few of the world's greatest scientists have had a sense of showmanship, and have been far from reluctant to use it when seeking public attention. When science is allied with industry, the use of a little showmanship in explaining its aims and achievements may be even more readily justified, but in this country, in sharp contrast to America, there is still an excessive inheritance of prejudice against town-crying and modern methods of drum-beating. Industry's residual passion for secrecy and the narrow contempt of some scientists for public opinion can form a deadly partnership. Although there are welcome signs that these reactionary prejudices are weakening in the chemical industry, the gulf between British and US conceptions of public relations work is not decreasing; progress on this side of the Atlantic is being outstripped by expansion there.

This return to a critical theme is prompted by receiving from the US Manufacturing Chemists' Association a most handsomely detailed report on their second Chemical Progress Week held earlier this summer. The first of these large-scale ventures in seeking more public interest and understanding we discussed fairly fully last year (see THE CHEMICAL AGE, 1954, **70**, 1287). The impressive results of 1954 encouraged the MCA publicity organisers to widen their efforts in 1955. Where regions had been selected for 1954, whole States became the target-areas for 1955. Over 5,000 people in the chemical industry took part in the week's programme, and a much greater proportion of the US population was able to see Chemical Progress Week as an event taking place in their own district and not as an event reserved for distant cities and merely to be read about. The co-operation of the American Chemical Society and the American Institute of Chemical Engineers actually enabled the week to be observed in areas where there is still very little chemical industry.

The statistics of publicity generally require their additions of grains of salt. Even so, the 'numerical' story of Chemical Progress Week, 1955, must command respect. Over 1,700 speeches were made to group-type audiences—e.g. chambers of commerce, women's clubs, etc.—and 2,339 press stories were printed in 815 newspapers and magazines, reaching a total circulation of over 36,000,000. There were more than 2,000 radio programmes or 'mentions' and 257 TV shows. Approximately 450 works visits were attended by 42,000 people, rather more than half of the number being schoolchildren and students. Literature, specially produced for the week, was lavishly distributed and nearly 15,000 posters were displayed. Practically all these counts of effort showed big advances on the similar figures for 1954; notably, press reports were greater by 62 per cent and radio reports by 313

per cent. It can hardly be doubted that the sum effect of all this was a greatly increased public awareness and appreciation of the chemical industry and its products, and, no less importantly today, of the career opportunities that the industry offers to youth.

Those who may be led to assume that we are recommending an identical publicity effort here must be reminded of our 1954 comments. Then we suggested that 'the bandwagon might need to be decked with rather more restraint here . . .' and that 'the one-week punch technique might well be less fruitful than a smaller but steadier effort . . .' Regional responses differ. Even in the United States, each area in the Chemical Progress Week programme has its own sub-committees and officers and adjusts the plan of campaign to suit its own population. Nor in any case would we put forward even the second Chemical Progress Week as an example of perfection; the MCA's own report shows that there still remains a good deal of scope for improvement. Difficulties that only actual practice could have revealed are not being complacently ignored. Much of the material used in 1955 was the same, or nearly the same, as the 1954 material, and it is being reported from many areas that fresh material will be essential if a third week is to make another successful impression in 1956. The area distribution of headquarters-provided material again suffered from bottleneck problems; requirements were under-estimated. The date chosen for the week is not altogether suitable for one of its principal aims, contact with schools and leaving-age youth. In many areas the week coincides with annual examinations. It has now been realised that practically all industry personnel participating in the programme come from works or production sectors; the industry's sales-force is scarcely engaged. This may have originated through an initial desire to moderate directly commercial aims, but it is now felt that added effort from salesmen would increase the number of meetings addressed and double the volume of literature distributed.

The type of literature produced for the week ranged from a book to 'throw-away' leaflets. 35,000 copies of the book, 'Chemical Industry Facts Book', were distributed. MCA's regular newssheet, 'Chemical News', had a special issue and an extra distribution of 50,000. Booklets on such topics as 'Chemicals from Salt and the Sea', 'Crops and Chemicals', 'Your Food and Chemical Research' were produced. The title of this year's 'throw-away' leaflet was 'What Chemical Progress Means to You'. In addition chemical companies supporting the week often distributed their own literature—the amount of this was in fact 300 per cent greater than in 1954. For 1956 a popularly written book, 'Miracles of Chemistry', and a booklet, 'Careers in Chemistry' are already scheduled.

Any one who has taken part in a few exhibitions knows that a high proportion of freely issued literature is wasted, but when the material is good and attractively enough presented there is always a compensating proportion that is far from wasted. The more substantial the booklet the more likely is it to be kept, in which case it may be read in time by several people and create fresh interest long after the occasion of distribution. The cost of this method of publicity often deters smaller companies from fully exploiting it, but literature production costs are low when 'general' items are published for an industry by its central organisation. It may help in distribution and interest to associate a publicity week with this type of book and booklet, but the two methods are not mutually indispensable. Here a careers booklet aimed at the schools could certainly make its own separate impact.

Nothing even remotely comparable to this MCA publicity effort has ever been attempted by the British industry. To the man in the street the chemical industry here still remains mysterious and enigmatic, something to do with acids, something to do with dyes. The arrival of a new chemical factory in most areas is a matter for concern, concern about fumes and explosions. Those who prefer to pursue the course of complacency might well reflect that the word 'chemical', used as a noun or an adjective, engenders quite as much suspicion as it does respect in this country.

Notes & Comments

Beryllium in the Courts

A LEGAL decision discussed recently in *The British Manufacturer* is of considerable interest to the chemical industry although the incident concerned arose in the electrical industry. A woman worker engaged for only two months in making fluorescent lighting tubes contracted acute beryllium poisoning; her duties had involved handling beryllium oxide or zinc beryllium silicate. At the time the use of these substances was experimental in this industry. When an action for damages was brought, the manufacturers' defence was mainly based upon the plea that they were unaware at the time that beryllium was toxic. At the first hearing the action was decided against the worker. On appeal, one of the three Lords Justices regarded this plea of ignorance as ineffectual. There was adequate information about the toxic hazards of beryllium in both British and US literature, and these dangers were in fact described in chemical abstracts in the company's own library. However, this powerful argument for reversing the first decision was not supported by the other two Lords Justices, the manufacturers' view that there was no reason at the time to suspect what was to them a 'a new material' being upheld. It is possibly not irrelevant that beryllium was officially listed as toxically dangerous a year after this unfortunate case of poisoning had occurred. However, the final instalment in this legal story may yet be told for leave to appeal to the House of Lords has been given.

A Prudent Course

THE importance attached by one of the appeal judges to the fact that the risks of beryllium were discussed in scientific literature held in the firm's own library should be noted by the chemical industry. That ignorance is not a valid defence is more of a military than civil principle. However, most firms remain ignorant about many subjects that are discussed in the comprehensive abstract journals they regularly receive—to 'study everything' is virtually impossible. When, however, a new or relatively unknown material is to be introduced, it would be prudent to make a thorough literature search for any references to its hazards.

Lung Cancer & Industry

A CONTRIBUTOR to the *British Medical Journal* (1955, 24 September, 780) has pointed out that the recent emphasis upon cigarette smoking as a direct (or casual) cause of lung cancer has drawn attention away from other suspect causes including industrial processes. This reminder that certain occupations are statistically associated with an abnormally high incidence of lung cancer is timely. The medical or industrial health literature cited falls between 1948 and 1955. This is a fairly recent period and during much of it the cigarette controversy has dominated most discussions on this subject. The principal types of process which have at least been listed for suspicion are mining some of the radioactive ores, nickel refining, manufacture of chromates, coal gas manufacture, processes that involve exposure to arsenical dust, and the asbestos industry.

Asbestosis & Mortality

THE evidence that there is a special risk of lung cancer occurrence in the asbestos industry is discussed in some detail in this latest *B.M.J.* article. Mortality statistics give a clear indication that asbestosis is more frequently associated with lung cancer than silicosis. A study of 113 people (all of whom had worked for at least twenty years where they were liable to be exposed to asbestos dust) showed that 39 had died by 1953 whereas by normal life expectation statistics only 15 should have died. An examination of the causes of death showed that almost the whole of this excess could be accounted for by lung cancer and other respiratory or respiratory-related diseases. Of the 24 extra deaths, 10 could be set against lung

cancer and 14 against other lung troubles. The 'chance' of lung cancer incidence was ten times higher than the normal, everyday chance; the 'chance' of the other respiratory diseases was about three times higher than the normal. Although it may be argued that a study of 113 people represents a small sample, this disparity in risk rate seems far too large to be dismissed as a statistical illusion. Furthermore, there was some indication that this high risk of contracting lung cancer was smaller among those asbestos workers who had enjoyed modern dust-reducing benefits during much of their employment. In a period when the incidence of this disease has been generally rising, evidence of a relationship bringing reduction in incidence rate seems more than suggestive.

Control of Dust Essential

MUCH larger 'sample-studies' have been taken for silicosis, but it has not been possible to trace any strong relationship between silicosis and lung cancer. Mortality from lung cancer was low where pneumoconiosis was prevalent, but this could be due to the relatively early age at which deaths from the latter disease tend to occur. However, there is no evidence that coal dust is carcinogenic and, in contrast, the evidence that asbestos dust may be is circumstantially strong. Obviously the most stringent attention to dust control must be paid in industries handling asbestos, and also in industries where other suspected materials (mentioned above) are handled.

Service for Science

A WELL-KNOWN writer of 'popular science' articles for US magazines has this year been academically honoured. He is also an industrial research chemist specialising in cellulose chemistry. His newly awarded D.Sc., at the age of 37, 'for his writings on scientific subjects and his research on cellulose chemistry' is a two-in-one recognition that would be unlikely to happen here. Typical articles mentioned in a brief 'profile' study in *Chemical and Engineering News* (1955, **33**, 3604) were 'Sodium: Temperamental Metal' in *Science Digest* and 'High Vacuum Does the Incredible' in *Nation's Business*. In this country it is far more likely that a research chemist's part-time preoccupation with scientific writing of this kind would reduce rather than add to his chances of higher academic status. Yet popular exposition is a notable and constantly needed service to both science and scientists, and when a suitably qualified person is able to achieve the journalistic skill also required the risk of exaggeration and distortion is greatly minimised. That in America this scientist's more popular work has been specifically mentioned in his doctorate award might cause surprise here but it should not produce derision. Our own academic attitude is obsolete and, in contrast, it discourages genuine scientists from popular article writing.

British Oxygen Development

THE British Oxygen Co. Ltd. announce that their chemicals division is being brought under a new subsidiary company to be known as British Oxygen Chemicals Ltd., the objects of the new company being to manufacture and sell chemical derivatives of carbide of calcium, acetylene, nitrogen, oxygen, etc. The authorised capital is £1,500,000 which will be divided into 1,500,000 shares of £1 each, and the directors are Mr. F. C. S. L. Lewin-Harris and Dr. R. F. Goldstein.

British Oxygen Chemicals Ltd., a development of the chemicals division of the British Oxygen Co., will base its main production operations at Chester-le-Street, County Durham. The first plant, for the manufacture of melamine, a raw material for the plastics industry, started production in 1951. A further plant for vinyl acetate monomer and polyvinyl acetate came into operation recently. British Oxygen Chemicals Ltd. is also responsible for making and selling vinyl pyrrolidone.

The chairman of the British Oxygen Co., Mr. J. S. Hutchison, announced at the annual general meeting of the company in May this year that it had been decided to expand the melamine plant. This extension will be brought into production in 1956.

Chemical Exports for Month of August

India Becomes Principal Buyer

EXPORTS of chemicals showed a considerable rise in August, increasing by more than £4,000,000 over the previous month. Significant in the demand for British chemicals was that India became the principal buyer, spending £867,103 more than in July. Australia, New Zealand, South Africa and Western Germany all imported more British chemicals than they did in the previous month. Chemicals in demand were: sodium hydroxide, sodium carbonate, aluminium sulphate, bleaching powder, hydrosulphite, lead compounds, insecticides and fungicides, and disinfectants, all of which more than doubled their July figures. Most noticeable decreases in the month were creosote oil, acetone, and coal tar.

EXPORTS : PRINCIPAL COMMODITIES

	Aug. 1955	July 1955	Aug. 1954
Acids, inorganic (cwt.)	16,717	12,735	12,908
Copper sulphate (tons)	4,587	1,683	1,839
Sodium hydroxide (cwt.)	441,696	203,847	407,898
Sodium carbonate (cwt.)	413,220	226,209	393,681
Aluminium oxide (tons)	2	2,116	23
Aluminium sulphate (tons)	3,759	1,756	2,664
Ammonia (cwt.)	9,391	7,303	8,137
Bismuth compounds (lb.)	24,543	22,567	33,401
Bleaching powder (cwt.)	52,424	15,252	22,620
Hydrosulphite (cwt.)	15,488	8,515	7,661
Calcium compounds, inorganic (cwt.)	29,969	29,418	24,817
Lead compounds, inorganic (cwt.)	6,416	3,752	6,227
Magnesium compounds (tons)	1,259	711	570
Nickel salts (cwt.)	7,615	8,856	6,482
Potassium compounds (cwt.)	5,610	4,103	3,393
Acids, organic & derivatives (value in £s)	85,498	81,243	67,960
Ethyl, methyl, etc. alcohols (vakue in £s)	109,373	178,494	91,922
Acetone (cwt.)	5,297	23,698	11,720
Citric acid (cwt.)	3,157	2,570	1,978
Sulphonamides, unprep. (lb.)	129,358	96,449	41,186
Dyestuffs intermediates (cwt.)	9,678	4,333	6,527
Total for elements & compounds in £s	**£5,196,703**	**£3,905,802**	**£3,985,681**
Coal tar (tons)	17,586	25,723	5,965
Cresylic acid (gal.)	336,847	353,401	183,205
Creosote oil (gal.)	1,526,730	2,064,163	3,958,874
Total for tar products in £s	**£407,774**	**£492,251**	**£392,637**
Indigo, synthetic (cwt.)	1,801	1,402	1,349
Total for synthetic dyestuffs (cwt.)	**23,707**	**16,788**	**21,814**
Total for paints, pigments & tannins in £s	**£2,058,582**	**£1,621,815**	**£1,508,525**
Total for medicinal & pharmaceutical products in £s	**£3,226,612**	**£2,716,553**	**£2,694,730**
Essential oils (lb.) :			
Natural	47,225	18,042	21,465
Synthetic	105,045	96,301	65,902
Flavouring essences (value in £s)	134,209	85,140	80,333
Total for essential oils, perfumes, etc., in £s	**£2,526,821**	**£1,855,994**	**£1,694,406**
Ammonium nitrate (tons)	317	524	542
Ammonium sulphate (tons)	15,884	20,106	34,194
Total for all fertilisers in £s	**341,229**	**435,335**	**670,819**
Total for plastics materials (cwt.)	**149,010**	**132,521**	**113,919**
Disinfectants, etc. (cwt.)	23,727	11,791	19,049
Insecticides and fungicides (cwt,)	63,043	39,787	38,319
Rodenticides and weedkillers (cwt.)	5,914	3,824	3,701
Lead tetra-ethyl (gal.)	642,497	469,022	381,555

VALUE OF EXPORTS IN £ : PRINCIPAL BUYERS OF CHEMICALS

	Aug. 1955	July 1955	Aug. 1954
India	1,867,198	1,009,095	1,589,742
Australia	1,731,750	1,509,512	1,415,159
South Africa	1,074,505	812,673	799,798
Canada	769,778	830,747	544,029
United States	676,792	752,435	626,139
New Zealand	665,125	587,931	603,332
Netherlands	645,909	787,724	469,029
Nigeria	595,527	425,020	296,078
Pakistan	551,962	323,817	196,940
Eire	489,999	638,874	461,450
Italy	467,550	572,306	339,992
Belgium	455,892	395,141	299,043
Gold Coast	453,249	335,657	232,846
Western Germany	438,340	435,066	410,468
Singapore	432,920	274,662	333,272
Sweden	424,910	549,026	469,250
Finland	420,208	255,951	336,832
France	415,028	513,059	340,010
Malaya	372,246	261,621	275,012
Egypt	318,785	518,113	313,841
Hong Kong	307,263	195,302	331,648
Argentina	302,507	463,617	388,241
Denmark	275,695	360,594	294,639
Trinidad	260,882	265,163	159,970
Norway	207,515	288,836	201,208
Switzerland	168,831	206,805	246,859
Turkey	192,640	200,352	159,708
Total value of chemical exports	**22,605,720**	**18,276,022**	**16,698,625**

Perkin Celebration

Centenary of Mauve in 1956

WITHOUT exaggeration it can be said that the discovery of the synthetic dye 'mauve' by William Perkin was the beginning of the modern dyestuffs industry and perhaps of the organic chemical industry in general.

To mark the centenary of this event appropriate celebrations are to be held in London in May 1956 under the patronage of HRH The Duke of Edinburgh. The initial moves were made by the Society of Dyers and Colourists some time ago and they have now been joined by The Royal Society, The Chemical Society, The Society of Chemical Industry, The Royal Institute of Chemistry and The Association of British Chemical Manufacturers.

The president of the celebration is the president of the Royal Society with the presidents of the sponsoring societies as vice-presidents. An organising committee has been set up under the chairmanship of Sir Robert Robinson.

Detailed plans have not yet been formulated but an appeal will shortly be made for support for a £100,000 fund which will be used mainly to set up a trust fund for financing Perkin Centenary Scholarships, intended to promote, advance and encourage technical education in relation to all aspects of the fabrication or application of colouring matters.

The main celebration will consist of a series of five lectures dealing with the effects of Perkin's discovery on life and industry during the past 100 years. There will also be a conversazione which will provide an opportunity for overseas delegates to meet one another and the delegates from Britain. A banquet is also planned at which it is hoped that HRH The Duke of Edinburgh will be present.

It is possible that a memorial volume will be produced.

Ti by Spectrography

ANALYSIS of titanium metal and its alloys by three spectrographic techniques is discussed in a paper by W. M. Henry, E. R. Bloser, and E. J. Center, of Battelle Institute, Columbus, Ohio, presented at the 128th National Meeting of the American Chemical Society in Minneapolis.

Samples in oxide form are used when extraneous elements are present in amounts ranging from 0.05 to 0.001 per cent or less. For the easily volatilised elements, the oxide-form sample is mixed with a carrier material (20 per cent AgCl-80 per cent TiO_2) and excited, using a direct current arc. For refractory elements, a portion of the oxide is sealed on the ends of one-quarter-inch diameter graphite rods and completely burned, using an overdamped interrupted arc.

The authors state that a solution spark method is more accurate for the analysis of high amounts of impurities and alloying additions. With this procedure, sample drillings are dissolved and the acidity and volume of the solution are adjusted in respect to metal content. Standards are readily synthesised, using pure stock solutions of titanium and the desired elements. A Lucite-cup assembly is used to contain the samples or standards during spark excitation. The accuracy of the solution spark method is in the range of ± 2-3 per cent, compared with chemical analyses.

Nylon Material

CALATON CA, a nylon product originally developed as a wound dressing is finding a number of interesting applications.

When made into a thin film this material is impermeable to water and bacteria but permeable to water vapour so that the wound can breathe and hence heal more rapidly. Difficulties arose, however, in converting it into a thin film and for this reason its use as a dressing was abandoned.

A number of new uses have been found for this polymer and it is now being sold in increasing quantities by I.C.I. Plastics Division. It is used for coating cables, conveyor belts and other articles where flexibility and high abrasion resistance are necessary.

Another use for Calaton CA is the treatment of wool to reduce its tendency to felting shrinkage. The wool, which has previousy been cleaned by ethanol extraction, is impregnated with an alcoholic solution of the product. The fabric after drying is treated with a weakly acidic solution to turn the polymer back to the original nylon. As little as three per cent of Calaton CA is said to be effective in stopping felting shrinkage.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

AN expert committee appointed by the Production Ministry of the Government of India has recommended that the State-owned penicillin factory at Pimpri, near Poona, should manufacture all types of penicillin required in the country. The manufacture of bicillin should be taken up at the factory. Steps should be taken to siliconise glass vials at the penicillin bottling plant at Bombay. The committee has recommended the use of potassium salt in India as there is no significant therapeutic difference between the potassium and the sodium salts, the point in favour of the potassium salt being that it is less hygroscopic. Another recommendation is to the effect that procaine penicillin should be dispensed in two forms, one fortified with sodium or potassium salt, and the other in oil with two per cent of aluminium monostearate. Among other recommendations, mention may be made of the use of benzathine penicillin and BBED penicillin as they are assuming greater prominence. The capacity of the factory is to be expanded by 60 per cent resulting in a production of 28 to 32 mega units of penicillin per year as against the present production of 15 to 20 mega units per year.

* * *

There was an all round improvement in the production of chemicals by the Mettur Chemicals and Industrial Corporation Ltd., Mettur Dam, South India, during the past year. The output of caustic soda reached the target production of 3,939 tons in 1954-55, since the expansion of the alkali plant in 1951, the previous year's, 1953-54, production being 3,078 tons. The production of liquid chlorine was 1,364 tons in the current year as against 1,265 tons in the past year while bleaching powder output was 2,217 tons as compared to 1,891 tons in the same periods. It has already been stated in these columns (see THE CHEMICAL AGE, 1955, **73**, 433) that the company has undertaken expansion of the stable bleaching powder plant which is expected to be completed in a few months.

* * *

The Dharambi Chemical Company of Bombay had treated as a trial measure 1,250 tons of sulphuric acid sludge from the Burmah Shell Refineries Ltd., during 1955 with successful recoveries. The construction of the new 25 ton capacity contact acid sulphuric plant has been delayed owing to the London dock strike and is expected to be completed sometime this month. The company produced about 20,838 tons of superphosphate in 1954, which is about 20 per cent of the total Indian production. The full capacity of the fertiliser plant has not yet been reached.

* * *

Imperial Chemical Industries (India) Ltd., are reported to be planning to expand their manufactures in India to include a wider range of chemicals and dyestuffs. A German team of dyestuff experts is already in the country preparing blueprints for another company, while an Italian team is expected to visit India shortly.

* * *

The capacity for the production of basic and silica refractories in India is expected to be increased. At the moment there are 32 units manufacturing refractories in India with a total installed capacity of 329,410 tons per year. With the expansion programme of six units and additional installation of three more units the total capacity would go up to 460,000 tons. There is adequate supply of firebricks and the shortage is only of magnesite and silica bricks. In this connection it may be added that considerable research work has gone on in the Central Glass and Ceramic Research Institute at Calcutta and at the National Metallurgical Laboratory at Jamshedpur for the manufacture of forsterite and chrome refractories utilising indigenous raw materials.

* * *

A new coke oven plant is expected to be erected at Durgapur, West Bengal, at a cost of Rs.120,000,000 (£9,000,000). There is great scope for the production of coke and manufacture of by-product coal distillation products. The new plant aims at high, medium or low temperature carbonisation of coal for production of metallurgical, domestic and industrial coke, manufacture of tar and its by-products and manufacture of benzol and its derivatives. The develop-

ments would be carried out in five stages and would culminate in the establishment of a Siseler-Tropsch synthetic oil plant.

* * *

The Government of India have accepted the proposal that steel plants should use washed coal. The intention seems to be to set up coal washing plants in the public sector and review according to the cost involved the price of coal. The Government of India are also understood to be considering the question of nationalising coal mines and have set up a committee to study the problem of amalgamation of uneconomic small collieries in Bihar. On the question of nationalising the Kolar gold mines, the Government of Mysore appear to have taken a firm stand in its favour though the final decision of the Government of India in this regard is awaited.

* * *

A development council for the art silk industry was inaugurated recently in Bombay by the Minister for Commerce and Industry of the Government of India. The council would serve the various aspects of the industry like the research programme, co-ordination of production and review of progress from time to time. The industry made a modest beginning in 1951 with about 5,000,000 lb. of viscose rayon and during the last four years not only has the production doubled but a start has been made in the production of man made fibres. An export promotion council was also formed sometime back to facilitate export of quality goods abroad.

* * *

A plea has been made for the continuance of protection to the aluminium industry in India which has been in operation since 1949 and which is due to expire by the end of the year. There are two primary producers of the metal, *viz.*, The Indian Aluminium Co. Ltd., and the Aluminium Corporation of India Ltd., who have a total installed capacity of 7,200 tons of ingots per year. The actual production in 1954 has been 4,833 tons while for the first six months of the current year it has been 3,417 tons. The two companies have expansion schemes to take the production to 20,000 tons per year as envisaged in the first five year plan. In this connection it should be added that the Electrochemical Society, India Section, is holding a special meeting in September wholly devoted to the production of aluminium, aluminium in the consumer industries and research on aluminium in India. The Society is bringing forth a directory of aluminium which is claimed to be the first venture of its kind.

Chemicals in Finland

CONTAINED in *Teknillisen Kemian Aikakausilehti* for 31 August are some facts and figures about the Finnish chemical industry.

The total production of nitrogen compounds by Typpi Company in 1954 was 17,265 tons, calculated as pure nitrogen. The manufactured products were as follows: nitro-chalk 56,967 tons; ammonia, technical, 3,199 tons, anhydrous 70 tons, and aqueous 25 per cent 587 tons; ammonium nitrate 556 tons and nitric acid 217 tons.

At present Typpi Company produce 40 per cent of the nitrogen fertilisers consumed by the Finnish agricultural industry. It was decided at the end of 1954 to double the size of the factory at a calculated cost of 2,400,000,000 Fmks.

Electrolysis of sodium chloride is carried out by the Kymmene Company and Finnish Chemicals Ltd. Both companies started last year to enlarge their plants; the new plant of Finnish Chemicals will have an annual capacity of 18,000 tons and that of Kymmene 12,000 tons.

The production of sodium hydroxide in 1954 was 27,641 tons and that of chlorine 24,561 tons. In addition to this *ca* 11,300 tons of sodium hydroxide were imported. The production of hydrochloric acid was 1,927 tons.

Figures for the years 1952-3-4 show a general increase in production by the Finnish chemical industry. Plastics materials although only produced on a small scale as yet, are coming into greater prominence. An estimated 580 tons of phenol-formaldehyde moulding powder were produced in 1954 as against 305 tons in 1952. Similar increases have been shown by other plastics.

Rare Earth Factory

A factory at Alwaye set up by Indian Rare Earths Ltd. treats monazite sand to produce rare earth compounds and trisodium phosphate. The residue is treated at the uranium-thorium plant set up by the Indian Government in the Department of Atomic Energy at Trombay to produce thorium and uranium compounds.

Tred 50 & Tred 85

Rubber Reinforcing Resins by Monsanto

IT is possible to obtain rubber compounds with high hardness values by the use of large quantities of mineral fillers. Such compounds, however, have poor physical properties says a publication 'Tred 50 and Tred 85' by Monsanto Chemicals Ltd. Better results may be obtained by the use of high styrene resins which produce compounds with similar hardness values but which exhibit excellent resistance to abrasion and flexing, coupled with low specific gravity.

This combination of properties has made possible the production of resin rubber soling materials which are now competing on favourable terms with leather. Experiments have shown that resin rubber soles wear from 2-4 times as long as first quality leather, while retaining many of the properties of the natural product.

Tred 50 and Tred 85 are high styrene butadiene copolymers which have been specifically designed by Monsanto as reinforcing agents for natural and synthetic rubbers. Tred 50 is an easy processing resin containing 50 per cent of combined styrene and is available in the form of a free flowing pale crumb. It requires no special mixing conditions and may be incorporated into rubber on an open mill or in an internal mixer at normal processing temperatures.

Tred 85 contains 85 per cent of combined styrene and is available as a free flowing white granular solid. A processing temperature of 100-120°C is required for this material to ensure complete dispersion in rubber and it is recommended for use where an internal mill or a steam heated open mill is standard equipment.

These two materials exhibit a high degree of reinforcement when added to rubber and Monsanto recommend their use where the following properties are important:—

1. High hardness
2. Low specific gravity
3. Low pigmentation
4. Good resistance to flexing
5. Good resistance to abrasion
6. Good ageing properties
7. High volume resistivity.

They are also of value as processing aids and their use greatly assists in the dispersion of mineral fillers. Other uses include control of swelling and shrinkage during extruding and calendering operations.

Extensive laboratory and wearer trials have been carried out to study the effect of Tred copolymers when used in the manufacture of resin rubber and micro-cellular type soling materials. Tred copolymers have also been examined in other applications such as luggage materials, flooring, cable stocks and general mechanicals where their reinforcing properties, coupled with ease of processing, make them of particular value.

There appear to be no particular difficulties in the processing of Tred 50 and 85. Tred 50 can be directly added to masticated rubber on an open mill and requires only normal processing temperatures to produce complete homogeneity. Tred 85, however, requires the addition of a flux to produce an homogeneous mixture, and it is recommended that it be banded on a mill at 100-120°C and that previously masticated rubber be added and then dispersed. Alternatively the resin may be added to masticated rubber on a mill at the same temperature, i.e. 100-120°C and dispersed.

Properties Examined

Monsanto have examined the properties of these copolymers in a variety of different uses, e.g. in a gum stock in comparison with other fillers, in shoe soling, in micro-cellular soling, and as an aid to extrusion.

Tred is claimed to be an excellent extrusion aid and it is said that it will be of special interest to manufacturers who produce high quality extrusions. Both surface finish and control of die swell are greatly improved by the incorporation of only small quantities of Tred. Additional advantages are shorter mixing cycles and improved ageing properties.

Some photographs are reproduced in this publication which illustrate the superior surface finish of extrusions containing Tred 50.

An appendix to this laboratory report describes briefly some of the experimental

methods used by Monsanto in this investigation. All mixing was performed on a laboratory two roll mill with a friction ratio of 1:1.25. Mill temperatures were controlled at 70°C except when Tred 85 were to be homogenised on the mill prior to compounding, when a temperature of 110-120°C was used.

A two day light 24 in. square platen steam press was employed for all curing operations. Curing was performed 24 hours after mixing in each case.

Tensile strength, elongation at break, modulus, hardness and compression set were all tested according to BS. 903:1950. Ring shaped specimens were used for tension strength, modulus and elongation at break per cent. The average of four results is quoted in each case.

Volume resistivity was measured by a new technique developed in Monsanto's laboratories, in which the voltage drop of a charged capacitor as its charge leaks through an electrical system across a rubber specimen is measured.

Oil Industry Literature

PIB Offers Wide Range

LITERATURE covering the oil industry covers a wide range and that issued by The Petroleum Information Bureau of 29 New Bond Street, London, W.1, is being repeatedly revised to keep it up to date. The Bureau has recently concluded revisions on several of its works and new titles have been added. All are free of charge on application.

Some titles now available are: Oil in Middle East, the US, Latin America, in the Far East and the USSR, Production of Oil in Britain, The Growth of World Oil Production (graph), and What Oil Means to Britain.

Prospecting, drilling, transport and production are fully covered and there is a comprehensive coverage of general subjects including The World's Oil Reserves, Lubrication, Oil & Steel, Chemicals from Petroleum, Petroleum—Some Lesser Known Uses, and Oil & Agriculture.

A variety of wall charts are also available, free, and cover the story of oil, welfare and educational services provided by the industry. Three charts—Searching for Oil, Drilling for Oil, and Refining of Oil—are available, price 4s. 6d. A new edition of a coloured wall map giving world oil production figures for last year and the intake capacity at the end of the year is available, price 2s.

The Bureau also offers a range of film strips, display cabinets, picture sets, episcope photographs and sets of samples of crude and principal products, specimen core of rock from Eakring, Notts, and specimens of Scottish oil-shale. All are loaned free of charge for a period up to 14 days.

Tobacco Curing

TOBACCO ageing is primarily chemical when flue-curing is involved, but probably involves both chemical and enzyme action when the tobacco is air-cured. Robert E. Barrett, of Battelle Institute, Columbus, Ohio, reported these conclusions in a paper, 'Enzymes of Un-aged Bright and Burley Tobaccos', presented before the 128th National Meeting of the American Chemical Society in Minneapolis.

Flue-cured tobacco, such as Bright, and air-cured tobacco, such as Burley, showed marked differences in enzyme activity when analysed by several different techniques. In Burley tobacco, enzyme activity was shown for an oxidase (similar to laccase), catalase, protease, invertase, cellulase, tyrosinase, and probably decarboxylase, and peroxidase. Except for the decarboxylases, the enzymes found in Burley tobacco either were undetected or exhibited only slight activity in Bright tobacco. Amylase, urease, cytochrome C oxidase, glucose oxidase, and certain deaminases, and other enzymes were not detected in either un-aged Bright or Burley tobaccos with the methods employed.

Indonesian Soda Plant

THE Indonesian Government has begun building a soda factory at Waru, near Surabja. Sponsored by the Government's Salt and Soda Enterprise department, the factory will include a caustic soda and bleaching powder plant, water purifying installation and a chemical laboratory.

To be completed by the beginning of next year, the factory will have a capacity of 10 tons of caustic soda daily. Soda will be manufactured according to the electrolytic mercury process.

Gas-Liquid Chromatography

Paper Read by Dr. A. T. James at Pharmaceutical Assembly

AT the 16th general assembly of the Federation Internationale Pharmaceutique, London 1955, a paper entitled 'Gas-Liquid Chromatography, A Method of Separation and Identification of Volatile Materials' was presented by Dr. A. T. James of Great Britain. An abridged version of Dr. James' address follows:—

Most workers concerned with the separation of closely related compounds are familiar with chromatographic techniques involving the use of a stationary solid or liquid and a moving liquid. Less widely known, however, are chromatographic techniques utilising a stationary solid or liquid and a moving gas. The adsorption chromatography of gases (gas-solid system) has been studied by many workers (in particular Claesson (1) and Janak (2)) but until recently has not come into general use owing to the frequent occurrence of non-linear distribution isotherms with consequent impairment of separations. Gas-liquid chromatography is a recent innovation, suggested originally by Martin and Synge (3) and developed by James and Martin (4) for the separation of volatile fatty acids.

High Rates of Flow

Since the mobile phase of the chromatogram is a gas it is possible to use long thin columns and to obtain high rates of flow of mobile phase impossible with liquid-liquid chromatograms of similar shape. In all chromatograms the main factor limiting the efficiency is the rate of diffusion in the two phases concerned. In the gas-liquid system diffusion in the gas phase is virtually instantaneous and the elevated temperatures at which the columns are generally run increases the rate of diffusion in the stationary liquid phase. For these reasons gas-liquid columns have very high efficiencies even at high rates of flow so that refined separations may be carried out more rapidly than with any other chromatographic technique. In addition it is generally much easier to detect low concentrations of vapours in gas streams than it is to detect low concentrations of solutes in solvents.

The columns are constructed of lengths of glass or metal tube into which is packed by vibration a suitably inert solid (usually kieselguhr) over whose surface is distributed a thin layer of the stationary liquid (a thermally stable substance of high boiling point). The column is held in a heated jacket at the desired temperature. The substances to be separated are applied to the top of the column packing with a micropipette and are then blown down the column by a stream of permanent gas (usually nitrogen) from a constant pressure source. The substances separate according to their relative volatility in the stationary liquid chosen and are detected as they leave the column in vapour form in the stream of permanent gas.

Many Methods Possible

There are many theoretically possible methods of detecting vapours in gases but so far only three have been widely used. The first method is limited to those substances capable of ionising in solution or which can be caused to produce ions by rapid chemical reaction in solution. The gas stream from the column is led into the base of a small cell containing water or other solvent. The acids or bases are extracted as the nitrogen bubbles through the solvent and can be continuously titrated. James and Martin (4) devised a simple automatic recording burette to carry out the titration continuously so that after loading the column and turning on the gas stream the whole process was automatic, the final result being recorded on a moving drum (see Fig. 1). The method was sufficiently sensitive to allow the detection of 0.02 mg. quantities of acids such as acetic acid or of 0.002 to 0.01 mg. quantities of volatile amines such as ethylamine.

The records produced by the automatic burette show a series of steps rather reminiscent of the types of diagram used to follow fractional distillations. When only carrier gas is leaving the column a horizontal line is drawn by the automatic burette and the emergence of titratable material is denoted by a step in the curve, the height of the step being a direct measure of the amount of material titrated. The machine is recording in effect a measure of the total

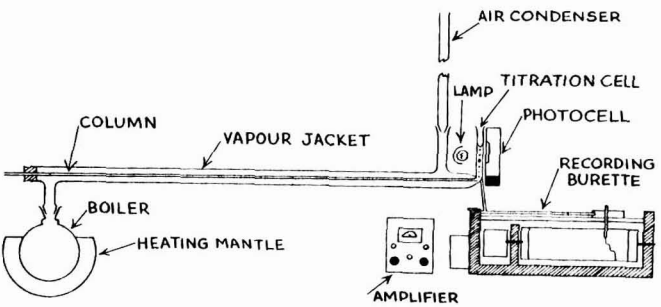

Fig. 1

amount of material that has emerged from the column. By plotting the differential of the experimental curve there result the peaks so familiar to those who have used chromatographic techniques.

Wider application of the gas-liquid chromatogram necessitates a detection technique that does not depend on the presence of particular types of chemical grouping in the molecules to be detected, so physical methods are indicated.

The second method used is to measure the thermal conductivity of the gas leaving the column and has been chiefly exploited for this purpose by N. H. Ray (1954), Phillips and his collaborators (5). The apparatus (the catharometer) consists of a platinum wire heated electrically and fixed along the axis of a tube through which is passed the gas stream. The composition of the gas stream determines the rate of loss of heat of the wire and hence its electrical resistance.

By using two cells, one for the gas stream leaving the column and the other for the gas stream entering the column, and connecting the two wires in a bridge circuit, any change in resistance of the wire in the chromatogram gas can with the aid of a suitable amplifier and recorder be plotted automatically. While having the advantages of simplicity and cheapness the method suffers from two main defects: (a) not very high sensitivity, and (b) a high sensitivity of its zero to changes in rate of flow of gas through the cells.

The third method utilises two columns, one being the chromatogram, the other acting as a reference source of carrier gas (any volatility of stationary phase being thus compensated for). The densities of the two gas streams are continuously compared in an instrument known as the gas density meter developed by Martin (Martin and James, 1953). In general the emergence of a substance from the chromatogram increases the density of the carrier gas. The instrument consists of a series of tubes bored in a copper block (maintained at the same temperature as the columns in order to prevent any condensation of the vapours) and connected in a manner analogous to a Wheatstone bridge.

Adjustable Throttles

Adjustable throttles are placed in some of the channels so that when the instrument is first set up resistance to flow in the channels can be adjusted until no pressure difference is generated across the network when the rate of flow of either gas stream changes. Two sets of channels (one for each gas stream) are connected by a cross channel in such a way that any difference in density between the two gas streams causes a small flow of gas through the cross channel. This channel contains a flow detector consisting of a small filament, heated electrically, arranged below and equidistant from two connected thermojunctions; any cross-flow of gas causes the stream of hot convected gas to be diverted to one or other of the thermojunctions, heating one and cooling the other. The resultant thermo EMF is fed to a DC amplifier whose output is led to a recording galvanometer. The galvanometer deflection is linearly related to the density difference of the two gas streams making quantitative measurement relatively simple.

The instrument is highly sensitive, density differences such as those caused by the presence of one molecule of amyl alcohol in 50,000 to 100,000 molecules of nitrogen being easily detectable. Its zero is relatively insensitive to changes in rate of gas flow and its response is determined only by the molecular weight of the substance being detected. As with the other two

methods described, the whole process is automatic once the column has been loaded and the carrier gas stream started. A schematic diagram of the whole apparatus is shown in Fig. 2.

SOME APPLICATIONS

(1) *The separation of fatty acids and their esters.*

In Fig. 3 is shown a separation of acetic, propionic, isobutyric, *n*-butyric, trimethylacetic, isovaleric, methylethylacetic, and *n*-valeric acids using a column 11 ft. long (arranged in a hairpin shape so that its overall length is only 4 ft.) at 137° C. (The total time for the separation is only 100 minutes). All the acids are well separated as is demonstrated by plotting the differential of the experimental curve. The derived curve is found to consist of sharp peaks. The four isomeric valeric acids are difficult if not impossible to separate in such small amounts by any other technique. This result was obtained by using the automatic burette to detect the zones leaving the column.

The columns give highly reproducible results and can be used some hundreds of times without exhaustion. The time at which a given substance emerges from a column depends on the temperature, the flow rate of nitrogen and on the nature of the stationary phase in the column. At a given temperature and with a particular stationary phase it is found that there exists a simple relationship between the retention volume (the volume of nitrogen passing through the column before the centre of the peak emerges) and the number of carbon atoms in the molecule for the members of any homologous series.

The range of acids capable of being detected is limited by the titration technique because it is not possible to raise the column temperature to a value high enough for a reasonable rate of movement of the longer chain fatty acids. Recently the range has been extended to include the C_{18} acids, using methyl esters instead of the free acids, with the gas density meter (James and Martin, 1955) as the detector.

(2) *The separation of volatile bases.*

The bases dealt with so far by this technique have been ammonia and the three methylamines (James, Martin and Howard Smith (**6**)), higher aliphatic amines and substituted pyridines (James (**7**)) and aromatic amines (James (**8**)). In all cases titration was used for detection and estimation. The aromatic amines, because of their weak basicity, were titrated in glacial acetic acid solution with perchloric acid.

(3) *The separation of other types of compound.*

A range of alcohols from methanol to *n*-pentanol has been separated in only 32 minutes. The separation of ethyl alcohol and isopropyl alcohol would be improved if the column were run more slowly.

INFLUENCING FACTORS

At a constant temperature and a constant flow rate of mobile phase the relative times of emergence of a mixture of compounds are dependent on the differences in their free energies of solution in the stationary phase. In solvents such as paraffin hydrocarbons the forces involved in

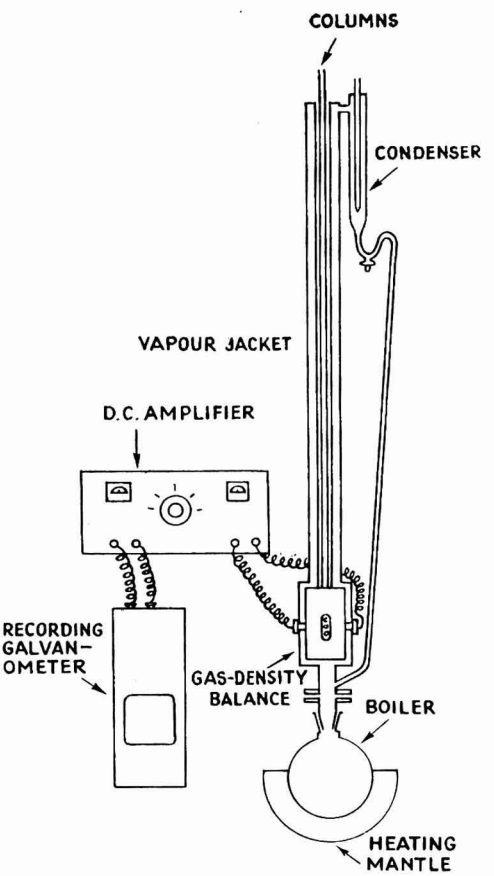

Fig. 2

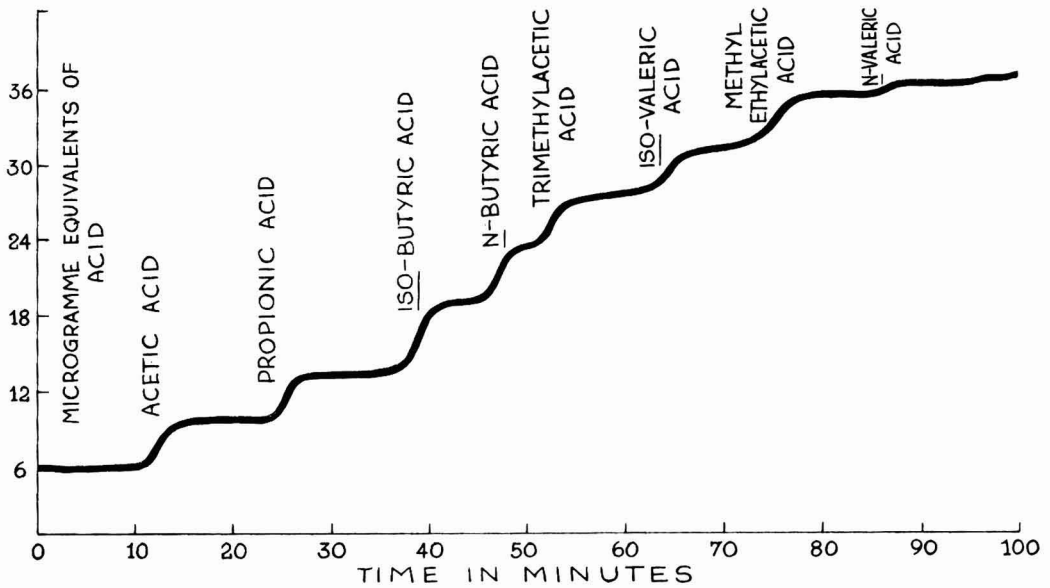

Fig. 3

solution are van der Waals forces, which vary with molecular weight, configuration, etc., and not with the polarity of the solute molecule. In such paraffinic stationary phases therefore separations are based on differences in molecular weight, etc.

In more polar stationary phases such as polyethers, long-chain alcohols, aromatic hydrocarbons, etc., polar forces such as hydrogen bonding are also involved. Separations in these phases can therefore take advantage of differences in polarity of the solute molecules. Aliphatic amines for example fall into three types, primary, secondary and tertiary. Primary and secondary amines possess an -N-H group and are therefore capable of hydrogen bonding with a suitable acceptor molecule such as an alcohol or an ether. Tertiary amines possess no -N-H group and cannot hydrogen bond in the same way. Thus methylamine, dimethylamine and trimethylamine emerge in order of molecular weight from paraffin columns and in order of hydrogen bonding power (i.e. the reverse order) from columns with substances such as glycerol as stationary phase.

To conclude, the advantages of gas-liquid chromatography can be seen to be: (1) highly refined separations can be carried out very rapidly; (2) the technique can be used with quantities of material ranging from micrograms to grams; (3) a study of the chromatographic behaviour of an unknown substance can give valuable information as to its structure; (4) it is applicable to all substances capable of being distilled, and (5) suitable commercial apparatus is already available in the United Kingdom and the United States. Indeed the advantages of the technique over analytical distillation in terms of efficiency, times and convenience are so great that in time it will replace the older technique.

I should like to thank the Editors of the *Biochemical Journal* and the *British Medical Bulletin* for permission to reproduce material already published.

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Monsanto-Lion Oil Merger

ALTHOUGH no official statement had been made in this country at the time of going to press, it is understood that on 23 September shareholders of Monsanto Chemical Co., St. Louis, Missouri, and Lion Oil Co., El Dorado, Arkansas, agreed to a merger of the two companies. This merger (which THE CHEMICAL AGE understands took effect on 30 September) has resulted in the formation of a single corporation with total assets of roughly £203,780,000.

The reasons given to the shareholders for the proposal that the two companies should be combined were that it would facilitate the development of new products and provide a wider diversification of products. In view of the fact that Lion Oil manufacture granulated ammonium nitrate, ammonium sulphate, anhydrous ammonia and nitrate solutions while Monsanto are the largest manufacturers of phosphorus compounds in the US, it is thought that the new company will probably enter the ammonium phosphate field in a big way. With Lion Oil supplying ammonia and petroleum hydrocarbons and Monsanto providing rich experience in the manufacture of agricultural chemicals, plastics, phosphorus compounds, organic chemicals, etc., it is expected that the new company will make rapid progress.

Pharmaceutical Assembly

Formation of New Industrial Section

A NEW section, with the title of 'Section of Industrial Pharmacists' was formed at the 16th General Assembly of the International Pharmaceutical Federation, held in London from 19-23 September. All pharmacists who are engaged in the pharmaceutical industry and who are members of the association are eligible to apply for membership.

The section has been formed so that industrial pharmacists may exchange information and opinions on technical and professional questions relating to the industry. It is emphasised that the new section has not been formed as a trade association.

The following officers and committee were appointed at the inaugural meeting on 21 September which was attended by 49 industrial pharmacists from 15 countries:—

President: C. W. Robinson (Great Britain).

Vice-Presidents: O. Gaudin (France), C. C. Stevens (Great Britain).

Secretaries: R. Morice (France), A. Duckworth (Great Britain).

Committee: the officers, together with, Mrs. F. F. Auslander (Israel), F. Chavatte (Belgium), J. Cooper (US), E. Lang (Switzerland), R. Larose (Canada), M. Mahmassani (Lebanon), J. Poldermen (Netherlands), A. Soldi (Italy), N. Stein (Denmark), A. Stump (Germany), S. Wistrom (Sweden).

At the first meeting of the committee, on 22 September, three sub-committees were set up to study and report on the possibilities of securing progress internationally in the following directions:—

(a) Greater uniformity in the labelling of toxic substances.

(b) Rationalisation, simplification and greater uniformity of procedure for the control of medicines by regulatory bodies where such exist.

(c) Improvements of standards of education and training for pharmacists wishing to enter industry.

In addition, preliminary consideration was given to other projects which might usefully be pursued by the section in due course.

Explosion at I.C.I.

A SERIOUS explosion took place in the low pressure compression plant at the ammonia works of I.C.I. at Billingham, County Durham, on 22 September. One man was killed and three more were seriously injured. One of these three has since died in hospital. Another 12 men were treated for minor injuries.

The section of the plant concerned was badly damaged and the process was shut down.

A report made by the company on 23 September said that the cause of the explosion was not yet known. Investigations which were still proceeding suggested that a gas explosion took place inside the damaged rotary compressor. It is not yet possible to say when production in the affected section will be resumed. Production is, however, continuing in other sections of the plant.

Fatal Accident

One man was killed and two injured in an explosion on the 15 September at an experimental hydrazine distillation unit of Whiffens Ltd., at Loughborough.

I.C.I. Profits Still Climbing

First Six Months of 1955 Creates Record

THE following unaudited figures were released by Imperial Chemical Industries Ltd. last week in regard to the company's estimated trading results for the first half of the financial year 1955 together with comparative figures (estimated where necessary) for the first half of the year 1954.

The consolidated turnover of the company for the first half of 1955 and its home and overseas subsidiaries for the first half of their current financial year ending in 1955 was £206,000,000. This was 9.5 per cent higher than the comparable figure for the second half of 1954 and 11.7 per cent higher than the comparable figure for the first half of 1954.

The estimated net income of the company, after depreciation but before taxation, for the first half of 1955 was £20,855,000 as against £19,920,000 for the first half of 1954 taken on the same basis. These figures include the trading profits of the home manufacturing divisions and the company's proportion of the trading profits of subsidiaries operated by those divisions but include only such dividends as have been declared up to 15 August, 1955, in respect of their current financial years by other subsidiaries at home and abroad.

The estimated charge for taxation at current rates against this income, after appropriate credits in respect of past over-provisions and past initial allowances, is £8,880,000 (first half of 1954 £8,660,000) and therefore the estimated net income of the company for the first half of 1955 after taxation is £11,975,000 (first half of 1954 £11,260,000).

For the purpose of computing the charges for the first half of 1955 for employees' profit sharing bonus and distributed profits tax (both of which depend on the dividend distribution for the year) the same total rate of ordinary dividend as was paid for 1954, *viz.* 10 per cent, has been assumed.

Carbonisation of Lignite

THE composition of tar produced from the low-temperature carbonisation of lignite was described in a paper presented at the 128th National Meeting of the American Chemical Society in Minneapolis. Development of uses for lignite has been the subject of concerted effort in recent years.

Low-temperature carbonisation can convert lignite into char, primary tar, water, light oils, and gaseous products. One process for doing this is now being used on Sandow lignite at Rockdale, Texas, by the Aluminium Company of America.

The authors of the paper, D. C. Rowlands, J. E. Burch, W. H. Mink, R. B. Filbert, E. J. Kahler and W. C. Ellis, stated that work at Battelle Institute, Columbus, Ohio, indicated that vacuum-flash distillation of the lignite tar produced distillate containing 25-30 per cent tar acids, 4-5 per cent tar bases, and 65-70 per cent neutral oils. The proportion of bases was lower than that usually found in coal tar. Silica-gel chromatography showed that the neutral oils contained 12 per cent paraffins, 35-40 per cent olefines, and 48-53 per cent aromatics. When 30 per cent of the tar was left as a pitch residue after distillation, it had a softening point from 100 to 110°C.

Priestley Memorial Plaque

A PORTRAIT medallion of the discoverer of oxygen has been given to the University of Wisconsin by Mr. Denis I. Duveen, a nephew of the late Lord Duveen. The small oval, white-on-blue Wedgwood china plaque showing in bas-relief the likeness of Joseph Priestley, 18th-century English chemist, was the university's latest acquisition of Duveen items relating to the history of chemistry and alchemy.

In 1951, Wisconsin purchased from the New York chemical manufacturer the greater share of his library on alchemy and the history of chemistry—one of the most extensive single rare books collections of its kind. Housed in the University Memorial Library, it comprises more than 3,000 separate monographs printed over a period of some 475 years.

Mr. Duveen, who was born in Britain, donated a supplementary collection after the 1951 purchase was completed and in the spring of 1955 gave the University the original typed script of the collection catalogue and a group of notebooks which contain extracts on German alchemical experiments conducted as recently as 30 years ago.

Barrier Creams Protect Workers

Dermatitis from Synthetic Glues & Resins

THE name of Rozalex is well known in the field of barrier creams for the prevention of dermatitis and other skin complaints caused by the handling of a variety of materials. The company's research and development department has devoted much time to investigations on the effects of various materials on the skin. We are glad to be able to publish now a technical bulletin, based on work carried out by the Rozalex laboratories, and entitled 'Dermatitis from Synthetic Glues and Resins'.

Synthetic adhesives comprise two main groups:—

Casein Glues—the composition of which is based on the action of water on casein in the presence of alkalis.

Resin Glues—of which there are two main classes:—

(a) thermoplastic, which include vinyl polymers, modified rubber and cellulose esters;

(b) thermosetting, which include urea-formaldehyde, phenol-formaldehyde, alkyd, and silicone resins.

In general, the resin glues present a much greater skin risk than the casein adhesives but in all cases where there is contact with synthetic adhesives, great care is necessary if skin irritation is to be avoided. The increased use of these products, because of their undoubted efficiency, has resulted in an increasing number of persons contracting skin conditions certified as occupational dermatitis.

Causes Serious Loss

Dermatitis is a comprehensive term applied to any inflammatory condition of the skin, the prefix 'occupational' being applied to those cases which arise as a result of conditions encountered during work, and in industry it is a problem of external contact with irritants. The importance of the problem can be more readily appreciated if it is realised that the loss of man-hours in industry, due to dermatitis, exceeds that from all other industrial diseases.

Synthetic resins are both primary irritants and sensitisers; as such, they are capable of producing skin conditions varying from erythema (redness) and itching to more severe conditions such as swelling and vesiculation. Primary irritants can be defined as substances which will produce irritation of the skin in anyone who is in contact for a sufficient time or in sufficient concentration; the reaction of the skin is usually in proportion to one or other of these factors.

Sensitisers produce a reaction only in the skin of persons who are hypersensitive to them but such cases are usually severe and are liable to relapse on further contact, even the slightest contact, though the irritant may be in low concentration. It is an abnormal reaction in an individual and it is unwise, where this condition can be demonstrated, to allow any form of contact with the offending substance since complete control is always difficult to achieve.

Risk at all Stages

Contact with synthetic glues varies in degree from small glueing operations to massive glueing by rollers and it should be remembered that contact can be made before and after the actual glueing operation, as in batch making, pressing, cutting glued sections and in loading and unloading during the process. There is a risk at all stages unless preventive measures are taken to avoid contact.

Synthetic glues have both a physical and chemical effect on the skin. Physically they dry hard on the skin, if not removed, and in their later removal cause abrasion or cracking of the outer skin layer.

Of all the constituents of these products the most common single factor in producing dermatitis is formaldehyde. The irritant properties of formaldehyde are pronounced, being both a primary irritant and a sensitiser, and the effect on the skin is intensified when, as so often happens, there are cuts, wounds and abrasions due to contact with sharp edges of dried glue, plywood or the material being handled. Formaldehyde is given off by the glues, particularly in hot pressing operations, and the concentration in the surrounding atmosphere may be considerable. It irritates the nose, throat and eyes and may cause conjunctivitis, bronchial or throat conditions.

Industrial Safety

It is important to select employees carefully for work which involves contact with synthetic resins or glues, and it would be very unwise to employ for such work any person already suffering from a skin disease or who has a personal history of dermatitis even though the original cause may not be known. It is equally important that workers should be regularly inspected for signs of skin irritation, any such cases should receive prompt medical treatment and should be removed from further risk of contact until the condition is cleared. All employees should be properly instructed on the risks involved, the preventive measures which must be taken to avoid dermatitis and they should be encouraged to report any skin irritation to a responsible person or to someone properly appointed for this purpose.

Several Measures Necessary

The most effective single contribution to prevention is the regular use, before work is started, of a suitable and efficient barrier cream but this can only be effective if other necessary measures are applied. Such measures comprise—

1. Reduction of contact to a minimum by mechanical methods of handling, as opposed to manual methods, wherever possible, including the use of suitable tools. This is often not so difficult as, at first, it may seem.

2. Good ventilation including, where necessary, air exhaustion to reduce the concentration of fume in the atmosphere.

3. Cleanliness—both of the worker and machinery. Brushes, tools, glue sticks, etc., should be cleaned or replaced regularly to ensure the avoidance of unnecessary risk.

4. Protective clothing—especially where there is gross contamination and where such protection can be adopted. This is a controversial matter since most workers find it difficult to work in gloves, but where necessary they should be provided together with overalls, aprons, etc. With all protective clothing, and particularly with gloves, it is very necessary that they should be cleaned regularly and thoroughly otherwise they only serve to accentuate the risk. It is a common practice to take off gloves at intervals, because of discomfort or for some other reason, and then to replace them on the hands with the result that glue is transferred to the inside of the glove and presents a greater risk, virtually, than if none were worn. All protective clothing should be examined periodically by a responsible person and any necessary replacements or repairs should have attention.

5. Washing facilities—to a satisfactory standard—should be available, the minimum facilities to include hot water, soap and towels. Towels should be changed when necessary, dependent on the number of persons and the condition of cleanliness. Frequent washing is desirable and facilities should be as close to the place of work as is possible, to encourage their use. Glue should not be allowed to dry on the skin and, if washing is not done, it should be removed with a clean, wet cloth.

6. All cuts and wounds should receive immediate first aid attention and be covered with a suitable dressing to avoid any contact with glue, since a damaged skin offers no defence whatever against synthetic glues.

7. Protective barrier cream should be used. The essential requirements of a suitable barrier cream for use when in contact with synthetic resins and glues includes the following:—

(a) non-irritating;
(b) protective against the irritant materials;
(c) easily applied to the skin;
(d) stability and flexibility;
(e) water resisting so that it will not be removed if glue is wiped off with a damp cloth;
(f) removable only by thorough washing with soap and hot water.

The barrier cream should be applied before work is started and should be reapplied on each occasion after washing which, as a minimum, should be done at 'break' times and meal times. The removal of any hard glue which remains can be facilitated by using a clean cloth, when washing, to rub off the glue since the glue will adhere to the film of barrier cream and not to the skin.

A special protective cream, Rozalex Barrier Cream No. 9, is now made for those in contact with synthetic resins and glues which, if properly used, and in conjunction with the foregoing preventive measures, will avoid the risk of skin irritation from these substances.

Safe Operation of Air Receivers

by A. G. THOMSON

THE term 'air receiver', as defined in the Factories Act, 1937, embraces a considerable variety of equipment used in the chemical and associated industries. It covers any vessel for containing compressed air and connected to an air compressing plant; any fixed vessel for containing compressed air or compressed exhaust gases and used for the purpose of starting an internal combustion engine; any fixed or portable vessel used for the purpose of spraying by means of compressed air any paint, varnish, lacquer or similar material; and, finally, any vessel in which oil is stored and from which it is forced by compressed air.

In view of the hazards presented when air or gases are stored under pressure in vessels of inadequate strength or unsuitable construction, it is evident that safety in the operation of air receivers and associated equipment is an item of major importance in the prevention of industrial accidents.

The regulations controlling air receivers are contained in Section 31 of the Factories Act, which provides that a receiver connected with an air compressor plant must be so constructed that it can withstand with safety the maximum pressure obtainable, or it must be fitted with a reducing valve or other suitable appliance to prevent the safe working pressure from being exceeded. It must also be provided with a suitable safety valve, so adjusted as to permit the air to escape as soon as the safe working pressure is exceeded. The pressure in lb. per sq. in. must be indicated on a pressure gauge which is correct. The air receiver must also be provided with a suitable manhole, handhole, or other means of access, which will allow the interior to be thoroughly cleaned.

Must be Plainly Marked

The Act requires that the safe working pressure shall be marked on every air receiver in such a manner that it is plainly visible. If more than one receiver is being used in a factory, each one must bear a distinguishing mark which shall be easily visible.

Any set of receivers supplied with air through a single pipe may be treated as one receiver for the purpose of satisfying the requirements relating to safety valves and pressure gauges, provided that in situations where a reducing valve or other suitable appliance is called for in order to prevent the safe working pressure from being exceeded, such an appliance is duly fitted to the single pipe.

Regular Examinations

It is further required that every air receiver shall be thoroughly cleaned and examined at least once in every period of 26 months. If the receiver is of solid-drawn construction, however, the examiner may specify in writing a period exceeding 26 months but not exceedng four years, within which the next examination is to be made. Should the vessel be so constructed that the internal surface cannot be thoroughly examined, a hydraulic test of a suitable nature must be carried out.

Every examination or test must be carried out by a competent person, whose report must be entered in or attached to the general register.

An oil storage tank forming part of a multiple-head oil fountain is exempted from the regulation which governs cleaning and examination of its internal surfaces, provided that a suitable safety valve is fitted in the compressed air inlet pipe to the tank, and that the tank is tested to twice the working pressure at least once in every period of 26 months. This exemption does not apply to any tank having a working pressure greater than 2 lb. per sq. in.

Air pressure tanks used in conjunction with fire sprinkler systems are exempted from the regulations contained in Section 31 of the Factories Act.

Attention is also drawn to Section 27 of the Factories Act, which requires manholes of certain minimum sizes in vessels which persons may enter and in which dangerous fumes, gas or vapour are liable to be present to such an extent as to constitute a hazard to personal safety.

The preparation of a series of British Standards for steel air receivers was authorised some 25 years ago by the Mechanical

Industrial Safety

Industry Committee of the British Standards Institution. The earliest specifications were published on 14 December, 1931, and an amendment dealing with hydraulic tests was adopted in April, 1933. In its present form the series comprises the following specifications:

BS.428:1931—Forge Welded Steel Air Receivers.
BS.429:1931—Riveted Steel Air Receivers.
BS.430:1944—Solid Drawn Air Receivers.
BS.—487:1949—Fusion Welded Steel Air Receivers.
BS.1099:1943—Small Fusion-Welded Air Receivers.

These specifications control the quality of materials and methods of construction and specify the tests to which components and finished receivers shall be subjected. For the purpose of the British Standards an 'air receiver' is defined as any vessel intended to contain air or inert gas above atmospheric pressure.

High Quality Air Receivers

As an indication of the high quality of air receivers manufactured to British Standard Specifications, it is sufficient to consider some requirements of BS.487, which applies to fusion welded air receivers for design pressures not exceeding 500 lb. per sq. in. The product of the pressure in lb. per sq. in. and the internal diameter in inches must not exceed 21,000.

Wherever it is reasonably practicable and the dimensions are within the usual methods of rolling mill practice, the shell of the receiver should be made from a single plate. Where this is not possible, it should be made with the minimum number of joints and the longitudinal seams in adjacent sections should not be in the same line.

Formulae are given for the thickness of the cylindrical shell plate and the end plates, which should in no case be less than 3/16 in.

Manholes in the cylindrical shells should be placed as far as possible from any welded seam and in no instances should a seam in an end plate be pierced.

All connections directly attached to the receiver are required to be of forged or rolled steel or of seamless or forge-welded tube.

A tell-tale hole to atmosphere not less than $\frac{3}{4}$ in. in diameter must be provided through the compensating ring. Openings for cleaning and maintenance must be so placed that the whole of the internal surface can be thoroughly cleaned and inspected. Holes for pipe connections or other fittings may be used for this procedure. Inspection holes other than manholes must be at or near the ends of a receiver. The recommended minimum number and dimensions of such openings, for receivers of normal length as compared with their diameters, are as follows:

Receivers up to and including 15 in. diameter, two inspection holes of at least 2 in. diameter;

Over 15 in. and not more than 24 in., two holes not less than $3\frac{1}{2}$ in. dia. or two oval holes not less than $3\frac{1}{2}$ in. by $2\frac{1}{2}$ in.;

Over 24 in. and not more than 36 in. dia., two oval inspection holes each not less than 5 in. by 3 in., or circular holes of equivalent area, or one manhole.

Over 36 in. dia., at least one manhole.

Finished receivers are tested to $1\frac{1}{2}$ times the design pressure and the joints are subjected at this pressure to a hammer test. The test pressure is then released and afterwards raised to twice the design pressure, being maintained at this value for not less than 15 minutes. The vessel must withstand these tests without permanent set.

Safety Fittings

BS.1123:1950 controls the quality of valves, gauges and other safety fittings for air receivers and compressed air installations, for design pressures up to 1,000 lb./sq. in.

It is considered desirable that there should be a margin between the operating pressure at which the compressor delivers air and the lowest pressure at which any of the safety valves is set to lift, in order that unnecessary blowing off of the safety valve may be avoided.

Where a set of air receivers is under uniform pressure supplied through a single pipe, the set may be treated as one receiver (as provided for in the Factories Act).

Where an air receiver or air receivers can be isolated from the safety valve, a fusible plug must be fitted to each receiver.

Where a stop valve is installed between

the air compressor and the receiver or receivers, the pipe line on the compressor side of the stop valve requires to be protected by a suitable safety valve. Where a reducing valve is installed in a pipe line, the pipe line and air receiver or receivers on the low pressure side of the reducing valve must be similarly protected.

Safety valves should preferably be of the direct spring-coated type and should be so constructed as to permit air to escape from the air receiver without increasing the pressure beyond 10 per cent above the blow-off pressure when the air compressors are giving their full output.

The body of every fitting subjected to internal pressure must be tested by the manufacturer to twice the design pressure.

In drawing up a programme for the safe operation of air receivers, it would be hard to find a more practical basis than the following list of questions, which appeared during the second world war in a British Government publication:

1. Have you a complete list of all air receivers, and where there is more than one receiver, has each a distinguishing number or letter?
2. Is the safe working pressure marked on each so as to be plainly visible?
3. Will each receiver withstand the maximum pressure obtainable from the compressor?
4. If not, is there a suitable reducing valve or similar appliance in the pipe supply to each receiver?
5. Has each a suitable safety valve, and are the valves correctly adjusted?
6. Has each a correct pressure gauge showing the pressure in pounds per square inch?
7. Has each receiver a suitable appliance for draining it?
8. Is the receiver blown out daily?
9. Has each receiver a manhole or handhole to permit of thorough internal examination?
10. Has each been thoroughly cleaned within the last 26 months?
11. Are an oil trap, fusible plug and thermometer provided on the pipeline between compressor and receiver?
12. Is the oil trap provided with a cock and is the trap periodically blown out?
14. Has each receiver been thoroughly examined by a competent person within the last 26 months, or, if of solid drawn construction, (a) been examined by a competent person within the period (not more than four years) laid down at the last examination, and (b), if the internal surface cannot be thoroughly examined has a suitable hydraulic test been made?
13. Is the temperature regularly checked to see that it does not rise unduly?
15. Have certificates of examination and test been entered in or attached to the general register, together with a record of the safe working pressures?
16. Are each receiver and its fittings being maintained in an efficient state, in efficient working order, and in good repair?

D

Industrial Safety

Flame Resistant Polymers

A SYMPOSIUM organised by the journal *The Rubber & Plastics Age* on the properties and applications of flame resistant polymers will be held at the National College of Rubber Technology, Holloway Road, London N.7, on 23-24 November.

The purpose of this symposium is to gather together the information at present available on the subject of flame resistant high-polymers and to suggest new applications where flame resistant polymers may be used to advantage in the interests of safety.

Chairman for the symposium will be Sir Hugh Linstead, MP, and the following lectures have been arranged:—

1. 'PVC and Related Polymers', by Dr. S. J. Skinner (British Geon).
2. 'PTFE and PTFCE', by Dr. J. Gadsby (I.C.I. Plastics Division).
3. 'Flame Proofing of Textiles', by F. Tattersall (Proban).
4. 'Chlorinated Rubber', by H. E. Parker (I.C.I. General Chemicals Division).
5. 'Flame Resistant Rubber—General', by J. R. Phillips (Dunlop Rubber Company) and Dr. J. R. Scott (RABRM).
6. 'Neoprene', by H. J. Lanning (Durham Raw Materials).
7. 'Thermosetting Resins', by C. P. Vale (BIP Chemicals).

The fee is 21s. and the address of the organisers is: *The Rubber & Plastics Age*, 147 Grosvenor Road, London S.W.1.

Safety Notebook

THE Minister of Labour, Sir Walter Monckton, and three leading industrialists will speak at the Guildhall, London, on Friday, 28 October, on the urgent necessity to reduce the number of accidents occurring in British industry.

The occasion is a one-day conference to be opened by the Lord Mayor of London.

Sir Ewart Smith, deputy chairman of Imperial Chemical Industries Ltd. and chairman of the British Productivity Council, will speak on 'Accident Prevention & Productivity'; Mr. A. E. Amor, deputy managing director of Kodak Ltd., on 'Accident Prevention & Man-power'; and Mr. P. E. Trench, managing director of Bovis Ltd., on 'Accident Prevention and Efficiency—with particular reference to the building industry'. At the close of the conference the papers will be summed up by Mr. H. R. Payne, chairman of the National Executive Committee of the Royal Society for the Prevention of Accidents.

The conference is being organised by the London Industrial Co-ordinating Committee which represents five industrial accident prevention groups who work in and around London. The Industrial Safety Division of the Royal Society for the Prevention of Accidents is also closely associated with the conference.

The conference is the principal event of National Industrial Safety Week, during which a campaign for safer working in British industry is being launched.

The object of the campaign is to encourage all workers, but particularly young workers, to 'start a safety habit to-day' and to remember that 'safety habits last a lifetime'. During the launching week it is hoped to introduce these two slogans into every factory, large or small, throughout the United Kingdom. The campaign also sets out to bring into the voluntary safety movement a great number of the smaller industrial concerns which at present have little or no safety organisation in their factories.

The conference is open to anyone interested in industrial accident prevention. Admission is by ticket only. These may be obtained from the Hon. Treasurer, Mr. H. Meanley, North Thames Gas Board, Kings Road, Fulham, London S.W.6, at 10s. 6d. each.

* * *

THE development of suitable footwear for specific work has been followed up intensively by the more progressive concerns in Scotland and nowhere more energetically than at Imperial Chemical Industries who have specialised problems to add to those of foot comfort.

The Clothing Committee at Ardeer has been searching for some years for the ideal footwear for the 1,000 workers in the blasting central department, where special precautions are essential. About a year ago a shoe was put out for test to a number of the women in the factory and from their comments and criticisms a further shoe was designed which incorporated certain modifications on the original design. The new shoe has now been issued to 24 women workers in various parts of the department for a two to three months' trial.

The shoes are black leather Oxfords with a special composition anti-static sole. It is planned to provide three different fittings to each size of the new shoe when the design has been finally approved since further modifications may be made after the results of the present test have been demonstrated and assessed. When finally approved the new shoe will be provided for all women workers entitled to free issue shoes and will provide them with footwear which is smart, safe and comfortable.

* * *

PROBAN anti-flame finish for textiles will shortly be available under licence to textile finishers it is announced by Proban Ltd. (a joint company formed by the Bradford Dyers' Association Ltd. and Albright & Wilson Ltd.).

At present only a small quantity of treated material is being produced, all of which is used in the manufacture of protective industrial clothing. When larger quantities become available in the new year it is claimed that it will become possible to control completely the fire hazard which exists with many cellulosic materials.

When burning cellulosic fibres are extinguished it is usually found than the ash which has been formed will continue to smoulder, and this type of combustion can cause severe burns. Textiles treated with the Proban finish are said to be free from this kind of smouldering or afterglow.

* * *

TWO grades of fire-retarding timber preservatives have become available in the Xylamon range recently introduced to this country. Pyromors-Normal is for use on wood, fibre-plates and similar combustible boards not exposed to weathering. Pyromors-Total, for indoor woodwork, not only gives protection from fire, but is also a preventative treatment against rot, fungi, house longhorn beetle and woodworm.

The insecticide and fungicide agents in Pyromors-Total have deep penetration power and both grades have high fire-retarding properties. They are non-corrosive and, because of high wetting power (low surface tension), they are easy to use. After drying, impregnated timber is odourless and not harmful to humans or domestic pets. Certain precautions are necessary immediately before and after application.

* * *

THE atomic energy industry at the present time is widely believed to be safer than industry in general says the International Labour Organisation, a specialised agency associated with the UN. But, ILO goes on to say, familiarity with ionising radiations may breed contempt. Competition to reduce prices may narrow the present margins of safety. Large mass production industries which use atomic materials only incidentally may not take the same precautions as marked the first controlled experiments in the field.

There are four things to be done:—

1. Establish codes of practice and national legislation.
2. Enforce them effectively.
3. Take any desirable additional preventive action (technical, medical, educational, etc.).
4. Organise trainings programmes.

These points were made by the ILO in presenting its paper on 'The Protection of Workers Against Ionising Radiations' to the UN's first international conference on the peaceful uses of atomic energy.

The ILO, which has been studying occupational health and safety problems since 1919, and designed the first international danger symbol for radioactive substances, has published the paper as a supplement to its periodical, *Occupational Safety and Health*.

In presenting this paper the ILO declare that the 'mistakes and miseries' made during the first industrial revolution should not be repeated during the forthcoming second (atomic) industrial revolution.

* * *

FOR the second consecutive year the US coke-manufacturing industry established a new safety record in 1954, according to reports submitted by coking companies to the Bureau of Mines, United States Department of the Interior. The combined fatal and non-fatal injury-frequency rate was the lowest recorded since complete reports of the industry were made available in 1926, and the total number of men killed and injured was the second lowest on record.

From reports submitted to the Bureau on 21,116 active beehive and by-product coke ovens operated in 1954, the combined (fatal and non-fatal) frequency rate was 5.51 injuries per 1,000,000 man-hours of work and 4.59 injuries per 1,000,000 tons of production—improvements of 18 and 11 per cent over the respective rates of 6.69 and 5.14 in 1953. It is noteworthy that the reduced rates resulted directly from a 33 per cent decrease in number of injuries which was greater than the 18 per cent decrease in man hours of work and the 24 per cent decrease in total product manufactured.

Safety Notebook

Greek Lignite Venture

The Greek Government has signed a contract with the Greek Chemicals & Fertiliser Co. of Athens for the exploration and development of lignite. The plant, to be built in the Ptolemais area of Western Macedonia, will be completed in three years and will produce 1,800,000 tons of lignite a year which is estimated will yield at least 200,000 tons of briquettes and 100,000 tons of coke. To finance these works the contractor will lay out $3,000,000 and use £3,500,000 of credits granted by German firms under the guarantee of the German Government.

Metal Cleaning

The Agidip Process

MASS-production metal cleaning is of great importance in many industries where the removal of polishing and buffing compounds, swarf, shop dirt, lubricating oils, etc., from metal surfaces is an essential pre-requisite to enamelling, electroplating, phosphating, painting or inspection.

Previously, metal cleaning methods have been widely used which depend on the action of the vapour of trichlorethylene and similar solvents. These had the disadvantages that the vapours were toxic and that certain types of soil which were water-soluble were not removed—e.g. brazing residues and the inorganic salts deposited by finger prints. Furthermore, metal objects which were recessed or of complex internal shape could not be adequately cleaned by the percolating vapour of the solvents commonly employed.

Two Liquid Cleaners

The di-phase processes originally introduced in the United States were designed to overcome some of these difficulties, since they employed two different and immiscible liquid cleaners which made contact with the work virtually simultaneously, either by dipping or spraying. The upper layer consists of a hydrocarbon solvent together with auxiliary solvents and free fatty acids, while the lower layer is an emulsion solvent in water combined with soluble soaps, wetting and dispersion agents.

A great improvement in the method of application of the di-phase cleaners has recently become possible by the development, by the Electro-Chemical Engineering Company, Queens Road, Weybridge, Surrey, of the range of Efco Agidip machines which are specially applicable to the batch cleaning treatment of small intricate components.

These machines are pneumatically operated, using the normal factory air line as a source of compressed air at 80 psi. No elaborate installation is required, and the machines are portable. Heat is provided by two thermostatically controlled 3 kw immersion heaters fitted in the base of the tank, which is lagged to reduce heat losses.

The Agidip action consists in a regular and rapid up-and-down movement of the work container through two layers of di-phase solutions, causing the items in the easily removable work container to receive a thorough and penetrating dip in each phase in turn on each upward and downward movement. This action results in a thorough cleansing of both oil-and water-soluble soils from the metal surfaces of the work.

After cleaning in the Agidip the work may be dried at once by an air blow-off, or passed in a drying cycle through the Agidrier machine in which a current of hot air is fanned through the work as it moves up and down in an action similar to that of the Agidip.

Avonmouth Story

THE story of Imperial Smelting Corp. Ltd. is told in an illustrated booklet recently published. First copies were presented to a delegation of members of the British Association for the Advancement of Science which recently visited the Corporation's Avonmouth, Bristol, works.

Controlled by the Consolidated Zinc Corp. Ltd., Imperial Smelting Corp. Ltd. produces one-eighth of the United Kingdom sulphuric acid requirements, and a description of the production and use of sulphuric acid is described in the booklet.

In another chapter there is a description of the production and use of hydrofluoric acid, and as with the chapter on sulphuric acid the scheme of production is vividly displayed by a sequence of coloured diagrams.

New Phosphate Prices

LAST week it was announced that Albright & Wilson Ltd. have found it necessary to increase the prices of certain of their products, and the following are some of the new prices:—

	£	s.	d.	
Monoammonium phosphate, ton lots, d/d	101	0	0	per ton
Diammonium phosphate, ton lots, d/d	97	10	0	,,
Phosphoric acid, technical (S.G., 1.700), ton lots, carriage paid	97	0	0	,,
Phosphoric acid, B.P. (S.G., 1.750), 10 carboy lots, carriage paid		1	4	per lb.
Sodium metaphosphate (Calgon), flaked, loose in metal drums, ton lots d/d	133	0	0	per ton
Disodium phosphate, crystalline, ton lots, d/d	38	10	0	,,
Trisodium phosphate, crystalline, ton lots, d/d	39	10	0	,,
Trisodium phosphate, anhydrous, ton lots, d/d	82	0	0	,,
Carbon tetrachloride, ton lots	79	10	0	,,

HOME

Change of Address

Borax & Chemicals Ltd. have moved into new offices in Birmingham at 15 Carrs Lane, Birmingham 4. Telephone: Midland 1159.

Concern About US Investments

At their annual general meeting in London on Sunday, 25 September, The Chemical Workers' Union passed a resolution 'noting with concern the large and expanding investments by American firms in the British chemical industry'. The resolution called on the Government to investigate this development and to find out to what extent it militated against the security and development of the industry.

CRL Open Days

An opportunity to see some of the work of the Chemical Research Laboratory, Teddington, Middlesex, was given to the Press and to representatives of various organisations on the open days, 27-30 September. The laboratory is divided into six research groups: corrosion of metals, inorganic chemistry, microbiology, organic chemistry, high polymers and radiochemistry.

The Royal Institute of Chemistry

The Royal Institute of Chemistry will hold its 7th annual dinner-dance at the Hotel Rubens, Buckingham Palace Road, London, on Friday, 14 October. Tickets for members, registered students and friends can be had—27s. single, 52s. 6d. double—from Dr. W. D. Raymond, Colonial Products Laboratory, Imperial Institute Building, South Kensington, S.W.7. The annual general meeting of the section will be held on Wednesday, 16 November, at the Institute of Metals, Grosvenor Gardens, London S.W.1, at 6.30 p.m.

Coal Board Opens New Coking Plant

A £2,500,000 coking plant was opened recently at Lambton, near Fence Houses, Co. Durham, by the National Coal Board. The plant has 52 ovens capable of carbonising 1,000 tons of coal a day. It replaces a plant which had 550 tons a day capacity. The new plant will produce 250,000 tons of coke annually, more than 3,000,000 gallons of tar, 1,000,000 gallons of benzol and 4,000 tons of sulphate of ammonia.

Analysts' Dilemma

A paper, 'The Analysts' Dilemma: Colour or Stability', will be read by R. J. P. Williams, M.A., D.Phil. A.R.I.C., at a meeting of the Midlands Section of the Society for Analytical Chemistry to be held at 7 p.m. on 12 October at the Mason Lecture Theatre, the University, Edmund Street, Birmingham 3.

New Fermentation Plant

On Monday, 26 September, Mr. S. W. Kipling, a member of the Pharmaceutical Society, and representatives of the Pfizer Co. of America, dug a sample of soil from the city centre, Birmingham. It was sent to the new Fermentation Plant for the manufacture of antibiotics at Richborough, Kent, which was opened by Lord Brabazon of Tara, P.C., G.B.E., M.C., on Friday, 30 September. There, Lord Brabazon sealed the soil which was sent to the US where it will be tested for micro-organisms.

BSI Sales Office in Birmingham

Through the co-operation of the Birmingham Chamber of Commerce, the British Standards Institution has now opened a sales office in the headquarters of the Chamber at 95 New Street, Birmingham 2. This development is in line with the BSI's policy of making British Standards readily available in industrial centres. Experience in Manchester, has shown that such a facility meets a local need.

Manufacture of Heroin

On Saturday, 8 October, at the annual conference of the National Union of Conservative and Unionist Associations at Bournemouth, Col. Sir Godfrey Llewellyn, will move the motion: 'That this conference, alarmed by the proposal to ban the manufacture of heroin, which if enforced would not only deny the sick of pain-killing benefits of this drug, but also endanger the lives of patients, urges the Government to continue to allow the manufacture of this drug, for medical purposes only, under strict control and with adequate safeguards'. Sir Godfrey will make the proposal on behalf of the Wales and Monmouthshire Provincial Area Council.

• OVERSEAS •

Oil Search in Nigeria

The Nigerian Federal Government is to grant a licence to search for oil to the Socony Vacuum Oil Co.

Pakistan Exporting Rock Salt

Under the Indo-Pakistan Trade Agreement, Pakistan is to export 1,000,000 maunds of rock salt to India. Delivery of the salt, valued at Rs.700,000, which began in September, will continue until 31 August next year.

Coke Demand Exceeds Production

The US Bureau of Mines reports that coke production in the US in July totalled 6,169,000 tons. Demand for coke, particularly for metallurgical uses, was heavy, exceeding production. Bituminous coal stocks continued to decline in July and stocks by the end of the month were sufficient only for 44 days' supply.

Spain Plans Cellulose Plant

The Spanish State-controlled Instituto Nacional de Industria (National Institute of Industry) is to build and operate a cellulose plant at Huelva. Planned capacity is for 20,000 tons of alpha cellulose or 24,000 tons of paper pulp. Raw materials will be obtained from eucalyptus wood in the Huelva area.

Brazilian Fertiliser Factory Contracts

The Brazilian National Petroleum Council has signed contracts with two Sao Paulo firms, Sociedade Paulista de Construcoes Ltda. and Sociedade de Engenharia 'Ecel' Ltda., for the construction of a fertiliser factory at the Arthur Bernardes refinery at Cubatoa. The factory is scheduled to be completed by the end of 1956.

Norwegian Fertiliser Plant

The Norwegian chemical concern Norsk Hydro has built a new plant for the production of 100,000 tons of complete fertiliser a year at Glomfjord, north of the Arctic Circle. At Eidanger in southern Norway, Norsk Hydro is already producing complete fertiliser at the rate of 50,000 tons a year. Complete fertiliser contains in concentrated form the three ingredients needed by the soil; nitrogen, phosphorus and potash.

Oil Strike in Negev Desert

The Israel Minister of Development, Mr. Yossev, announced on 23 September that the Lapidoth Oil Co., in which US investors have shares, has struck oil at a depth of 4,906 ft. in the Halatz settlement in the Negev desert.

Canadian Petroleum Statistics

Output of refined petroleum products in Canada in 1954 rose from 146,037,096 barrels in the preceding year to 159,935,615, the Dominion Bureau Statistics reports. Receipts of crude during the year increased to 169,452,850 barrels from 150,751,697. Domestic supplies rose to 92,679,819 barrels from 69,345,587, but imported supplies fell to 76,733,031 barrels from 81,406,110 in 1953.

Cobalt & Copper Production Records

The August output of cobalt at the Rhokana Corporation's Rhodesian cobalt plant—113,098 lb. of cathode metal and 57,750 lb. of cobalt carbonate—was a record. If this rate of production is maintained the annual output from the plant will be 2,050,000 lb.—higher than the total production of the US and just short of the combined production of Canada and Newfoundland.

Indian Alcohol

Measures to encourage the production and use of industrial alcohol in India were recently considered at a meeting of the Government of India and State Government representatives. At present the only available outlet for industrial alcohol in India is as an additive to petrol. The state of Uttar Pradesh is the largest producer of power alcohol in India, at the rate of 750,000 gallons per month. It is hoped to divert some of this to industrial uses.

First Liquid Alum

The Nichols Chemical Co. Ltd. announce plans for the immediate construction of a plant in the Niagara peninsula area for manufacture of liquid aluminium sulphate. The plant, which will be built near Thorold, Ontario, is expected to be in operation early next year, and will be the first in Canada to produce liquid alum with output going primarily to local pulp and paper mills.

• PERSONAL •

From 1 December DR. A. M. BAXTER, M.Sc., will be head of G. & J. Weir's research department.

MR. MAURICE J. SMITH, M.A., has been elected to the board of directors and appointed overseas trade director of Evans Medical Supplies Ltd.

MR. ARTHUR H. ELLIOTT has been appointed executive vice-president and general manager of Iricon Agency, which is acting as agent for nine US oil companies in certain matters relating to the Iranian Oil Consortium.

After 30 years with the Unilever organisation, MR. GEORGE FREDERICK GREAVES, financial director of Joseph Crosfield & Sons, Ltd. retired at the end of September.

DR. W. B. LITTLER has been promoted Chief Scientific Officer and appointed Principal Director of Science Research (Defence), Ministry of Supply, in succession to DR. W. CAWOOD, who is to become Principal Director of Scientific Research (Air) on 1 November.

SIR JOHN WRIGHTSON, vice-chairman, and MR. PETER WRIGHTSON have been appointed managing directors of Head, Wrightson & Co.

DR. R. F. GOLDSTEIN, B.Sc., Ph.D., F.R.I.C., F.Inst.P., general manager, has been appointed a director of British Oxygen Chemicals Ltd.

DR. W. STEVEN has been appointed superintendent of the Development and Research Department Laboratory of The Mond Nickel Co. Ltd. in Birmingham, in succession to the late MR. HOWARD EVANS, A.I.Met., F.I.M. Dr. Steven took a 1st Class Honours B.Sc. degree at Glasgow University in 1939, was awarded a Walter Duncan Research Scholarship, and obtained his Ph.D. degree in 1942. He then spent five years with William Jessop & Sons Ltd., Sheffield, as a research metallurgist engaged on research and works control on tool steels, constructional steels and stainless steels. During this period he was associated with the work of the Hardenability Sub-Committee formed under the aegis of the Special & Alloy Steels Committee of the Ministry of Supply. He was secretary of this sub-committee and was concerned with the publication of the Hardenability Symposium issued in 1946 by the Iron and Steel Institute. Dr. Steven joined The Mond Nickel Co. in July 1947 as a research metallurgist in their Development & Research Department Laboratory in Birmingham. He was elected a Fellow of the Institution of Metallurgists in 1953 and is a member of the Iron and Steel Institute, the Institute of British Foundrymen and other Societies, to which he has presented numerous papers on steels and cast iron.

The board of directors of Petrochemicals Ltd., now a subsidiary of Shell Chemical Co. Ltd., has been reconstituted as follows: MR. W. F. MITCHELL, chairman; MR. L. H. WILLIAMS, managing director; MR. F. H. BRAYBROOK, general manager; MR. F. MACKLEY, MR. E. J. BARNSLEY, MR. L .R. BATTEN.

MR. F. J. TEMPEL who succeeded DR. PAUL RYKENS as vice-chairman of Unilever Ltd. has now succeeded Dr. Rykens as chairman of Unilever NV. Dr. Rykens reached retirement age in 1953 but agreed to remain as chairman of Unilever NV, and a director of both Unilever Ltd. and Unilever NV. Born in Rotterdam, Holland, Dr. Rykens settled in England in 1929. Mr. Tempel, born in Holland, studied economics, later joining Van den Berghs in 1923. In 1929 he was transferred to Paris where he remained until 1931. He took over the management of Unilever in Berlin in 1934, returning to occupied Holland in 1940. At the end of the war Mr. Tempel returned to Germany as an adviser to the British Military Government for the reorganisation of the Unilever business in Berlin. He came to England in 1952 where he has since lived.

F. J. Tempel

SIR ERIC BOURNE BENTINCK SPEED, K.C.B., K.B.E., M.C., has been appointed to the British Board of Engelhard Industries Ltd. Sir Eric, who was educated at Christ's Hospital and was a scholar-elect of St. John's College, Oxford, served throughout the 1914-18 war in the King's Own Yorkshire Light Infantry and in 1920 he joined the War Office and was transferred to the Treasury in 1934. Two years later Sir Eric was appointed private secretary to the Rt. Hon. Stanley Baldwin who was then Prime Minister and First Lord of the Treasury. Shortly after the outbreak of war he rejoined the War Office and in 1942 was appointed Permanent Under Secretary of State for War, a position he held until he retired from the Civil Service in December, 1948. In 1949 Sir Eric became first managing director of the Anglo-Australian Corporation of Melbourne and Sydney, Australia, and remained in this office until his recent return to the UK. In this country Engelhard Industries Ltd. has three main divisions—the Hanovia Lamps Division; Baker Platinum Division, and Hanovia Products which is their Ceramics Division.

MR. GLANVILL BENN, chairman of Benn Brothers Ltd., proprietors of THE CHEMICAL AGE, left London this week for Australia, where he will attend the Commonwealth Press Conference as an official delegate representing the Periodical Proprietors' Association. According to present arrangements, the UK delegation will be led by Lord Burnham.

Obituary

The death has occurred at Durham at the age of 74 of MR. P. A. SCHWARTZ, formerly manager of the Bankfoot coke works, Crook, and later of the New Brancepeth coke works. Born in Germany, Mr. Schwartz came to Britain about 50 years ago to help in the building of coke ovens at Crook and Blaydon-on-Tyne. He stayed to become manager of the Bankfoot works at Crook. He retired five years ago, but since then had acted as consultant to a firm of coke-oven plant contractors.

Will

MR. HENRY MUMFORD SMITH, Newport (Co. Mayo), former owner of chemical works in the West Riding of Yorkshire and Cheshire, left estate in England and the Republic of Ireland valued at £12,500 (duty paid £1,776).

Drying of Varnish

STUDIES of varnish and linseed oil films, completed at Battelle Institute, Columbus, Ohio, show that varnishes with drier take up nearly twice as much oxygen during air-drying as varnishes without drier. Also, with drier, a large proportion of the absorbed oxygen is held in carbonyl and hydroxyl groups rather than in ether groups, which had been expected to predominate. Since carbonyl and hydroxyl groups do not aid in cross-linking, it is believed that most of the polymerisation during drying occurs as carbon to carbon bonds, rather than as ether bonds.

These results were described in a paper, 'The Effects of Driers on Composition and Physical Characteristics of Linseed Oil and Varnish Films—A Chemical and Infra-red Study', by Ernest R. Mueller and Clara Smith, of Battelle Institute, presented at the 128th National Meeting of the American Chemical Society in Minneapolis.

The Battelle work with linseed oil films yielded opposite results: air-dried linseed oil films with drier present contained slightly less oxygen than plain air-dried linseed oil films. Oxygen bonds of various types were found in proportions similar to those noted in varnish films.

In these experiments the oxygen linkages were determined through use of the 'difference technique' of infra-red spectrometry. The air-dried film was placed in the sample slot of the spectrometer and a fresh film inserted in the reference position. Then the spectrometer automatically subtracted all chemical groups that were common to sample and reference and produced a transmission curve of the differences between sample and reference.

US Copper Sulphate

Production, shipment and stocks of copper sulphate in the US all decreased markedly in July according to the Bureau of Mines, US Department of the Interior. Compared with June, production fell from 6,920 tons to 5,560 tons, shipments (excluding consumption by producing companies) from 7,028 tons to 6,180 tons and stocks from 2,432 tons to 1,796 tons.

Publications & Announcements

FLEXIPAIL rubber buckets manufactured by Edward Aldersley Ltd., of Manchester, are being made in a wide range of sizes and colours. Latest model is the all-black three-and-a-half gallon capacity bucket which has recently concluded a series of chemical tests to observe its resistance to a wide variety of chemicals including sulphuric, hydrochloric, phosphoric and nitric acids. Fitted with either plastic, brass or stainless steel handles, the buckets are acid resistant, virtually unbreakable, non-rusting and leakproof.

* * *

FACTRON Products Ltd., a subsidiary of the Tretol organisation, have issued details of their new ranges of specialised protective and decorative floor coatings. Applied by brush or spray, the rubberised floor paint can be applied direct on new concrete without the necessity of neutralising treatment. It is said to protect against mild acid and alkali attack.

* * *

OFFICIAL concern has recently been expressed at the number of accidents and the risk of shock, when welding at an altitude or in a confined space. It is obvious that with the high voltages now required by many types of electrodes even gloves and insulated holders do not provide complete safety. Philips Electrical Ltd., Century House, Shaftesbury Avenue, London W.C.2, have introduced a low voltage safety relay which, they say, gives welders complete protection by ensuring that at no time, except when the arc is being ignited or is burning, is a full open circuit voltage available. The relay (type PE 3,100) is in effect a voltage divider which reduces the full open circuit voltage of the power source by 50 per cent. As soon as the electrode is brought into contact with the workpiece, the splitter device is automatically by-passed and full voltage is available for striking an arc. A delay device holds the open circuit voltage to full value for one second after the arc is extinguished, allowing re-striking should the arc be broken accidentally, and permitting tacking of the workpiece without re-operating the main relay. The equipment can be fitted to the output side of any welding plant, either AC or DC up to a capacity of 500 amp. A local power supply of 220 V AC is required.

A NEW index consisting of a list of Silicone Notes published by Midland Silicones, together with other publications of interest, has just been brought out by the company, of 19 Upper Brook Street, London, W.1. Each section is in two parts. The first, 'Silicone Notes', lists publications by Midland Silicones; the second lists articles that have appeared in technical journals and are either of permanent value or give the latest available information on a particular subject. The sections are: general publications, electrical insulation, Drisil silicone water-repellent products, Releasil silicone release agents, greases and compounds, fluids, organosilicon chemicals, Silastomer silicone rubber products, resins paints and other resinous products. Out of a total of some 220 publications listed 46 are new since the last list and 37 are available for loan or retention.

* * *

SYNTHETIC resins, wholly or in part, in paint media, have almost superseded that of natural occurring resins and gums. A description of Featalak and Featasol surface coating resins which cover a wide range of materials for application in the paint, varnish, and printing ink trades, are given in a pamphlet just issued by Featly Products Ltd., of Manchester. It gives details of Featalak resins for moulding compositions, foundry resins, and Featalak resins for laminating and impregnating.

* * *

DESIGNED in collaboration with AERE, Harwell, and the sub-committee of the British Science Masters' Association is the Radioactivity Meter type No. 552 made by Isotope Developments Ltd., Beenham Grange, Aldermaston Wharf, near Reading, Berks. This instrument is designed primarily for educational purposes, but is also suitable as a general purpose rate measuring instrument, giving a useful accuracy for quantitative work. It consists of a beta-gamma geiger counter probe and ratemeter circuit, employing a single cold cathode trigger tube. The counter is of a robust pattern with window thickness 3.5-4 milligrams/sq. cm. Indication of the low count rate is shown by a flash for each pulse, in the trigger tube. Built-in EHT supply is continuously variable 300-600 volts.

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.)

PILKINGTON'S TILES LTD., Clifton Junction, Lancs.—23 August, £100,000 debenture and an equitable mortgage by way of further security thereto, to Industrial & Commercial Finance Corp. Ltd., respectively charged on specified properties at Clifton, Lancs, and a general charge and on specified shares and debentures; also 27 August, mortgage and debenture to the District Bank Ltd. securing all monies due or to become due to the bank; charged on specified properties at Clifton, Lancs, and a general charge (subject to, etc. as described in schedule). *—. 5 April, 1955.

TITANIUM PRODUCTS LTD., London W., hard facing metal producers.—23 August, mortgage to Anglo-American Corp. of South Africa Ltd., securing £25,000 due to mortgages from Leon Nussbaum; charged on letters patent for improvement in or relating to Sintered Hard Carbide Products. *Nil. 10 March, 1955.

Satisfactions

A. BOAKE, ROBERT & CO. LTD. (formerly A. BOAKE, ROBERTS & CO. (MANUFACTURING) LTD., London E., chemical manufacturers.—Satisfaction, 25 August of guarantee, etc., registered 27 April, 1953.

BRITISH CELANESE LTD., London W.—Satisfaction, 30 August of debenture stock registered 24 September, 1946, to the extent of £13,350.

CARBON PROPERTIES LTD., London W.—Satisfaction, 1 September of charge registered 3 March, 1954.

MONCKTON COKE & CHEMICAL CO. LTD.—Satisfaction, 30 August of debenture registered 13 February, 1946.

Company News

F. W. Berk & Co. Ltd.

A rights offer of 1,920,000 ordinary 5s. shares is planned by F. W. Berk, chemical manufacturers and merchants. The price of issue will be announced shortly. Mr. A. D. Berk, chairman, announced that additional funds are needed to finance an extensive expansion programme, and negotiations have been concluded for an additional factory at Sandridge, Hertfordshire. The bentone plant of Abbey Chemicals, the company formed earlier this year in conjunction with Hoyt Metal Co. of Great Britain, is being constructed. To supply all plant and equipment required it may be necessary to increase Abbey Chemicals' capital early next year from £100,000 to £150,000 of which F. W. Berk's proportion is 48 per cent. It is also planned to install new plant at several of Berk's factories and to expand the company's activities in various fields. The directors expect profits for this year to equal those for 1954 which would justify a final ordinary dividend for 1955 on the increased capital at the rate of 4½d. per share.

Ashe Chemical Ltd.

The directors have declared an interim dividend on the ordinary shares of 1s. each, at 6 per cent (72d. per share less tax at 8s. 6d. in the £). Warrants will be posted on 14 October and dated for payment 15 October, 1955.

Jenson & Nicholson

A rights issue of ordinary shares to raise £366,000 has been announced by Jenson & Nicholson, paint manufacturers. Ordinary shareholders registered on 6 September are offered 488,000 5s. ordinary shares at 15s. each in the proportion of one for four.

Reichhold Chemicals

As a result of satisfactory trading for the first six months of the year, an interim dividend of 7½ per cent is declared on account of 1955, payable 1 October. A similar interim was paid for 1954.

Savory & Moore Ltd.

The directors are considering proposals for capitalising £100,000 of capital and revenue reserves for an issue of 100,000 ordinary shares of £1 to be allotted to

[continued on page 754

Company News

continued from page 752

holders of the existing £150,000 ordinary stock. It is also proposed that the stock shall be transferable in 5s. units. The group's net current assets have increased from £580,181 to £640,839, and total net assets at book values from £1,235,922 to £1,269,839.

Evans Medical Supplies Ltd.

On 7 September the directors of Evans Medical Supplies Ltd. decided to issue 854,113 ordinary shares of 5s. each. The price has now been fixed at 6s. 9d. per share, payable in full on application. Ordinary stockholders registered at the close of business 12 September, 1955, are being provisionally allotted three new 5s. ordinary shares for every eight 5s. units of stock held at that date (fractions of a new share being ignored). The new ordinary shares when fully paid will be converted into stock.

Market Reports

LONDON.—A steady business characterises most sections of the industrial chemicals market and there has been a fairly good inquiry for forward contracts. Export trade remains at about recent levels. Renewed activity has been reported from the fertiliser market with sulphate of ammonia and nitro chalk quoted at firmer rates. Sodium sulphite is dearer at £66 5s. per ton for the anhydrous, and higher quotations have been recorded for industrial nitrate of soda, sulphide of soda, sodium percarbonate, barium carbonate and hydrogen peroxide. Borax and boric acid are moving well and formaldehyde continues in steady call. Firm prices and a steady demand describes all sections of the coal-tar products market with no special feature to record.

MANCHESTER.—Steady trading conditions have been reported during the past week in most sections of the Manchester market for heavy chemicals. Home-trade users are mostly taking good deliveries against contracts and a fair number of fresh inquiries from shippers have been circulating. The underlying strength of the market has been reflected in increased quotations for industrial refined nitrate of soda, peroxide of hydrogen, sulphide of soda and one or two other lines.

GLASGOW.—A rather quieter position is prevailing in the Scottish heavy chemical market, although the latter part of the week has been slightly better. Certain branches of the textile trade have been rather quieter, and this naturally has had an effect. There has also been a slight falling off in regard to export. Prices on the whole are unchanged.

Next Week's Events

MONDAY 3 OCTOBER

RIC (London Section)

London: Chemical Society's Rooms, Burlington House, Piccadilly, W.1, 6.30 p.m. 'The Production of Scientific Apparatus' by R. Barrington Brock, M.B.E., B.Sc., F.R.I.C.

TUESDAY 4 OCTOBER

RIC (London Section)

Dagenham: Essex Technical College, 6.30 p.m. 'Man-Made Textile Fibres' by F. V. Davis, B.Sc., F.T.I., F.R.I.C.

WEDNESDAY 5 OCTOBER

Royal Statistical Society

Birmingham: Exchange & Engineering Centre, Stephenson Place, Birmingham 2, 6.45 p.m. 'The Uses of Factor Analysis in Industrial Physics' by G. W. Scott Blair.

The Chemical Society

Manchester: Large Chemistry Theatre, University of Manchester, 6.30 p.m. 'Inorganic Metallurgical Aspects of Atomic Energy' by L. Rotheram, M.Sc.

Institute of Metal Finishing

Glasgow: Institution of Engineers & Shipbuilders in Scotland, 39 Elmbank Crescent, 7.30 p.m. 'Cyanide Plating Solutions' by J. M. Sprague, M.Sc., F.R.I.C., F.I.M.

THURSDAY 6 OCTOBER

The Chemical Society

Bristol: Chemistry Department, The University, 7 p.m. 'The Impact of Nuclear Energy on Industry' by Dr. J. M. Fletcher.

Edinburgh: North British Hotel, 5 p.m. Society of Chemical Industry Lister Memorial Lecture, 'The Chemistry & Functions of Vitamin B12' by Dr. E. Lester Smith, F.R.I.C.

FRIDAY 7 OCTOBER

Society of Chemical Industry

London: Chemistry Lecture Theatre, King's College, Strand W.C.2, 7 p.m. 'The Reactions of Alcohols with Halides' by Dr. W. Gerrard, Ph.D., D.Sc.

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

THE POLYTECHNIC,
309 REGENT STREET, W.1.
DEPARTMENT OF CHEMISTRY & BIOLOGY

A course of six lectures on
"AROMATIC SUBSTITUTION"
will be held on Friday evenings at 7 p.m., commencing 28 October, 1955.

Lecturers:
Professor M. J. S. Dewar, Professor E. D. Hughes, Professor H. Burton, Professor D. H. Hey, Dr. P. L. D. de la Mare, Dr. W. Davey.

Fee for the course: £1.

Further details and enrolment forms may be obtained on application to the Head of the Department of Chemistry & Biology.

J. C. JONES,
Director of Education.

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.

ASSISTANT WORKS CHEMIST required by Telephone Manufacturing Co., Ltd., to be responsible to the Chief Chemist with problems arising at our St. Mary Cray, Kent, works in connection with materials and finishes. B.Sc. or A.R.I.C. essential. Pension and bonus scheme after qualifying period.

Write fully, stating age, experience, and salary required to:—

Personnel Manager
TELEPHONE MANUFACTURING CO., LTD.
Martell Road.
West Dulwich, S.E.12.

EXPERIMELTAL OFFICER required by the **ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, BERKS,** to undertake experimental work in the chemical engineering laboratory and to assist in the development and design of chemical plant and equipment for novel processes in the atomic energy field. Applicants should be at least 26 years of age and have had experience of either small or large-scale chemical plant operation. The minimum qualification is H.S.C. (Science) and applicants should be about H.N.C. standard in Chemistry, or Chemical Engineering, preferably with a pass degree, or equivalent, in Chemical Engineering.

SALARY.—£775-£945 per annum (male). Contributory Superannuation Scheme. Successful married officers now living outside the establishment's transport area will be eligible for housing on one of the Authority's estates; until housed, a lodging allowance may be payable.

Requests for application forms by **POSTCARD** to the Senior Recruitment Officer at the above address. Quote reference A.578/38.

THE MURPHY CHEMICAL CO., LTD., WHEATHAMPSTEAD, HERTS, manufacturers of insecticides and fungicides, have vacancies for young **CHEMISTS,** freshly graduated or with some industrial experience, to work upon the development of new products. Write, in confidence, to The Secretary.

MAINTENANCE ENGINEER, age 30/35, with A.M.I.Chem.E., A.M.I.Mech.E. or similar qualification, required for large Chemical Works in Lancashire. Good Salary and prospects for the right man. Pension Scheme.

Apply in writing, giving full details of education, qualifications and experience to:—
McKECHNIE BROTHERS LTD., P.O. BOX. NO. 4. WIDNES, LANCS.

THE RADIOCHEMICAL CENTRE at **AMERSHAM** has vacancies for **CHEMISTS** to work on the preparation of isotopically labelled compounds, particularly materials of biological interest, and on the separation of radioactive isotopes from irradiated materials at high levels of activity. For certain posts practical experience in the chemistry of natural products, particularly of the steriods, would be an advantage, whilst for other posts candidates should have wide laboratory experience in Inorganic or Physical Chemistry.

Successful candidates will be appointed either to the Scientific Officer Class, minimum qualifications being a Second Class Honours Degree in Chemistry or Biochemistry, with the grade according to age, experience and qualifications of Principal Scientific Officer (£1,270-£1,680 per annum), or Senior Scientific Officer (£1,205-£1,270 per annum), or Scientific Officer (£528-£948 per annum), or to the Experimental Officer Class minimum qualifications being Higher School Certificate in Science subjects, or equivalent qualifications, with the grade according to age, experience and qualifications of Senior Experimental Officer (£1,155-£1,350 per annum), or Experimental Officer (£808-£988 per annum), or Assistant Experimental Officer (£330-£718 per annum). Rates for women are slightly lower. It will be necessary for persons appointed to join the Authority's contributory superannuation scheme.

Housing accommodation may be available for a selected officer if he is married. Requests for application form on a **POSTCARD** to the Personnel Officer, The Radiochemical Centre, Amersham, Buckinghamshire. CON/HAR/620B/Z89.

INDUSTRIAL CHEMIST required by leading container closure manufacturers in Midlands. Progressive position requiring knowledge metal printing, varnishing, stoving, and metallurgy, associated with food packaging industry. Maximum age 35 years.—Written applications, with details of experience previous appointments, etc., to **P. A. METAL CLOSURES LTD., BROMFORD LANE, WEST BROMWICH, STAFFS.**

GRADUATES in **MECHANICAL** and **CHEMICAL ENGINEERING** required for progressive positions in the Research, Design and Production Divisions of THE POWER-GAS CORPORATION LIMITED. Training given to men without previous industrial experience. Apply to:—**STAFF PERSONNEL MANAGER, PARKFIELD WORKS, STOCKTON-ON-TEES.**

THE SOUTHERN OIL COMPANY, LIMITED, have a vacancy for a **RESEARCH CHEMIST** in their laboratories. He would be expected to take charge of the Research Laboratory and Research Bakery, the work involved covering all aspects of edible oil refining and shortening manufacture. Previous experience in this field is essential.

The position is permanent and pensionable and the salary paid will be commensurate with experience and qualifications.

Write, stating full details of age, qualifications, etc., to the Company at Westinghouse Road, Trafford Park, Manchester, 17.

Situations Vacant—*continued*

HAWKER AIRCRAFT LTD.

require a

DEVELOPMENT ENGINEER

for research into use of

PLASTICS

for aircraft components and tools.

Applicants should possess a University Degree, preferably in Chemical Engineering, and experience in plastic industry would be an advantage.

Applications, giving full details of qualifications and experience, to :

THE PERSONNEL SUPERVISOR,
HAWKER AIRCRAFT LTD.,
CANBURY PARK ROAD,
KINGSTON-ON-THAMES.

EXPERIMENTAL OFFICERS & ASSISTANT EXPERIMENTAL OFFICERS in various Government Departments. The Civil Service Commissioners invite applications for pensionable posts. Applications may be accepted up to 31 December, 1955, but forms should be returned as soon as possible as an earlier closing date may be announced either for the competition as a whole or in one or more subjects. There are at present no vacancies for meteorologists. Interview Boards will sit at frequent intervals.

The posts are divided between the following main groups and subjects :—

(*a*) Mathematical and Physical Sciences ;
(*b*) Chemistry and Metallurgy ;
(*c*) Biological Sciences ;
(*d*) Engineering Subjects ; and
(*e*) Miscellaneous (including, e.g., Geology, Library and Technical Information Services).

AGE LIMITS.—For Experimental Officers, at least 26 and under 31 on 31 December, 1955 ; for Assistant Experimental Officers, at least 18 and under 28 on 31 December, 1955. Extension for regular service in H.M. Forces. Candidates aged 31 or over with specialised experience for Experimental Officer posts may be admitted.

Candidates must have at least one of a number of specified qualifications. Examples are Higher School Certificate, General Certificate of Education, Scottish Leaving Certificate, Scottish Universities Prelliminary Examination, Northern Ireland Senior Certificate (all in appropriate subjects and at appropriate levels), Higher National Certificate, University Degree. Candidates taking their examinations in 1955 may be admitted. Candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. In general a higher standard of qualification will be looked for in the older candidates than in the younger ones.

SALARY (London) :

Experimental Officer : £790-£960 (men) ; £693-£848 (women).

Assistant Experimental Officer : £320 (at age 18) to £700 (men), £614 (women). Starting pay up to £575 (men) or £537 (women) at 26. Somewhat lower outside London. Promotion prospects. Women's scales subject to improvement under equal pay scheme.

Further particulars from **CIVIL SERVICE COMMISSION, SCIENTIFIC BRANCH, 30, OLD BURLINGTON STREET, LONDON, W.1,** quoting No. S94-95/55. 7784/70/9/55/JP/a.

FOR SALE

CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE: 3285 EAST.**

ECONOMIC BOILERS.—Two 11 ft. 6 in. diam., 175 lb. w.p., 15,000 lb. evap. ; 10 ft. 6 in. diam., 160 lb. w.p. ; 9 ft. 6 in. diam., 120 lb. w.p. New 1948. 400 other Boilers in stock.

TWO Broadbent **WATER-DRIVEN CENTRIFUGES,** 30 in. diam., 12 in. deep, 1,150 r.p.m.

SIX Aluminium **CONDENSERS,** 14 ft. long by 2 ft. 3 in. diam. 386 Tubes, ¾ in. o.d.

FORTY Riveted **RECEIVERS,** 8 ft. 6 in. long, 5 ft. 6 in. diam., 75 lb. w.p. Numerous other sizes.

Solid Drawn **STEEL PIPES,** 6 in., 8 in., 10 in., 12 in., 14 in., thousands of feet in stock, plain and flanged.

CAST-IRON PIPES, 1,200 yds. 10 in. and 400 yds. 8 in., **NEW.** Also most other sizes, up to 24 in. bore.

VALVES in Stainless, Gunmetal, Enamel Lined.

CAST-IRON TANK PLATES, 2 ft. square. 500 in stock.

FRED WATKINS (BOILERS), LTD.
COLEFORD, GLOS.

MORTON, SON AND WARD LIMITED
offer
HYDRO EXTRACTORS

36" and **21"** HYDRO EXTRACTORS by BROADBENT, equal to NEW, belt driven through centrifugal clutch with safety interlocks. Steel galvanized baskets. **48"** by BROADBENT all electric under driven, pit type. 3 point suspension, steel galvanized basket, with starter.

MIXERS

NEW 'MORWARD' 'U' shaped MIXING VESSELS made to requirements in s.s. or m.s. Jacketed or unjacketed, with or without mixing gear.

JACKETED PANS

NEW 100g, 150g, and 200g in m.s. for 100 lb. w.p. with or without mixing gear.

20g. STAINLESS STEEL Jacketed pan, bottom outlet 40 lb. p.s.i.

SECOND HAND EQUIPMENT

MIXERS, JACKETED PANS, etc. available from stock—all in good condition.

PUMPS

Selection of new MONO and second hand pumps in stock, 2" to 5".

Enquiries invited
MORTON, SON AND WARD LIMITED,
WALK MILL,
DOBCROSS, NEAR OLDHAM,
LANCS.
Phone : Saddleworth 437

TWO BRAND NEW STERILISING VESSELS—7 ft. long by 3 ft. diameter.

One S. J. WERNER MIXER with pan approx. 2 ft. by 2 ft. of the tilting type.

Two steam jacketed **CAST-IRON FILTER PRESSES**—each with 38 s.j. plates and 39 frames, cake size 2 ft. 4 in. square.

Several JOHNSON CAST-IRON FILTER PRESSES—various sizes and types.

GARDNER MIXERS and Mixers and Sifters combined, sizes "E," "G," "H" and experimental.

HYDRO EXTRACTORS—24 in., 30 in. and 36 in.

Two Gardner "H" size Steam-jacketed **MIXERS.**

Two 18 in. **KEK PLATE MILLS**—with feeders delivery bins, motors and entablature.

Two No. 4 **SUPER MIRACLE MILLS** with motors and starters.

Three Single-effect **EVAPORATORS** by Scott with pumps and motors.

RICHARD SIZER, LTD.
ENGINEERS,
HULL.
Telephone: 31743.

600

COMPLETE VACUUM DRYING PLANT by Scott, comprising horizontal band drier approximately 35 ft. by 6 ft., with service feed hoppers, shaker feeder, condensate receivers for hotplates, vacuum augmentor, kek mill, screening and finished material hoppers, tailings elevator, wet and dry vacuum pumps. Powered by flameproof motors. Drier of the 7-band type, but has operated with three bands only.

ROTARY DRIER by Vernon, Paris—30 ft. by 4 ft. diam. of ¼ in. riveted mild steel plate, running on two roller paths. Motorised through girth gear and pinion. Fan, cyclone and furnace parts available.

Patent **TUBULAR DRIER** by R. Simon—approximately 14 ft. by 6 ft. by 6 ft. Cast-iron construction on glazed base. Revolving reel agitator of solid drawn steel tubes suitable 60-80 lb. sq. in. w.p. Motorised 12½ h.p. 415/3/50. Separate belt drive to No. 4 Sturtevant extractor fan, feed hopper included.

Three Self-balancing **HYDRO EXTRACTORS** by Cherry Tree—21 in. diam. galvanised basket. Fitted spring op., self-releasing brake and hinged safety cover. Motorised.

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