Chemical Age

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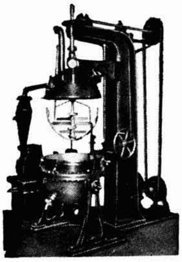

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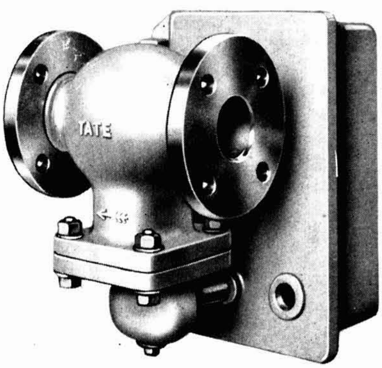

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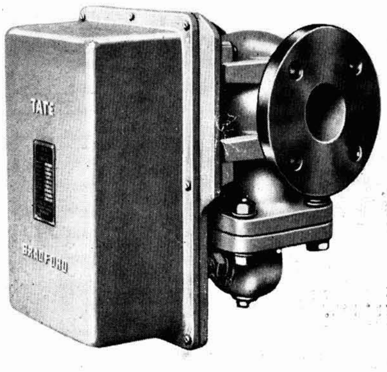

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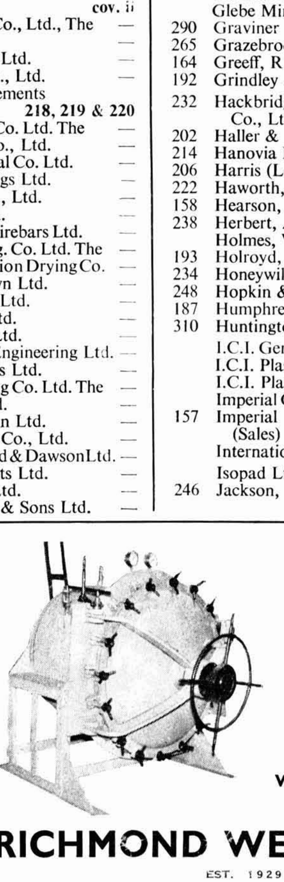
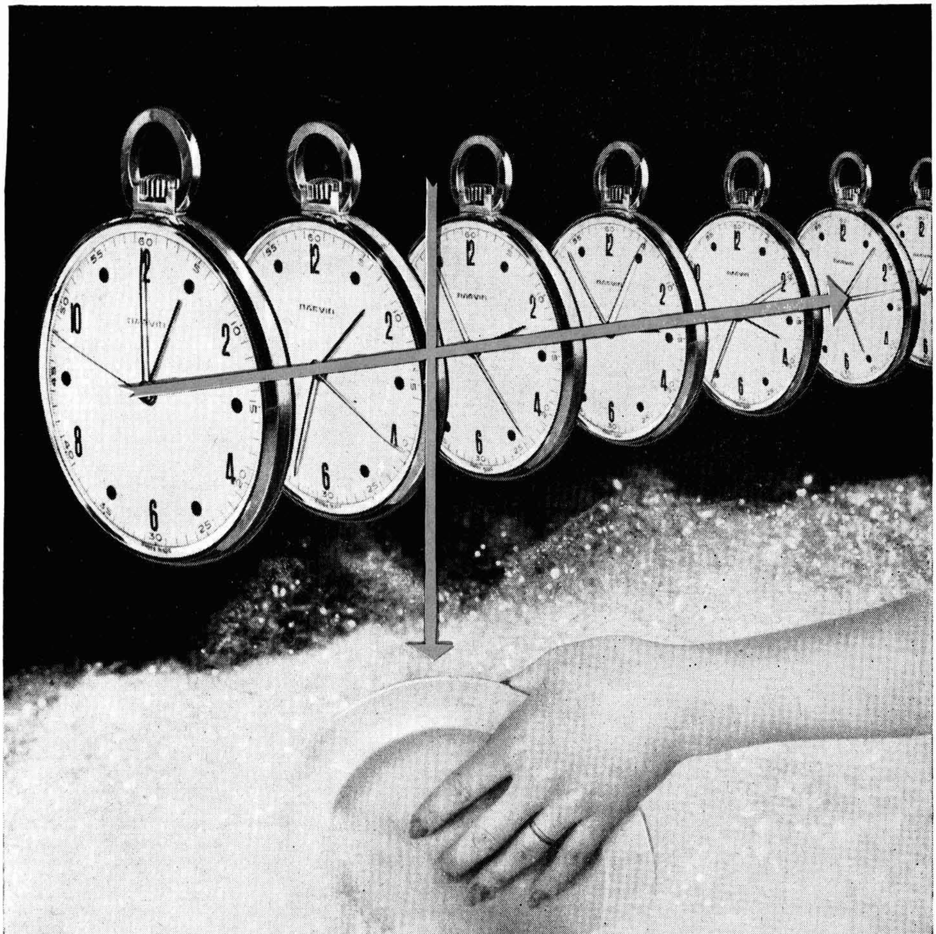
INDEX TO ADVERTISERS

The first figures refer to advertisement in **Chemical Age Year Book**, *the second to the current issue*

[continued on page 188





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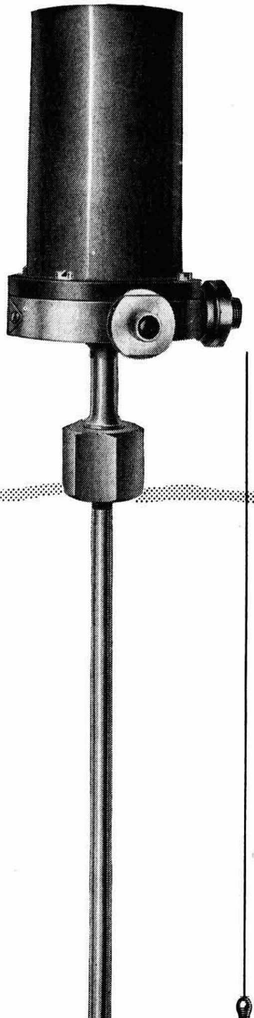

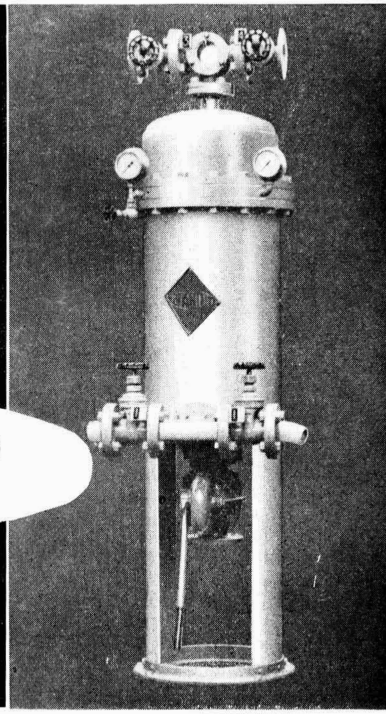

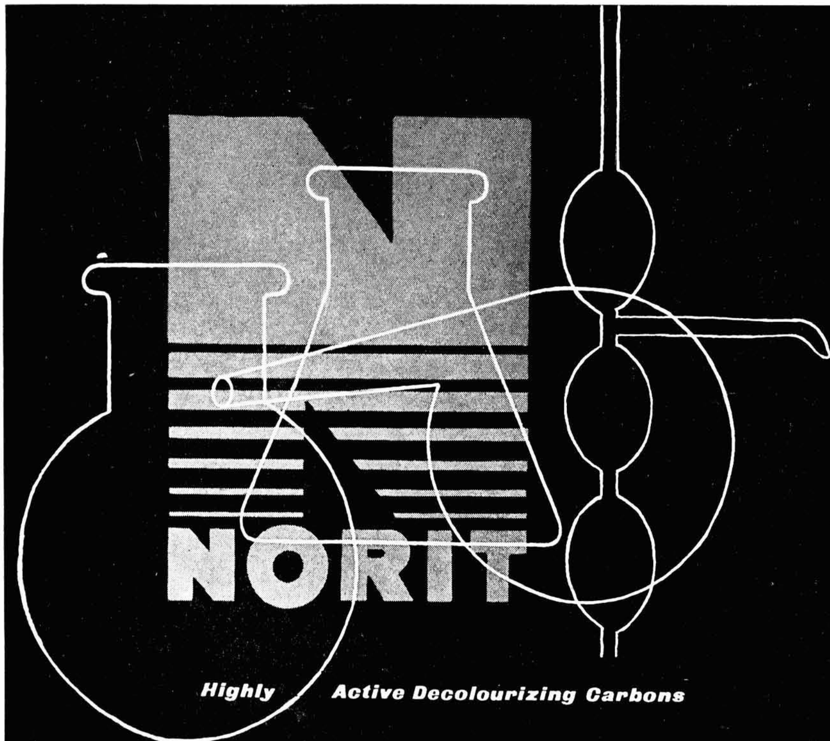
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IN THIS ISSUE

Annual subscription is 52s 6d ($7.40), single copies 1s 3d (by post 1s 6d).

MIGRATION PROBLEM

CHEMICAL INDUSTRY throughout the world today has a major problem to solve in order to safeguard its future and its position with regard to competition. That problem is the recruitment of highly qualified scientists and engineers, managerial, technical and supervisory personnel and, in view of the growing mechanisation and automation in chemical industry, the greater number of skilled workpeople.

Although chemical industry in this country, in the US and in Europe is generally taking keen interest in surmounting the difficulties, the solution of the problem will require great co-operation with educational and appropriate government departments.

The various large chemical concerns will undoubtedly influence the man-power problem. It will be these companies which must ensure that scientists undertake the work for which they are best qualified and, by providing the right environment, encourage research and effective development. Professional personnel, too, must receive due reward, by appreciation, status, salary, and advancement.

It is alarming to realise that at the present time some one hundred engineers and a similar number of persons from other professions which includes doctors, scientists, lawyers etc., are leaving the UK every year to take up posts in the US. Although these figures are numerically insignificant, the type of professional man involved is not, for it is the man with outstanding qualifications and often with a research fellowship who leaves the UK, ultimately perhaps to enter American industry.

It has been estimated that on an average between 10 and 20 first-class honours chemists, physicists and engineers graduate from the average UK university. A very few stay on to take their doctorates and a few others gain research scholarships.

From recent reports it would seem that of the graduates who gain US or Canadian research scholarships and fellowships, many stay on in those countries to continue working at the universities or join industrial research organisations.

Emigration to Canada is regarded by many persons today as a stepping off place for the US. The rate of loss through migration of trained personnel from Canada to the US has increased. Since 1950, when 20,000 people left Canada for the US, the number of migrants has increased from 25,000 to 30,000 persons a year.

Few UK universities appear to keep detailed records of the careers of their graduates, but details from Oxford, which has close connections with the US, indicate that 12 scientists go to the US each year for further research studies after taking their doctorates. It is now estimated that of those going to the US during the last two years (i.e. 24) five will not return. During each of the last three years one of those six to eight with research fellowships has left for the US.

A northern university has reported that about 11 per cent of its total highly qualified graduate output of chemists and physicists and engineers has been lost to the US during the last five years, and yet another university records

10 per cent of this type of graduate have emigrated to the US. Of those going to Canada, quite a few have eventually settled in the US.

A Scottish university reports that in 1955, one out of eight highly qualified scientists went to Canada and of 27 engineers, two went to the US on research fellowships and two emigrated to Canada.

However, several leading UK chemical manufacturers are known not to have lost any scientific personnel by reason of emigration, while the Atomic Energy Research Establishment at Harwell has reported that only one scientist has left in the last three years for the US and that one or two have gone to Canada to join the Canadian Atomic Energy Establishment, which in any case is associated with the UK establishment. However, it is well known that the US plans to expand its nuclear power programme and may well look to this country for trained personnel. Undoubtedly the higher salaries paid by US concerns are influencing UK scientists and engineers. Salaries of up to $8,000 to $10,000 ($2.80 = £1) a year can be obtained by young scientists, and $25,000 to $30,000 before tax against £4,000 in the UK by older men, that is, two to three times as much as could be gained in the UK. However, taxation in the US is another factor to be considered. University scientific personnel also have a considerable additional income from industrial consultation fees (up to $100 a day). Such consultancies in the UK are very rare.

US scientists also appear to have greater freedom in research than their UK counterparts, while the laboratories are better equipped and there are more funds available for research.

Obviously, salaries, fees, facilities etc., in the UK must be brought into line with those of the US in order to avoid the growing emigration of highly trained scientific and engineering personnel to the US.

FERTILISER TERMINOLOGY

THERE seems small doubt that the US is about to make history in the fertiliser industry by becoming the first of the great world producing and using countries to abandon P_2O_5 and K_2O as yardsticks of nutrient valuation. Last year the Association of American Fertiliser Control Officials (in October) adopted a proposal that the phosphorus and potassium contents of fertilisers should be stated in terms of P and K, bringing these nutrients into line with nitrogen. already stated in terms of the element. This is a change that has been widely advocated by soil scientists on both sides of the Atlantic. The continued use of the oxide terms of reference is a stubborn hangover from early Victorian chemistry. Time was when phosphorus was declared as the tri-calcium phosphate and when nitrogen was always declared as ammonia. Now it seems that in the US there is marked support for an all-elementary system.

Against this type of change there is only one argument, namely, that it will confuse farmers and traders long-habituated to the other system. In terms of P and K, fertilisers will declare appreciably smaller percentage contents of P than of P_2O_5 and slightly smaller figures for K than for K_2O. Opposition to the change is based on the fear that non-technical people engaged in buying and selling will think that fertiliser plant-food contents have been lowered. It is a notable feature of present discussions in America that the resistance movement is surprisingly weak. Thus, the vice-president of the Olin Mathieson Chemical Corporation in charge of its plant food division said early this year: 'To continue this out-dated usage is to hoodwink the farmer by making the analysis appear bigger than it does when expressed wholly as elements. . . . Changes should have been made more than a quarter of a century ago, when they were first seriously discussed. They must be made today.' Of the objection that the change will create confusion the vice-president said that this was nothing more than the normal human resistance to change, and the proposals were in fact a move towards a simplification that would reduce confusion.

The change is favoured among official advisers and agricultural teachers in a majority of three to one. There seems little doubt that it will become part of each State's legislation by 1960 or before. Undoubtedly such a step by America will stimulate pressure for making a similar change in this country. Everyone who has ever tried to explain fertiliser terminology to non-chemists will certainly welcome any opportunity to abandon the P_2O_5 or so-called phosphoric acid yardstick. It is not even truthful for P_2O_5 is not, and never has been, phosphoric acid, and every phosphatic fertiliser statutory declaration under our own Act is a chemical lie. Changes of this type, however, are much easier to bring about smoothly than those who dislike change pretend. It is hightime that throughout the world, fertiliser terminology was rescued from its obsolete traditionalism.

CHEMICAL EXPORTS IN 1956

ALTHOUGH by value UK exports of all types of chemicals in December were slightly lower than in December 1955, the year's total, at £244,526,579, represented an increase of £11½ million over 1955 and £40½ million compared with 1954. Imports of all chemicals, by value, were lower in December than in the same month of 1955 by almost £2½ million, and the 1956 figure of £107,450,257, represented a fall of £4½ m compared with 1955 and a rise of £5.9 m against 1954.

In 1956 shipments of inorganics, large increases were experienced in the following cases: copper sulphate, up by 8,821 tons; sodium hydroxide, up by 1,406,283 cwt.; carbon blacks, almost doubled by an increase of 224,618 cwt. Among organics, increases were experienced in exports of acids and their derivatives, by value, up by £368,360; glycerine, up by 27,691 cwt; sulphonamides, in other than tablet or prepared form, up by 306,756 lb.

1956 exports of mineral tar and crude chemicals from coal, petroleum and natural gas, at £4,664,958, were up by £347,560. UK exports of manufactured fertilisers continued to decline, the 1956 total of £1,087,772 being £3,499,209 below 1955 and £5,928,188 under the high 1954 figure. On the other hand, imports of manufactured fertilisers rose by just over £1 million to £9,099,982, a figure that was higher than 1954 exports by £1,937,192.

VAGUE INFORMATION

RECENTLY received in this office, the latest edition of *Rumanian Foreign Trade*, published by the Rumanian Chamber of Commerce, is a great disappointment to us. In a section of six pages devoted to the post-war history of the Rumanian chemical industry we hoped to find some solid facts and figures for production; something, in fact, to show how the industry has developed from practically nothing to be a major section of the nation's economy.

Instead, all the figures published are quite useless from our point of view. Many comparisons are given; for example, the 1955 production of chemical fertilisers is stated to be 1,656, compared with 100 for 1950. This figure is impressive; how much more impressive it might be if we knew the 1950 figure.

It must be said that this deficiency is not confined to publications from behind the Iron Curtain. Many trade and production surveys from all over the world are equally as vague.

Markets in SE Asia for Plastics Raw Materials

Growing Demand from India, Hong Kong

THERE is a growing demand for chemicals and plastics raw materials for the Indian plastics industry. In 1948, India had 40 factories producing plastics goods, now there are more than 100 large and medium plants, with many more operating on a cottage industry basis. The Government encourages investment in the industry, which currently totals about Rs80 million, because production of plastics creates a market for the chemical industry.

This is stated in a recently conducted Canadian Government survey of the Asian markets for plastics raw materials. Official Indian estimates of the present raw material requirements are:

	Tons
Phenol formaldehyde moulding powder (electrical grade) ..	500
Urea formaldehyde moulding powder	600
Polystyrene	3,500
Polythene	1,500
P.v.c. resin compounds	1,600
Cellulose acetate/acetate butyrate (moulding powder, sheets) ..	800
Cellulose nitrate (sheets, rods, tubes)	300
Acrylics (moulding powder, sheets)	300
Nylon-monofils, powder yarn ..	3,000
Styrene butadiene copolymer latex (GRS rubber)	20,000

With the exception of general grade phenol formaldehyde moulding powder, which is manufactured in India, all raw materials for the industry are imported. Production of some plastics raw material is projected under the second five year plan, but using mainly imported chemicals. Eventually, the basic chemicals for plastics raw materials will be manufactured.

Polychem Ltd., in association with Dow Chemical Co., are constructing a plant for polystyrene. ICI (India) is to set up a factory shortly to make 5,500 tons of polythene a year. The National Carbon Co. (Indian) Ltd. plans to produce polythene and Ratlanchard Harjasvai (Plastics) will make urea formaldehyde moulding powder in collaboration with a British firm. The newly formed East Anglia Plastics (India) Ltd. plans to manufacture cellulose acetate flakes and p.v.c. resins. If all these plans materialise, India will have an annual installed capacity for moulding powders of 11,400 tons by 1960-61, as against 1,180 tons in 1955-56.

The ex-works price of a pound of phenol formaldehyde moulding powder is about 21 cents, while the landed cost, without duty, of a comparable product from Germany is about 15 cents. Duty amounts to 31.5 per cent *ad valorem*. The duties levied on the three main chemical raw materials used in its manufacture are refundable to plants with a minimum annual capacity of 200 tons.

Pakistan. Annual requirements of Pakistan's rather small plastics industry are estimated as follows:

	Tons
Phenol formaldehyde moulding powder	150-200
Polystyrene	600
Methyl methacrylate sheeting ..	70
Cellulose acetate	50
Polythene	20

As in the case of India, UK manufacturers are the main suppliers.

Hong Kong. Following rapid expansion in recent years, the plastics industry is now one of the most important in the Colony. There are more than 300 privately owned plants of all sizes. Hong Kong is a substantial importer of raw materials, an extremely large proportion of which come from the Commonwealth.

The following are the Colony's imports in pounds during 1955 and the first six months of 1956.

	1955 lb.	1st half 1956 lb.
Vinyl resins (including p.v.a. and p.v.c.)	558,155	289,950
Acrylic resins ..	345,448	338,191
Polystyrene and polydichlorostyrene ..	7,029,471	4,890,571
Cellulose acetate/acetate butyrate	248,976	129,368
Formaldehyde resins (including phenol, urea, melamine)	1,585,802	1,287,244

Most paint producers use alkyd resins extensively and the market for them is expanding rapidly. Polyester resins offer prospects for the future.

Singapore. The most recent development here has been a plant to extrude polythene tubing. This is the only plastics extrusion operation in South East Asia and the factory imports polythene from the UK. The tubing is designed for cold water supply for irrigation sprinkler systems and for specialised liquids.

Japan. Rapid expansion of Japan's plastics industry in recent years has made that country a net exporter of primary plastics and made it fourth among the world's leading producers. The industry is based largely on indigenous carbides.

Japan's newly organised petrochemical industry produced its first polystyrene last year and hopes to supply polythene this year. Japanese production of plastics raw materials in 1955 rose to 130,000 tons, the bulk of which comprised synthetic resins, including p.v.c., vinyl acetate, polyvinyl alcohol, and urea resin. There is an abundance of limestone and coal for carbide production.

Table below shows the targets set in the Government's five year development programme.

Item	1956	1957	1958	1959	1960
			Metric Tons		
Phenol resin	13,400	14,000	15,000	16,000	16,500
Urea resin	50,000	53,000	56,000	60,000	65,000
P.v.c.	55,000	60,000	65,000	70,000	72,000
Methacrylate resin	1,200	1,500	2,000	2,500	3,000
Silicone resin	300	400	500	600	700
Fluorinated resin	200	300	400	500	600
Alkyd resin	6,200	6,600	7,300	8,000	8,500
Polyester	1,000	1,500	2,000	3,000	3,500
Polystyrene	1,100	6,300	8,000	10,000	12,000
Polythene	0	10,000	15,000	20,000	25,000
Cellulose acetate	7,300	13,000	18,600	24,100	29,500
Polyvinyl acetate	28,000	46,000	59,500	79,000	102,200
Polyvinyl alcohol	12,400	20,780	27,100	36,200	47,200
Melamine resin	3,400	5,450	6,680	6,980	8,800
Totals	179,500	238,830	283,080	336,880	394,500

Carbide and Carbon Lower Ethyl Silicate Prices . . .

Prices of ethyl silicate 40 and ethyl silicate, condensed, have been reduced by Carbide and Carbon Chemicals Co., a division of Union Carbide and Carbon Corporation. This brings the price of ethyl silicate 40 down to 42 cents a pound in tank cars and ethyl silicate condensed to 30½ cents in tank cars. The reduction follows process improvements that have resulted in substantial economies. The company now has ample production facilities to meet anticipated demands for ethyl silicate and is confident that the lower prices will encourage still wider uses of those products, particularly their further use as a binder in speciality refractories, heat-resistant paints, and catalyst pellets.

. . . and Ethylene Diamine

A price reduction of four cents a pound for ethylene diamine, has also been announced by Carbide and Carbon, bringing the tank car price for ethylene diamine down to 40 cents a pound The use of reactive resin finishes based on ethylene diamine has imparted wrinkle resistance to cotton fabrics. Ethylene urea produced from ethylene diamine, is reacted with formaldehyde to yield 1,3-dimethylolimidazolidone-2—the cross-linking agent that gives wrinkle resistance to cotton. Other uses include fungicides for the control of apple scab and cherry leaf spot, ethylene dithiocarbamate salts, as an intermediate for polyamide resins in heat sealing applications for packaging and in making the new gel for thixotropic paints.

Brotherton's Open New Head Office in Westgate, Leeds

BROTHERTON HOUSE, the new £350,000 head office of Brotherton and Co. Ltd., at Westgate, Leeds, was officially opened on Monday 28 January by the Rt. Hon. The Earl of Scarborough, K.G., in the presence of the Lord Mayor of Leeds and other officials and guests.

The new building, which stands on a site of about 1,210 sq. yards, is seven storeys high. It includes a basement for car parking and a top floor for kitchen services, restaurants and roof garden. The other five floors are occupied by offices.

Interior heating is provided by oil-fired boilers and distributed through ceiling panels in the corridors and rooms. Two automatic lifts allow access to all floors and fire-escape staircases are contained in semi-circular projections above the north and south entrances. Total area inside is about 40,000 sq. ft.

Work was begun at the end of January 1955, after the site had been cleared of its existing buildings, and was completed by Christmas 1956. The offices will accommodate a staff of 150.

Designed by Victor Bain, FRIBA, the building represents the first step in the City's development scheme. A new road is planned to link the Headrow with the Bradford road. As part of this scheme, a roundabout, to be known as the Westgate roundabout, will be built this year. Brotherton House faces this roundabout and is thus in a position of some prominence. When the new road is completed the present Grace Street, which runs parallel to the Eastern boundary of the site, will be closed to through traffic. The south side is bounded by the present St. Paul's Street, which will continue to serve through traffic.

Brotherton's administrative offices were first centralised in Leeds at the end of last century. In 1911 a move was made to rented premises in City Chambers. By 1954 the company's expansion had made the space occupied in City Chambers inadequate. Attempts were made to buy or lease a larger building, but at that time there was still a severe shortage of office space in Central Leeds. It was decided then to approach the corporation for the lease of a new site, and the company was offered space in the Westgate improvement area on a 125 year lease.

The company is now a public company with a capital employed of about £3,500,000. Its chairman is Captain B. L. Ratcliffe, M.C., a nephew of its founder, the late Lord Brotherton.

Overflow Meeting on Films and Automation

All tickets for the Scientific Film Association meeting on films and automation to be held on 21 February at 6.30 p.m. in the Mezzanine Cinema, Shell-Mex House, Strand, London WC2 have been distributed. Owing to continued demand, a second meeting is being held on 22 February at 6.30 p.m. in the same cinema. Admission is free and tickets are obtainable from the association at 164 Shaftesbury Avenue, London WC2.

Both meetings will be addressed by Mr. S. B. Bailey of the DSIR intelligence division.

New Plant Planned

Ashburton Chemicals Ltd., Tenax Road, Trafford Park, Manchester 17, have had plans prepared for the erection this year of a chemical works in Glynllifon Park, near Caernarvon, Wales.

New Acid-Polishing Plant for London Glassworks

A NEW PLANT has been erected at the Wealdstone, Middlesex, glassworks of James Powell and Sons (Whitefriars) Ltd., for the polishing of cut glassware by sulphuric and hydrofluoric acid. The new plant will improve the output and quality of the company's production of cut crystal and bring about greatly improved working conditions for the staff in that section by means of air-conditioning.

Acid-resisting rigid p.v.c. is used extensively in the equipment which is in contact with the acid or acid fumes. The acid bath is thermostatically heated and kept at a constant temperature of 130°F. Fumes drawn off from the acid tanks are filtered through an alkaline solution in a scrubbing tower before release. Similarly, all liquid effluent is rendered innocuous before being discharged into the drains.

Fisons Order High Pressure Nitric Plant for Thames Estuary Site

REPORTING on their projected £4½ million plant for the production of nitrogenous fertiliser on the Thames Estuary, Fisons Ltd., Felixstowe, say that work is proceeding with the levelling of the 25-acre site at Stanford le Hope.

A contract has been awarded to the Chemical and Industrial International Ltd., Nassau, for the construction of a 250 ton per day nitric acid plant to be built on the site. Designed by the Chemical and Industrial Corporation, Cincinnati, it will be constructed by the Nassau firm.

The plant is a single unit high pressure nitric acid plant and is a departure from the usual European practice, where for many years the atmospheric or medium pressure type nitric acid plant has been used.

Fisons, who state that consumption of nitrogen fertiliser in Great Britain last year amounted to about 291,300 tons, estimate that an annual 450,000 tons could profitably be used. Output of their new plant will be in the region of 49,000 tons a year.

Extra Antioxidant Plant for Billingham

NEW 'TOPANOL' O plant of ICI Ltd. is now under construction at Billingham. It will be in operation by mid-1958 and has been designed to produce 1,600 tons a year of this lubricating oil and gasoline antioxidant. Installation of this extra capacity forms part of ICI's drive for additional exports.

This is the third antioxidant to go into quantity production at Billingham. During the last war, production of 'Topanol' A (2:4-dimethyl-6-t-butyl phenol) was started and soon ICI added 'Topanol' M (NN' disec-butyl-p-phenylene diamine) another motor gasoline antioxidant. Later came 'Topanol' O (4-methyl-2:6-di-t-butyl phenol). Prospects for both of the phenolic types A and O appear bright as new applications outside the petroleum industry are discovered.

UK to Show at World Atomic Exhibition

THE United Kingdom Atomic Energy Authority will exhibit at the International Atomic Energy Exhibition which is to be held in Holland from 1 July to mid-September.

Included in the UK exhibit will be an 18 ft. model of Calder Hall, the first commercial nuclear power station. Other exhibits showing the authority's work in the production of isotopes will also be shown.

The exhibition will be housed near Schiphol airport, Amsterdam, and will demonstrate how atomic energy is being applied to peaceful purposes. Many countries have announced their intention to exhibit, including the US, France, Belgium, Canada, Holland, Norway and Burma.

UK Chemical Exports and Imports in 1956

EXPORTS

		QUANTITY		VALUE	
		1955	1956	1955	1956
INORGANIC					
Acids	Cwt.	182,028	196,145	610,384	642,983
Copper sulphate	Tons	39,171	47,992	3,566,726	4,917,222
Sodium hydroxide	Cwt.	3,955,333	5,361,616	5,295,193	6,681,026
Sodium carbonate	,,	4,584,464	4,787,866	2,769,099	2,997,847
Aluminium oxide	Tons	20,259	26,308	626,111	856,446
Aluminium sulphate	,,	36,695	42,118	507,771	601,761
Other al. cpds.	,,	2,894	3,676	128,900	171,407
Ammonia	Cwt.	108,713	91,310	392,463	340,393
Ammonium cpds. (not fertilisers or bromide)	Tons	18,494	23,262	726,954	883,668
Arsenical cpds.	,,	3,372	4,388	256,405	344,116
Bismuth cpds.	Lb.	313,770	322,063	282,452	272,644
Bleaching powder	Cwt.	349,558	346,432	567,686	570,574
Hydrosulphite (bleaching)	Cwt.	104,408	81,931	853,654	647,420
Other bleaching materials†	Cwt.	96,695	113,044	390,033	509,050
Calcium cpds.	,,	367,091	342,801	711,147	693,790
Carbon blacks†	,,	262,824	487,442	938,638	1,704,639
Iron oxides (chem. manufactured)	Cwt.	90,243	92,920	295,372	298,578
Lead cpds.	,,	67,931	48,745	417,247	326,536
Magnesium cpds. (nes)	Tons	17,971	13,916	776,147	722,794
Nickel salts	Cwt.	77,456	79,676	735,033	762,884
Potassium cpds. (not fertilisers or bromides)	Cwt.	59,580	57,131	670,078	552,694
Sodium bicarbonate	,,	739,969	734,438	638,955	654,731
Sodium phosphates	,,	87,289	99,657	359,921	436,366
Sodium silicate	,,	398,824	413,379	321,808	365,191
Other sodium cpds.	,,	1,677,584	1,744,640	3,743,405	3,803,700
Tar oxide	,,	7,149	7,631	242,726	281,308
Other inorganics (nes)		—	—	5,791,159	5,751,114
ORGANIC					
Acids and derivatives		—	—	956,917	1,325,277
Glycerine	Cwt.	37,306	64,997	449,768	679,761
Ethyl, methyl, etc., alcohols†		—	—	1,422,105	1,360,522
Acetone	Cwt.	162,337	188,026	429,109	486,624
Arsenical cpds.		—	—	200,840	206,580
Citric acid	Cwt.	32,301	41,703	324,097	408,878
Gases, compressed, liquid or solid		—	—	913,093	924,329
Phenol	Cwt.	56,666	97,957	374,841	633,371
Salicylates	Lb.	1,096,028	952,691	235,415	244,242
Sodium cpds.	Cwt.	22,340	26,481	288,085	310,294
Sulphonamide (not prepared)	Lb.	1,381,877	1,688,633	1,026,158	897,001
Dyestuffs intermediates	Cwt.	72,365	85,589	1,462,726	1,338,048
Organic cpds. (nes)†		—	—	12,368,206	13,766,300
Total, elements & cpds.		—	—	**53,067,454**	**59,372,109**
Coal tar	Tons	166,609	114,684	1,460,133	1,079,376
Cresylic acid	Gals.	2,917,814	3,729,625	796,326	1,218,824
Benzol	,,	277,759	1,234,104	54,117	204,664
Cresote oil	,,	20,260,118	24,304,973	1,306,769	1,589,073
Other min. tar & chems. from coal, petroleum & nat. gas	Cwt.	359,617	250,892	700,053	573,021
Pigment dyestuffs	Cwt.	22,415	23,887	964,806	970,621
Other syn. dyestuffs & cpds.	Cwt.	192,902	187,242	8,842,959	8,529,955
Syn. organic pigments	,,	25,057	24,046	788,019	813,691
Tanning extracts	,,	119,507	109,364	563,221	491,214
Syn. tanning materials	,,	80,621	74,159	271,428	264,894
Pigments, paints, varnishes		—	—	21,410,246	23,494,360
Drugs, medicines, etc.		—	—	35,884,870	35,943,012
Perfumery, soaps, etc.		—	—	25,368,256	26,829,915
Ammonium nitrate fertilisers	Tons	5,814	3,786	187,846	122,650
Ammonium sulphate	,,	203,928	24,638	3,891,788	478,425
Other nitrogenous fertilisers		—	—	71,051	26,308
Phosphatic & potassic		—	—	122,676	69,270
Other fertilisers		—	—	313,620	391,119
Explosives		—	—	12,257,298	10,905,209
PLASTICS MATERIALS					
Phenol & cresol formaldehyde resins	Cwt.	68,765	62,601	422,784	445,162
Urea formaldehyde resins	,,	239,786	270,259	1,122,823	1,297,055
Unplasticised vinyl resins	,,	150,075	163,637	1,598,966	1,561,725
Plasticised vinyl resins	,,	111,848	106,162	1,566,346	1,362,425
Other vinyl resins	,,	151,137	183,062	1,699,444	2,327,247
Moulding powders	,,	616,475	797,418	8,120,016	10,273,120
Sheet, rod, tube, film, etc.	,,	351,287	374,363	8,482,090	8,860,859
Insecticides, etc.	,,	476,744	354,766	4,283,260	4,162,314
Weed killers	,,	80,802	85,833	912,984	980,741
Carbons, decolorising		64,375	92,001	272,272	399,081
Tetraethyl lead anti-knock cpd.	Gals.	5,450,655	4,839,560	11,626,629	10,427,284

† Figures for 1956 are not completely comparable with those for previous years.

IMPORTS

		QUANTITY		VALUE	
		1955	1956	1955	1956
INORGANIC					
Acids	Cwt.	108,601	61,737	310,148	181,420
Al. oxide abrasives	Tons	30,555	25,200	1,714,933	1,480,541
Silicon carbide abrasives	,,	11,387	11,540	1,133,435	1,183,749
Arsenic trioxide	,,	6,101	5,551	234,626	191,935
Borax refined	Cwt.	469,747	465,006	895,082	887,655
Calcium carbide	,,	1,375,497	1,067,670	2,439,516	1,985,622
Carbon blacks (charred)	,,	279,535	162,409	1,395,724	900,383
Other carbon blacks (not acetylene black)	Cwt.	122,301	90,205	472,781	342,075
Iodine	Lb.	1,169,318	475,107	592,124	236,507
Mercury	,,	961,987	1,486,387	1,225,988	1,627,139
Sodium, calcium, potassium, lithium	Cwt.	59,567	73,254	755,048	1,025,959
Carbonate	,,	108,424	85,422	332,593	278,261
Other potassium cpds. (not fertilisers)	Cwt.	91,930	73,607	410,751	344,729
Selenium	Lb.	180,191	196,635	526,035	1,177,554
Silicon	Tons	9,275	6,016	1,196,964	910,883
Chlorate	Cwt.	112,460	91,598	314,960	280,282
Phosphate	,,	4,295	21,063	22,141	97,048
Other sodium cpds.	,,	325,896	291,271	1,197,232	1,101,825
Inorganic chemicals (nes)		—	—	2,687,163	2,706,584
ORGANIC					
Acids, anhydrides & their salts & esters		—	—	2,319,028	1,888,121
Glycerine	Cwt.	85,841	98,837	700,414	735,929
Menthol	Lb.	170,584	101,482	409,330	205,115
Naptha, methyl & alcohols & alcohols mixtures		—	—	1,712,917	2,482,259
Glycol ethers & estas	Lb.	5,238,469	6,437,826	452,065	554,235
Sodium cpds.	Cwt.	89,850	113,589	825,441	1,131,151
Styrene (monomeric)	Galls.	2,761,666	3,469,307	1,603,785	1,884,640
Vinyl acetate (monomeric)	Tons	9,809	9,313	1,428,570	1,338,386
Dyestuffs intermediates	Cwt.	10,690	9,120	502,820	524,524
Organic cpds. (res.)		—	—	13,369,141	11,783,962
Syn. dyestuffs & cpds.	Cwt.	28,764	35,519	2,414,774	2,727,155
Tanning extracts	,,	1,102,982	820,243	4,113,295	3,125,532
Pigments (inc. tit. dioxide)	Cwt.	281,522	249,963	1,540,512	1,480,229
Other pigments, paints, etc.		—	—	534,657	672,633
Vitamins, salts & esters		—	—	1,775,575	1,539,548
Antibiotics		—	—	488,414	781,962
Alkaloids		—	—	1,507,485	925,416
Prop. medicines (des.)		—	—	482,010	575,818
Basic slag	Tons	79,057	91,673	655,701	737,078
Potassium chloride	Cwt.	10,198,544	11,097,868	8,060,119	9,099,982
Potassium sulphate	,,	278,750	259,214	274,697	263,355
Other fertilisers		—	—	523,418	1,365,310
PLASTIC MATERIALS					
Vinyl resins	Cwt.	222,617	124,368	2,957,505	1,747,338
Other syn. resins		134,248	193,840	1,808,362	2,933,234
Moulding powders	,,	84,003	29,792	1,710,367	502,417
Sheet, rod, tube, film & foil	,,	123,716	115,245	5,552,926	5,466,329
Disinfectants, insecticides, weedkillers, cattle dressings	Cwt.	25,863	28,117	1,147,508	1,010,042

EXPORTS OF CHEMICAL ELEMENTS AND COMPONENTS TO PRINCIPAL MARKETS

	1954 £	1955 £	1956 £
Nigeria	422,647	591,221	502,376
South Africa	2,169,444	2,734,208	2,649,403
India	4,982,775	4,778,816	5,999,613
Pakistan	846,501	708,471	721,329
Singapore	529,799	514,162	612,793
Malaya	612,840	683,592	772,488
Hong Kong	770,869	580,807	464,768
Australia	3,407,460	3,846,507	3,600,739
New Zealand	1,251,603	1,250,237	1,222,249
Canada	2,597,738	2,974,775	3,067,294
Jamaica	507,733	622,116	832,921
Eire	1,529,612	1,523,116	1,527,132
Finland	962,541	903,644	769,082
Sweden	1,855,648	1,622,602	1,834,551
Norway	860,023	1,061,037	1,179,360
Denmark	1,256,954	1,089,801	1,188,759
West Germany	1,362,796	1,548,954	1,495,540
Netherlands	2,324,745	2,018,474	2,259,347
Belgium	996,574	1,026,579	1,218,719
France	1,795,564	1,856,605	2,615,585
Switzerland	743,188	698,084	858,164
Portugal	684,453	438,231	544,521
Spain	391,352	551,280	659,438
Italy	1,673,371	1,415,464	1,950,985
Greece	237,579	293,350	699,668
Turkey	273,548	425,642	590,983
Egypt	830,846	862,852	811,106
Indonesia	726,686	1,016,170	816,139
China	519,839	526,888	328,910
Japan	251,286	279,540	698,307
US	2,849,355	2,732,970	3,322,529
Argentina	1,750,900	1,432,951	1,035,981

INCO LINK WITH TEXAS GULF FOR ELEMENTAL SULPHUR RECOVERY

CONCLUSION of an agreement with Texas Gulf Sulphur Co. marks a further advance in the programme of International Nickel Co. of Canada Ltd. for maximum utilisation of Sudbury District ores. Under the agreement, a pilot plant will be operated at Copper Cliff to investigate processes for the recovery of elemental sulphur from dioxide bearing gases.

The joint pilot plant for sulphur recovery processes will be built near the site of Inco's new iron ore recovery plant. It will comprise two sections, one for scrubbing and cleaning gas and one for reduction of the sulphur dioxide to elemental sulphur. Investigations into the feasibility of the project may extend for several years. If they indicate that commercial production is economically possible, production by Texas Gulf will be planned on a basis of many hundred tons of sulphur a day.

At present Canada imports about 370,000 tons of elemental sulphur a year, mainly for the pulp and paper industry, which is also a market for liquid sulphur dioxide now made at Copper Cliff, a plant that has replaced some of Canada's sulphur imports.

The fluid bed roasting process used in the Inco iron ore recovery plant, the first $19 million unit of which went into operation a year ago, yields sulphur dioxide gas suitable for the production of a range of useful by-products.

This development, plus recent improvements in the technology of sulphur dioxide reduction to elemental sulphur has resulted in the Inco/Texas Gulf decision to advance experiments to the pilot plant level.

Natural gas, when it becomes available, will be among the reducing agents investigated by Texas Gulf in the pilot plant, along with propane gas and heavy fuel oils.

The iron ore recovery process makes available a rich and steady supply of sulphur dioxide bearing gas that permits more efficient and economical manufacture of sulphuric acid than is possible using gas drawn from conventional hearth roasters. A portion of this gas will be delivered to a new $3 million acid plant to be erected by Canadian Industries Ltd. adjacent to the Inco operations.

The sulphuric acid, to be produced by the contact process, will be shipped by tank truck to mining companies in the Blind River area for leaching ore in the extraction of uranium. Contracts signed provide for delivery at the rate of about 1,000,000 tons of acid a year, beginning early in 1958.

US Interests Survey New Processes for Titanium Slag and Scrap Recovery

IT has been estimated that 50 per cent of titanium is lost as slag and scrap. Technical difficulties and economic considerations have until recently hindered recovery of titanium and caused prices to remain at a high level. In the US, however, the Bureau of Mines and some industrial groups have been investigating likely processes for titanium slag and scrap recovery.

Allied Chemical and Dye recently reported that its Solvay process division has developed a continuous process. Slag is used as the starting material for making titanium tetrachloride which can be reduced by sodium. The company is to join with Kennecott Copper in a $40 million investment for titanium recovery.

Kennecott Copper has interests in titanium through its subsidiary, Chase Brass and Copper, which is reported to have developed a technique for melting and casting titanium in inert atmospheres or under a vacuum. The joint Allied-Kennecott company is to use this process. Kennecott also has interests in Quebec Iron and Titanium, which mines and processes iron-titanium ore. Titanium slag obtained is now used mainly for titanium pigments.

The joint company expects to be producing titanium tetrachloride, titanium sponge and titanium billets by the end of 1958.

Another company interested in recovering titanium is Mallory-Sharon Titanium, also of the US, which produces titanium mill products. A laboratory scale electrolytic process for recovery of slag and scrap metal has been developed and now a large-scale pilot plant for refining titanium scrap is planned. The process yields titanium metal of such purity as to give a Brinnel hardness of 60, compared with 120 and 140 of present commercial titanium. A notable feature is that the quality of the scrap used appears to be unimportant.

Isotactic Polymers are Subject of SCI Paper

AT A JOINT meeting of the London Section and the Plastics and Polymer Group of the Society of Chemical Industry on 4 February, Professor G. N. Natta of the Polytechnic Institute of Industrial Chemistry, Milan, will give a lecture on 'Isotactic Polymers.' Professor Natta's work on steriospecific polymerisation is considered to have opened a completely new chapter in the chemistry of macromolecules.

The meeting will be held at the SCI Meeting Room, 14 Belgrave Square, London SW1, at 6.30 p.m. Members of the Section and Group who wish to attend are advised to arrive early.

Three New Titanium Investigations in Soviet Union

1: Separation of Niobium, Tantalum and Titanium

A METHOD of quantitative separation of niobium, tantalum and titanium has been reported by F. V. Zaikovskii (*Zhurnal Analiticheskoi Khimii,* 1956, No. 11, 269-77; article in Russian) following a study of the phase distribution of these elements as pyrocatechols under various conditions. Titanium and tantalum are separated from niobium at pH3. Titanium is then separated from tantalum by re-extraction with 5 per cent sulphuric acid. After separation of titanium and tantalum, niobium is extracted from oxalate solution in the form of pyrocatechinate at pH7. The accuracy order is said to be ± 10 per cent. Other elements (zirconium, tin, lead etc.) cannot be extracted in the form of pyrocatechols.

2: Interaction of Titanium Carbide and Cobalt

INVESTIGATIONS carried out by V. N. Eremenko and N. D. Lesnik (*Voprosy ponoshkovoi metallurbii i protshnosti materialor,* 1956, **3**, 73-80; article in Russian) on the effect of titanium carbide on cobalt showed that the crystallisation temperature of cobalt was reduced in compositions containing up to 6 per cent titanium carbide, but was increased with a higher carbide content. The assumption was made that the titanium carbide/cobalt system was of the eutectic type, with the eutectic point occurring at a titanium carbide content of 6 per cent and at 1,300°C.

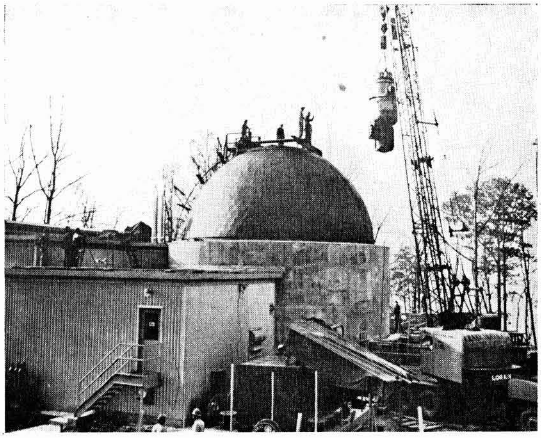
The solid solubility of the carbide in cobalt was determined metallographically and by hardness measurement, and was found to decrease with temperature —the solubility at 1,310°C was 0.9 per cent, and at 700°C was 0.15 per cent. It was found that alloys containing up to 0.2 per cent titanium carbide were softer than pure cobalt, but with higher carbide content hardness increased. These investigators suggest that the solubility of titanium carbide in cobalt tended to stabilise a high-temperature cubic modification of the cobalt, which was less hard than the hexagonal structure.

3: Increasing Titanium's Hardness and Resistance

AN EFFECTIVE METHOD of increasing the surface hardness and wear resistance of titanium by nitriding the metal by furnace heating in a stream of purified and dried ammonia has been reported by A. N. Minkevich, A. D. Taimer and Yu A. Zot'ev (*Metalloredeine i Obrabotka Metallov,* 1956, No. 7, 39-48; article in Russian). Prolonged heating and absorption of hydrogen during the process, however, is found to result in grain growth and lowering of the mechanical properties. To minimise this effect, temperatures should not exceed 800-900°C, these investigators state. Maximum depth of

(Continued on Page 204)

LONDON FIRM SIGNS AGREEMENT ON SMALL ATOMIC POWER PLANTS



World Rights for Sale and Development Outside America

WORLD rights outside the American continent for the sale and development of small sized pressurised water reactors have been given by Alco Products Inc., New York, to Humphreys and Glasgow Ltd., London. Modelled on the Alco army package power reactor, which is due to begin operating on a commercial scale within a few days, these atomic power plants are small enough for industrial use and are economic for export.

Announcing this in London on 29 January, Mr. Ambrose Congreve, chairman of Humphreys and Glasgow, said this type of reactor was originally developed by the US Government for the submarine *Nautilus*, which recently completed 50,000 miles on one charge.

As a result of the agreement, the British company could now make 'a definite offer to put forward proposals for steam generating plants or electric power stations of between 10 and 20MW, giving firm prices and costs of operation. Such stations will, of course, supply localities of 20,000 to 40,000 people.

'The 10MW power station will occupy an area no greater than a lawn tennis court', declared Mr. Congreve. 'The value of the installation will be about £2 million and electric power will be produced at around 1½d. to 2d. per unit. The charge of enriched uranium, depending on the enrichment, will weigh between ½ a ton and 3½ tons and will last from 18 months to two years. All these figures naturally depend on the site and the degree of enrichment of the uranium fuel selected.'

A major advantage of the nuclear plant is freedom from interruption of fuel supply by transport difficulties. A year's fuel charge is so small that delivery by air is feasible.

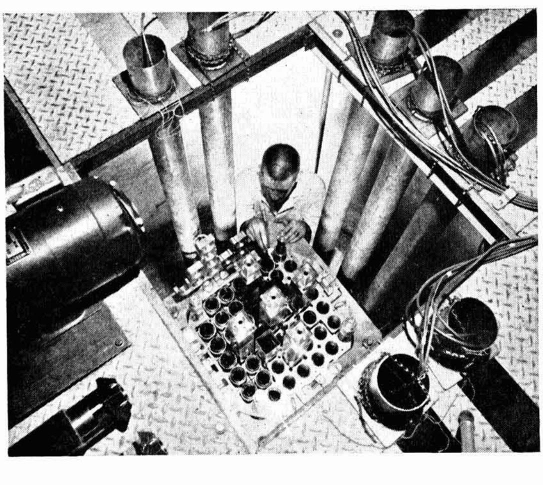
Nearly all plant and equipment for orders taken by the British company will be procured in this country so that dollar demands will not be large.

The reactor uses enriched uranium fuel, now obtainable on loan from the US under contract whereby supplies are guaranteed for the life of the reactor.

By the circulation of water under pressure, heat is removed from the reactor. On leaving the reactor this water passes through a steam generator or boiler and is then pumped back to the reactor. Steam generated in the boiler passes to a turbo-alternator set where electrical power is produced.

A high degree of safety is claimed for the design and the vapour container will, it is said, give complete protection to the surrounding population in the event of any conceivable nuclear incident.

Demand for these small and medium-sized plants is expected to come chiefly from communities or industrial concerns in areas where the cost of fuel is high and long-range transmission uneconomical.



Above: The 14-ton reactor is lowered into the domed vapour container of the Alco army package power reactor. The plant will start operating shortly

Left: Adjusting a control rod in the Alco army reactor's core. This plant is sited at Fort Belvoir, near Washington, DC

Reactors of this type are also expected to be used as prototypes for smaller countries seeking to gain operating experience of nuclear power plant at low capital cost.

Alco pressurised nuclear power plants are at present available in three sizes, giving net electrical outputs of 2, 5 and 10MW respectively. Extension of the range up to 25MW is in hand.

Outline specifications of the 10MW plant are:

Thermal power generated, 46,000 kW
Electrical power generated, 10,600 kW
Required for auxiliaries, 600 kW
Net electric power available, 10,000 kW
Thermal efficiency, 22 per cent
Uranium enrichment, 4-12 per cent
Core life before refuel at full power, 18 months
at 80 per cent load factor, 30 months
Control rod number, 7-9
Average fast flux approx., 5×10^{14}n/cm^2 sec
Average thermal flux approx., 10^{14}n/cm^2 sec

The primary loop consists of the reactor pressure vessel, steam generator primary coolant, circulating pump and pressuriser. The moderator and coolant is light water and the water system pressure is 1,500 p.s.i.g. Circulation rate varies with enrichment, a typical rate being 9,000 galls./min. Typical coolant temperature reactor inlet is 485°F and typical coolant temperature reactor outlet is 518°F. The approximate diameter of the reactor pressure vessel is 4 ft. 6 in. The reactor pressure vessel is 16 ft. high.

Primary structures consist of a vapour container housing the complete high-pressure primary system; a primary shield of the iron stroke water and concrete type; a secondary shield consisting of three to four feet of concrete and surrounding the primary loop equipment; a fuel vault for unused fuel elements; and a spent fuel pit adjacent to the vapour container.

Typical data for the secondary system for a station with condensing turbine and bled steam for feed water heating are:

Steam pressure at turbine, 375 p.s.i.g.
Steam temperature, 439° F.
Steam flow from steam generator, 174,000 lb./hr.
Feed water temperature, 280° F.
Condenser pressure, 2.5 in. Hg.
Turbo-alternator output (net sent out), 10,000 kW.

FOUR CASES OF TETRAETHYL LEAD POISONING REPORTED

ALTHOUGH tetraethyl lead (TEL) is a highly toxic liquid, is manufactured on a large scale and is widely distributed, cases of poisoning are rare because of the stringent precautions taken in manufacture and handling. This organo-metal compound is absorbed through the skin and respiratory and alimentary mucosae and is concentrated in the brain, body fat and liver. Its toxicity is due to its lead content and because of selective uptake manifestations of poisoning are dominated by involvement of the central nervous system, thus differing from those of inorganic lead poisoning.

Mild intoxication causes headache, irritability, restlessness, anxiety, fatigue, insomnia with bad dreams and minor gastro-intestinal symptoms including anorexia, vomiting and diarrhoea. Sometimes a persistent metallic taste is present. In more severe intoxication there are similar symptoms followed by a toxic psychosis. Hallucinations, delusions and intense fear are usual and suicide attempts have been reported. In the most severe cases coma and convulsions occur. Relapses are common but chronic effects and permanent sequels have not been reported.

Inhalation of TEL vapour for a brief period may prove fatal. However, symptomless workers after prolonged minor exposure have been found to excrete large amounts of lead in the urine some time after removal from exposure. This suggests that TEL may be absorbed in appreciable quantities and the lead stored in a relatively non-toxic form.

Three moderately severe cases are described and a fourth case with severe psychosis, in a report in *The Lancet*, 1957, *i*, 181 (26 January) by P. R. Boyd, Chief Medical Officer, The Associated Ethyl Company Ltd., G. Walker and I. N. Henderson, both of the Middlesex Hospital.

Precautions Neglected

The four men involved were members of a team of five engaged in cleaning underground tanks which had contained leaded petrol. The affected men scraped the deposit containing TEL from the floors and sides of the tanks and shovelled it into buckets. They were provided with protective clothing and equipment designed to protect against fluid and vapour, consisting of oilskin suits and hats, rubber boots and gloves, and a face-mask with a positive-pressure air-line. However, for various reasons the men neglected the strict precautions laid down for this type of work.

Poisoning was apparent some three weeks to a month after tank cleaning operations by the team. The foreman, who exhibited symptoms after three weeks, had regularly cleaned leaded petrol tanks for 10 years, but had never previously noted any ill effects. The second case had only worked in tanks on the one occasion. Symptoms were noted a month later. The third case had worked inside tanks for 6 weeks. His symptoms occurred a month after the last cleaning operation. The fourth case had been working in leaded petrol tanks intermittently for about a year. He denied any symptoms when seen at the time of cases 2 and 3, but was admitted to hospital a week later.

Cases 1 to 3 were treated in turn for three-day periods with edathamil $CaNa_2$ (Versene), by intravenous infusion, with pencillamine orally and edathamil $CaNa_2$ orally. Barbiturates were also given in the first few days of treatment. Edathamil $CaNa_2$ orally was given until the clinical condition was satisfactory. Urinary lead excretion of the three cases studied in detail was found to increase sevenfold by edathamil Ca Na_2 administered intravenously. Case 4 required electroconvulsion therapy. It is noteworthy that the highest lead excretion was found in case 1 who had been exposed to TEL the longest. It is suggested that much of the lead had been stored in a relatively non-toxic form in this case but in case 4 the TEL was absorbed over a short period and poisoning was severe because the rate of absorption exceeded that of degradation and excretion.

OCCA MEETING HEARS LECTURE ON WATER DISPERSIBLE ALKYDS

WATER dispersible alkyd resins were the subject of a paper presented to the London section of the Oil and Colour Chemists' Association by Mr. F. Armitage and Mr. L. G. Trace on 16 January.

Mr. Armitage said that work on the subject was still in the experimental stage, and thanks were due to Lewis Berger and Sons Ltd. for allowing the paper to be read.

Oil modified alkyds, he said, had featured in a number of suggested formulations. Earlier work had not led, in general, to the commercial exploitation of any resin dispersions equal in performance to conventional solvent thinned paints. There were indications now that water-based resins were gradually finding their way into decorative and industrial finishing fields not previously exploited.

Mr. Trace presented the paper, in which he described a new type of water-dispersible alkyd where a proportion of the polyol in an oil modified alkyd resin was replaced by a polyethylene glycol, with the intention of forming a molecule with a 'built-in' dispersing agent.

Variation in the molecular weight of the polyethylene glycol from 100 to 6,000 was shown in a series of resins.

Emulsification of resin could be achieved by heating to about 80°F and pouring into water with mechanical stirring. Alternatively, better results were obtained by first diluting the resins with a proportion of 'two-type' solvent, then adding water to the mix, and hand stirring.

Gloss paints, with gloss equal to that of conventional alkyd paints, were easily prepared, and outside exposure panels had so far shown very good durability with titanium pigmented finishes. Undercoats and flat wall paints had been made.

When asked how the glycols were prepared, Mr. Trace said one could prepare them in the normal way for manufacture, there was nothing particularly difficult about it. It was not done at a high temperature; he normally worked at 200°C to keep the viscosity of the final resin as low as possible.

A speaker was concerned about the effect of running water on such paint films, and said he had found something like a 100 per cent increase in weight of a green shade. He was not at all happy about the use of such paints where there might be condensation, as, for example on a window. He felt it might be worth a closer consideration of the methods of testing.

Then a speaker said he had gathered that the flow properties of the paints were poor and he asked the reason for that. Also he asked why the gloss was very good. Mr. Trace replied that the flow was of the same order as other emulsions. As to gloss, he said the system was considered to be essentially one of alkyd resin and water. When it dried out it left a film of the resin, and there was no reason why it should not have a full gloss.

The authors' view was invited on the opinion of a paint manufacturer in America that the more normal emulsion paints of today would be on their way out in consequence of the application of the water-dispersible resins. Mr. Trace did not feel he could go so far as that, at the present stage. He considered that the paints discussed in the paper represented a coming development, but the normal emulsion paints would hold their own for some time.

Titanium Investigations

(Continued from page 202)

the nitrided layer produced by heating at 850°C was obtained after 16 to 24 hours; at 950°C the maximum was reached after 4 hours and after 1 hour at 1,050°C.

When depth of nitriding was plotted against the volume of ammonia passed, the graph showed that maximum depth was obtained with a delivery of 15cm.^{3}/min. at a temperature of 850°C with 24 hours' heating. The nitrided surface, which varied in depth between 0.06 and 0.1 mm., was formed from solutions of nitrogen and hydrogen in α-titanium. A very thin superficial layer, a few microns in depth, had the structure of titanium nitride.

Overseas News

NEW BAUXITE PROCESSING PLANT PLANNED FOR BRITISH GUIANA

IT is reported that the Demerara Bauxite Co. Ltd. has decided to extend its operations in British Guiana by erecting at Mackenzie a new industrial plant which will process bauxite into alumina for export.

Local manufacture of alumina will create a new industry in British Guiana and is receiving the full support of the Government. Large-scale additional installations including settling tanks, filter systems and calcining kilns for extraction of alumina will be erected.

The new plant will take about two and a half years to construct and involve the expenditure of approximately $60 million (local currency). The parent company of Demerara Bauxite Co., the Aluminium Co. of Canada (itself principal subsidiary of Aluminium Ltd.) is making available funds in Canadian currency.

Preliminary work will begin before the end of this year and completion is planned for 1959. When the plant is in operation, the company expects to provide regular employment for some 700 Guianese over and above the 2,000 people at present employed at Mackenzie.

The new plant will be designed to produce 220,000 long tons of alumina a year, involving the treatment of about 500,000 tons of bauxite from the adjacent mines.

Production figures for the Demerara Bauxite Co. Ltd., for November 1956 were 124,347 tons of bauxite. Total shipments for 1956 are expected to be some two million tons of bauxite.

Ciba to join in French Melamine Resin Venture

Ciba Ltd., chemical and dyestuff manufacturers, Basle, are to participate in a new French company, Societe des Produits Chimiques de l'Allier, which will produce certain melamine resins under Ciba licence. Ciba and SA des Manufacturers de Glaces et Produits Chimiques de Saint Gobian Chauney et Cirey are each putting up half the share capital of French francs 150 million.

Petrochemical Plant Supplies Gas to Sydney, NSW

Silverwater, NSW, petrochemical plant of the Petroleum and Chemical Corporation (Australia) Ltd., is now producing gas for domestic supply to Sydney, as a by-product of oil processing. The plant incorporates the first Semet-Solvay high BThU oil gas plant outside North America.

Starting from a residual oil, it makes benzole, toluene and xylene as well as light and heavy tar. The oil-cracking unit produces gas of high calorific value, with a high percentage of ethylene and propylene.

The installation includes the first Didier-Kogag final tar dehydration unit outside Europe and four-type purifiers which are said to be the first of their kind in the local gas industry.

Danish Gasworks Difficulties

It is reported that the A. P. Moller's pyrolytic gasworks in Amager, Denmark, has experienced further technical problems and is now not likely to be in operation before May. The Copenhagen Municipality is considerably affected by this delay, since it had been counting on covering 40 per cent of its gas consumption from this plant.

Celanese Open New LP Polythene Plant in Texas

New 40-million lb. a year plant of the Celanese Corporation of America, for making polyolefin resins comes into full production this month. The new resin, called Fortiflex, made under licence from Phillips Petroleum Co., is an ethylene polymer and a member of the new group of plastics known as low-pressure polythene.

It is claimed that Fortiflex will open up new fields for plastics and that it is capable of substantially improving the qualities of many existing items. Products made from this resin will resemble in some respects those made of polythene, but will provide properties enabling it to be used in many fields now barred to polythene.

These products will have, it is said, an unusual combination of rigidity, heat resistance, toughness and chemical inertness. They will withstand prolonged exposure to live steam, but will not become brittle even at −180°F.

Current research indicates the likelihood of future modification of the basic properties of Fortiflex and as market needs develop, the company will produce a family of Fortiflex polyolefin resins with performance characteristics fitting them to a variety of processes and fabricating applications.

Located on a 220-acre site near Houston, Texas, the Celanese plant will ship most of its resin by canal. The entire production will be shipped in moulding pellet form for injection and extrusion moulding.

Argentine Exchange Rates for Chemical Imports

Argentine Circular 2718 of 7 December transfers the following items from the list attached to Circular 2304 to that attached to Circular 2305 of goods which may be imported at the free rate of exchange without prior permit: 4271, cetyl acetamide; 4284/5, stearyl alcohol; 4556, tertiary butyl peracetate alkyl aryl phosphate, di-tertiary butyl peroxide and polyethylene glycol; 4774 bis, styrene monomer.

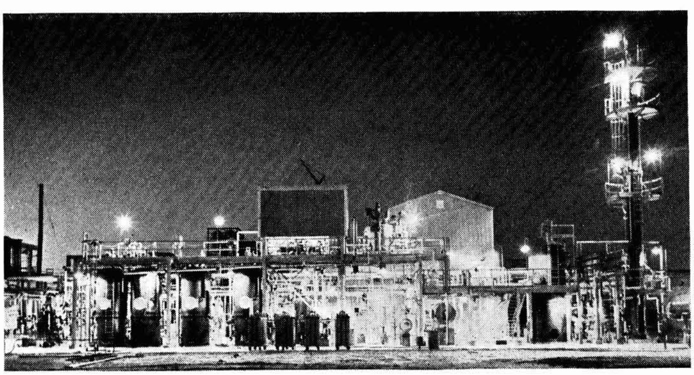
Bauxite Exploration in Mozambique

Applications have been invited by the Portuguese Ministry for the Overseas Provinces from companies interested in exploring for bauxite in Mozambique. Preference will be given to those companies specialising in such work and to those willing to install in Mozambique plant for the treatment of bauxite or the production of aluminium.

Polycarbonate Resins Developed in Germany

A new class of thermoplastic resins, the organic polycarbonates, has been described to a meeting of the Society of German Chemists in Hamburg, by Dr. H. Schnell of Farbenfabriken Bayer, AG.

Made by reacting carbon dioxide with



A section of the new polyolefin resin plant near Houston, Texas. On the right is a distillation tower.

aromatic polyhydroxy compounds, these new resins have high melting points, between 150° to 300°C, and show outstanding resistance to heat, oxygen, sunlight and weathering. They can be maintained in the molten state at temperatures of over 300°C, for prolonged periods without decomposition, which will facilitate processing. Non-orientated film made from polycarbonate resin has a strength similar to cellulose ester films, but substantially greater impact and tear resistance. The tensile strength can be substantially increased by orientation. Mechanical strength is almost unaffected at temperatures of up to 100°C.

These resins are at present in experimental, small scale production, and applications testing is in hand.

Ceylon Ilmenite Project

An Indian mineralogical expert, Mr. P. S. K. Moorthy, whose services have been provided by the United Nations Technical Assistance Administration, is in Ceylon to draw up designs and plans for the ilmenite refining project at Pulmoddai in the north of the island.

Portuguese Uranium

Many thousands of square miles of South-East Portugal's dry rocky hills are being explored by 300 prospectors with geiger counters to determine the extent of what is believed to be one of the largest deposits of uranium in Western Europe.

Rumanian Exports of Acetylsalicylic Acid

Salicylic acid and preparations thereof, e.g., sodium salicylate, methyl salicylate and acetylsalicylic acid, are now important Rumanian exports.

Because of its good quality and the favourable conditions of supply Rumanian acetylsalicylic acid is in good demand by such countries as the UK, Germany, Federal Republic, India Lebanon, Egypt, Turkey etc.

The 'Chimimport' Foreign Trade State Company of Bucharest, Str. Ion Ghica No. 2 is the sole exporter of these products.

Italy's Expenditure on Chemistry Research

More than 8 milliard lire is now being spent in Italy on research at 537 laboratories and similar institutions. Chemistry research heads the list with 2.6 milliard lire, followed by mechanical industry (1.8 milliard), textile industry (1.5 milliard), and metallurgy (1.4 milliard).

Rome Refinery to Move because of Pollution

In view of the pollution, Societa' Purfina Italiana, which operates a petroleum refinery in the suburbs of Rome, has been asked to move its plant farther away from the city. The company has now chosen a site on the Via Aurelia, about 14 miles north-west of Rome. When the transfer is made, the capacity of the refinery will be increased from the present 500,000 tons a year to 1,000,000 tons.

About 40 per cent of the output will be distributed locally, while 30 per cent will be exported, and the remainder shipped by rail. To facilitate shipment, the company plans to build a pipeline leading to the shore.

Dutch Superphosphate

Satisfactory results and a rise in exports have been obtained by the Albatross Super-Phosphate Works at Utrecht, Netherlands. However, superphosphate sales declined on the home market due to the bad weather. It is announced that the company is planning to establish a South African subsidiary.

Oxidising Azomethines by Rohm & Haas

The fact that certain azomethines may be readily oxidised in good yield with anhydrous peracetic acid in methylene chloride was reported by Mr. W. D. Emmons, Rohm and Haas, Redstone Arsenal Research Division in the 5 December issue of the *Journal of the American Chemical Society*. The products appear to be the first compounds obtained with a well authenticated oxygen-nitrogen-carbon three-membered ring system.

The compounds are said to be extremely reactive and to undergo a variety of rearrangements and fragmentations. They are active oxygen compounds comparable in many respects to organic peroxides and may be regarded as 'electronic tautomers' of both amides and nitrones. They can be isomerised readily to either one or both of those isomers under proper conditions.

Applications are uncertain, but would appear to be as oxidising agents, polymerisation catalysts and synthetic intermediates.

Philippine Fertiliser Plant

A contract has been closed by the Atlas Consolidated Mining Co., with Saint Gobain Chauney et Cirey, of Paris, for the purchase of a copper smelter refinery and an acid fertiliser plant costing US$1,590,500 for the Philippines.

Columbian Plastics Restrictions

All imports of cellulose, celluloid, and synthetic plastics or plastics materials into Colombia are now subject to the prior approval of the Ministry of Development.

Protection against Radioactive Aerosols

A possible means of protecting the civil population from effects of radioactive aerosols of the type arising after nuclear explosions, was proposed by Dr. Bisa at a recent conference in Mainz, Germany. The technique is based on experience in treating lead dust poisoning by injections of the potassium-sodium salt of ethylenediamine tetraacetate, which exchanges sodium and potassium within the body of form lead-EDTA complex, which being water-soluble is eliminated in urine. This accelerates lead elimination some 47 times.

Dr. Bisa suggests that modifications to this proved technique could be used to eliminate radioactive strontium from the body if a physiologically compatible complexing agent could be found. Radiostrontium is among the most dangerous constituents of radioactive aerosols arising from nuclear explosions.

The tetraacetate could be administered intravenously or by inhalation as an aerosol.

Resin Paint for Rail Tankers

An amine-cured Epikote resin-based paint for sulphuric acid rail tank cars is being used by South Australian Railways. A black undercoat is used followed by a glossy top coat. After 18 months' service, inspection of the system showed that this method of protection was standing up to the job better than conventional paints at six to nine months.

Italian Draft Patents Law

It is understood that a draft law extending the validity of patents for industrial inventions from 15 to 18 years is before the Italian Parliament. Patents granted under the present law and due to expire at the end of 15 years may, under the new Law, be extended on payment of 50,000 lire for the sixteenth year, 75,000 for the seventeenth year and 100,000 lire for the eighteenth year.

French Alcohol Production

It is estimated that production of alcohol in France last year was about 2.6 million hektolitres. Existing stocks are reported to be slightly over two million hektolitres, but if export agreements are fulfilled according to plan, stocks at the end of August 1957 should have been reduced to under one million hektolitres.

New Ethylene Oxide Plant for Bayer

Farbenfabriken Bayer AG are to build a 12,000-ton ethylene oxide plant at Dormagen. The oxygen will be made by direct oxidation of ethylene, using a process of the Scientific Design Co. of New York, US, who are also to build the plant.

Ethylene oxide will be used by Bayer as an intermediate for manufacture of ethylene glycol, its esters and ethers, emulsifiers and various other products. Bayer does not contemplate manufacture of ethylene oxide detergents.

New Water Soluble Resin by Glaxo Products

A new water-soluble synthetic resin dimethyl hydantoin formaldehyde (DMHF), now available in tonnage quantities is water-white, practically odourless, with a melting range of 59-80°C. It dissolves rapidly in water, in all proportions, to give solutions of low viscosity. A 10 per cent water solution is almost neutral. It is soluble in methanol, ethanol, ethyl acetate, methylethyl ketone, chloroform, methylene chloride and hot glycerol. Insoluble in benzene, petroleum ether, diethyl ether, trichloroethylene and carbon tetrachloride, it has been developed by Glyco Products Co. Inc., Empire State Building, New York 1, NY.

It is compatible in various concentration with glycols, formamide, acetamide, urethane, glycollates, 'Carbowax,' gelatine, dextrin, starch, polyvinyl alcohols, neutralised polyacrylic acid, sodium carboxy methyl cellulose, casein and zein. When a soft or sticky coating is desired, one of these products may be added.

This new resin, has other interesting properties. It has a high gloss, is adhesive, will not ferment or decompose, and is resistant to oils, gasoline and many aromatics. It is being used for special textile sizing and paper coating. It may be used for temporary metal coatings (to be washed off later); lining drums or rubber hose carrying oils, gasoline, toluol, trichlorethylene etc.; water - paints; binders for foundry moulding sand, pigments, abrasives, metal powders, adhesives, inks, insecticide sprays, textile printing, finger-wave lotions and aerosol sprays for grooming hair.

French Duties Suspended

According to an announcement in the French *Journal Officiel*, duties on the following items are suspended until 30 June this year: hydrocarbons; aromatic hydrocarbons-isopropyl benzene (cumene); polyacids and their anhydrides, acid halides, acid peroxides and peracids, and their halogenated, sulphonated, nitrated or nitrosated derivatives; aromatic polyacids—phthalic acids, their salts and esters; paraphthalic acid (terephthalic), its salts and esters; dimethyl terephthalate.

US Plant will Increase Butyl Rubber Capacity by a Third

A plant with an initial capacity of 30,000 tons a year of butyl rubber is to be built by Petroleum Chemicals at Lake Charles, La. This project will increase the US national productive capacity for butyl rubber by about one-third. Raw material will be drawn from the hydrocarbon streams available at the Lake Charles refineries of Cities Service and Continental Oil Companies, joint owners of Petroleum Chemicals Inc.

Jordan Phosphate Exports

The Jordan Phosphate Co. has been granted permission by the Jordan Ministry of Economy to export a record 450,000 tons of phosphate this year to Europe and the Far East. It is expected that the quantity to be exported in 1958 will be even greater.

Vitamin A Source

It is reported by S. K. Pradhan and his co-workers (*J. Sci. industr. Res.*, 1956, **15c**, No. 10, 218) that the visera and liver of Dara (*Polynemus indicus*) fish yield 4 per cent of an oil rich in vitamin A. A concentrate containing 5023 IU of vitamin A per g. of oil is obtained by treating minced liver and viscera with refined groundnut oil by the pick-up method. The loss in pick-up oil during processing was 9 per cent. Quality of the vitamin A is comparable to that obtained from shark liver oil.

Tanks for Liquid Fluorine

The general chemical division of Allied Chemical and Dyestuffs Corp., 61 Broadway, New York 6, NY, US, has developed tanks for transporting liquid fluorine. Fluorine is kept in a special inner container surrounded by a layer of liquid nitrogen inside a second outer chamber.

It is claimed that liquid fluorine can be kept in these containers without loss during exceptionally hot weather for periods of several weeks.

New Cuban Refinery

Soon to start operations is the $25 million Shell Refinery of Cuba. Capacity will be 25,000 barrels daily and products will range from aviation spirit to domestic insecticides.

Ilmenite in India

According to a Government report, India has reserves of ilmenite and rutile sands of the order of 300 million to 350 million tons. Six factories have been set up in Travencore-Cochin to exploit local deposits. In Bombay, the State Government has granted five mining leases and four prospecting licences for the development and working of the mineral-bearing sands.

SA Uranium Exports

South African exports of prescribed materials (uranium and thorium) were valued at £3,681,825 in November 1956, against £1,865,371 in November 1955. Total exports in the first 11 months of 1956 were £34,526,995, compared with £26,161,095 in the corresponding period of 1955.

South African production of uranium oxide in 1956 totalled 4,400 tons. By the end of the year production was at an annual rate of nearly 5,000 tons. South Africa's concentrated ore is estimated at 1,100 million tons, with a uranium oxide content of 370,000 tons.

Canadian Tariff Changes

Additions to the Canadian customs tariff include Paraphenetidin for use in the manufacture of acetophenetidin (British preferential and most favoured nation, free; general 25 per cent; ossein imported for use exclusively in the manufacture of gelatine (BP and MFN, free; general 25 per cent).

Danish Tin Recovery

The Elting plant at Middelpart, Denmark, for the recovery of tin from tin can waste has been completed. This is the first such plant in Denmark. Previously the waste was sent to Germany, the UK or Norway for processing. It is understood that two Swiss firms have an interest in the plant.

US Atomic Fair

A trade fair of the atomic industry is to be held from 28 to 31 October in the Coliseum Building, New York, US. The exhibition is being held in conjunction with the 4th annual conference of the Atomic Industrial Forum and the annual meeting of the American Nuclear Society.

Any UK companies interested in participating or visiting this event should write to Mr. Charles Robbins, Atomic Industrial Forum Inc., 3 East 54th Street, New York 22, NY, US.

Shell Development of US Announce New Heat Resistant Adhesives

There is now considerable research for heat-resistant adhesives which are required in modern aircraft for bonding metal-to-metal, as well as for plastics for use in structural laminates.

From Shell Development, of California, US, there is news of such a heat-resistant adhesive, Adhesive 422, which is expected to be in use a year hence and a resin X-131, now in the development stage.

Working in conjunction with the US Wright Air Development Centre since 1951, Shell have aimed at an aluminium-to-aluminium adhesive with usable strength after 200 hours at 500°F. Adhesive 422, is described as an epoxy-phenolic. Its tensile shear strength is about 2,500 p.s.i. at −100°F, 1,600 p.s.i. at 500°F initially and 800 p.s.i. after 200 hours at 500°F. It is understood that this adhesive has been used in the US B-52 for nearly a year. Improvements (chiefly stabilisers) are being sought to overcome ageing at 500°F.

Besides being heat-resistant, adhesive 422 has been found to make a good foam. As it is heavily loaded with aluminium powder it is heavier than other foamed plastics and has no apparent value. However, foamed 422 was discovered to be a good structural filler where strength and heat resistancy offset its high (para foam) weight.

The resin X-131 is a polyepoxide having a relatively high number of functional groups per molecule which when cured provide more cross-linking and thus higher strength and heat resistance. A number of different cures can be used including dicyandiamide, 2,6-diaminopyridine, and 4,4′-diaminodiphenyl sulphone. Particularly good strength and heat resistance is said to occur with a boron trifluoride complex. Laminates of X-131 $-BF_3$ -400 are reported to have a flexural strength of about 35,000 p.s.i. at 500°F. and are almost as strong after 200 hours at 500°F. Proposed uses for X-131 laminates include ducting, structural sections, randomes and missile bodies.

CHEMICAL PIONEERS

2 Nicolas LeBlanc

The second article in this series on the pioneers of the chemical industry deals with Nicolas LeBlanc, inventor of the soda process which bears his name. The author, Dr. D. W. F. Hardie, is well known as a historian of the Industrial Revolution and of the chemical industry. It is believed that the series will be of particular interest to students as well as to older readers in this country and overseas.

NICOLAS LEBLANC was born on 6 December 1742 at Ivoy-le-Pré, France, the elder son of Nicolas LeBlanc, manager of a local iron forge, and his wife, Maria Berthin. When Nicolas was nine years old his father died. For the next eight years young Nicolas was under the care of a surgeon in Bourges, a circumstance which, after his foster parent's death, may have determined his choice of surgery as a career. At his school of surgery in Paris he made the acquaintance of Lavoisier, Vauquelin and Fourcroy—young men destined to justify the claim that chemistry was the 'French science.' On completion of his training in Paris in 1780, LeBlanc became surgeon to the Duke of Chartres (later Duke of Orleans). The Duke, whose physician was none other than Berthollet—then about to forsake medicine for chemistry—himself practised chemical experimentation in dilettante fashion. Every circumstance thus conspired to promote Nicolas LeBlanc's interest in chemistry.

War of Independence

The American War of Independence (1776-81) caused an acute potash shortage in Europe and, consequently, a steep rise in the prices of the alternative soda alkalis, kelp and barilla. On the Amsterdam Bourse, then the chief continental chemical mart, prices of soda doubled. In the post-war years alkali prices did not return to their earlier levels. Prompted by this situation, the French Academy of Sciences, in 1782, offered a prize of 12,000 livres for an effective industrial process for the production of artificial alkali.

In 1737 Duhamel Dumonceau, by intermediate formation of sodium sulphate, demonstrated the feasibility of synthesising soda from common salt; thereafter, in both France and England, there were many partially successful attempts at commercial alkali manufacture. Fourcroy, in his chemical textbook, published in 1789, wrote: 'Many persons possess this secret in England and withdraw on a large scale soda from the salt of the sea.' From 1780 to 1784 John Collison, in a small works in Battersea, was producing soda by a process similar in essentials to that which later history was to associate with the name of LeBlanc.

There is no evidence that LeBlanc became interested in soda synthesis as a result of the offer of the Academy prize. In the event, he neither claimed the reward, nor was ever considered as a possible recipient. LeBlanc's experiments in soda manufacture were carried out in 1784-88, along with a number of unrelated chemical investigations. In 1789, after he had left the service of the Duke of Orleans, LeBlanc, believing that he had developed a more effective soda process than any hitherto published—a view in which he was confirmed by D'Arcet of the College of France—approached his former patron and interested him to the extent of 200,000 livres in commercial exploitation of his invention. The Duke was then, for reasons of prudence, resident in London, and it was in that city on 12 February 1790 that a partnership agreement was signed between him, LeBlanc, Dizé (D'Arcet's assistant), and Shée.

Soda Investigations

The process described in the specification of LeBlanc's patent, dated 24 September 1791, would by present standards of scrutiny probably be patentable in one respect only, namely, the use in the reaction mixture of saltcake, carbon (coal), and chalk (limestone) *in certain stated proportions*, claimed to be advantageous. In all other respects LeBlanc's procedure may readily be shown to have been anticipated by practice in England or France. A surprising feature of the specification is the precision with which the plant is described, and most surprising of all is LeBlanc's proposal to line the receiver-tanks for the hydrochloric acid (from the saltcake stage) with india rubber!

Cut-off from Supplies

Before the end of 1791, on a site now occupied by St. Denis railway station in Paris, LeBlanc and his associates were producing soda at a rate of 5 cwt. a day. In February 1793 France and Britain went to war, and on the 9th of the following month hostilities broke out between France and Spain; France thus found herself cut off from external supplies of alkali. Citizen Shée persuaded Citizen LeBlanc to take the patriotic steps of foregoing the monopoly, granted to him under his patent, and of putting his process at the disposal of the embattled nation. LeBlanc agreed; details of the process were published in a pamphlet of which he was the author.

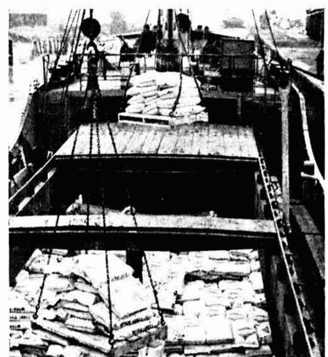
During the Revolutionary war LeBlanc served the Committee of Public Safety as a kind of government chemist, at his own expense. In return for his technological services he was offered a professorship of natural history at Alby. This he declined, and for some time carried on his work privately on the chemistry of nickel. The Republic, in 1801, acknowledged its indebtedness to LeBlanc by restoring to him the deserted alkali factory at St. Denis. His former partners, Shée and Dizé, now in established posts under the new regime, refused to assist in restarting operations. The inventor determined to carry on alone.

While LeBlanc had been engaged in the service of his country other manufacturers, particularly in the soap-making district of Marseilles, had been successfully employing his process: his monopoly had vanished. By borrowing and by applying to the government for financial compensation LeBlanc, who calculated the losses he had incurred through his patriotism at £100,000, still hoped to establish himself as a soda manufacturer. Compensation when it came, however, amounted to about £2,000. To the disillusioned inventor the prospect appeared bleak.

The bitterness of his situation began to affect his mind. His quest for justice became obsessive; neglecting practical affairs he passed his days and nights writing futile letters and petitions; at last, in the cold dawn of a January morning in 1806 he put an end to his distress with a pistol shot.

First Imports of Nitrogenous Fertiliser reach UK

LAST WEEK first shipments from Rotterdam of the new granular nitrogenous fertiliser Nitra-Shell arrived at UK ports. They mark the entry of Shell Chemical Co. Ltd. into fertiliser production. Nitra-



Unloading Nitra-Shell from the 'Lauwersborg' at Colchester

Shell will be imported from Holland prior to completion of a new £6½ million plant at Shell Haven.

With a guaranteed nitrogen content of 20.5 and 36 per cent carbonate of lime, this fertiliser is one of the most concentrated of its type. A new style of packaging has been designed, consisting of a 5-ply paper sack, including 1-ply polythene-lined and 1-ply bitumen lined.

FERTILISER TRENDS IN 1956

Combinations of Fertilisers with Weed Killers/Insecticides Discussed

By

D. P. Hopkins, B.Sc., F.R.I.C.

INCREASE in British fertiliser consumption has been the trend of the last few years and there is every reason to expect this to continue. The industry can feel highly satisfied for during this same period farming's economic prospects have undoubtedly become less certain, with smaller profit margins obtainable for some major commodities, e.g., milk, pig-meat.

At one time, and here one is looking backwards to the pre-war period, it was regarded as an economic law that the graphical lines for farm commodity prices and fertiliser usage ran in parallel. It is a major consequence of farming's greater scientific awareness that this 'law' no longer applies with such rigour. Many more farmers now realise that the reply to a failing market must be lowered production costs, and that spending more upon fertiliser dressings to produce higher yields per acre can in fact bring down costs per unit of produce, per sack of cereal grain or per ton of potatoes, etc.

Fertiliser production is, of course, almost totally concerned with the supply of three plant-foods, nitrogen, phosphates, potash, or N, P_2O_5, and K_2O to use the current yardsticks of content-valuation. The upwards movement of recent years has not been similar for all three, thus:

UK annual consumption (tons of plant-food)

	N	P_2O_5	K_2O
1953-54	241,600	380,600	251,000
1954-55	248,100	334,600	252,400
1955-56	291,300	385,800	305,400

Little change in phosphate use, but marked advance in nitrogen and potash use, is evident from these data. This is closely in agreement with current advisory policy, which regards the average rate of phosphate dressings for many crops as ample, but advocates considerably increased use of nitrogen with some accompanying extra use of potash.

Deliveries of fertiliser in UK July-September Tons of plant-food

	N	P_2O_5	K_2O
1954-55	40,500	62,100	45,300
1955-56	50,800	67,100	53,700
1956-57	60,400	70,300	67,000

It could over-readily be assumed that increases in 1955-56 consumption were attributable to rise in subsidy payments for fertilisers, but although nitrogen and phosphate enjoy subsidies potash does not—and the percentage of expansion is highest for potash. A helpful factor in 1955-56 sales was the record harvest of the preceding year; the wet season just ended, could have something of a reverse effect upon sale for 1956-57. However, figures for the first quarter (July to September) still reveal a rising trend for all three plant-foods, again with more marked increases for nitrogen and potash.

There are two simultaneous developments in modern agriculture which are mainly contributing towards increased fertiliser usage. First, the widespread introduction of new stiff-strawed cereal varieties, e.g., Proctor barley, Cappelle wheat; these do not 'lodge' (i.e., suffer from stem breakdown) in wet weather as much as former varieties, and in consequence more nitrogen per acre can be safely given to them, as much as 4 cwt. of nitrogen fertiliser per acre often being profitable

Extra nitrogen dressings for these crops will be of the same fertiliser types usually given now, such as sulphate of ammonia, 'Nitro-Chalk,' the new 'Nitra-Shell,' or nitrogen in compounds; one or two pleas have been made, however, for slower-acting nitrogen fertilisers, akin to the expensive organics, but it still seems doubtful whether the manufactured condensed urea fertilisers (urea-formaldehyde types) could be produced at a low enough cost to suit farm crop economics.

Better Management

Second, there is the powerful movement towards better grassland cultivation and management. Grass, our major crop, has been fertiliser-neglected for many years, although its response to nitrogen is greater than that of most arable crops. On many farms, though not yet by any means on all, nitrogen rates for grass are being raised, and the extra grass is saving feeding-stuffs whether consumed in grazing or as silage. Neither of these developments has yet made its full impact on fertiliser demand.

Both these developments involve nitrogen as the more dominating plant-food, but the extra use of potash is a natural accompaniment. Bigger yields per acre take up more soil potash, and this must be balanced with extra potash; the effectiveness of nitrogen is badly disturbed when potash is not also adequately available. How far the same truth applies to phosphate is a matter of opinion. At present the majority view would seem to be that existing rates of phosphate application are enough to balance the rising rates of nitrogen. Also, it is considered that as phosphatic fertilisers have for so long been the most heavily used, many soils have now built up good reserves of this nutrient. Obviously this slightly complacent attitude towards phosphate needs cannot last indefinitely. Certainly with grassland, any relative decline in soil phosphate will have a serious effect upon the important presence of clovers. Also, any reserve from past phosphate usage being drawn upon now will decline, and there will eventually be a rising tide of soil tests showing phosphate-deficiency.

Against this argument, however, it should be said that phosphatic fertilisers are being more efficiently applied by many farmers today. The major cause of phosphate loss is not crop uptake but soil fixation, i.e., forming insoluble and non-available soil compounds. Today's drilled and granulated fertilisers expose less surface area per unit weight of material to the soil, and the extent of loss by fixation is thus reduced, not at all completely, but quite usefully.

Superphosphates

Superphosphate continues, of course, to be the most commonly used phosphatic fertiliser, either in its familiar single form or as the newer triple superphosphate with 47 per cent sol. P_2O_5 content. Most of the phosphate in compound fertilisers is also based upon single or triple superphosphate. Nitro-phosphates have made no headway yet in Britain despite their development in Europe and the US. Second place in the phosphatic fertiliser list is taken by basic slag, and nowadays limited home production is augmented by imported tonnages from Europe.

The prospects for continued expansion in the use of nitrogen and potash are therefore good, but by comparison prospects for phosphate expansion seem considerably smaller. However, a decline in phosphate consumption is unlikely—so long as the use of the other main fertiliser nutrients rises vigorously, the use of phosphate must at least stay at present levels.

There is nothing outstandingly new to be reported on manufacturing changes. Post-war development in producing granulated compounds in the UK has led the world, and this bold innovation is still being consolidated. Where here more than 90 per cent of compound production is granulated, in America the proportion is probably not even yet as high as 20 per cent. The main granulation process used here—the wet slurry process coupled with drying—has had to be adapted to deal with more and more concentrated mixtures, mixtures containing over 30 per cent of total plant foods compared with about 20 to 24 per cent not many years ago. Higher nitrogen content in particular gives rise to new problems of caking in the bag, a serious defect of quality when fertilisers are drilled. It has been found that better drying is the surest answer to this problem; a paper read last year to The Fertiliser Society by Dr. B. Raistrick (*Fert. Soc. Proc.*, 1956, No. 38) is particularly relevant However, better drying, if merely approached by seeking higher drying temperatures, may bring other problems—ammonium chloride sublimation, also a cause of caking (W. A. Mitchel, *J. Sci. Fd Agric.*, 1954, **5**, 455), and also serious increases in air pollution (see CHEMICAL AGE, 1956, **75**, 242).

The combination of fertiliser with soil insecticide or weedkiller, though often advocated in America, is not widely developed here, but the incorporation of aldrin (for wireworm) in a compound fertiliser has been successfully achieved by Fisons Ltd., and by one or two other producers, and 1957 has begun with the announcement from Fisons Ltd. of a compound fertiliser containing Tecane for the control of wild oats on sugar beet land. The development of these dual-purpose products could be the prelude to a far-reaching revolution in the industry, and one bringing many difficult problems.

A variety of fertiliser-pesticide mixtures is possible, and a recent US State-by-State survey (*Agricultural Chemicals*, 1956, **11**, 7, 44) showed that although aldrin is the most frequently included pesticide, chlordane, heptachlor, dieldrin, lindane, DDT, and toxaphene are all also used. Parathion, zineb, BHC and IPC have also been used but these seem to have been somewhat isolated examples.

Complex problems of legislation for declared composition are raised with this type of product. There is, too, the problem of rate of use, for alterations in rate per acre desirable for fertiliser use may be undesirable for the combined pesticide. The more cautious British developments in this field seem wise—the few dual products being aimed at specific crops for which fertiliser practice is fairly standardised. More is possible—in theory at any rate—with mixtures of grassland fertilisers and the selective weedkillers like MCPA and 2,4-D, but rates of fertiliser dressings to grass vary widely in practice, and this can upset the weedkillers' effectiveness or selective safety. Another practical problem is that of contamination—traces of the weedkiller passing into other fertilisers and causing crop losses. So far here this fertiliser-weedkiller development seems limited to special products for lawns for which a standard rate of dressing is stated.

New nitrogen-producing ventures based on oil (see CHEMICAL AGE, 1955, **73**, 1046 and 1099) are still being constructed, but the shape of products to come has been revealed by the imported Nitra-Shell, now marketed here while home production arrangements are being created. This appears to be the usual combination of ammonium nitrate and calcium carbonate, but with a 20.5 per cent nitrogen content compared with the 15.5 per cent grade long known here as Nitro-Chalk, an ICI product. The proportion in which the two materials are mixed for this type of fertiliser is, of course, a matter of manufacturing option, but it is considered that it will give rise to difficulties in fertiliser advisory work to have these differing contents for otherwise similar products.

ICI Appoint Four New Directors

FOUR APPOINTMENTS have been made to the board of Imperial Chemical Industries Ltd., three of them with effect from 24 January. They are: Dr. R. Beeching, as technical director; Dr. J. Ferguson as research director; Mr. L. H. Williams, as director in charge of Group B—dyestuffs and pharmaceuticals (effective from 1 April on the retirement of Mr. P. K. Standring) and Mr. C. M. Wright as development director.

Dr. Beeching

Dr. Ferguson

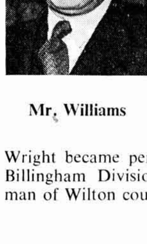
Two changes have also been made on the ICI main board. Mr. J. L. S. Steel has been appointed economic planning director and Mr. C. Paine, previously development director, succeeds Mr. Steel as Group A (heavy chemicals) director.

Dr. R. Beeching, who is 53 joined ICI in 1948 and in 1951 became a member of the Terylene council. In 1952 he went to Canada and in 1953 was appointed a vice-president of ICI (Canada) Ltd. with special responsibility for Terylene development. Since 1955 he has been chairman of the Metals Division.

Dr. J. Ferguson, who is 57, joined the Billingham Division of ICI as a research chemist in 1928. In 1931 he moved to the General Chemicals Division and from 1935 until 1939 was actively engaged in shadow factory work. After a period with the Ministry of Supply in 1941, Dr. Ferguson returned to ICI. From 1942 until 1949 he was research manager and a director of the Alkali Division, and from 1950 until 1951 held the same positions in the General Chemicals Division. In 1951 he became the joint managing director of that division.

Mr. L. H. Williams, who is 54, has spent all his career in ICI with the Paints Division or its constituent companies. In 1929 he became plant superintendent of Naylor Brothers, Slough, and, successively assistant works manager (1932), works manager (1935), development manager (1938), division director (1943), division managing director (1945), and division chairman (1949).

Mr. C. M. Wright, who is 52, joined Synthetic Ammonia and Nitrates Ltd., Billingham in 1927. From 1929 until 1941 he was engaged in research, or on the works, of ammonia, methanol and Drikold (solid CO_2). In 1942 he was appointed Prudhoe works manager and after a period from 1947 to 1951 as gas and power works manager, he was appointed works general manager. Mr. Wright became personnel director of the Billingham Division in 1952 and chairman of Wilton council in 1954.



Mr. Williams

Mr. Wright

FOR YOUR DIARY

MONDAY 4 FEBRUARY

SCI—London: 14 Belgrave Square SW1, 6.30 p.m. 'Isotactic Polymers' by Professor G. N. Natta.

CS—Durham: Lecture Room 239, University Science Laboratories, South Road, 5.15 p.m. 'Electron Diffraction by Gases and its Chemical Application' by Dr. L. E. Sutton.

CS—Oxford: Physical Chemistry Laboratory, 8.15 p.m. 'Chemical and Physical Properties of Metal-Ammonia Solutions' by Professor A. J. Birch.

TUESDAY 5 FEBRUARY

I.Chem.E.—London: The Geological Society, Burlington House, 5.30 p.m. 'Liquid-liquid Extraction' by H. R. C. Pratt.

CS—Edinburgh: Biochemistry Lecture Theatre, Teviot Place, 7.30 p.m. 'Nucleotide Structure and Function' by Professor J. Baddiley.

CS—Dundee: Chemistry Department, Queen's College, 5 p.m. 'Some Recent Developments in the Chemistry of Metallic Surfaces' by Professor K. W. Sykes.

WEDNESDAY 6 FEBRUARY

CS—Dublin: Chemistry Department, University College, 7.45 p.m. 'Co-catalysis in Friedel-Crafts Reactions' by Dr. D. C. Pepper.

FRIDAY 8 FEBRUARY

CS—Birmingham: Chemistry Department, The University, 4.30 p.m. 'Some Current Problems in Phase Transitions' by Professor A. R. Ubbelohde.

CS—Exeter: Washington Singer Laboratories, Prince of Wales Road, 5 p.m. 'Some Developments in Inorganic Stereochemistry' by Professor R. S. Nyholm.

CS—St. Andrews: Chemistry Department, St. Salvator's College, 5.15 p.m. 'Liquid-phase Oxidation of Hydrocarbons' by Dr. G. Twigg.

SULPHUR RECOVERY FROM ACID GAS

Production at the Four Marcus Hook Hydrogen Sulphide Units

SULPHUR PRODUCTION at the Sinclair Refining Company's sulphur recovery units at the Marcus Hook, Pennsylvania, and the Houston plant, Texas, refineries totals 100 short tons daily. Capacity of these two refineries is estimated at 135 short tons per day.

Acid gas containing 80 per cent hydrogen sulphide as a process stream is recovered by the sulphur recovery units which convert the hydrogen sulphide gas to molten sulphur.

There are four separate hydrogen sulphide recovery units at the Marcus Hook refinery which extract hydrogen sulphide from almost all the refinery gas streams as well as from a liquefied propanes-butanes fraction feedstock for a high pressure polymerisation unit. The plant came on stream in February 1956. The following description of the hydrogen sulphide extraction operations and the sulphur recovery unit are taken from the December 1956 *Quarterly Bulletin*, British Sulphur Corporation Ltd.

Extraction Process

For the extraction, the process streams enter near the bottom of their respective extractors and flow upwards through packed beds of Raschig rings or bubble trays. A solution of diethanolamine is fed to the extractor above the Raschig ring bed and flows downwards contacting the process stream. Thorough contacting of the counter-current streams is effected by the Raschig rings and the hydrogen sulphide contained in the process stream is extracted by the amine solution. The essentially hydrogen sulphide free process stream leaves the top of the extractor while the amine solution containing the hydrogen sulphide leaves the bottom of the extractor and is fed by an amine regenerator, which is heated by a steam reboiler.

On release from the amine solution, the hydrogen sulphide leaves the tops of the extractors and is routed as feed to the sulphur recovery unit. The regenerated amine is circulated continuously back to the top of the extraction towers after heat exchange with foul amine and final cooling.

The acid gas fed to the sulphur plant, which contains up to 80 per cent hydrogen sulphide, is converted to molten sulphur of 99.9 per cent purity in a standard two-stage converter. The acid gas stream is fed into the combustion chamber of a waste heat boiler. Air is blown into the combustion chamber at a regulated rate so that only one-third of the hydrogen sulphide in the acid gas is burned to sulphur dioxide. The sulphur dioxide formed combines with the remaining hydrogen sulphide to form sulphur and water. As the reactions take place at high temperatures, the products formed are in the vapour state.

Flame temperatures as high as 1,500°F have been recorded in the combustion chamber of the waste heat boiler, as a result of the heat evolved by the combustion of burning gas plus the heat liberated by the exothermic sulphur forming reactions. This combined heat is removed by the generation of 150 p.s.i.g. steam at the waste heat boiler.

At the elevated temperatures, the sulphur forming reactions commence and some of the sulphur vapours formed condense out at the waste heat boiler, draining out as molten sulphur through a seal pot into an underground molten sulphur storage tank. The remaining vapours pass though the combustion chamber and are cooled while passing through the reverse chamber at the rear of the boiler. The hot gases move forward through boiler tubes, where they are cooled to approximately 575°F before leaving the waste heat boiler.

From the waste heat boiler, the gases pass downwards through a bauxite bed of catalyst in the first converter. The catalyst promotes the reaction and brings it nearer to completion, thereby contributing to greater sulphur recovery.

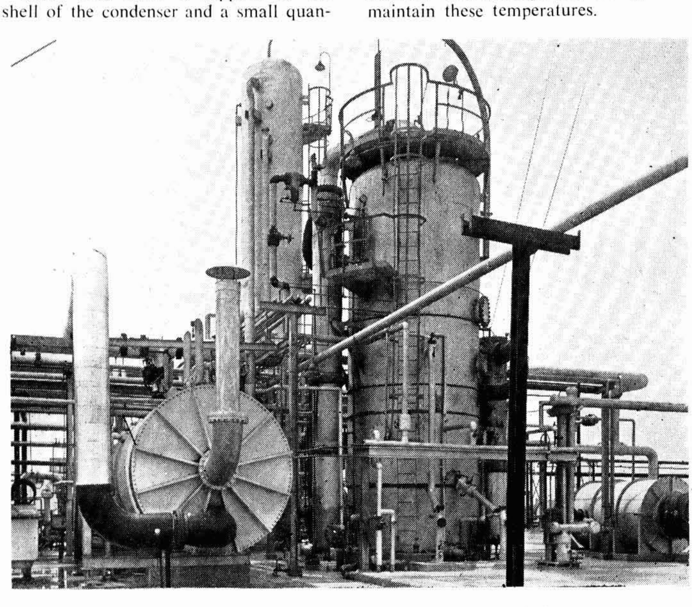
As these reactions are exothermic, there is a temperature rise across the catalyst bed. The sulphur therefore leaves this vessel in the vapour state and with remaining gases is cooled in a condenser to approximately 300°F when the sulphur condenses at the bottom of the condenser and in a molten state flows through a seal pot into an underground molten storage tank.

Boiler feed water is supplied to the shell of the condenser and a small quantity of steam at 15 lb. per sq. in. is generated as a result of heat exchange by the cooling of the gases and condensing of sulphur.

Unreacted and uncondensed gases leave the condenser to enter an auxiliary burner, where they are heated to about 425°F. The burner is a small combustion chamber which fired with a small slip stream of acid gas feed to the sulphur plant and a small quantity of combustion air. From this burner the gases pass to a second catalytic converter where a bauxite catalyst bed promotes further reactions so that an overall recovery of 93 per cent sulphur is obtained from the hydrogen sulphide in the acid gas feed stream. Some sulphur condenses in this second converter, leaving the bottom of the vessel as molten sulphur. In this state it passes through a seal pot into the storage tank.

Exit gases from the second converter enter a second condenser as previously described and again sulphur is drawn off. Any further gases from this second condenser are passed through a scrubber containing Raschig rings. Some molten sulphur from the underground tank is pumped over the Raschig rings as reflux to absorb any sulphur mist that might be carried out of the unit. The recovered sulphur and the reflux sulphur return to the underground tank. Any traces of sulphur vapours or unconverted hydrogen sulphide from the scrubber enter an incinerator which is fired with a small quantity of fuel gas, and are burned to sulphur dioxide.

All lines carrying molten sulphur are steam-jacketed to maintain the sulphur in a molten state between 280°F and 300°F. Steam coils in the converters, scrubber and underground storage tank maintain these temperatures.



Condenser column and converter unit at Marcus Hook

LONDON FIRM DEVELOPS HEAVY GAUGE POLYTHENE SHEETS

Produced for Vacuum Forming Industry

HEAVY GAUGE POLYTHENE sheets have now been introduced by the Iridon Division of Commercial Plastics Ltd., 1 Avery Row, Grosvenor Street, London W1.

Iridon-1000 polythene sheet has been specially developed with the needs of the vacuum forming industry in mind but many industries will find heavy gauge polythene sheets of considerable interest. The chemical industry should find this type of sheeting useful for protecting chemical plants and vessels against corrosion. Resistance of polythene to acids is well known and its value as a lining material over a wide range of chemical plant cannot be over emphasised. The chemical inertness of Iridon-1000 polythene is also considered to open a new field of applications in the manufacture of containers for liquids and chemicals. Such containers are light, durable and easy to produce.

Yield Per lb.

This new plastics material is being produced in gauges ranging between 0.010 in. and 0.125 in. thick. Polythene sheeting has an exceptionally low specific gravity (0.923) and hence the yield per lb. is considerably higher than most other rigid thermoplastic sheets. A table of approximate yields is available from the manufacturers to facilitate costing and working out the weight of a given area in any gauge.

A few of the characteristic properties of Iridon-1000 polythene sheets are:

Tensile strength 1,850 lb./sq. in. when tested at 20°C at a rate of 4 in./min. Low temperature brittle point -40°C. Density .923. Specific heat at 20°C .55°. Vicat softening point 87°C—this is the temperature at which a square needle of 1mm. side under a load of 1 Kg. penetrates the specimen to a depth of 1 mm. The rate of heating is 50°C/hour starting below 30°C. Water absorption—only 0.15 per cent by weight is absorbed after a year's immersion at room temperature.

Highly Resistant

Iridon-1000 is markedly resistant to a wide variety of chemical attack—including hydrofluoric acid. It is exceptionally resistant to inorganic chemicals and may be used for storing or conveying strong acids, strong alkalis, aqueous salt solutions and gases. However, it is affected by a number of organic chemicals. Organic polar liquids of low molecular weight, e.g., alcohols, aldehydes, organic acids, esters, ketones etc., in certain concentrations may cause environmental cracking if the polythene is under polyaxial strain. Aromatic, aliphatic and halogenated hydrocarbons are absorbed to some extent by Iridon-1000 polythene so that dimensional changes occur, and in some cases the absorption may be accompanied by loss of mechanical properties.

Attack of any kind is accelerated at higher temperatures and for this reason and because mechanical strength decreases with increasing temperatures, the upper limit of operation is considered to be 60°C. In exceptional circumstances, higher temperatures of operation may be found satisfactory.

Sunlight and prolonged exposure to outdoor use may degrade unpigmented polythene. It is therefore recommended that natural Iridon-1000 sheets should be avoided where the application necessitates outdoor exposure. A special Iridon-1000 black is recommended for such applications.

This polythene can be stamped, punched, sawn or sheared. Usually conventional sheet metal equipment will be found suitable with little or no modification.

It has a tendency, as have other thermoplastic sheets, to hold a static charge, with consequent attraction of dust particles. A simple method of destaticizing the sheet to prevent this attraction is to wipe the surface of the sheet or formed parts with a one per cent to two per cent solution of ordinary liquid household detergent, which must be allowed to dry and evaporate. Then, if necessary, the surface can be polished with a soft dry cloth. A few rules relating to vacuum forming Iridon-1000 are recommended.

It is understood that both straight vacuum forming and drape forming can be used. In the former case a female mould appears to produce more satisfactory results and far less thinning of the material. When vacuum forming into a female cavity, it is suggested that the depth of draw should not exceed one half the undrawn length per cavity.

Where drape forming is used the draping action should be carried out more slowly than in the case of other thermoplastics. For consistent quality level, the drape forming machine should permit the speed of drape to be varied, and to be accurately controlled.

Heat Conductivity

Iridon-1000 has a very poor heat conductivity. Therefore it is slow to heat up and slow to cool and unless the components are cooled below 130°F before being removed from the mould considerable warpage may occur. With very thick gauges exceeding ⅛ in. thick, (which should be available soon) uneven heating may result owing to the fact that the side facing the heater becomes soft whereas the reverse layers are not adequately softened. Excessive heating of the upper surface may result in oxidation. It may be found necessary to preheat the material in an oven to overcome this. To avoid flow of material in the direction of the evacuation channels it is recommended that the holes should be smaller than usual. If the holes are too wide there is a tendency for the material to be sucked into the channels

First-ever Titanium Condenser Tubes for Uskmouth Power Station

FIRST TITANIUM condenser tubes ever to be installed in a British power station are now undergoing trials at Uskmouth Power Station, Newport, Mon.

In co-operation with the divisional controller, South Wales Division, Central Electricity Authority, ICI Ltd. are carrying out long-term trials in which a number of titanium tubes is being exposed, under normal service conditions, to a particularly aggressive estuarine cooling water.

ICI have established by laboratory tests that titanium has a phenomenal resistance to many corrosive media, particularly seawater. The tubes are solid-drawn from ICI titanium 130.

Installing titanium condenser tubes at Uskmouth Power Station

● After only nine months in office, Mr. Basil R. Jackson retired as chairman of the British Petroleum Co. on 31 January at the age of 65. He has been succeeded by Mr. Neville A. Gass, former deputy chairman. Mr. Jackson joined Anglo-Persian (as BP was then known) in 1921. He represented the company in the US from 1930 to 1935 and was appointed a director in 1948. He became a managing director in 1949 and deputy chairman in 1950. Mr Gass, who is 63, joined Anglo-Persian in 1919. He became a managing director in 1939 and was made deputy chairman last year.

● Dr. John Taylor, scientific adviser to Cyanamid Co. of Great Britain Ltd., farm and home division, left for the US on 26 January for a four weeks' investigation of the newer applications of the antibiotic aureomycin as a food preservative and animal feed supplement.

● Sir Hugh Beaver, on becoming deputy president of the Federation of British Industries, has resigned from the Council for Scientific and Industrial Research. He has served on the council for four years and was chairman of its predecessor, the Advisory Council.

● Mr. R. M. Esdaile, director of Acalor (1948) Ltd., chemical engineers and corrosion specialists, has left London for a world-wide business trip. He is to pay goodwill calls on Acalor agents to consolidate existing business connections and to open up further contacts. He will be visiting Canada, the US, South America, South Africa, Singapore, India and Pakistan, Kenya, Cyprus, Israel and Italy.


R. M. Esdaile

● Dr. G. L. Riddell is relinquishing his post as director of research, Printing, Packaging and Allied Trades Research Association from 31 March. He is joining Albert E. Reed and Co. Ltd. as head of their expanding packaging research and development division. Dr. Riddell has been Patra's director of research since the association was founded in 1930.

● Mr. C. L. Evans who, as reported last week, has been appointed production director of Brotherton and Co. Ltd., joined the company in 1949. After serving four years as chief chemist, Birmingham works, he was transferred to the head office in Leeds as development manager. Since November 1955 he has been production manager of the company.

From 1925 to 1949 Mr. Evans was employed by the City of Birmingham Gas Undertaking and later the West Midlands Gas Board. Among the numerous appointments he held during that time was that of senior research chemist of the Birmingham Gas Department. The author of many scientific publications, Mr. Evans was, for 14 years, a part-time lecturer in applied chemistry and gas engineering at Birmingham Central Technical College. Elected a Fellow of the Royal Institute of Chemistry in 1946, he is a member of the Institution of Gas Engineers, a member of the Institute of Fuel and an associated member of the Institution of Chemical Engineers.

People in the NEWS

● Following reorganisation of the board of Howards of Ilford, the board now consists of Mr. T. W. Howard, chairman; Mr. J. A. E. Howard, managing director; Mr. E. W. M. Fawcett, technical director; and Mr. H. P. P. Hodgkins, commercial director. The board of the parent company, Howards and Sons, remains unchanged.

● An industrial accident prevented Mr. J. W. Harrison, consultant for F. W. Berk and associated companies, from delivering a lecture on zirconium tannages at the annual meeting, London and Home Counties Group, Society of Leather Trades' Chemists on 25 January. His place was taken by a colleague, Mr. A. Taylor, who gave a paper on metal chelating agents.

● Mr. E. H. Davison has been appointed treasurer of Courtaulds as from 1 February and Mr. J. L. Fraser has been appointed chief accountant from the same date.


Dr. A. Key, senior chemical inspector, Ministry of Housing, who is a member of the new-standing technical committee on synthetic detergents. He is a past president, Institute of Sewage Purification

● Mr. Philip Jaram has joined QVF Ltd., suppliers of visible-flow glass pipeline for industry, as manager at their new premises in Duke Street, Fenton, Stoke-on-Trent. Mr. Jaram, who is 31, comes to QVF Ltd. from James A. Jobling and Co. Ltd., having been production control supervisor at their Pallion, Sunderland, factory which produces visible-flow glass pipeline for QVF. At Fenton, Mr. Jaram will also be responsible for co-ordination of supplies and for warehouse control.

● It is announced by Shell Chemical Co. that Mr. J. M. Butler has resigned from the position of general marketing manager, and will shortly take up a senior appointment in the paint industry. From 1 February, Mr. P. J. March, formerly manager of the company's Egham technical service laboratory, takes up a new appointment as marketing manager (industrial), while Mr. H. G. Huckle, formerly manager, agricultural sales department, is appointed marketing manager (agricultural). Mr. G. W. Atkinson takes up the appointment of manager, Egham technical service laboratory.

● Dr. Joseph D. Campbell has been appointed agronomist for the north central district of the plant food division, Olin Mathieson Chemical Corporation, New York. His headquarters will be in Omaha, Nebr.

● Dr. Daniel Dine, assistant export sales manager of Marchon Products Ltd. leaves by air for Kingston, Jamaica, on 5 February on the first lap of a three-month South American tour. A graduate in industrial chemistry from Milan University, he joined Marchon Products in 1950 as a plant supervisor on the fatty alcohol sulphation plant.

● Mr. F. E. Barritt, works manager of KDG Instruments Ltd., Manor Royal, Crawley, has joined the board. Another new director is Mr. L. R. Pullen, sales manager.

● Mr. Leonard B. Smith has been appointed superintendent of the general service section of the sales technical service department of British Oxygen Gases Ltd. at Cricklewood. Before joining British Oxygen in 1948 as an instructor at Cricklewood, Mr. Smith was with Richard Crittall Ltd. and Swinton and Dickinson Ltd. He became chief instructor in 1953 and senior technical assistant in July last year.

● Mr. Charles Robson, a director of Ashmore, Benson Pease and Co., Stockton-on-Tees, has been elected president of the Teesside Industrial Development Board.

● Mr. Alec Walter Stones has been appointed manager of the Western District of British Oxygen Gases Ltd., at Birchgrove, Cardiff. He takes the place of Mr. J. E. Clark, who has accepted an appointment with British Oxygen Wimpey Ltd. which was formed recently for the construction of special rocket projects. Mr. Stones joined British Oxygen in 1938 as assistant manager of the sales technical service department at Cricklewood, London. He then went to the company's Yorkshire district at Rotherham as assistant sales manager, and returned to Cricklewood in 1950 as manager.

SEVEN INSTRUMENT MAKERS SHOW LATEST DEVELOPMENTS

SEVEN scientific instrument manufacturers were showing at an exhibition held in the Engineering Centre, Birmingham, on 22, 23 and 24 January. They were: Black Automatic Controls Ltd., Leafield, Corsham, Wilts; A. C. Cossor Ltd., Highbury Grove, London N5; Elcontrol Ltd., 10 Wyndham Place, London W1; A. M. Lock and Co. Ltd., 79 Union Street, Oldham, Lancs; W. G. Pye and Co. Ltd., Granta Works, Cambridge; Southern Instruments Ltd., Camberley, Surrey; and West Instruments Ltd., 52 Regent Street, Brighton, Sussex.

Organisers of the exhibition were A. M. Lock who, as well as being instrument makers themselves, act as Midland agents for the other six companies.

Solenoid valves for control of liquids or gases were among the exhibits of Black Automatic Controls. Normally these are open when the circuit is energised and closed when it is broken. They are also available for the reverse operation.

Pressure switches were also shown by Black. These are for use on gas or low-pressure air installations where reliable control or safety cut-off is required.

Flow level controls and proximity switches were shown by Elcontrol. Liquids having a specific resistance of up to 20 megohm per cm. cube can be controlled by Elcontrol flow level equipment which can be used to open or close valves and to give suitable warnings.

For non-conducting liquids and solids, proximity switches may be used. A capacity operated relay unit coupled to an electrode operates a controlling relay on the near approach of a solid or liquid. Physical contact with the electrode is not necessary.

Miniature *p*H Meter

Prominent on W. G. Pye's stand was the miniature *p*H meter, which measures 3¾ in. by 6½ in. by 5 in. and weighs 4½ lb. Normal scale reading for the instrument is 2 to 12 *p*H, but this may be offset two units by the buffer scale, allowing the full range of 0 to 14 to be covered. An accuracy of ± 1 per cent is claimed and the scale is readable to 0.05 *p*H.

Other Pye exhibits included an automatic titrator, a *p*H amplifier and tropical *p*H meter, together with the Cathodeon combined Pirani and ionisation gauge which is for measuring pressures over the range of 1 mm. Hg down to 10^{-6} mm. Hg.

Oscillograph records can be developed quickly and easily, it is claimed, by using the oscillogram auto-processor shown by Southern Instruments. The exposed roll is drawn at a uniform rate through developing and fixing solutions which are maintained at a constant temperature. A large exposed roll container, which can be loaded in daylight, is incorporated, and widths of paper up to 6 in. can be handled.

Indicating pyrometric controllers were shown by West Instruments. Applications for this equipment occur in the plastics industry, in extruders and similar machinery. A representative of the company said that West hoped soon to supply recording equipment as well. This, he thought, would be of interest to the chemical industry in general.

A *p*H dose rate controller designed for use with Pye industrial *p*H measuring equipment was shown for the first time by A. M. Lock and Co. This controller is designed to regulate the flow of reagent to a process of effluent to maintain the *p*H within required limits.

The output from the *p*H meter is fed into the dose rate controller which carries adjustable high and low limit switches. If the measured *p*H is between these two preset limits no control action takes place. If the *p*H drops below the low limit one output relay on the controller is energised, if the *p*H goes above the high limit another relay is energised. The energising of either of these two relays sets a two stage timer into operation, the first of which energises a reversible electric motor in the motorised control valve to either increase or reduce the reagent flow. The motor operates for a preset time depending on the process. At the end of this time, the second timer stage switches off the motor for another variable preset time.

If at the end of this 'wait' period the *p*H has been restored to its required value no further action takes place until another deviation outside the set limits occurs. If, however, the *p*H is still outside its limit the cycle of events repeats until the correct *p*H conditions are restored. The use of this enforced 'wait' period after each adjustment to the motorised valve allows for any time lags between the reagent addition and measuring points, and also allows time for the reaction change to take place as a result of the changed reagent flow rate. This system prevents 'hunting" of the control system.

Nordac's Submerged Conversion Unit at Gas in Industry Show

ORGANISED by the North Thames, South Eastern, Eastern and Southern Gas Boards an exhibition 'Gas at Work in Industry' was held at the Royal Horticultural Hall, London SW1, from 22 January to 2 February. The aim of the exhibition was to demonstrate to industrialists the many applications of gas in modern industry.

The use of radiant heat sources at temperatures above 700°C was shown on Stand G. Aluminium tubes for tooth pastes, shaving creams etc. are extruded in a very brittle state and have to be annealed. The North Thames Gas Board's industrial appliance workshops have developed an annealing plant for Impact Extrusions Ltd., Browells Lane, Feltham, Middlesex. Heating is provided by passing a gas-air mixture through porous brick and igniting it at the surface.

Another application of radiant heat is the firing of letters onto glass phials, bottles etc.

A model of a submerged combustion unit made by Nordac Ltd., Uxbridge Industrial Estate, Uxbridge, Middlesex, was shown on Stand J. Nordac claims that submerged combustion is an efficient method of evaporating corrosive liquids such as sulphuric acid, phosphoric acid, and various salt solutions. The method has even been applied to pitch, producing a hard material of greater commercial value.

Degreasing tanks were also shown on Stand J. A demonstration of the importance of good design was shown by two similar gas-heated tanks one of which is properly constructed. Efficiency is increased from 31 to 57 per cent and the heating time cut by half.

As well as manufacturing plant and equipment, the various area gas boards provide a development service for industry. The area gas engineer, backed by a central bureau of information, is available to advise on heating problems. Research and development staff are also available. In the opinion of a Gas Council representative the service available is perhaps as good as would be obtained from a private consultant, with the added advantage that it is free.

Soddy Memorial Trust Inaugurated

THE SODDY MEMORIAL TRUST has been inaugurated, with Sir Gerald Campbell as chairman, to honour the late Professor Frederick Soddy, M.A., LL.D., F.R.S., Nobel Laureate, to commemorate his work and to perpetuate his name. An appeal has been launched to perpetuate the name of Britain's first radiochemist by a Soddy Memorial Lecture to be held in September of each year, the month of his birth and death.

Patrons will be listed from all who have donated £1 or upwards to the fund. Individual donations will not be disclosed. The total now stands at just over £300, with a further covenant for £50 a year for seven years. The administrative trustees, aim at £1,000 for investment, the interest to be used for the purposes of the trust.

It has been suggested that the first group of memorial lectures be given in the colleges or universities in which Professor Soddy worked: Eastbourne College; University College, Aberystwyth; McGill University, Montreal; Glasgow University; Aberdeen University; University College, London; Oxford University.

Correspondence should be sent to Major Howarth, 55 Park Lane, London W1.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents),' which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London, WC2, price 2s 6d including postage; annual subscription £6 6s.

Specifications filed in connection with the applications in the following list will be open to public inspection. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period. Dates on which these applications will be open to inspection are given in 'Official Journal (Patents)'.

ACCEPTANCES

768 343 Chlorinated phenols of high bactericidal activity. Coalite & Chemical Products Ltd.
768 344 Detection and estimation of content of given gas in gaseous mixture by thermal conductivity. Soc. Anon des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny et Cirey.
768 345 Process and apparatus for the recovery of ammonia and pyridine from coke oven gas. Otto, H.
768 224 Reaction of solid substances with gases. Chemiebau, Dr. A. Zieren Ges.
768 347 Sulphonilate salts of amino alcohol esters of penicillin. Lovens Kemiske Fabrik.
768 122 Production of polymers. Petrocarbon Ltd.
768 226 Hydraulic fluids. Farbwerke Hoechst AG.
768 123 Compounds of the pregnane series. Organon Laboratories Ltd.
767 945 Rendering textile materials water-repellent. Farbenfabriken Bayer AG.
768 025 Polycyclic ketones. Ciba Ltd.
767 949 Calcination of lime. Imperial Chemical Industries Ltd.
767 950 Organic compounds containing phosphorus. Ciba Ltd.
768 125 Resinous compositions comprising a glycidyl polyether and a phenol-formaldehyde resin. Shell Refining & Marketing Co. Ltd.
767 951 Polymers and copolymers of vinyl chloride. Wacker-Chemie Ges.
767 955 Antifog materials. National Research Council.
768 028 Alkylated catechol and compositions thereof. Pittsburgh Plate Glass Co.
768 236 Metalliferous monoazo dyestuffs. Ciba Ltd.
767 925 Acrylonitrile copolymers. Farbwerke Hoechst AG.
768 354 Nickel cyclopentadienides. California Research Corp.
768 238 Simultaneous metal ion concentration and pH control in chemical and biological media. Dow Chemical Co.
768 129 Cosmetic preparations. Ciba Ltd.
767 923 Water-soluble salts of carboxyalkyl cellulose ethers. Hercules Powder Co.
768 241 Monoazo dyestuffs. Ciba Ltd.
768 133 Purification of crude phthalic anhydride. American Cyanamid Co.
767 924 Carboxyalkyl cellulose ether salts. Hercules Powder Co.
768 137 Fabrication of highly porous urea-aldehyde resin filter materials. Spumalit-Anstalt.
768 089 Di-guaunyl hydrazones. Farbenfabriken Bayer AG.
768 091 Decomposition of ammonia. Imperial Chemical Industries Ltd.
768 250 5-0-Derivatives of 2-deoxy ribose. National Research Development Corp.
768 144 Amines. May & Baker Ltd.
768 364 Antibiotic anisomycin. Pfizer & Co. Inc.
768 257 Piperidine. Imperial Chemical Industries Ltd.
767 979 Poly N-chlorophosphonitrilates. Taylor, M. C.
768 098 Sulphur-containing derivatives of hexachlorobicycloheptenes. Boots Pure Drug Co. Ltd.
767 921—767 922 Pyrimidine derivatives. Imperial Chemical Industries Ltd.
767 991 Chemical modification of cellulose. Fothergill & Harvey (Research & Development) Ltd.
768 157 Diepoxides of cycloaliphatic esters. Union Carbide & Carbon Corp.
768 263 Resin acid nitriles and nitriles so produced. Armour & Co.
768 032 Sweetening process for petroleum distillates. Esso Research & Engineering Co.
768 158 Desiccants. Rose, H.
768 266 Alpha-diketones. Badische Anilin- & Soda-Fabrik AG.
768 034 Fractionation of oils and other organic substances by selective extraction. Groll, H. P. A.
768 267 Separating acenaphthene, diphenylene oxide, and fluorene from aromatic oils. United States Steel Corp.
768 269 11 α-Hydroxy-4,16-pregnadiene-3, 20-dione and its esters. Upjohn Co.
768 271 4, 16-Pregnadiene-3, 11, 20-trione. Upjohn Co.
768 107 Cracking gas oils. Esso Research & Engineering Co.
768 273 Purification of terephthalic acid. [Addition to 750 806.] Imperial Chemical Industries Ltd.
768 027 Rubber and synthetic resin materials in expanded form. Genatosan Ltd.
768 278 Treating sugar juices. Spillmann, H. J.
768 166 Emulsions of polymers. British Oxygen Co. Ltd.
768 040 Crystallisation of nitrates from nitric acid solutions of calcium phosphate. Norsk Hydro-Elektrisk Kvaelstofaktieselskab.
768 378 Gas plating with copper acetylacetonate. Commonwealth Engineering Co. of Ohio.
768 167 Filters for gas. Cooper's Mechanical Joints Ltd.
768 282 Leaching uranium from sulphidic materials. Canadian Patents & Developments Ltd.
768 043 Erythromycin acid addition salts. Abbott Laboratories.
768 111 Toluylene diamine. Farbenfabriken Bayer AG.
768 046 Dry sweetening compositions. Abbott Laboratories.
768 286 Solid elastic organopolysiloxanes. General Electric Co.
768 288 Destructive hydrogenation of asphaltic hydrocarbons. Esso Research & Engineering Co.
768 172 Dialkoxy derivatives of bis-acetals of an unsaturated dial and their preparation and conversion into a trienic dial. Hoffmann-la-Roche & Co. AG.
768 173 Pyrimidine / substituted - urea complexes. Merck & Co., Inc.
768 291 Pharmaceutical tablets. Schering Corp.
768 049 Natural or artificial rubber and other elastomers. Deutsche Gold- Und Silber-Scheideanstalt, Vorm. Roessler.
768 392 Apparatus for mixing liquids with gases. Farbenfabriken Bayer AG.
768 050 Ion exchange processes and apparatus. Permutit Co. Ltd. (Sharples Corp.)
768 116 Supplementary motor fuel. Monsanto Chemical Co.
768 293 Electrostatic developer composition. Battelle Development Corp.
768 294 Burning cement, lime and like materials containing calcium carbonate. Portland-Zementwerke Heidelberg AG.
768 007 Antibiotic cycloserine. Commercial Solvents Corp.
768 297 Roasting of sulphide ore concentrates. New Jersey Zinc Co.
768 055 Coating carbonaceous or carbon-coated articles with silicon nitride. Union Carbide & Carbon Corp.
768 119 Complex ester synthetic lubricants. Esso Research & Engineering Co.
768 056 Barium titanate composition. National Lead Co.
768 184 Synthetic resins. Chemische Werke Albert.
768 303 Aliphatic ω - chlorocarboxylic acid nitriles. Vereinigte Glanzstoff-Fabriken AG.
768 062 Recovery of unsaturated water-soluble organic amides. American Cyanamid Co.
768 192 Foamed substances based on isocyanate-modified polyesters by using compounds which split off formaldehyde. Farbenfabriken Bayer AG.
768 305 Polyesters by poly-addition. Deutsche Solvay-Werke Ges.
768 194 O-(phenylsulphonyl) - glycollyl anilides and aminoacetyl-anilides therefrom. Aktiebolaget Astra Apotekarnes Kemiska Fabriken.
768 307 Alcohol, metal derivatives thereof. Hoffmann-La Roche & Co. AG.
768 067 Isothiouronium compounds. Armour & Co.

768 199 Production of alcohols. Deyhydag Deutsche Hydrierwerke Ges.
768 070 Hydroforming catalyst supports. Esso Research & Engineering Co.
768 018 Reduction of iron oxide. Freeman, H.
768 074 Natural and synthetic rubber compositions. Columbia - Southern Chemical Corp.
768 076 Recovery of 3-chloronitrobenzene. General Aniline & Film Corp.
768 077 Recovery of chloronitrobenzenes. General Aniline & Film Corp.
768 309 Amides of alginic acid. Henkel & Cie Ges.
768 079 Zinc and cadmium sulphides and selenides. Du Pont de Nemours & Co.
768 080 Cis-cyclohexane-1, 2-dicarboxylic anhydride. Allied Chemical & Dye Corp.
768 206 Diphenolic acids. Johnson & Son Inc.
768 310 Treatment of boiler feed water. [Addition to 699 666.] Permutit Co. Ltd.
768 316 Packing body for gas- or vapour-liquid contact towers. Dow Chemical Co.
768 426 Apparatus for separating mixtures of solid substances into fractions according to specific gravity. Stami-Carbon NV.
768 320 Large agglomerate break up in fluidised coking of heavy hydrocarbon oils. Esso Research & Engineering Co.
768 430 Purification of acrylonitrile. Soc. Industrielle des Derives de l'Acetylene (SIDA).
768 436—768 438 Photographic light sensitive emulsions. Kodak Ltd.
768 439 Separation of vapours from gases. Simon-Carves Ltd.
768 831 Recovery of uranium values from waste material. Smith, F.
768 832 Water - insoluble colouring matters. Farbwerke Hoechst AG.
768 662 Treatment of aqueous liquors. Monsanto Chemical Co.
768 643—768 644—768 645 Cyclopentanopolyhydrophenanthrene compounds. Merck & Co. Inc.
768 444 (Ortho - oxy-carboxy) - phenyl esters of phthalocyanine tetrasulphonic acids. Durand & Huguenin AG.
768 666 Polymeric materials. Monsanto Chemicals Ltd.
768 675 Hydrogen peroxide. Olin Mathieson Chemical Corp.
768 835 Polymerising polymerisable unsaturated compounds by emulsion polymerisation. Ciba Ltd.
768 836 Treatment of gaseous reactants with fluidised catalysts. Stone & Webster Engineering Corp.
768 837 Synthetic rubbers. General Electric Co.
768 551 Recovery of polycarboxylic acid anhydrides. Chempatents Inc.
768 838 Poultry feeds. [Addition to 722 024.] Monsanto Chemical Co.
768 839 Hydrofining of hydrocarbons. Esso Research & Engineering Co.
768 681 Dis-azo metallisable dyestuffs. Imperial Chemical Industries Ltd.
768 840 Compounds containing a cyclopentyl ring. Cassella Farbwerke Mainkur AG.
768 654—768 655 Reduction of sludge deposition from crude oils. British Petroleum Co. Ltd.
768 554 Treatment of polytetrafluorethylene. UK Atomic Energy Authority.
768 558 Recovery and classification of solids. Phillips Petroleum Co.
768 448 Measurement of thickness of metallic and other conducting coatings on backings of conducting materials. British Non-Ferrous Metals Research Assoc.
768 690—768 701 Copolymeric dispersants and lubricant compositions containing them. California Research Corp.
768 562 Foamed plastics. Spumalit-Anstalt.
768 452 Ferrous calcium citrate complex containing water of hydration. Ortho Pharmaceutical Corp.
768 694 Vertical retorts for coal carbonisation etc. West's Gas Improvement Co. Ltd.
768 695 Evaporators. Bennett Sons & Shears Ltd.
768 453 Extraction of animal glue. Armour & Co.
768 649 Polyester - diisocyanate polyaddition products of high molecular weight. Farbenfabriken Bayer AG.
768 699 Resin-bonded glass-cloth laminates. British Oxygen Co. Ltd.
768 454 Phenothiazine complex. Imperial Chemical Industries Ltd.
768 844 Pigmented organic plastics. Goodrich, B. F., Co.
768 570 Silver powder. Westest Technical Corp.
768 708 Polyacrylonitrile solutions. [Addition to 714 530.] Courtaulds Ltd.
768 715 Production of phenols. Soc. Des Usines Chimiques Rhone-Poulenc.
768 718 Process for town gas. Esso Research & Engineering Co.
768 867 Titanium tetrachloride. New Jersey Zinc Co.
768 870 Continuous press for separating liquids from solids. American Defibrator Inc.
768 755 Silicone oils. Monsanto Chemicals Ltd.
768 470 Cyanuric acid esters of epoxy alcohols and polymers thereof. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij.
768 474 Aromatic carboxylic acids. Badische Anilin- & Soda-Fabrik, A.G.
768 874 Fungicidal compositions. Drug Houses of Australia Ltd.
768 646—768 647—768 648 Cyclopentanopolyhydrophenanthrene compounds. [Divided out of 768 645, 768 643, 768 644.] Merck & Co.
768 598 Water-soluble methylol compounds of copolymers. Badische Anilin- & Soda-Fabrik AG.
768 760 Naphthalene derivatives. Hoffmann-La Roche & Co., AG.
768 480 Process for production of articles from viscose solutions. Soc. de la Viscose Suisse.
768 875 Antibacterial substances from plants of the cruciferae and tropaeolaceae. Madaus & Co.
768 883 Textile colouring compositions. Rohm & Haas Co.
768 887 Resinous materials. Ford Motor Co. Ltd.
768 892 Terephthalic dialdehyde. Vereinigte Glanzstoff-Fabriken A.G.
768 893 Methyl bromide production. Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler.
768 896 Cellular compositions. Du Pont de Nemours & Co.
768 899 Porous articles from polymeric resins. [Addition to 715 100.] Badische Anilin- & Soda-Fabrik AG.
768 762 Solid sulphonated synthetic resin tanning agents in compact form. Farbwerke Hoechst AG.
768 904 1, 1, 2-trichlorethane. Knapsack-Griesheim AG.
768 603 Furane compounds. Sandoz Ltd.
768 506 Washing and bleaching agents containing substances which give off oxygen. Seifenfabrik Hochdorf AG.
768 765 Organic compounds of nongaseous elements of the 2nd to 5th groups of periodic system. Kali-Chemie AG.
768 769 Odourless natural or synthetic rubber sponge. Du Pont de Nemours & Co.
768 768 Molten silicates. Stratabar Process Co.
768 770 Amines. Upjohn Co.
768 905 Lubricating compositions. [Addition to 703 445.] Shell Research Ltd.
768 512 Pharmaceutical tablets. Smith Kilne & French International Co.
768 772 Amino ketone compounds. Parke, Davis & Co.
768 773 Thiamin. Pfizer & Co., Inc.
768 777 Chloroaryloxyacetates and choroaryloxypropionates of the partial esters of 2, 2-dichloropropionic acid and an aliphatic polyhydric alcohol. Dow Chemical Co.
768 907 Salts derived from substituted thioglycollic acids. Uclaf.
768 778 Chloral derivatives. American Home Products Corp.
768 909 Reducing the sulphur content of coke containing a high percentage of sulphur. Esso Research & Engineering Co.
768 779 Preparation of glycerine. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij.
768 780—768,781 Bending glass. Libbey-Owens-Ford Glass Co.
768 785 Vaporising liquefied gases. Bendix Aviation Corp.
768 787 Azo nitriles containing betahydroxyalkyl substituents. Du Pont de Nemours & Co.
768 788 Spasmolytically active substituted para-methoxy phenyl-acetamides. Naamlooze Vennootschap Nederlandsche Combinatie Voor Chemische Industrie.
768 790 Siloxanes. Midland Silicones Ltd.
768 524 Heparin. Erba Soc. per Azioni.
768 913 Aluminium extraction apparatus. Soc. D'Electro-Chimie, D'Electro-Metallurgie et des Acieries Electriques D'Ugine.
768 794 Vitamin A aldehyde. Eastman Kodak Co.
768 795 Fabrication of rhenium. Battelle Development Corp.
768 622 Photographic emulsions. [Addition to 742 222.] Kodak Ltd.
768 801 Esters of cyclopentanophenanthrene compounds. Laboratories Francais de Chimiotherapie.
768 626 Cyclic method for combustible gas rich in oil gas. United Gas Improvement Co.
768 915 Liquid filters. Bosch Ges., R.
768 628 Bromination of isoolefin-polyolefin interpolymers. Goodrich, B. F., Co.
768 534 Determining ash content of coal. Stamicarbon NV.
768 630 Lubricating greases. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij.
768 808 Light stable vinyl aromatic resin compositions. Dow Chemical Co.
768 633 Natural and synthetic rubber accelerators. United States Rubber Co.
768 634 Filter for separating particles from gas. Hersey, H. J.
768 918 Gas filters. Hersey, H. J.
768 537 Separation of gases and other foreign matter from liquids, particularly pulp suspensions. [Addition to 740 588.] Freeman, H., and Boadway, J. D.
768 919 Podophyllotoxin-glucoside from various species of podophyllum. Sandoz Ltd.
768 813 Substituted 1, 2-diphenyl-3, 5 dioxo-pyrazolidines. Geigy AG, J. R.
768 830 Working up aqueous liquors containing ammonia. [Addition to 733 796.] Metallges, A.

Commercial News

Hickson and Welch Maintain Dividend on High Net Profit

Dividend for Hickson and Welch is being maintained at 15 per cent for the year ended 30 September 1956. The final dividend is unchanged at 11 per cent. Ordinary capital is £550,000. It is also proposed to capitalise £150,000 of reserves, subject to CIC consent, by way of scrip issue.

After an increased depreciation charge of £84,143, against £63,431, the group profit is up from £406,894 to £417,333. After taxation the net profit is £210,612, compared with £196,571.

Earned for ordinary, year ended 30 September, 62.5 per cent; ordinary dividend, 15 per cent; times covered, 4.16 times; yield (10s shares at 34s), 4.5 per cent.

NEW COMPANIES

CIMID LTD. Capital: £25,000. Registered in South Australia to carry on the business of manufacturers of goods, wares and merchandise, chemicals, compounds and preparations etc. British address: 1-4 Copthall Chambers, Angel Court, London EC2.

ELGAR RESEARCH LABORATORIES LTD. Capital £10,000. To engage in research in the discovery or invention of materials, methods and processes applicable to the manufacture of electronic, radio and television equipment, to engage in research, development and production of germanium, silicon and powdered silver and any other product and material, etc. Directors: J. Z. Lang (chemical engineer, director of Elgar Trading Ltd.); and G. J. Strowger (director of Thorn Electrical Industries Ltd.). Reg. office: Stafford House, Norfolk Street, London WC2.

MARINE AND INDUSTRIAL PLASTICS LTD. Capital £5,000. General merchants, manufacturers of and dealers in articles and processes of reinforced, moulded and other plastics and fibreglass substances, chemical products etc. Directors: F. C. Hyatt and D. Wilson. Registered office: 58 Theobalds Road, London WC1.

NUCLEAR GRAPHITE LTD. Capital £10,000. Machiners of graphite and carbon blocks for use in the construction of nuclear power stations etc. Subscribers J. R. S. Hadfield and J. D. Simon, 18 Austin Friars, London EC2.

MCCALL AND MILLAR LTD. Capital £5,000. To acquire the business of chemical merchants now carried on by McCall and Millar, 97 Maryhill Road, Glasgow. Directors J. A. Millar and M. P. Millar.

INCREASE OF CAPITAL

POLYPHARMA LABORATORIES LTD. Mount Pleasant, Alperton, Wembley, Middlesex. Increased by £400, beyond the registered capital of £100.

ICI Ltd. Turn Down Wages Claim

REPRESENTATIVES of three trade unions were told by Imperial Chemical Industries on 24 January that an increase in wages for 80,000 wage-earning employees could not be justified in the prevailing circumstances. Union leaders expressed dissatisfaction at the reply and will refer the matter back to their executives for further consideration.

Claims for 70,000 other workers in the chemical industry and 45,000 in the drug and fine chemicals industry have been lodged, and these are usually settled on the lines of ICI's settlement.

Reducing Time-Lag on Patents Applications

THE INTERVAL between the filing of a complete patent specification and the granting of the patent is now, on the average, about three years. This compares with one year two months in 1938. That was stated by Sir David Eccles, President, Board of Trade, in reply to a Parliamentary question last week.

Sir David said he was trying to increase the Patent Office staff. Steps taken included recruiting in the universities, improving the salary scales of examiners and appointing older men. He could not say whether the time lag was now becoming greater.

New Witco Glasgow Office

On 1 February, Witco Chemical Co. Ltd., Bush House, Aldwych, London WC2, opened an office in Glasgow to take care of their expanding Scottish business. In charge will be Mr. J. W. Johnson, who is being transferred from the London office. At first he will operate from his private address at 84 East Kilbridge Road, Busby, Lanarkshire.

Obituary

MR. ARTHUR MORTIMER, O.B.E., F.C.S., chairman of Amber Chemical Industries Ltd. and its associated companies, Amber Chemical Co. Ltd., Amber Oils Ltd., and Amber Pharmaceuticals Ltd., died on 26 January at the age of 74. Mr. Mortimer had been associated with the group for a number of years and had been chairman since 1950.

Market Reports

MOST CHEMICALS IN GOOD DEMAND

LONDON An active demand persists for the general run of chemicals including the solvents and rubber chemicals, and reports indicate a good movement to practically all the home consuming industries. Export trade inquiry also continues at a good level. The price of permanganate of potash has been advanced by 1½d. a lb. and titanium oxide is dearer; both these changes being shown in the list of chemical prices given in last week's issue. As from 29 January the basis prices of white lead and red lead have been reduced by 40s and 45s per ton respectively. Prices elsewhere are mostly unchanged and firm. There is a good outlet for the coal-tar products with pitch and creosote oil in brisk demand.

MANCHESTER Firm price conditions have been maintained this week in virtually all sections of the Manchester chemical market. Contract deliveries of the soda, potash and ammonia compounds and many other heavy chemicals are on steady lines, and a number of fresh inquiries have been in the market from both home users and shippers. Among the fertilisers, basic slag and the concentrated varieties are moving steadily to the consuming end and the demand for sulphate of ammonia and superphosphates for straight use is improving.

GLASGOW A reasonable week's trading can be reported from the Scottish heavy chemical market, and business generally has been fairly active. On the whole prices have remained firm. There has been a good volume of enquiries for export, and the market has been satisfactory.

Classified Advertisements

CLASSIFIED RATES: All sections 5d. per word. Minimum 8/-. Three or more insertions 4d. per word. Box Number 2/- extra. Up to mid-day Tuesday for insertion same week.

SEMI-DISPLAY: 30/- per inch. Three or more insertions 25/- per inch.

SUBSCRIPTION: Annual Subscription of 52/6 brings 52 weekly copies of CHEMICAL AGE direct to your address from the printer (postage paid by the publishers), and a copy of CHEMICAL AGE YEAR BOOK.

COMPANY MEETINGS AND REPORTS: £12.12.0 per column. Three column measure (approximately 360 words).

EDUCATIONAL

A.M.I.CHEM.E.—More than one-third of the successful candidates since 1944 have been trained by T.I.G.B. All seeking quick promotion in the Chemical and Allied Industries should send for the T.I.G.B. Prospectus. 100 pages of expert advice, details of Guaranteed Home Study Courses for A.M.I.Chem.E., B.Sc.Eng,, A.M.I.Mech.E., A.M.I.Prod.E., C. & G., etc., and a wide range of Diploma Courses in most branches of Engineering. Send for your copy today—**FREE.** T.I.G.B. (Dept. 84), 29, Wright's Lane, London W.8.

SITUATIONS VACANT

A progressive Company engaged in the manufacture of Inorganic Chemicals and situated in South West Lancashire, has a vacancy for an additional **PLANT MANAGER.** A qualification in Chemistry or Chemical Engineering is essential and some experience in plant management will be an advantage. For a young man with ability, initiative, tact and determination, this opening affords scope for future advancement. The position is permanent and is covered by a contributory pension and life assurance scheme. Applicants are requested to send full particulars of education, qualifications and career to date, to Personnel Manager, **BOX No. C.A. 3521, CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

CHEMICAL ENGINEER required, age preferably under 25, previous industrial experience not essential. The post offers exceptional opportunities for a man of initiative and practical interests and will, at first, involve considerable travelling, both at home and overseas. **NORDAC LIMITED, UXBRIDGE, MIDDX.**

IMPERIAL SMELTING CORPORATION, LIMITED, has a vacancy in Development Department for a Group Leader, Instruments (Investigations). Duties will involve visiting all works in the Organisation to examine the possibility of the extension and introduction of instrumentation on chemical/metallurgical plants and processes and, in addition, supervising a team carrying out special measurements on the Avonmouth Site. Candidates should have a Degree, preferably in Electrical Engineering, Physics or Chemical Engineering, or equivalent professional qualification and at least two years' experience in either instrument development or instrument manufacture. In addition, an Assistant Instrument Engineer is required for duties in the same section involving the design and development of instruments up to the prototype stage for measurements on chemical and metallurgical plants. A young person recently qualified would be preferred and an interest in instrumentation and the application of instruments to chemical/metallurgical processes and plants will be looked for. Applications should be submitted to **PERSONNEL MANAGER, IMPERIAL SMELTING CORPORATION, LTD., ST. ANDREW'S ROAD, AVONMOUTH, BRISTOL,** quoting reference DMI/CA.

SITUATIONS VACANT: continued

BAKELITE, LIMITED, Redfern Road, Tyseley, Birmingham, have a vacancy on their staff for a **CHEMIST** with First- or Second-Class Honours Degree, to work on problems associated with the manufacture of Moulding Powders. All aspects of manufacture from basic raw materials to finished products will also be encountered and the person appointed will also assist in technical service to customers. The vacancy is in the Works Technical Department, which also carries out investigation work into problems associated with the manufacture of Industrial and Decorative Laminates. Please reply, with full details of personal experience, qualifications, etc., to **PERSONNEL MANAGER.**

Hopkin & Williams, Ltd., require male **ASSISTANTS** for preparative organic work in their Chadwell Heath, Essex, Laboratories. Training in Chemistry to about Inter.-Sci. standard desirable. A wide range of experience is offered with facilities for further education. Applications should be made to the **PERSONNEL OFFICER, HOPKIN & WILLIAMS, LTD., FRESHWATER ROAD, CHADWELL HEATH, ESSEX.**

WANTED Young Organic Chemist for technical sales of industrial chemicals made by Rohm & Haas, Philadelphia and their English subsidiary. Technical sales experience required. Excellent opportunity. Send curriculum vitae to **BOX No. C.A. 3519, CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

FOR SALE

Approximately 2 tons **BLEACHING POWDER** (Drums) available. Chlorine, 25 per cent. What offers part or whole? Crampton, Oxnead, Norwich (Buxton 200).

Brand New **COCHRAN** Vertical and **ECONOMIC** Self-contained **STEAM BOILERS** in stock, also all sizes reconditioned and guaranteed. List on request.

STAINLESS STEEL TANKS, PANS, CONDENSERS, PLATES, VALVES AND COCKS. Very wide selection.

4 new **ALUMINIUM CONDENSERS,** 14 ft. long, 2 ft. 3 in. dia., 386 tubes $\frac{7}{8}$ in. o.d.

FRED WATKINS (BOILERS). LTD., COLEFORD, GLOS.
Phone: Coleford 2271/2.

TWO Stainless Steel and **TWO** Tinned Steel Twin "Z"-blade Mixer/Blenders, each approx. 10 cwt. capacity. **GEORGE COHEN, SONS & CO., LTD., WOOD LANE, LONDON, W.12.** Tel.: Shepherds Bush 2070.

***BOX NUMBERS:** Reply c/o "Chemical Age" · Bouverie House · Fleet Street · EC4*

FOR SALE: continued

FOR SALE: continued

WORK WANTED & OFFERED

INVITATION TO TENDER

The Board of Trade has for disposal about 150 long tons **AUSTRALIAN RUTILE SAND** (minimum 95 per cent TiO_2) packed in bags; lying in store in North Wales.

Any material, the subject of this offer, purchased from the Board, must not be re-exported from the United Kingdom but must be consumed in the United Kingdom and not elsewhere.

Full particulars and forms of tender (returnable by February 12, 1957) may be obtained on application to the Board of Trade, C. & G. 7 (B), Room 317, Lacon House, Theobalds Road, London, W.C.1 (Telephone: Chancery 4411, Ext. 329/330).

PATENTS & TRADE MARKS

KING'S PATENT AGENCY, LTD., (B. T. King, A.M.I.Mech.E., Patent Agent), 146a, Queen Victoria Street, London, E.C.4. ADVICE Handbook, and Consultation free. Phone: City 6161.

SALE BY AUCTION

By Order of the Liquidator, D. A. Jacobs, Esq., F.C.A.
re: Harry Green Limited (In Members Voluntary Liquidation).

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SOAP & CHEMICAL MANUFACTURING PLANT,
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Conveyors: Drying Racks: Electric Furnaces & Ovens:
MOTORISED & STEAM PUMPS
LANCASHIRE 22 ft. HORIZONTAL BOILER
BOTTLE FILLING & LABELLING MACHINES
Laboratory Equipment: Chemicals: Benches: Consumable Stores: Stock of Soap:
CONTENTS OF ENGINEER'S SHOP
ELECTRIC MOTORS UP TO 60 H.P.
5-TON STEEL GANTRY: ELECTRIC HOISTS
STOCK OF PERFUMES, MOULDS & CARTONS
OFFICE FURNITURE & CANTEEN EQUIPMENT

Catalogues when ready (price 6d. each) may be obtained of Messrs. Chipchase Wood & Jacobs, Chartered Accountants, 18 Bentinck Street, London, W.1, and of

Messrs. Henry Butcher & Co., Auctioneers, Valuers & Surveyors of Factories, Plant & Equipment, 73 Chancery Lane, London, W.C.2.
Telephone: HOLborn 8411 (eight lines).

WANTED

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