The Chemical Age

VOL. LXXVI No. 1945

20 October 1956

CHEMICAL PLANT & EQUIPMENT

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INDEX TO ADVERTISERS

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

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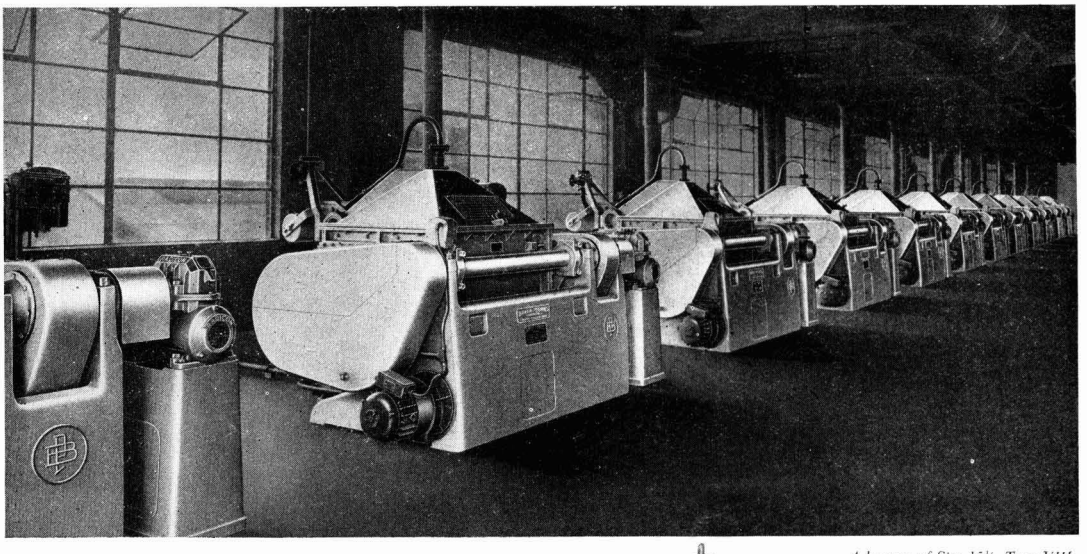
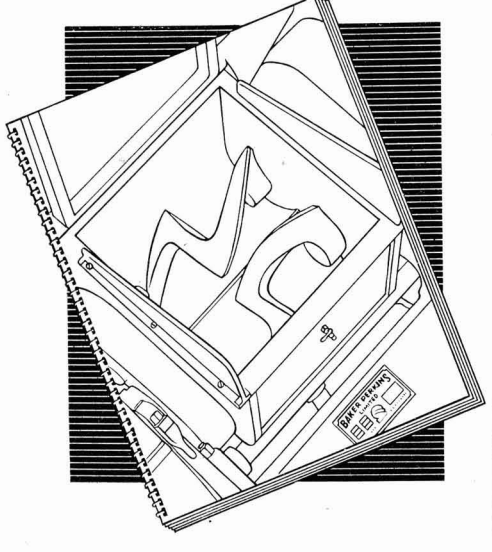
UNIVERSAL MIXING MACHINES

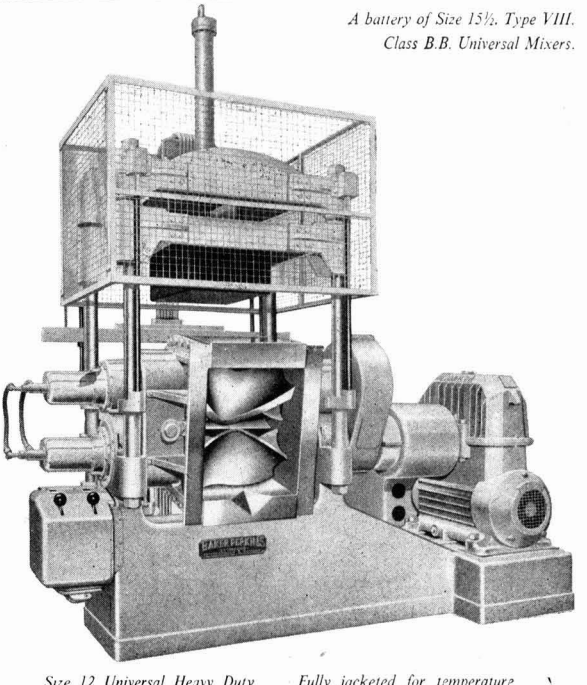


A battery of Size 15½. Type VIII. Class B.B. Universal Mixers.

Whatever your mixing requirements may be Baker Perkins can offer you authoritative and objective guidance, deriving from 75 years experience in the vast field in which mixing forms part of industrial processes. They advise on familiar problems and experiment to solve new ones equally without fee or obligation.

This booklet illustrates and describes Universal Mixing Machines in types, sizes and capacities characteristic of the range. free on request.





Size 12 Universal Heavy Duty Mixer for Rubber and Plastics. Capacity per mix 9 Imp. gallons. H.P. 40.

Fully jacketed for temperature control and with pressure ram actuated hydraulically or pneumatically as preferred.

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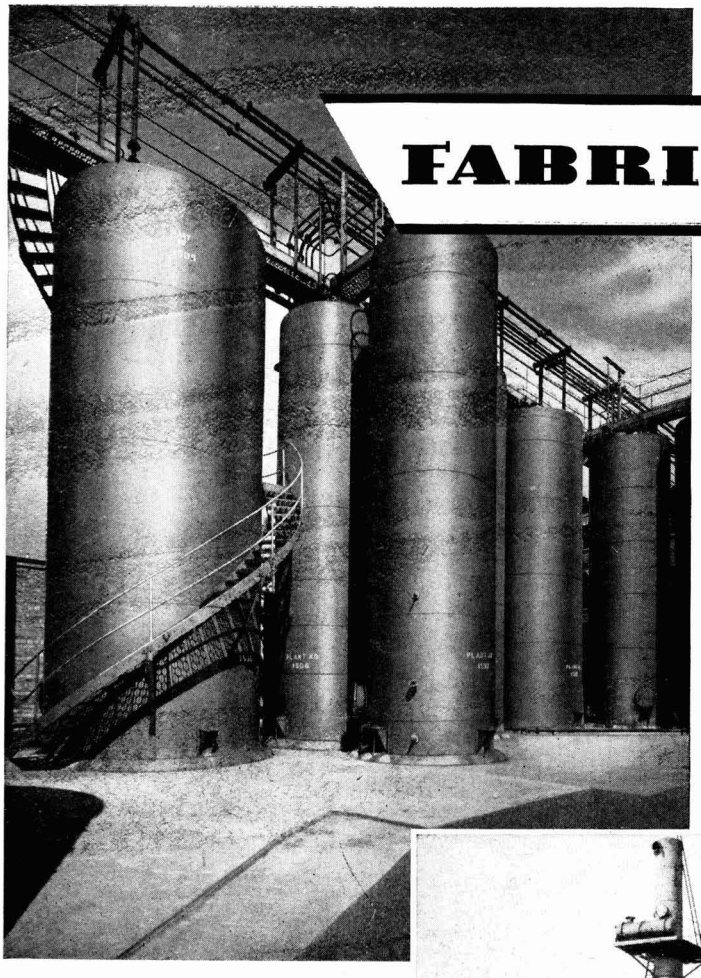
Engineers
WESTWOOD WORKS – PETERBOROUGH



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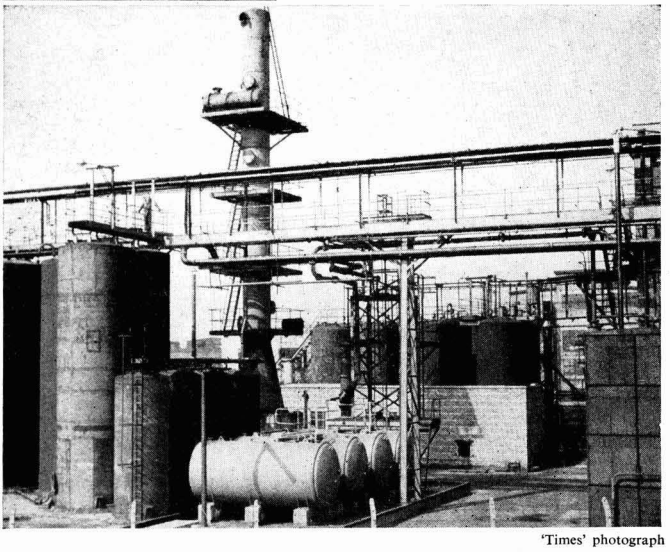
In the making of plant and equipment in cast iron and fabricated steel, Widnes Foundry and Engineering Co. Ltd., have served the industry for over a hundred years.

(above) Part of a battery of twelve mild steel storage tanks —the largest (of which there are four) being 12 ft. in diameter and 30 ft. high.

(right) Mild steel fractionating column, complete with condenser and battery in storage tanks; part of the plant supplied to Ashburton Chemical Works Ltd., a member of the Geigy Group of Companies.



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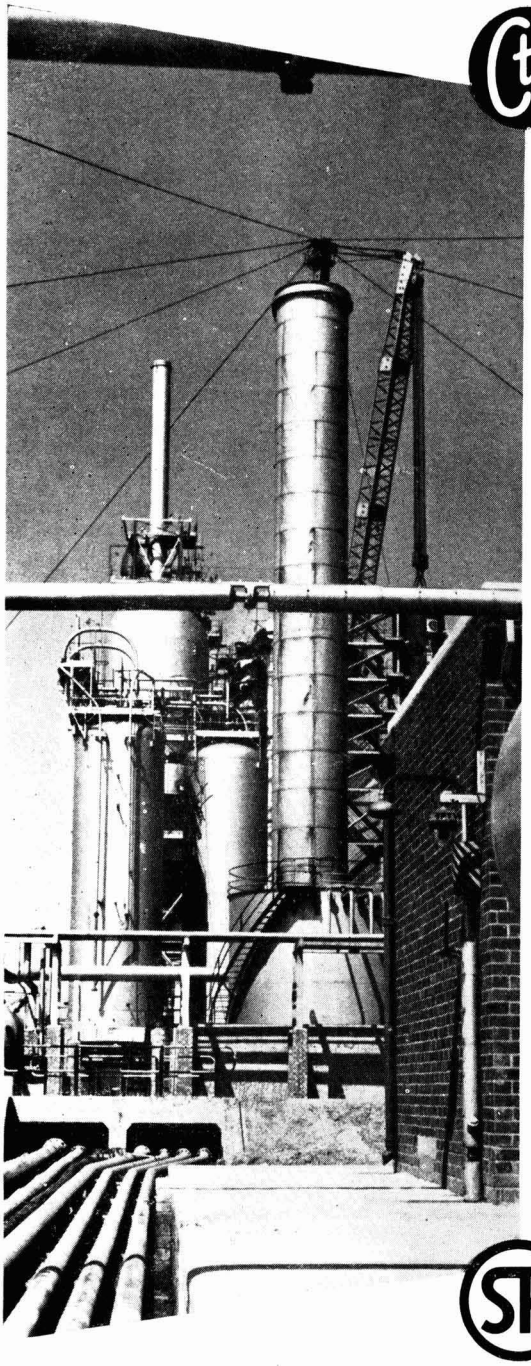

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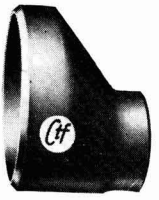
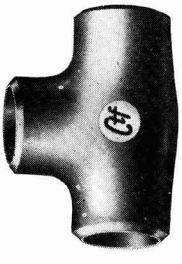


Superior plant is the Potent Agent in achieving economical production. Shipbuilding, Oil Installation, Chemical Plants, Hydro Electric schemes and all the other triumphs of twentieth century engineering require pipes and fittings that will give efficient service allied to well planned layout.

Shaw-Petrie and Clyde Tube Forgings Limited, manufacture, fabricate, and erect, to the highest specification, a complete range of pipework and Seamless Steel and Alloy Butt Welding Fittings.



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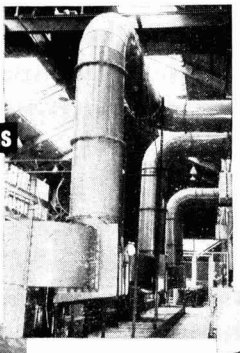


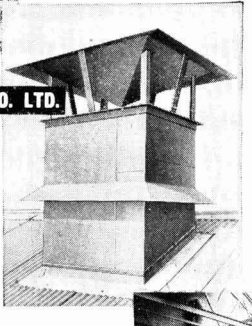
VICKERS-ARMSTRONGS

Leading from the anodising tanks at the Vickers Supermarine Works, South Marston, this exhaust ducting is made in COBEX by Horwitch Smith & Co Ltd.

THE PROOF is in the organisations using it. The list is a long and impressive one. The following are just a few of the many world famous industrial companies which choose COBEX for important work involving corrosion resistance.

NEWTON CHAMBERS & CO. LTD.

A dish-ended vessel, fifteen feet long by eight feet diameter, being lined with COBEX/VELBEX LAMINATE for the storage of concentrated hydrochloric acid.



THE DISTILLERS CO. LTD.

Cowl on the ducting system constructed entirely from COBEX in the Barry (Glamorgan) works of British Geon Ltd., a Distillers plastics company. Fabricated by Tanks and Linings Ltd. Droitwich.

ENGLISH ELECTRIC CO. LTD.

This famous organisation used COBEX (laminated with Velbex) for the ducting tank lining and facing panels in the Stafford electro-plating shop, equipped by W. Canning & Co. Ltd., Birmingham.

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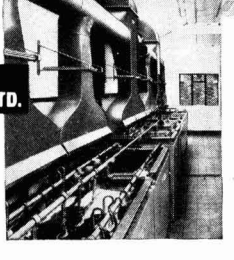
RIGID VINYL SHEET

No other synthetic construction material combines the chemical resistance of COBEX with such ease of fabrication and low manufacturing cost



ELECTRO CHEMICAL ENGINEERING CO. LTD.

Fume ducting in new demonstration plating department at Woking, fabricated in COBEX by Prodorite Ltd., Staffs.

Write for leaflet and technical data to

BX PLASTICS LTD. *A subsidiary of the British Xylonite Co. Ltd.*, HIGHAM STATION AVENUE, LONDON, E.4. TELEPHONE: LARKSWOOD 5511

Expansion bellows manufactured according to a patented process from 'Fluon' p.t.f.e. by Crane Packing Ltd., of Slough, Bucks.

- **Unaffected by corrosive liquids and gases**
- **Good electrical insulation**

'FLUON' polytetrafluoroethylene, manufactured by I.C.I., is unique among plastics materials. Its latest use in industry, for flexible bellows, exploits its chemical inertness and electrical insulation. Bellows made from 'Fluon' are suitable for use as flexible connectors for pipes, sleeves and shaft glands which operate in contact with corrosive chemicals, solvents and lubricants. They have many uses in hydraulic power and control systems and in fluid pressure operated devices such as meters and governors. Their electrical insulating properties make them suitable for insertion in pipe lines where it is necessary to break the electrical continuity or to prevent electrolysis between dissimilar metals on either side of a joint. Tests so far carried out show that bellows manufactured by the Crane process will withstand over 1 million oscillations between the minimum and maximum working lengths at normal temperatures and pressures up to 30 p.s.i. on 2" bore.

Some other uses of 'FLUON' p.t.f.e.

'Fluon', because of its remarkable properties, is an ideal material for gaskets, packings, seals and couplings of many kinds. It is chemically inert and unaffected by all known corrosives except fluorine compounds and molten alkali metals. 'Fluon' may also be extruded as continuous-length tubing for lining high pressure hose. It is also suitable for light duty bearings required to work without lubrication.

'Fluon' is non-adhesive, non-wetting and has a remarkably low coefficient of friction. It is tough, resilient and flexible. It has a very low permittivity and power factor and good dielectric strength. Its working temperature range is from —80°C. to 250°C.

'Fluon' is the registered trade mark for the polytetrafluoroethylene manufactured by I.C.I.

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VOL. LXXVI No. 1945
20 OCTOBER 1956

The international weekly chemical journal covering every aspect of industrial chemistry and chemical engineering

THE CHEMICAL AGE

NEWS of the WEEK

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VIEWPOINT

Achievements & Problems

'OUR CHEMICAL INDUSTRY: Some Achievements; Some Problems' was the title of Sir Alexander Fleck's Society of Chemical Industry Messel Memorial Lecture on 12 October. There is probably no person better qualified to speak on UK chemical industry than Sir Alexander, the chairman of ICI Ltd. His remarks therefore deserve careful consideration.

Sir Alexander's lecture reviewed Messel's life and the significant part he played in making the chemical industry of the UK contribute to social development and paid tribute to the important work done by plant managers, section managers, process superintendents and works managers, in the smooth running and development of the chemical industry. He did not minimise, however, the essential, and over a long term, the even more effective work done by research scientists and administrators.

Aided by such statistics as are available for the past 75 years, Sir Alexander outlined the industry's progress. It was not until 1907, however, that the first census of production was taken, and even this can only give an approximate picture because of difficulties of classification and changes in money values.

A graph can be produced taking 1907 as 100 if the statistics are confined to chemicals, dyestuffs and drugs. But this excludes such products as fertilisers and explosives, the whole of the plastics industry and all chemical activities arising from the cracking or other pyrolysis of petroleum products. Such a graph shows that between 1907 and 1951, there has been a five-and-a-half fold increase in the real value of production in this section of the chemical industry, compared with a three-fold increase for manufacturing industry as a whole. Similar estimates for the last five to 10 years show the expansion of the industry.

These figures Sir Alexander considered to be good evidence of the achievements of the chemical industry and its awareness of the needs of the times.

Rate of progress was not discussed, but the lecturer gave his opinion that if the UK is to remain among the leaders of chemical industries of the world, this rate of progress must be kept up for many years. He considered research had gone ahead satisfactorily. Accurate estimation of the cost of research is always a matter of some difficulty, but a figure of £300 million a year has been suggested.

Sir Alexander's analysis of this figure was interesting. He believes it indicates that civilian research and development expenditure is now about £110 million, of which 70 per cent will be spent by industrial concerns. When services are omitted it is about one per cent of the UK's gross national product of manufactured end products. This shows that the industry's record of increased production is linked with far-sighted, aggressive and effective research. Only with this form of research, and with more technically trained people than are now coming forward, can Britain hope to compete with the chemical industries of other nations.

Rightly, Sir Alexander warned against the transposition of research developments into the field of production. It will be agreed that though time is desirable for adequately proving a project, loss of income, and profit, caused by late production must be considered carefully.

One set of problems which the lecturer believed to merit more detailed examination was that of chemical industry workers. The industry acknowledges that circumstances, which are changing continually, call for methods and conditions of working to be kept under review. Automatic controls are being introduced in many processes with consequent lessening of shift hours. And in this respect the chemical industry is probably unique; unlike other industries the number of people now employed has not increased in comparison with the volume of output. The problem now is to maintain workers' interest and satisfaction in work of a monitoring character.

A possible answer, Sir Alexander suggested, would be the development of the trade union system. He envisaged 'an organisation which will be flexible, which will be capable of understanding current and impending changes and which will be willing, as far as lies in its power, to lend its support to changes which will be good for the industry and for the people in it.' In the meantime he recommended works councils where representatives of the important sections can gain an appreciation of the attitude and point of view of other sections of the industry.

Because of the greater specialisation of the chemical industry, there are comparatively few factory payroll workers. In some cases, only one of every two might be considered thus. Over the whole industry, three out of four might be a reasonably accurate estimation for factory payroll workers compared with six out of seven employed people of the country. As specialisation develops and the industry becomes more and more technical the ratio will decline still further and there will be increasing numbers of people up-graded.

According to Sir Alexander, the answer to these problems lay in sociological advances on many fronts as for instance, profit-sharing schemes, capital participation by the workers and cultural participation in art. Above all, there should be a general advance in the educational level of the people of the UK.

Electroplating Service

HARSHAW Chemicals Ltd., a wholly-owned subsidiary of the Harshaw Chemical Co., of Cleveland, Ohio, US, is now manufacturing addition agents for the Harshaw Perflow, Perglow, Nubrite and Nibrite nickel electroplating processes.

Facilities are located at Waltham Cross, and include an electroplating service laboratory to provide analyses and testing of nickel solutions.

General manager of the company is Mr. A. C. Benning, who has Mr. S. E. Pross as assistant general manager.

L. van der Hoorn's Chemisch-Technische Industrie NV, Utrecht, Holland, will continue its activity relating to Harshaw processes on the continent.

Synthetic Rubber Plant

ERECTION of a plant at Barry, Glamorgan, to manufacture Hycar butadiene/acrylonitrile copolymers and latices (nitrile rubbers), has begun. The plant is for British Geon Ltd.

For many years Hycar synthetic rubbers and latices have been manufactured solely by the BF Goodrich Chemical Co., Akron, US, with which company Distillers is associated in the manufacture of polyvinyl chloride in this country.

The plant will be alongside those of British Resin Products Ltd., British Geon Ltd. and Distrene Ltd., the three companies comprising the Distillers plastics group.

ABCM ANNUAL DINNER

Sir Cyril Hinshelwood's Three Wishes

THREE WISHES for the Association of British Chemical Manufacturers were made by Sir Cyril Hinshelwood, president of the Royal Society, at the Association's annual dinner in London on 10 October.

'First,' he said, 'I wish that in 10 years' time you are still the ABCM and not the National Chemical Board. Second, that your good relations with pure science continue indefinitely, and third, that your research departments will continue to flourish and give you all you need.'

Earlier Sir Cyril who, as principal guest of the ABCM, was replying to the toast of 'The Guests,' had declared there was no province of human affairs which the chemical industry did not touch. The industry was characterised by its extraordinary understanding and humanity and this would continue if it went on recruiting the right people.

Referring to the education of people coming into the chemical industry, Sir Cyril said he was not very happy about the relation between the sciences and the arts. Young people seemed to be divided by their headmasters into scientists and administrators. He hoped the ABCM would exercise its influence to right this matter.

Sir Cyril reminded the 1,062 members and guests that 'if we continue to be inventive and adventurous we shall go on being a great country.

Of the Royal Society, he said it symbolised the relations between pure science and the chemical industry. That alliance was essential because much of the industry's works depended on pure science.

Reference to the 'great and expanding' chemical industry was made by Mr. G. F. Williams, chairman of the ABCM Council, when he proposed the toast of 'The Guests.' 'So varied are our products and activities,' he said, 'that no one knows how the national economy is effected by our industry. We have achieved much and will do more.'

Mr. Williams spoke about research work 'which proceeds apace' and the importance of rapid publication of knowledge acquired. This was essential to the advancement of learning, he added.

Of Mr. J. Davidson Pratt, the Association's director and secretary, who is retiring next year, Mr. Williams said he was glad that Mr. Davidson Pratt would continue to act in a part-time advisory capacity.

In his reply, Mr. Davidson Pratt said that he had been 29 years with the ABCM. 'It has been a good innings helped enormously by good relations all round.'

Sir Alexander Fleck (left), chairman of Imperial Chemical Industries Ltd., receiving the Messel Medal for 1956 from Mr. Julian M. Leonard, president of the Society of Chemical Industry

German Synthetic Rubber

AS originally scheduled, the synthetic rubber plant now under construction at Hüls in the Ruhr is expected to begin production in the early summer of 1958. Annual output will amount to 45,000 tons with the production process based on the use of butadiene. Capital investment necessary is about DM 114 million, but direct operating costs will be fairly low as a staff of only 400 workers will be required. Present output of synthetic rubber totals about 12,000 tons. Imports of synthetic rubber in 1955 totalled 19,500 tons while those of natural rubber reached 164,000 tons.

It is understood that 50 per cent of the share capital of the new company, Buna-Werke Hüls, is held by Chemische Werke Hüls with the remainder equally divided among the three successor concerns to the former I. G. Farben.

NOTE & COMMENT

INTEREST IN NIOBIUM

ATOMIC ENERGY, jet engines and guided missiles have spurred the development of an, until recently, obscure metal—niobium, or columbium, as it is also known. Like zirconium and hafnium, and even lead and zinc, niobium is nearly always found in nature with a similar element, tantalum. In fact the similarity with tantalum is such that for a long time the two were believed to be identical.

Separation of niobium and tantalum has proved somewhat troublesome. Recently, however, the US Bureau of Mines announced an economic new process, which would enable low grade ores, concentrates or smelter slags to be used. The technique is one of liquid-liquid extraction and involves dissolving the feed material in a water-base solution to which is added an organic solvent which will not mix with the first solution. On churning or shaking the two solutions together, the organic solvent extracts one of the metals. It would appear that to date, hydrofluoric acid and hydrochloric acid contacted with methyl isobutyl ketone are the best solutions.

After further treatment niobium and tantulum oxides of more than 99 per cent purity are obtained, from which the two metals are recovered. The silver-grey metal recovered as end-product can be used to impart strength and stability in alloys suitable for operating in temperatures up to 1,500°F and above, since the melting point of niobium is 2,500°F. It is used as a carbide stabiliser in stainless steels and to inhibit intergranular corrosion in the 800° to 1,600°F temperature range. Niobium can also be used to give strength and high temperature creep resistance to low iron alloys in jet engines exposed to extreme heat and operating strain. Addition of the metal to chromium stainless steels improves ductility and reduces the tendency to air-harden.

UKAEA'S ORDER

AS NIOBIUM has a low neutron cross-section, it is suitable for certain applications in nuclear reactors. In this respect the UK Atomic Energy Authority has just placed what is believed to be the first full-scale order in the world for niobium for use in the Dounreay nuclear reactor power plant, Caithness. Niobium is also considered to have a considerable future in gas turbine engine construction, for this type of engine will require high temperature alloys.

At the present time the US consumes about 85 per cent of the world's total production of columbite and tantalite ores. The US has to import 99 per cent of its needs from such areas as Brazil, Nigeria (see THE CHEMICAL AGE, 13 October, p. 69), Belgian Congo, Malaya, Mozambique, Uganda, Madagascar, French Equatorial Africa. The Kennecott Copper Corp. is now exercising an option to acquire 51 per cent of Molybdenum Corporation of America's interest in a niobium deposit in the Oka area of Quebec, Canada. Also Fansteel Metallurgical Corporation stockholders have recently approved the authorisation of a convertible debenture issue of up to $3 million to be used in expanding production of niobium and tantalum at its Muskogee plant, Oklahoma.

Since niobium has so many important uses and there are possibilities of its use in atomic reactors and gas turbine engines, it appears reasonable to suppose that a great deal more will be heard of this metal in the future.

WATER RESEARCH

THE FIRST Annual Report of the youthful Water Research Association—which is now established at Redhill, Surrey—is a modest enough document, for little of the work by newly appointed staff has been in operation for more than about six months. The Association now has 170 members subscribing between £14,000 and £15,000 per annum, and representing almost 60 per cent of the water supply of Great Britain and Northern Ireland. However, there are still some 250 water undertakings which have not yet joined, and perhaps it is mainly for this reason that application has not yet been made for Grant Aid under the DSIR scheme for research associations. Meanwhile, it certainly seems obvious that an income of about £15,000 a year is very low for any programme of research that could be called sizeable. Industrial firms whose products are used by water supply undertakings may join, but the list of members at 30 June 1956 shows only two such members, Albright & Wilson and F. W. Berk.

The actual research report shows clear signs of activity and programme-formation. Fundamental physico-chemical studies on coagulation are envisaged as a result of discussions with water supply organisations. The only coagulant aid used in the UK is activated silica although its effectiveness lacks a clear scientific interpretation. It is suggested that hydroxyethyl cellulose and bentonite might also be effective. Similarly sand is the main filter medium, but the use of polythene is mentioned.

The information division set up dealt with 45 inquiries during its first half-year of existence. Oddly, one inquiry asked if lead arsenate was a suitable work killer for use on a water-gathering ground!

DIARY DATES

MONDAY 22 OCTOBER

Chemical Society
Oxford: Physical Chemistry Laboratory, South Parks Road, 8.15 p.m. 'Sandwich Complexes' by Professor G. Wilkinson.

SCI (Plastics & Polymer Group)
London: 14 Belgrave Square SW1, 6.30 p.m. 'Polyurethanes' by Dr. A. Höchtlen.

Institution of the Rubber Industry
Manchester: Grand Hotel, 6.45 p.m. 'Evaluation of Tyre Compounds by Means of Laboratory and Service Tests' by E. R. Thornley.

Institute of Metals
Sheffield: Engineering Lecture Theatre, The University, St. George's Square, 7.30 p.m. 'Bessemer and His Process' by J. Mitchell.

TUESDAY 23 OCTOBER

Royal Institute of Chemistry
Dagenham: South-East Essex College of Technology, Longbridge Road, 7 p.m. 'Newer Analytical Reagents' by Dr. R. Belcher.

Institution of Chemical Engineers
Chester: The Grosvenor Hotel, 7 p.m. 'Fluidisation Applied to the Handling of Bulk Solids' by D'Arcy Smith.

Society for Analytical Chemistry
Falkirk: Lea Park Restaurant, 7.30 p.m. Joint meeting with the Stirlingshire & District Sections of the RIC and SCI. Exhibition of special analytical apparatus.

Hull Chemical & Engineering Society
Hull: Church Institute, 7.30 p.m. Film show: 'Air Compressors, their Manufacture and Use' by C. A. F. Mackintosh.

WEDNESDAY 24 OCTOBER

SCI (Food Group—Nutrition Panel)
London: 14 Belgrave Square SW1, 6.30 p.m. Debate: 'That in the Opinion of this Panel, Sugar is an Unnecessary Article in the Dietary'. Proposed by Dr. A. E. Bender, opposed by H. C. S. De Whalley.

Institute of Fuel
Manchester: Engineers' Club, Albert Square, 2.30 p.m. Preliminary paper on nuclear energy by I. Hopkins.

Manchester Metallurgical Society
Manchester: Manchester Room, Central Library, 6.30 p.m. 'Stress Corrosion' by Dr. T. P. Hoar.

Society of Leather Trades Chemists
Manchester: Reynolds Hall, College of Technology, 2 p.m. 'Modern Management Technique' by Dr. F. H. Kroch, and 'Work Study and Industrial Productivity' by A. G. Rees.

Manchester Literary & Philosophical Society (Chemical Section)
Manchester: Portico Library, 57 Mosley Street, 6 p.m. 'The Future Shape of Technical Education'.

THURSDAY 25 OCTOBER

Chemical Society
Bristol: Chemistry Department, The University, 5.15 p.m. 'Aromatic Substitution' by Professor M. J. S. Dewar.

SCI (Microbiology Group)
London: 14 Belgrave Square SW1, 6.15 p.m. Showing of films of microbiological interest.

RIC, CS & SCI
Leeds: Chemistry Lecture Theatre, The University, 6.30 p.m. 'New Developments in the Chemistry and Application of Dyestuffs' by Professor W. Bradley.

Society for Analytical Chemistry
Nottingham: Gas Showrooms, 7 p.m. 'Recent Advances in Ion-Exchange Resins' by D. K. Hale.

Institute of Metals
Birmingham: Birmingham Exchange & Engineering Centre, Stephenson Place, 6.30 p.m. 'Dry Corrosion' by E. C. Williams.

North East Metallurgical Society
Middlesbrough: Cleveland Scientific & Technical Institution, 7.15 p.m. 'Sixty Years of Non-Destructive Testing' by J. F. Hinsley.

Incorporated Plant Engineers
Manchester: Nag's Head Hotel, Jackson's Row, 7.30 p.m. 'Is Planned Maintenance Worthwhile?'

FRIDAY 26 OCTOBER

Royal Institute of Chemistry
London: Sir William Beveridge Hall, Senate House, The University WC1, 3 p.m. Conference on 'The Education and Training of the Chemist'. 'Industrial Employers' by Dr. N. Booth; 'Government Service' by Sir Owen Wansbrough-Jones; 'Universities' by Professor E. G. Cox; 'Technical Colleges' by Dr. E. G. Edwards; 'Schools' by Sir Eric James. 5 p.m. Discussion, opened by Professor T. S. Wheeler.

Chemical Society
Exeter: Washington Singer Laboratories, Prince of Wales Road, 5 p.m. 'Modern Research on Phase Transformations' by Professor A. R. Ubbelohde.
Glasgow: Room 24, The Royal Technical College, 3.30 p.m. 'Metal Atoms as Aromatic Systems' by Dr. J. Chatt.
Newcastle-upon-Tyne: Chemistry Building, King's College, 5.30 p.m. 'Modern Inorganic Stereochemistry' by Professor R. S. Nyholm.

Manchester Statistical Society (Industrial Group)
Manchester: Portico Library, 57 Mosley Street, 6 p.m. 'Some Recent Applications of Statistics in the Chemical Industry' by G. A. Coutie.

Plastics Institute
Manchester: Engineers' Club, Albert Square, 6.45 p.m. 'Electroformed Moulds' and 'Trueprocess Castings for Plastics Dies etc.' by P. Spiro and A. Torry.

Institute of Metal Finishing
Sheffield: Fitzwilliam Room, Grand Hotel, 7 p.m. 'Sprayed Plastic for the Prevention of Corrosion on Plating Equipment' by J. C. Lyon.

Society of Industrial Engineers & Work Study Society
Porthcawl: Esplanade Hotel. Opening of two-day conference on 'Work Study & Industrial Engineering in the Small and Medium-Sized Firm'.

OEEC Report

EUROPEAN chemical production rose by 11.5 per cent in 1955 compared with a rise in total industrial production of 8.6 per cent. For the first six months of 1956 the figures are six and five per cent respectively. These figures are given in the latest report of the Organisation for European Economic Co-operation.

Investment in the chemical industry in 1955 was 23 per cent greater than in 1954, and the productivity of the industry, which was already high, also continues to increase. In the opinion of the chemical products committee of OEEC, overall chemical production will continue to rise in the foreseeable future, although, for the industry as a whole, the rate of expansion is for the time being at least rather slower than in recent years.

The committee has also made an examination of certain obstacles to trade in chemical products.

People in the NEWS

● Newly appointed research manager of British Industrial Plastics (Chemicals) Ltd., Oldbury, near Birmingham, is DR. W. WILSON, formerly of the Department of Chemistry at Birmingham University. Dr. Wilson received the Degree of D.Sc. from Birmingham last year.

● Manager of Wembley works of British Oxygen Gases Ltd., MR. A. KNOWLES, has been appointed technical manager (acetylene), at the company's headquarters at Bridgewater House, London. He takes over the position formerly held by MR. E. A. GROOM. New district manager at Wembley is MR. D. R. HARRIS. Another BOG appointment is that of MR. ROBERT J. C. BRYCE (48), as district manager, Scottish division.

● Director of export sales of Du Pont's Organic Chemicals Department, MR. H. JOSEPH SWEZEY, has retired after 37 years with the company. He is succeeded by MR. J. PRESTON WILLS, who has been assistant director of export sales since 1951.

● DR. R. LESSING, who has been associated with the National Smoke Abatement Society and the former Coal Smoke Abatement Society since 1908, has been elected president in succession to SIR ERNEST SMITH. Sir Ernest has been re-elected hon. treasurer. Chairman of the executive council is MR. F. J. REDSTONE (Chief Public Health Inspector, Bristol) and the deputy chairmen are DR. J. S. G. BURNETT (MOH, Preston), and MR. JOHN INNES (Chief Public Health Inspector, Paisley).

● It is announced by Borax & Chemicals Ltd. that MR. GEORGE L. THOMPSON has been appointed general manager, and MR. PETER F. FOSSEY assistant sales manager. Mr. Thompson will continue in charge of all technical services and development.

● DR. PAUL J. FLORY, Professor of Chemistry and acting chairman of the Department of Chemistry, Cornell University, has been chosen to head Mellon Institute's investigational activities as executive director of research. This is a new position of research leadership in Mellon Institute which has been established since the recent retirement of Dr. Edward R. Weidlein as president. Dr. Flory has had a distinguished career in research, having spent twelve creative years in the chemical and allied industries and ten fruitful years in the field of scientific education with much accompanying investigational work. He has pioneered research on the constitution and properties of substances comprised of giant molecules, such as rubbers, plastics, fibres, films, and proteins, and is the author of 106 papers in scientific journals, all of which have been original contributions to chemical and related literature. A 670-page boof, his 'Principles of Polymer Chemistry,' published in 1953, is a respected treatise. Twenty-two patents have been issued to him, inclusive of instances of co-invention. Dr. Flory is also well known professionally for his notable investigational accomplishments in photochemistry, chemical reaction kinetics, thermodynamics, and statistical mechanics. He is a member of the National Academy of Sciences, and he also has membership in the American Chemical Society, in the American Association for the Advancement of Science, and in the Society of the Sigma Xi.

● MR. L. W. GODFREY, formerly with Ancon Metals & Chemicals, London WC2, is shortly starting his own agency at 7 Angel Court, London EC2.

● Federation of British Industries deputy president is now SIR HUGH BEAVER, K.B.E., managing director of Arthur Guinness, Son & Co. Ltd. Since 1942 he has been a member of the DSIR advisory council (chairman 1954-56). In 1953-54 he was chairman of the Committee on Air Pollution (the Beaver Committee).

● President of the Fertiliser Manufacturers' Association is now MR. P. K. PROCTOR (H. & T. Proctor Ltd., Bristol); vice-president is MR. I. MCCORMICK (SAI Ltd., Edinburgh).

● Son of the late George Barger, Regius Professor of Chemistry, University of Glasgow, MR. EVERETT BARGER (46), has been appointed Secretary-General of the Commonwealth Press Union. He is a former lecturer in history at Bristol University and at present holds an appointment with the United Nations Organisation in Geneva.

● Following the 3 October meeting of the council of the Oil & Colour Chemists' Association, DR. H. A. HAMPTON, of the Manchester section, has been appointed Acting Honorary Treasurer of the Association. Dr. Hampton is a graduate of Birmingham University and was awarded a Ph.D. in 1930. In that year he joined Imperial Chemical Industries as a research chemist at The British Dyestuffs Corp. Ltd. Since 1945 he has been manager of the resins service department of the dyestuffs division.

● Assistant secretary of Shawinigan Chemicals Ltd., MR. GEORGE A. DONALD has been appointed treasurer of the company. MR. PERCY W. WRIGHT, formerly secretary-treasurer, will continue as secretary and has been made a director of the company. Mr. Donald comes from Aberdeen.

OBITUARY

DR. J. W. TREVAN, F.R.C.P., F.R.S., director of the Wellcome Research Laboratories at Beckenham, Kent, from 1940 to 1953, died at his home at Addiscombe, Surrey, on Saturday, 13 October, at the age of 69. A pioneer in the application of statistical methods to the biological assay of drugs, he joined the staff of the Wellcome physiological research laboratories as head of the department of pharmacology in 1920. In 1940 he succeeded Dr. R. A. O'Brien as director of the Wellcome physiological research laboratories and two years later became a director of the Wellcome Foundation. For some months before his retirement in 1953 he combined with his other duties that of acting director-in-chief of the Wellcome Research Institution. Dr. Trevan's researches were concerned with bacterial toxins, snake venoms, the action of local anaesthetics, the physiology of the kidney, the nervous control of respiration, and traumatic shock.

The death occurred on Sunday, 14 October, of Mr. Edward George Lambert, registrar of Imperial Chemical Industries Ltd. He was 59. Mr. Lambert joined the registrar's department of Nobel Dynamite Trust Co. Ltd. in 1912. He became assistant registrar of ICI in 1927 and registrar in 1946. In addition Mr. Lambert was one of the original trustees of the ICI employees profit sharing scheme.

Hydrazine Conference

World-Wide Attendance Anticipated

AN INTERNATIONAL conference on 'Hydrazine and Water Treatment' is being organised in May next year by Whiffen & Sons Ltd. It is expected that users from all over the world will attend, together with research workers who will present the latest available information. Papers will be given by delegates from the United Kingdom, United States and European countries.

The conference will be held at the Royal Bath Hotel, Bournemouth, on 15, 16 and 17 May 1957. Registration forms are available from the Conference Officer, Whiffen & Sons Ltd., North West House, Marylebone Road, London NW1. Intending delegates are invited to write direct, if possible before 15 December, so that detailed arrangements can be made.

Hydrazine is added to boiler feed water as an oxygen scavenger. It has the advantage over other scavengers that it produces no solid or corrosive products and it helps to keep the water alkaline.

Dimethyl Hydantoin

DIMETHYL HYDANTOIN (acetonyl urea) is now being produced on a tonnage basis by the Glyco Products Co. Inc. at Williamsport, Pa.

DMH (dimethyl hydantoin) is offered commercially as white crystals, melting above 178° C. It is readily soluble in water, alcohol, ether and ethyl acetate. It forms addition complexes with benzene, thiophene and furan. It is non-toxic under ordinary conditions. It reacts with formaldehyde to give methylol compounds or polymer resins (water-soluble).

As a substituted urea cyclic compound, it lends itself to many chemical reactions. As a solid solvent for water soluble inorganic and organic compounds, it is attracting attention.

A four-page bulletin giving the physical properties and chemical reactions of DMH is available from the Glcyo Products Co. Inc.

Jobling Reduces Prices

A NEW edition is announced this month of the scientific catalogue issued by James A. Jobling & Co. Ltd., Sunderland, and covering the wide range of laboratory and scientific glassware manufactured at the Wear glass works. A feature of the latest issue is a number of reductions in the prices of Grip-Seal ground-glass jointed ware. The new edition of the catalogue has a comprehensive price list issued as a companion volume.

Drawback of Import Duty

THE Board of Trade gives notice that it is considering an application for drawback of import duty under the Second Schedule to the Import Duties Act, 1932, as amended, in respect of the undermentioned material:—

Sodium-4-amino-salicylate imported and subsequently re-exported in the same state, or as tablets in which it is the only active ingredient with the addition of inert excipients of sugar etc. for coating.

Any representations which interested parties may wish to make should be addressed in writing to the Board of Trade, Tariff Division, Horse Guards Avenue, London SW1, not later than 27 October 1956.

Austrian Oil and Natural Gas

DURING the first five months of this year, Austria's oil production was 1,444,199 metric tons compared with 1,492,021 tons during the same period of 1955. The Austrian's, however, fear they may lose first place in oil production in western Europe to the German Federal Republic, for in May, West Germany's oil production at 295,840 metric tons, nearly equalled Austria's production of 296,132 tons in the same month. Natural gas output in Austria increased slightly from 311.3 million cubic metres in the first five months of 1955 to 320.3 million cubic metres during the same period this year.

New Company Formed

GLASS fibre reinforced plastics rods, bars, tubes and sheets will, it is claimed, be produced shortly for the first time in quantity and at an economic price, by Thermotank Plastic Engineering Ltd., a new company recently formed by the Thermotank Group. The company states that quantity production will be made possible by the installation of specially-designed and patented equipment, machinery and processes at its Chapelhall Works, near Glasgow, and by the development of new manufacturing techniques. Mr. Iain Stewart, chairman of Thermotank Ltd., the group's parent company, is chairman also of the new concern with Mr. G. Cuming as managing director.

Rods and bars with diameters ranging from $\frac{1}{4}$ in. to 1 in. will be available in continuous lengths, and tubes are to be produced with internal diameters ranging from 1 in. to 24 in. Any section normally produced as a metal extrusion will also be supplied.

ICI Nobel Division

Developments Outlined by Division Chairman

DEVELOPMENT projects in progress in the Nobel Division of Imperial Chemical Industries were outlined recently by Dr. James Craik, chairman of the division council and sectional meetings.

The new continuous nitroglycerine plant (see THE CHEMICAL AGE, 14 July, p. 72) had operated very well, he said, and it was now planned to put into use the remote control system suggested, using television for viewing the plant from the control room. A similar plant will be installed at No. 2 Hill, and building work is well advanced. This unit will be supervised by an optical system working on the periscope principle.

At Dumfries the company was building a unit to manufacture a special grade of Cellofas known as BXHV. This material would not be available commercially until mid-1957 when the plant was completed.

The Ardeer project for the manufacture of silicones was well advanced and it was expected that it would be in use by the end of 1957.

Titanium Pigments

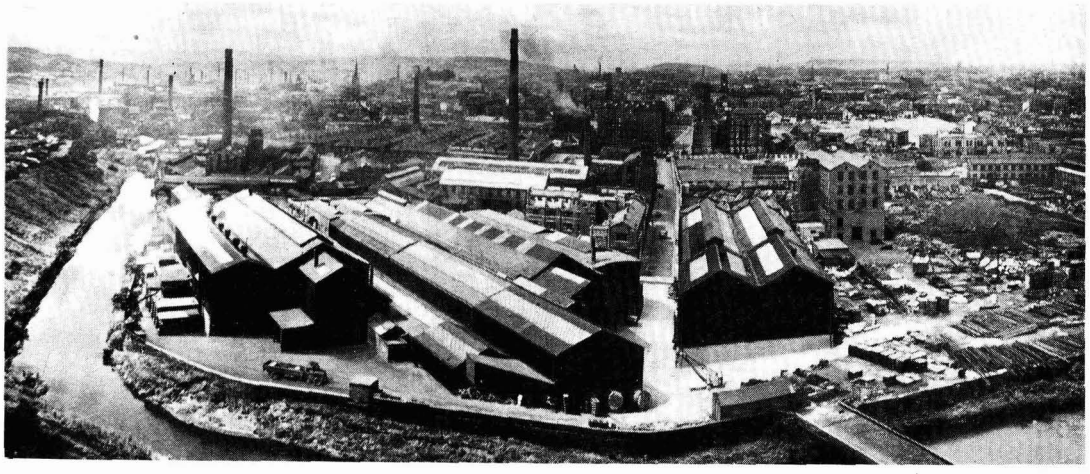
A FURTHER extension of production facilities at Grimsby is to be carried out by British Titan Products Co. Ltd. These extensions, which are due to be completed during 1958, will raise the production at Grimsby to 70,000 long tons per year, approximately seven times the output of the plant when it started in 1949.

The new production is required to meet the growing home demand for titanium pigments, and also to enable the company to expand its export trade. Production of titanium pigments at the company's Billingham works continues at full output.

Canadian Trade in Chemicals

A NOTEWORTHY development in Canadian foreign trade during first six months of 1956 was the falling off in the rate of increase of chemical exports. Sales of crude petroleum had largest proportionate increase of all commodities—some 285 per cent over first half of 1955 and almost 1,500 per cent over the corresponding period in 1954. Exports of asbestos also rose.

Data on commodity imports, at present available for the first five months of 1956, indicate a widespread increase among all the major groups. Substantial increases appear in the chemicals and petroleum groups which rose by 25 and 16 per cent respectively.



CHEMICAL INDUSTRY OUTLINES

W. C. Holmes—150 Years of Service

AN IRON FOUNDRY, which was probably in existence before 1800, was the beginning of the firm of W. C. Holmes & Co. Ltd., of Turnbridge, Huddersfield, manufacturers of plant for the gas and chemical industries. In 1809 the business was in the hands of John Holmes, the next owner being the first William Cartwright Holmes.

Two sons, Joseph Francis and William Cartwright in partnership succeeded the first W. C. Holmes and traded under the name of Holmes Brothers, advertising themselves as 'Whitesmiths and Gas Fitters'. In 1847 the firm moved to Hillhouse, the site of the first Whitestone Iron Works. It was on this site in 1850 that the firm of W. C. Holmes & Co. was established by W. C. Holmes, Jnr., then only twenty-three years old.

New & Simplified Type

From 1853 onwards patents taken out by William Cartwright Holmes concerning 'Improvements in the manufacture of gas and apparatus employed therein' led to a new and simplified type of gas plant. One invention covered the production of gas from coal simultaneously with the addition of steam, thus generating water gas in the retort as in present day vertical retort practice.

The activities of the firm in those early days are well described by an advertisement which appeared in the press:

> 'Gas apparatus for producing gas from coal, wood, peat, oil, resin and other gas-producing material, on the best and most approved principles'.

In the early days the company offered financial assistance to purchasers of its gas plant. An extract from a catalogue issued at the time reads:

> 'Messrs. W. C. Holmes & Co. are prepared to assist in the establishment of gas works in any town or village which, after inspection, they know will return a fair dividend upon the outlay, by providing a portion of the required capital'.

At Henley-in-Arden in 1862 a contract was placed for a gas works at a cost of £1,600, half the capital to be provided by the contractor, who received 160 five pound shares in the undertaking. In the following 25 years over 300 installations or extensions of existing works were carried out in towns, villages and private houses. Others were built on the Continent of Europe and elsewhere.

When the site of the works at Hillhouse was acquired by the London North Western Railway in 1880 the company moved to its present site at Turnbridge.

Above: View of the works of W. C. Holmes & Co. Ltd. Right: Mr. F. Brian Holmes, joint managing director, a grandson of the founder

With the death of Mr. W. C. Holmes in 1882 his three sons became associated in the management of the business. At about this time the increasing size and complexity of gas works plant led the company to specialise in the cooling, washing, purifying, storing and metering of gas, and later in plant for the recovery of by-products.

The partnership of the three brothers continued and in 1910 it was incorporated as a limited company with Mr. P. F. Holmes as chairman and governing director.

Specialisation

The trend towards specialisation which took place at the end of the last century led to a number of important developments by the company.

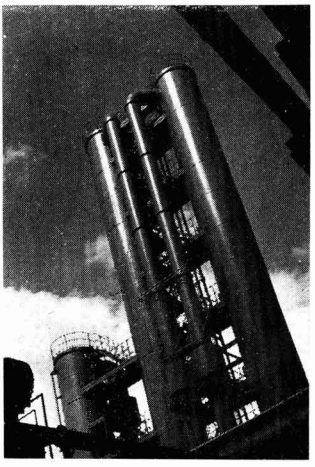
About the year 1882 by-product coke ovens were first introduced into this country for the production of blast furnace and foundry coke, and it was then that the company began the manufacture of by-product recovery plant for such works, and of refining plant for ammonia, tar and benzole. A number of plants were erected for John Darby & Co., later known as Semet-Solvay Co. Ltd.

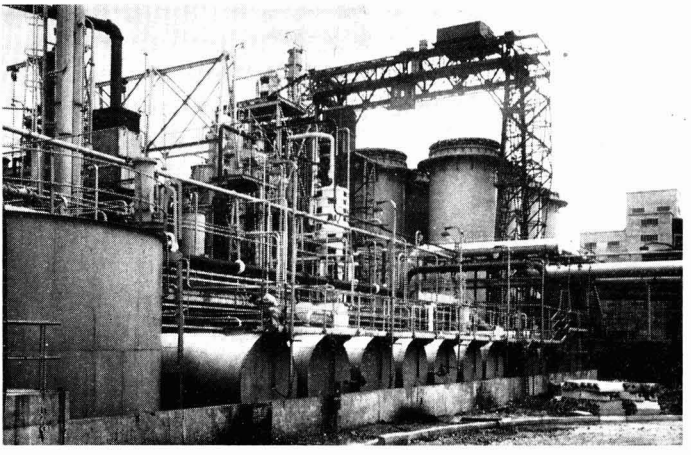
In 1911 the first installations for the continuous distillation of tar were designed and built under licence.

In 1934 the company, in conjunction with the Gas Light and Coke Co., of London, commenced the building of benzole recovery plants operating with an increased oil circulation with the object of bringing about a considerable reduction in content of sulphur compounds present in gas. A number of installations were made during and after the war.

Another process introduced by the company was for the removal of

W. C. Holmes





Left: Tower scrubbers, part of the benzole plant, at the East Midland Gas Board's works, Rotherham. Above: Effluent treatment plant at North Western Gas Board's Newton, Manchester, plant

organic sulphur compounds from towns gas. This process has been applied to the treatment of towns gas used in industry, principally in the manufacture of special glasses, and for heat treatment of non-ferrous metals.

The first commercial plant for the improvement of ammonia still effluent in this country was constructed by Holmes for the Manchester Corporation Gas Department, and installed at their Partington works in 1929. Shortly afterwards a similar installation was made for the chemical works attached to the Glasgow undertaking. Only one other such plant was constructed in this country up to the outbreak of war, but since the end of the war interest has revived and the company has been awarded several contracts in this field.

Wide & Varied Range

As might be expected after more than a century of operation the range of products manufactured by the Holmes' organisation is wide and varied. For this reason the organisation has recently been divided into three distinct and separate divisions: Gas and chemical engineering division, gas handling division and gas cleaning division. Each division deals with a specific phase of the company's activities.

The gas and chemical engineering division deals with the design, manufacture, installation and commissioning of plant for the treatment and purification of gas for the carbonising and oil cracking industries, the recovery of the corresponding by-products, and the manufacture of allied chemical plant. This division maintains a research and development department which is conveniently located at the Spenborough gas works of the North Eastern Gas Board where investigation can be made and pilot plant tried out under actual works conditions.

The research and development department has an extensive programme of research laid out not only in the gas treatment field but in general chemical engineering which will lead to new processes and widen the scope of the division's activities. Active interest is being taken in new methods of purification of the gases produced by new gasification techniques now being developed, including operation at high pressures.

The gas cleaning division, as its name implies, specialises in the manufacture of plant for the cleaning of air and gases. This, in view of the increasing concern over the problem of atmospheric pollution, is a vital and growing field. Plant manufactured by this division ranges from large scale electrical precipitation plant to high efficiency Trion electronic air filters which have recently been introduced in the UK.

Inert Gas Generators

In addition to manufacturing the Holmes-Connersville blowers, exhausters and boosters the gas handling division manufactures a large range of inert gas generators at from 3,000 to 50,000 cu. ft. per hour. These generators, together with nitrogen generators and adsorptive air dryers are finding increasing applications in the chemical industry.

Early in 1947 Holmes obtained a controlling interest in the firm of B. Thornton Ltd., also of Turnbridge. Thornton specialises in the supply of equipment for steel works and rolling mills.

On 7 February 1949 the holding company of BHD Engineers Ltd. was formed and having acquired the whole of the share capital of Holmes and of the Bryan Donkin Co. Ltd., of Chesterfield, controls the activities of these two companies and their subsidiaries.

OCCA Conference

PROVISIONAL title of the Oil & Colour Chemists' Association's next biennial conference is 'Catalytic Processes Relating to the Surface-Coating Industries.' The conference will be held at Torquay from 21 to 25 May 1957.

The following have promised to contribute papers: Professor D. D. Eley, of Nottingham University; Dr. G. C. Bond, of Hull University; Dr. D. F. Rushman, of the Paint Research Station; and Mr. R. R. Coupe, of the Printing, Packaging and Allied Trades Research Association. A paper will be presented by a member of the Shell Chemical Co., and other papers dealing with driers and resin polymerisation are envisaged.

Anyone wishing to contribute a paper on this topic should write to Mr. P. J. Gay, Hangers Paints Ltd., Stoneferry Works, Hull, Yorks. Non-members who want details, when published, of accommodation, social activities etc., should write to Mr. R. H. Hamblin, M.A., General Secretary, Oil & Colour Chemists' Association.

Many new or improved items of chemical plant and equipment have been announced during the past year and a number of new installations has been made in the factories of chemical companies. Some of the more interesting developments are reviewed in the following pages

Chemical Plant & Equipment

ANNUAL REVIEW OF DEVELOPMENTS

Plant Processes

MOST recent addition to the range of processes which THE POWER-GAS CORPORATION LTD., STOCKTON-ON-TEES, can offer for producing synthesis gas is the Texaco process. Several ammonia plants incorporating the Texaco partial oxidation process are now in successful operation and the process is accepted practice for the production of synthesis gases.

The process will produce carbon monoxide and hydrogen from a wide range of feedstocks including heavy oils, refinery gases and natural gas. The process is normally operated at a pressure of about 350 p.s.i.g., but operating conditions can be varied to suit particular applications.

Conversion of carbon monoxide to produce hydrogen by the shift reaction:

$$CO + H_2O \rightleftharpoons H_2 + CO_2$$

is carried out at pressure using a sulphur resistant catalyst. The number of conversion stages depends on the percentage of carbon monoxide to be converted, and condensate is injected between the stages of conversion to cool the gases and provide the excess steam necessary to ensure continuation of the shift reaction.

Removing CO_2

To remove carbon dioxide from the gas, hot potassium carbonate, monoethanolamine or water wash absorption/desorption processes either alone, or combined, are adopted, the method chosen depending on the economics of each particular case.

Carbon monoxide and final carbon dioxide removal is achieved by liquid nitrogen wash or copper liquor absorption. The liquid nitrogen wash process is particularly suitable for ammonia synthesis gas production, since an air fractionation plant producing pure oxygen for the Texaco gasification step, and nitrogen for the synthesis gas is an integral part of the factory installation. To reduce the carbon dioxide content of the gas to acceptable limits for nitrogen wash an alkali wash is employed. The cost of utilities and chemicals for these processes affects the choice of the final purification step.

Main advantages of the process are that: (a) Gasification under pressure saves compression costs either by utilising feedstocks available at pressure or by pressurising the feedstock, and (a) The plant can be readily adapted to use either gaseous or liquid fuels within the same reaction chamber and is designed so that a change of feedstock can be made after only a brief shut down.

The process follows the increasing tendency to use hydrocarbon feedstocks in place of coke or coal in countries or locations where hydrocarbon fuels such as natural gas, fuel oil, liquefied petroleum gases or refinery tail gases are available.

AS THERE is a growing demand by users of sulphate of ammonia for delivery of supplies in bulk, SIMON HANDLING ENGINEERS LTD., CHEADLE HEATH, STOCKPORT, has designed a pneumatic handling, storage and loading plant. The plant collects the sulphate, distributes it to storage, reclaims it and loads it into railway wagons entirely in bulk.

The sulphate dryer discharges into an open hopper in the sulphate store from whence it is picked up by a suction nozzle attached to a flexible pneumatic pipe. A rotary exhauster provides vacuum, by means of which the sulphate is drawn up until it enters a cylindrical receiver with a hoppered outlet. Here, due to expansion and reduced velocity of the air stream, the sulphate is released and accumulates in the hopper, while the air passes out through a cyclone dust collector and enters the exhauster.

Sulphate is released from the receiver hopper through a rotary air seal and is discharged over the floor of the sulphate store by gravity chute. Sulphate is reclaimed from floor storage by the same suction nozzle and flexible pneumatic pipe and is delivered into the receiver and discharged through the rotary air seal as described above. A throw-over valve value in the breeches chute below the receiver diverts the sulphate into a loading-out chute in a railway track shed. A flexible pipe at the end of the chute allows uniform loading of a wagon.

Such a plant can handle 5 tons per hour.

BENZOLE recovery and benzole rectification are normally regarded as two separate processes. In conventional processes, the heat needed for recovery and rectification is supplied by steam, much of it at high pressure, and much of this heat is wastefully rejected in cooling water.

In the UCB-Wilton pipestill process developed by UNION CHEMIQUE BELGE and CHEMICAL ENGINEERING WILTONS LTD., CHEADLE HEATH, STOCKPORT, the heat used for recovery is more than enough for complete rectification as well.

Preheated benzolised wash oil is brought into intimate liquid/liquid contact in a distillation column with a recirculating stream of debenzolised oil, which is continuously heated in a Wilton pipestill. The benzole is driven off into a fractionating system, and the same volume of wash oil as that in which the benzole was absorbed is returned to the benzole scrubbers through a series of reboilers and heat exchangers. Thus, apart from a small quantity of low-pressure steam, all the heat used is supplied by the pipestill, which is solely a heater and not a distillation apparatus.

Pipestill Process Economies

Compared with steam process, the UCB-Wilton pipestill process has been shown to give economies of £10,000 to £15,000 per annum per thousand tons of coal carbonised per day, and these economies are virtually independent of carbonising plant capacity.

Other products of the company include a pipestill open design for a continuous tar distillation plant at the Caerphilly works of the NCB.

SIMON-CARVES LTD., the parent company, has developed a process for the recovery of ammonium which is entirely separate from the production of sulphate crystals. It is said that the process allows closely controlled conditions of sulphate manufacture so that crystals of the desired size and shape are consistently produced.

Plant Equipment

STAINLESS STEEL chemical pumps have been developed by SIGMUND PUMPS LTD., GATESHEAD, for chemical and process applications. Known as the B-N series, the pumps are available for outputs of five up to 200 gallons per minute against heads from 10 up to 250 feet. A total of six different hydraulic units can be used, but only two support frame assemblies (sizes 1a and 1) are required. Special attention has been given to effective sealing and the pumps can be supplied with a variety of sealing forms.

Stainless steel 18/8/3 has been used as a basic material for the range as it has a high resistance to corrosion in chemical pump application. The pumps are unaffected by nitric acid, all concentrations, 7° F; sulphuric acid 10 per cent, 7° F; oleum, 7° F; cupric sulphate 10 per cent, 7° F and developers etc. The B-N pumps also satisfactorily handle liquids at temperatures up to 220° F.

This company also produces the Pum Pak, a general service, electric pump unit, intended for such applications as air conditioning, boosting, circulating systems, condensate, general water supply, heating systems, refrigeration, sprinkling, spray booths, bottle washing machinery, water softening etc.

SPECIALISTS in chemical plant production are WIDNES FOUNDRY & ENGINEERING CO. LTD., WIDNES. Their separate steel fabricating department covering approximately 200,000 square feet uses mild and stainless steel. The machinery in this particular department includes a 1 in. × 16 ft. roll, a plate edge planer, pells cropper, cold saw etc. The combined production covers pilot plant for the initial stages in production of titanium and more recently, has included cast iron vessels approved by the Government after gamma ray test for porosity. A battery of special cast iron vessels has been ordered by the UK Atomic Energy Authority. The body of the vessel is approximately 5 ft. 8 in. outside diameter × 6 ft. 3 in. high and the complete vessel weighs approximately 30 tons.

LATEST addition to the range of Mopumps manufactured by RHODES, BRYDON & YOUATT LTD., STOCKPORT, is the '350' series of vertical high temperature circulating Mopumps, offered for pressures up to 350 p.s.i. The company states that the new series should be particularly useful for marine services and for industrial boiler house installations where space is limited. The vertical pumps are stated to have the advantages of horizontal pumps of compactness, ease of access to working parts, reduced overall length, increased rigidity of the pump end, reduced distortion due to pipe strain by the motor not being attached to a base plate or wall, and elimination of static deflection caused by an overhung impeller in the horizontal pumps.

THREE new thermoplastics, under the trade name of Durapipe, Z, K or N, have been developed by RICHARD E. DUPONT LTD., LONDON, for use as pipes by the petroleum industry. The plastics are strong, light in weight, and are said to have excellent resistance to corrosion. The pipes are being made in light, normal and heavy gauges, with outside diameters conforming to British Standard 1600 (1950) and American Petroleum Institute Standard API 5-L. These sizes are also in keeping with British Standard 1387. The pipe is normally fabricated in 20 ft. or 25 ft. lengths. Sound and permanent joints can, it is claimed, be quickly made with solvent or adhesive cement applied with a paint brush. The pipe can be cut and machined easily with simple hand tools. It will take threads and can be welded. Recent developments in the manufacture of Durapipe N, which is a type of nylon, now allow extrusion of pipe and casing up to 5 in. API Standard in 25 ft. lengths.

NOW being introduced to this country after being tried and proved in the US are the range of LaBour DZT Pumps manufactured by BRITISH LABOUR PUMP CO. LTD., LONDON. The pumps have been designed with a view to improving efficiency in chemical liquor pumping applications. A tapered open-type impeller is an important feature of design and with this modification a smaller sized pump using less h.p. achieves capacities hitherto requiring larger and more expensive types of pump.

Since the impeller head is separate from the shaft, the impeller can now be removed from the pump without dismantling more than the suction head. A heavier shaft is employed enabling the pump to be run at speeds up to 3,300 r.p.m. with increase in head conditions. Oil lubrication is also adopted.

Another recent introduction by this company is the LaBour alloy—K.26, one of a number of alloys specially cast for use on difficult chemical duties. K.26 is an austenitic alloy of low carbon content containing over 50 per cent total of nickel, chromium, molybdenum and copper. Compared with conventional stainless steels, K.26 has increased resistance to corrosion, under oxidising and reducing conditions. The alloy can be welded and machined under conditions similar to those for 18/8 stainless steels and is comparable to the latter in price.

Its duties cover a wide range of chemicals and it has already been subjected to severe independent tests by leading industrial and chemical companies in the country. K.26 has been developed to fill the gap between the conventional stainless steels and the LaBour alloy R.55 which is normally recommended for the majority of particularly corrosive duties.

TWO new methods of preventing evaporation from open tanks and vessels have been reported recently. The AMERICAN AGILE CORPORATION, OHIO, US, has developed tiny air-inflated polythene pillows (each measures $\frac{5}{8}$ in. OD by $1\frac{1}{4}$ by $\frac{1}{4}$ in.) which are floated as a $1\frac{1}{2}$ in. layer on the surface. The pillows are stated to have a virtually unlimited life, are resistant to most chemicals and allow access into the liquid. Evaporation can be reduced as much as 70 per cent. Some 833,000 pillows are already in use at the atomic energy centre in Oak Ridge, Tennessee.

To prevent vapour loss in large petroleum storage tanks, a tyre (the same diameter as the storage tank) made of nylon fabric base and coated with butadiene acrylonitrile synthetic rubber is placed between the floating roof and the tank wall. The tyre is partially inflated with liquid and secured to the floating roof, thus acting as a complete seal between the floating roof and the tank wall. This method is in use at Mobil Oil's Coryton refinery and has been incorporated

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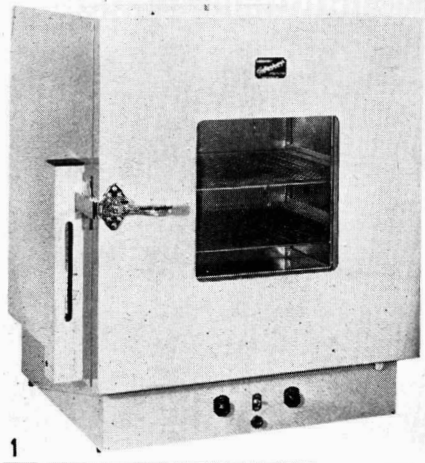
1 Humidity oven (A. Gallenkamp & Co. Ltd.); 2 Twin-shaft portable type stirrer (Kestner Evaporator & Engineering Co. Ltd.); 3 Polythene bin (British Xylonite Co. Ltd.—Halex Division); 4 Air filter regulator set (Crosby Valve & Engineering Co. Ltd.); 5 Three-tier laboratory ball mill (Pascall Engineering Co. Ltd.); 6 Arc welding face shield (Panorama Equipment Ltd.); 7 Pipe bending machine (Chamberlain Industries Ltd.); 8 Chemical drying tray (British Resin Products Ltd.); 9 Unit steam trap (Lancaster & Tonge Ltd.); 10 Vertical high temperature pump (Rhodes, Bydon & Youatt Ltd.)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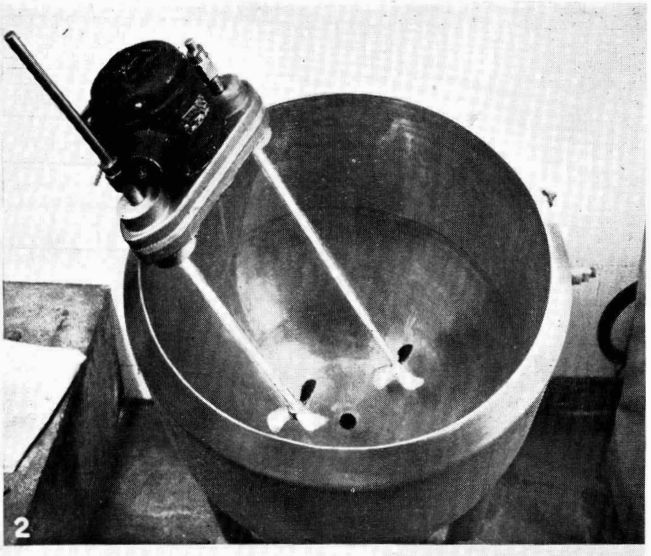
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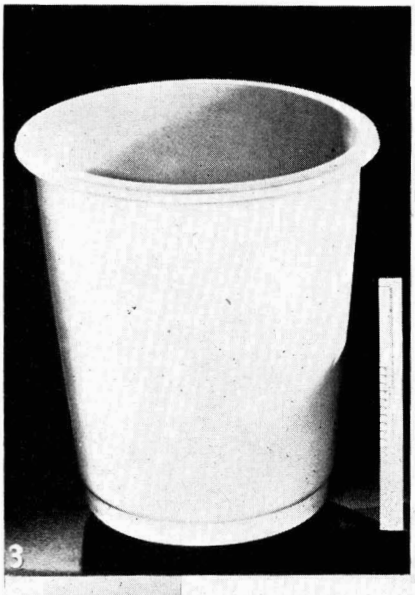
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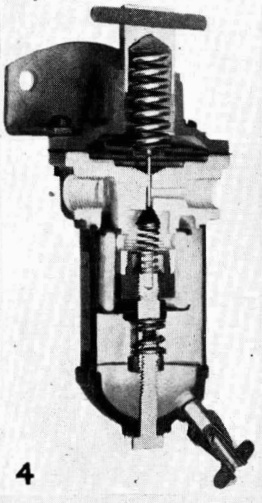
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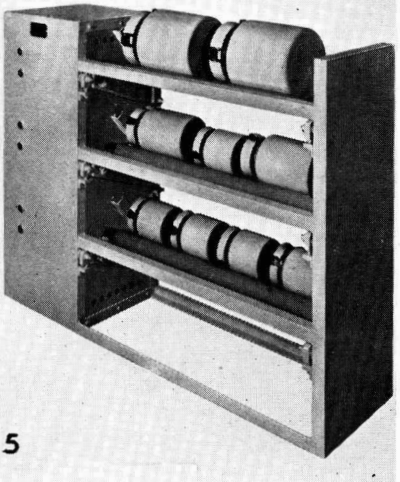
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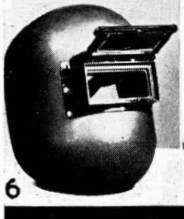
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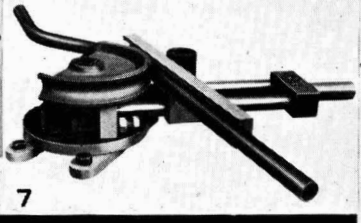
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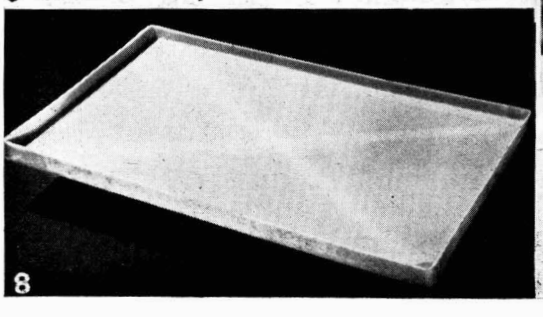
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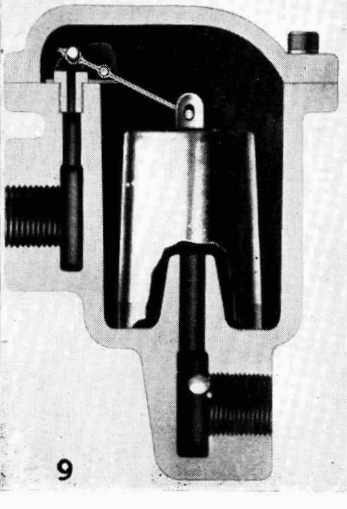
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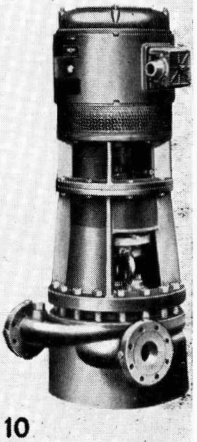
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in two 80-foot diameter tanks. The design has been built under licence from the Hammond Iron Works US by WM. NEILL & SON (ST. HELENS) LTD.

THERE are novel features in a mixing machine designed and developed by BAKER PERKINS LTD., PETERBOROUGH. Ingredients to be mixed are weighed off into a wheeled truck which can be placed between the main frames of the mixing machine and clamped to the top flange of the trough. The trough and truck are then up-ended together, the truck staying in position during the period of mixing. When the movement is reversed the truck can be wheeled away for further processing of the contents. Thus dust-free working is ensured as well as ease of charging and discharging.

It is pointed out by the makers that this method of mixing is not universally applicable, but is useful for mixing certain substances. The original machine was designed for handling welding rod flux.

A NEW bagging scale the GA-38, which weighs and bags 50 and 100-lb. bags and, by means of a new pneumatic gate assist mechanism, 25-lb. bags, has been developed by RICHARDSON SCALE CO., CLIFTON, NEW JERSEY, US.

Bagging speeds are normally 15 50-lb. bags per minute, with accuracies ($\pm$0 to 3 oz.) and operation.

Special features are the scale's power driven belt feeder, the pneumatic gate assist, compensation and counter mechanisms, dust exhaust vents, variable speed motor drive and bagholder (optional in either manual or air-operated models).

LARGE electric surface heaters are now obtainable from ISOPAD LTD., BOREHAM WOOD, HERTS. The company has recently installed an isomantle for a flameproof area on a 500-gallon resin vessel at W. A. Mitchell & Smith Ltd., Mitcham, Surrey. It has a 56 kW loading and is constructed in two parts, one heating the base and 13 inches of the cylindrical side of the vessel, the other part heating from platform level in three 120° segments. Control is automatic with three heat switches for the 37 horizontal circuits, each controlling a pair of circuits giving choice of 'series', 'parallel' or 'single' circuits. Fine automatic control is effected by mercury-in-steel contact thermometers, one calibrated to 100-350°C, the other which controls the heating surface being calibrated from 100-500°C.

THE adoption of British Standard 2598: 1955 *Glass Pipelines* in its range of industrial plant and pipeline products was recently announced by QVF LTD., of STONE, Staffs. Although the manufacture of glassware with the former standards of pipe end will be discontinued, the company states that metal and plastic backing flanges, inserts, gaskets and bolts for use with existing glassware, will continue to be available. The company will also continue to supply the backing flanges to suit Quickfit pipe ends drilled to mate with Jobling backing flanges, which are suitable for coupling Quickfit pipes in sizes 1 in., 1½ in. and 2 in. to the new QVF standard.

THE most recently introduced insulating refractory of the M.I. range developed by MORGAN REFRACTORIES LTD., NESTON, WIRRAL, CHESHIRE, is M.I.26 low heat storage insulation refractory. It can be used at temperatures of 2,600°F (1,425°C) filling the gas between the lower temperature M.I.23 (2,300°F; 1,260°C) and M.I.28 (2,800°F; 1,538°C) which is used for high temperature work. The M.I.26 can be used as a fuel saver when it is at the hot face, but can be employed as a backing lining when furnace conditions make hot face application impossible.

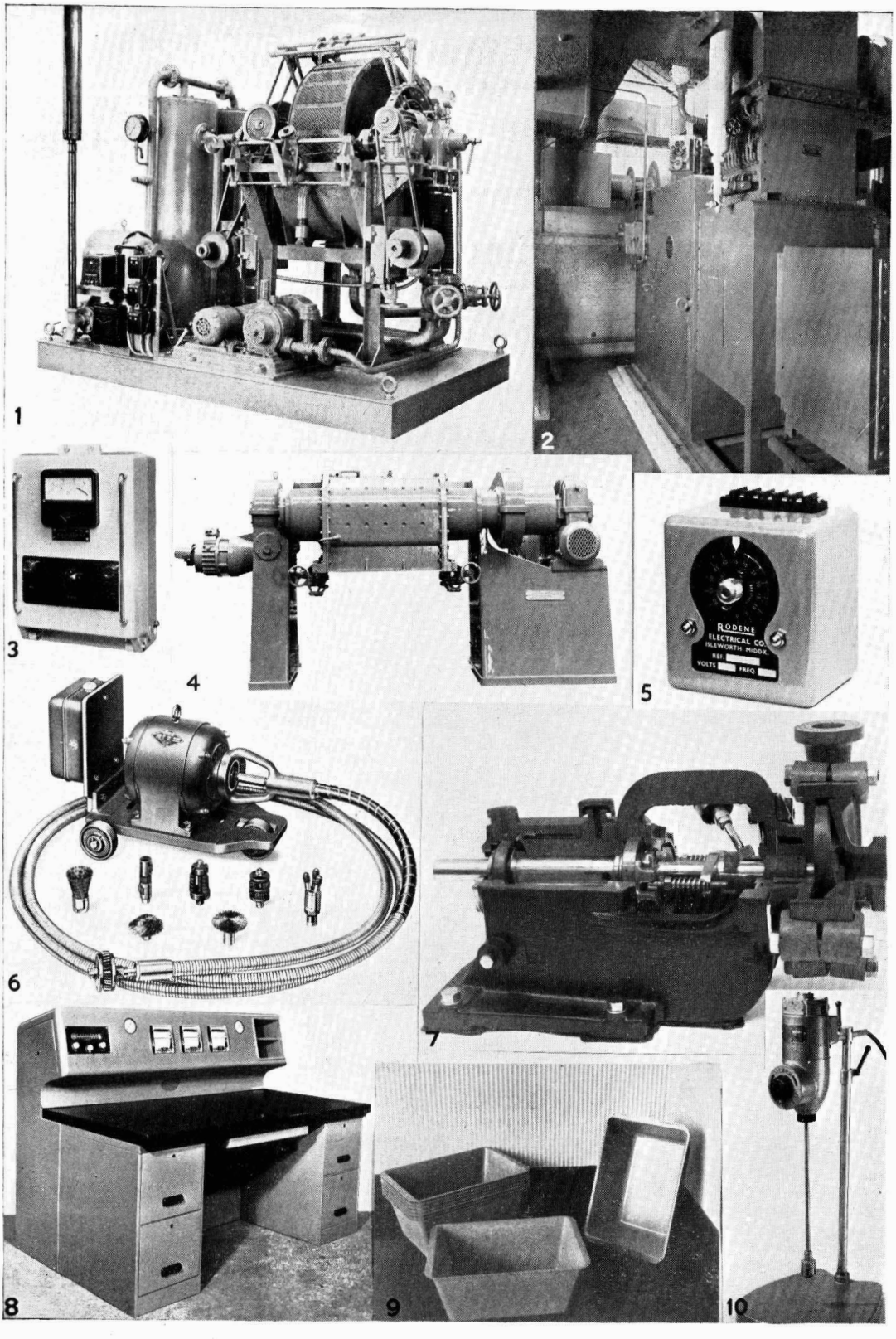
OF interest is the Paxman rotary vacuum filter, manufactured by DAVEY, PAXMAN & CO. LTD., COLCHESTER. This consists of a drum divided into a number of vacuum and pressure tight cells which are connected to ports in an automatic valvehead. The drum is clothed with a filter medium which may be cloth, gauze, synthetic fibre material, etc. The valvehead is divided into a number of ports which control the filtration cycle. The drum is arranged to rotate partly submerged in the slurry to be filtered, and the speed of rotation varies according to the material filtered. The application of vacuum to the internal cells of the drum causes the solids in the slurry to be drawn against the filtering medium on the periphery of the drum, the filtrate passing through the medium into the cells, and through the valvehead to a filtrate receiver tank. The vacuum continues to be applied to the cells as they leave the filter trough, with the result that moisture is being removed from the filter cake, and this can then be discharged by means of a scraper knife, a doctor roll, string discharge or other means. This process is continuous and may include washing of the filter cake if required.

Paxman filters are used for the filtration of froth flotation fines, flocculated coal slurries, chemical slurries, food products, paper pulp, effluents, lime sludges and other materials. The filters can be made in cast iron, mild steel, stainless steel, rubber lined and other materials of construction.

A PORTABLE stirrer developed by KESTNER EVAPORATOR & ENGINEERING CO. LTD., LONDON, is fitted with twin shafts, both being driven by a common motor through a suitable gear box. Each shaft carries one or more propellers rotating in the same direction. This arrangement has three main advantages. Firstly, the number of zones of agitation is increased. Secondly, each zone operates in opposition to the next, so causing a more efficient and overall degree of agitation. Thirdly, mass rotation of the liquid experienced when a single shaft is employed without baffles, is eliminated. The angle of the stirrer shaft can be adjusted and the complete unit easily removed for use on other vessels; the total weight of approximately 80 lb. makes the unit truly portable. Each shaft is held by a quick action collet chuck which enables the length to be adjusted to a maximum of 5 ft. 6 in. The position of the propellers can be adjusted. Fitted with a ½ h.p., totally enclosed motor and gear box, this stirrer will give a high degree of agitation in up to 100 gallons of a fluid having a viscosity of eight poises and a specific gravity of 1.8, and mild agitation in up to 200 gallons.

A new Kestner special side entry type stirrer, is a development of the conventional unit which has been employed for many years for the agitation of fluids contained particularly in deep tanks or vessels under pressure or vacuum. A special bearing assembly is employed which allows the propeller shaft to be moved forward by hand while not rotating and locked in position to form a seal which prevents the escape of fluid held in the

1 Rotary vacuum filter (Davey, Paxman & Co. Ltd.); 2 Direct dehumidifier—model CHK (Birlec Ltd.); 3 Nucleonic level indicator (Baldwin Instrument Co. Ltd.); 4 Mixing machine (Baker, Perkins Ltd.); 5 Self-resetting process timer (D. Robinson & Co.); 6 Tube descaler (Flexible Domer (Gilman) Ltd.); 7 Flooded suction pump—model DZT (British LaBour Pump Co. Ltd); 8 Control desk (Foxboro Yoxall Ltd.); 9 Glass fibre reinforced work baskets (Universal Metal Products Ltd.); 10 Laboratory mixer (Premier Mills Ltd.)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mixing vessel. This feature allows the stuffing box to be repacked without the need for draining the mixing vessel of its contents. An extra deep stuffing box is provided with grease feed to lantern rings and also a flushing connection. Quantities of up to 20,000 gallons or more may be handled with these units depending upon the viscosity of the fluid which is to be agitated and the degree of agitation required.

SPECIALIST in heat transfer equipment for the chemical, oil and other industries with emphasis on extended surface is BROWN FINTUBE (GREAT BRITAIN) LTD., BIRMINGHAM. Now being used extensively in many varying applications in both the chemical and oil industries is the LEC2005RR Hairpin type extended surface heat exchanger, 17 sq. ft. The shell assembly can be manufactured from carbon steel and stainless steel, and the inner elements can be manufactured from carbon steel, admiralty brass, aluminium brass, aluminium and stainless steel. This type of exchanger is manufactured in 5, 10, 15, 20 and 30 ft. lengths and can be banked together into any required number of parallel streams to suit any application. The streams can be changed in accordance with the process requirement.

OF entirely new design is the Panorama welding helmet marketed by PANORAMA EQUIPMENT LTD., LONDON. The helmet has a flip front glass holder which allows quick observation of work without raising the helmet. A ratchet adjustable cushion headband allows instant fitting to all head sizes and there is a three-position adjustable chin rest. These new features, combined with a moulded one-piece fibre shell, have produced a helmet which is light in weight, comfortable and completely proof against light leaks, side flashes, etc.

Heating & Maintenance

THE packaged boiler is considered to be ideally suited to the chemical industry. Recently, G. W. B. FURNACES LTD., DUDLEY, WORCESTERSHIRE, has installed a powermaster packaged automatic boiler at Sandoz Products Ltd., of Bradford. This works specialises in the production of dyes, bleaches, detergents and similar materials for textile applications. The steam demands of this type of plant are therefore subject to considerable fluctuations. Since the firing system of the new boiler is subject to fully modulating control, violent fluctuations in steam are easily catered for. Thus, from 20-100 per cent boiler capacity the correct fuel/air ratios are maintained giving consistent operating efficiencies of over 80 per cent.

The boiler sent to the customer only requires to be connected to fuel, water steam and electricity lines. Model 200 is capable of a maximum steam output of 6,900 lb./hr. F and A 212°F. It occupies a floor space 18 ft. 3 in. long by 8 ft. wide. Apart from providing process steam in works and laboratories, the boiler caters for space heating in offices, stores, laboratories etc. The pressure is then reduced to 10 and 15 p.s.i. Feed water to the boiler comprises approximately 60 per cent condense return, the rest coming from the mains. All types of fuel may be used for firing the powermaster range of boilers. The model 200 fires on 950 secs. viscosity oil, this oil being maintained by means of steam heated coils at a temperature of 90-100° F, while a built-in preheater on the boiler itself raises the temperature still further to the optimum for atomisation which is 150°F.

BASIC feature of patent 637943 taken out by CHAMBERLAIN INDUSTRIES LTD., LONDON, for its small hand-operated tube bending machine type TRU/1), is the method employed in securing the tube during bending to prevent slipping and at the same time gripping the minimum of tube. The result permits close set bends which are necessary when bending tubes to fit around piers and projections.

The Staffa bender is capable of bending light gauge ferrous and non-ferrous tubes of up to 1¼ in. diameter and steam and gas tube up to ¾ in n.b. The forming of tube is by compression bending over an accurately machined centre forming die and slipper. The throat ratio of the bend is equal to 3 × diameter, and bends of up to 180° can be produced cold and unloaded and free from flattening and wrinkling. Change-over from right to left in bending direction can be carried out in a matter of seconds when the bending arm is returned to its pre-bending position a device automatically ensures the correct angle of lead prior to the next bend.

The bender can be mounted on bench, vice or bipod.

STAINLESS STEEL bellows with a wide variety of applications in the chemical, Diesel, steam plant, petrol refining, atomic energy and marine industries are produced at TEDDINGTON AIRCRAFT CONTROLS' recently formed industrial bellows section.

The bellows are made from highly finished cold, rolled sheet (avoiding the unequal stress characteristics of lap-welded tube) of uniform thickness with internal diameters ranging from one inch to 84 in. and which can stand temperatures up to 800°C. They are said to have proved particularly effective for exhaust connections, expansion joints and wherever a corrosion or temperature resistant flexible connection is required.

Annual Review of Plant

OF entirely new design is the unit steam trap which has just been added to the range of Lancaster steam traps made by LANCASTER & TONGE LTD., PENDLETON, MANCHESTER. It is an inverted bucket trap with a double leverage action, which enables large diameter seatings to be used, thus giving a large capacity to size ratio. It is suitable for pressures up to 200 p.s.i. saturated, and will lift its condensate. All internal parts are made of stainless steel (copper float excepted) and the unit can be examined and cleaned without breaking pipe joints. The unit is, at present, available in ¾ in. and 1 in. sizes, but a ½ in. size should be available shortly. The ¾ in. and 1 in. size weighs 7 lb. and can be suspended on the pipeline. The ½ in. trap will weigh 4 lb. All traps are steam tested to working pressure and hydraulically tested to 400 p.s.i.

MUCH of the range of equipment designed by FLEXIBLE DRIVES (GILMANS) LTD., SMETHWICK, for descaling boilers, economisers, or other tubular installations, was being shown at the recent Fuel Efficiency Exhibition. Two main types of tube descalers were being exhibited: those incorporating the use of a flexible drive, driven by either compressed air or an electric motor, or the air-turbine type tube cleaners which are inserted into the tubes themselves. This latter type is of particular interest to petroleum refineries, power stations, chemical plants or any installation where spark risk must be avoided.

MODELS illustrating applied fuel economy in some of the principal power stations and works of IMPERIAL CHEMICAL INDUSTRIES LTD. were among the company's exhibits at the Fuel Efficiency Exhibition. ICI products and processes contributing to fuel efficiency were on show. These included Alfloc water treatment

and Equipment

methods for preventing the formation of scale, and chlorine manufactured by General Chemicals Division for the prevention of slime in steam condensers and process coolers. Pioneer insulating plaster board was used to illustrate the theme 'Fuel economy in a fertiliser factory.'

The Metals Division of the company showed the contributions made by various of its wrought non-ferrous metal products, including plain and integral finned heat exchange tubes and aluminium integral heat transfer sheets, while Marston Excelsior Ltd., an ICI subsidiary, displayed heat exchangers. Reference was also made to a number of other ICI products which are being used to achieve fuel efficiency in some form or other.

PERMANENT protection for insulation is provided by Corrosheath jacketing aluminium which is thin sheet aluminium, cross-corrugated to give strength and to facilitate handling. It is supplied by CORROSHEATH LTD., LONDON, in rolls, plain or backed with an asphaltic moisture barrier. The jacketing is easily cut to the required size on the spot and is fitted on any size of pipe; fixing is by means of aluminium bands and seals. The jacketing can be removed and re-installed with ease. Where insulation may be alkaline, jacketing with factory attached moisture barrier to prevent corrosion may be used.

Laboratory Equipment

THREE-TIER laboratory ball mills are obtainable from the PASCALL ENGINEERING CO. LTD., CRAWLEY, SUSSEX. Known as the No. 6 model, three pairs of 2½ in. diameter rolls are mounted one above the other in three tiers. Each pair consists of one driven roll and one idler roll. The idler can be placed in any of three positions to accommodate containers up to 9 in. diameter. The rolls are of hard white rubber bonded to steel spindles and are accurately centred and ground concentric with the journals. Each pair of rolls can accommodate pots of the following capacities:—two 1-gallon or three ½-gallon or four ¼-gallon or four 2-pint or five 1-pint. Various sizes of pots can be set up on the rolls such as two 1-gallon, three ½-gallon and four 2-pint, that is a total of nine pots. A separate drive is provided to each pair of rolls so that one, two or three tiers can be operated as required. The three motors are ¼ h.p. wound for 200/220 or 230/250 volts, single phase, 50 cycles, a.c. supply. The driven rolls can be operated at 132, 190 or 277 r.p.m. The main frame of the mill is fabricated from rolled steel angle and plate and all bearings apart from those fitted to the motors are self-lubricating.

A HUMIDITY OVEN for moderate test conditions has been displayed by A. GALLENKAMP & CO. LTD., LONDON. With a capacity of 6 cu. ft., the oven can be used over a temperature range of ambient or slightly below to 50°C. It has a sturdy, enamelled steel case with tinned copper liner and the door is closed by a roller bolt catch. The makers claim that there is rapid recovery of temperature and humidity after opening the door which is air-tight to give good humidity control. Air circulation is maintained by a centrifugal fan driven by an induction motor mounted at the back of the oven. Air is circulated through ducts at the top and bottom and a removable tray is fitted in the bottom duct for containing salt solutions, over and under which the air passes at high velocity. Heating is by means of a tubular element mounted near the fan. Electrical controls, which are fitted to the bottom front panel, consist of mains and heater indicator lights, a mains fuse and a door heater switch. Automatic control is available as an optional extra. The makers state that a rigorous specification of all parts ensures high performance and excellent reliability.

UNIQUE FEATURES of the Premier laboratory mixer, Model 1300 developed by PREMIER COLLOID MILLS LTD., WALTON-ON-THAMES, are the high-speed turbine type head and the Premier dispersator. The latter gives results comparable to intricate high-speed machines relying on ultrasonic vibrations. Apart from conventional mixing and agitating, the unit can be used for emulsifying, dispensing, melting, pigmenting, reacting, dissolving, etc. The dispersator, considered the best type of mixing head for general use, can be replaced by a marine-type propeller for gentle agitation, or a small cage-type beater for mixing thicker products. The motor is 1/30th h.p., maximum speed 4,000 r.p.m.

Also new to this company's range of mixers is the Premier multipurpose colloid mill, model 3000. Occupying some three sq. ft. of bench space, this mill is a universal machine for the small manufacturer and can be used for producing small special orders in larger organisations. It also has applications in the laboratory as the results obtained can be duplicated on a works scale. The mill can be supplied either with flat abrasive (carborundum) stones, three in. in diameter for dispersing and grinding, or flat stainless steel working surfaces for emulsification. The unit is belt driven and speeds of up to 12,000 r.p.m. can be obtained when using stainless steel working surfaces and up to 8,000 r.p.m. using abrasive stones. The hopper has a capacity of seven pints (four litres). The outlet is of stainless steel construction. Output is of the order of 60/300 lb. per hour, depending on viscosity of material, clearance and type of working surface used.

Handling Equipment

A POLYTHENE bin with a capacity of 10 gallons has been added to the BEX range of products. Made by the Halex Division of BRITISH XYLONITE CO. LTD., it should be ideal for a wide number of industrial purposes.

The lid fits closely on the rim of the body, which is curved over to provide an all-round grip for easy lifting. Unaffected by acids, alkalis, water and all chemicals (except some fats and oils) it is moulded in one piece, eliminating seepage through seams. The manufacturers claim that it will neither rust nor corrode, and the absence of hard, sharp edges reduces the likelihood of damage to floors or woodwork, even when it is full.

Measurements are 21 in. deep (18⅝ in. without lid) 15⅜ in. inside diameter.

POLYTHENE snap-on caps for sealing glass vials are one of the latest additions to the range of injection moulded thermoplastic closures marketed by THE METAL BOX CO. LTD., LONDON. The cap, which is attractive in appearance, is stated to give a first-rate seal and it is easy to snap on or remove, because of the flexibility of polythene. An aluminium tear-off seal can be fitted over the polythene cap giving tamper-proof protection to the container until it has been opened. The polythene cap can be used with or without the metal overseal, as the contents of the vial would still be protected. Closing machinery has been developed to close the overseal.

The snap-on cap is used mainly for medical powders, tablets, pills, capsules etc. However, it is also suitable for packaging certain liquids, and it is

Plant Review

now being tested as a seal for that purpose.

PLASTIC work baskets made from glass-fibre reinforced plastic material, are moulded by UNIVERSAL METAL PRODUCTS LTD., SALFORD. They are being used by a number of firms for handling work in progress. The advantages of these containers are said to be their toughness and wearability and their light weight. They can easily be stacked, and the corners are radiused to facilitate cleaning, an important factor when used for handling precision products. Each container measures 17 in. by 13 in. by 7 in. deep.

Control Equipment

A SELF-RESETTING PROCESS-TIMER (or synchronous time delay unit), Type 2500, has recently been added to the Rodene range of timers, distributed by D. ROBINSON & CO., HARLOW, ESSEX. The dial only has to be handled, it is stated, when presetting a new timed period, as the unit automatically resets when the mains are disconnected. The output switch (rating, 5 amps.) has a change-over action which allows the controlled circuit to be made either for the timed period or from the end of the timed period and until the mains are switched off. A new motor, the Rodene Type 2000, is incorporated in the timer. It is also supplied separately for driving recorder charts etc. The Type 2500 timer occupies about 4 in. cube.

A SHIFT manager's control desk has been designed by FOXBORO-YOXALL, LTD., LONDON, for ICI's plant at Billingham. It is designed to focus at one point the critical measurements which the shift manager requires to have under his eye at all times. In the centre of the panel, over the desk proper, three Foxboro Consotrol 2-pen recorders provide a continuous record of six critical measurements. These Consotrol recorders are so grouped that the six records can be comfortably seen with a single glance. On the left of the desk is an F/M radio receiver which provides up to the minute weather forecasts, since weather conditions may have an important bearing on the operation of plants which use large amounts of cooling water or are affected by extreme changes of temperature. The desk is provided with four deep, lockable drawers so that shift managers may each have a place to leave their personal equipment in safety.

TWO NEW thermostats, the TQP water thermostat and the FSI flue thermostat, have been introduced recently by SUNVIC CONTROLS LTD., HARLOW, ESSEX. Although developed particularly for the control of automatically fired boilers, these thermostats are suited for many and varied temperature control applications.

The TQP thermostat is said to satisfy the need for a simple and robust control device providing a change-over switch facility. The scale is clearly marked in °F (range, 70° F to 190° F, temperature differential, 7° F to 12° F) and the instrument is easily set to the required operating temperature. The setting is not affected by the position in which the TQP is mounted.

The FSI also features change-over contacts which in this case are operated from a bimetal helix via a clutch. The use of the clutch ensures that the contacts change on a rise or fall of approximately 50° F at any flue gas temperature. The maximum operating temperature is 750° F and the maximum permissible temperature is 1,000° F.

FOR use with oil burners of the high and low flame type, a range of adjustable by-pass oil valves has been developed by BLACK AUTOMATIC CONTROLS LTD., CORSHAM, WILTS. These by-pass valves are of three types: (a) with adjustable minimum opening position set by means of a screwed stop and lock nut; (b) having stable calibrated adjustment of minimum opening position (in small sizes only); (c) metering valves with adjustment for both high and low flame settings and (d) re-circulating by-pass valves specially designed for packaged boiler units.

The company is also developing a range of pressure switches. Their outstanding feature is the use of a small, neat microswitch which is nevertheless capable of handling adequate control current. The pressure switches are of the diaphragm type and are available in various pressure ranges. They are provided with full adjustment over their respective pressure ranges, differentials being factory set as required.

In addition the company is developing other items for the growing field of automatic control, including diaphragm and differential piston valves and miniature solenoid valves.

Air Conditioning

SPECIALISTS in air conditioning and dehumidification plant are BIRLEC LTD., BIRMINGHAM. The available range of standard Birlec air conditioning equipment is comprehensive, ranging from small units such as the BE40 and CHE units which are suitable for conditioning small rooms with two and six occupants respectively, to the CHX direct dehumidifier, the largest unit, which is used for rooms having several hundred occupants and extensive processing machinery.

Birlec laboratory lectrodryers, of both low and high pressure designs may be used when a supply of dry air or gas is required in laboratory work e.g., humidity control in drying cabinets, prevention of condensation in cooling chambers, drying out vessels and tubing, removal of oxidising moisture from furnace atmospheres etc.

IMPROVEMENTS have been made in the Crosby Mason Neilan No. 74 air set by CROSBY VALVE & ENGINEERING CO. LTD., WEMBLEY, MIDDLESEX. The air set includes a 50 micron ceramic cartridge type filter, a tight shut off reducing valve and a relief valve. It is claimed that the instrument will provide a stable air output despite fluctuations of supply or demand. The filter element can be replaced by undoing one bolt and nut. Light alloy and steel have been eliminated from the all-brass body, which is rated at 250 p.s.i.

A DEVICE for increasing the average size of finely suspended mists or dusts to facilitate their efficient removal by classic methods has been developed by the BRITISH CECA CO. LTD., LONDON. It is known as the aero jet venturi and is an effective wet scrubbing system, capable of dealing with the finest particles of noxious gases. Because of its simplicity it would appear to have marked advantages over the alternative systems of electro-static and ultrasonic precipitation. Initial outlay for installation is low and in many instances cyclones and filters hitherto operating with low efficiency can be re-utilised. Using various solutions and liquors it is possible with an aero jet venturi to scrub out soluble vapours and fumes from gas streams. The equipment requires little space for installation. Total power requirements are usually of the order of 1.7 h.p. per 600 c.f.m. of gas treated.

SLTC ANNUAL GENERAL MEETING

Papers Presented at Leeds Conference

THE ANNUAL general meeting and conference of the Society of Leather Trades' Chemists was held on Friday and Saturday 21 and 22 September at Leeds University. On the first day Dr. G. W. Kenner delivered the seventh Procter Memorial Lecture on 'The Present and Future Scope of Peptide Synthesis'. Following this came the annual general meeting of the Society, and among the items considered was the adoption of the revised Official Methods of Analysis. These will be available in book form in the near future.

During the meeting the following papers were presented: 'Some Further Electron Microscope Researches' by Professor D. Burton and Dr. R. Reed; 'The Tanning Characteristics of Aliphatic Aldehyde-Ketone Resins' by J. R. B. Hastings and Dr. T. White ; 'New Light on the Mechanism of Liming and Bating' by Dr. G. H. Green ; 'Some Investigations into the Rate of Tannage of Sole Leather' by N. L. Holmes and Dr. H. G. Wollenberg ; and 'Some Experiments on the Impregnation of Sole Leathers' by J. M. Harrison and T. Turner. Summaries of these papers are given below.

IN RECENT years, great advances have been made in the analytical and structural chemistry of proteins and the question must be asked whether synthesis will keep pace. No deep and rapid incursion into this field should be expected, but progress in two directions is discernible. Oligopeptides containing some ten amino-acid residues arranged in a definite sequence can now be constructed from most, if not all, of the amino-acids which occur in proteins; the chief interest in such compounds has lain in their relation to hormones and antibiotics, but they may also prove useful as models in studies of protein reactions. Many polypeptides have been synthesised from single amino-acids and the possibility of repeating many times a given short sequence is now apparent.

Defined Structure

For building oligopeptides of defined structure we still rely fundamentally on the approach made by M. Bergmann, namely protection of the terminal amino group of an amino-acid or peptide, while the terminal carboxyl group is condensed with the amino group of another section of the peptide chain. However, the actual range of methods is now much greater than was available to Bergmann. In addition to his carbobenzoxy protecting group we now have the tosyl, phthaloyl, and trityl groups to name only the most important, and in addition to the azide method of condensation there are those methods relying on various mixed anhydrides, cyanomethyl esters, thiolesters, derivatives of trivalent phosphorus, and carbodiimides. The power of these methods has been amply demonstrated in the syntheses of oxytocin and related compounds by du Vigneaud and his colleagues as well as other groups of workers.

Polypeptides have been synthesised from the N-carboxyanhydrides of amino-acids, but this method is not applicable to the production of material containing more than one amino-acid and having a defined structure. For this purpose some of the methods used in the synthesis of oligopeptides can be adapted, but there are many problems in securing reasonable yields of material with a high molecular weight. Nevertheless progress along these lines can be confidently expected.

Electron Microscope Researches

STRUCTURAL changes in tanned collagen fibrils during shrinkage in hot water were described. First the fibrils swell either at certain regions along their length or at their ends. The bands across the fibrils become fainter in the swollen regions and, significantly, become much closer together. At the same time the swollen portions flatten and assume a peculiar spiral form. This initial swelling is usually observed at a temperature below that of macro-shrinkage, i.e. below that of a strip of leather as determined in the usual apparatus. Moreover, the fibrils in any particular sample of leather do not all swell and shrink at the same rate.

Stubby Structures

On raising the temperature, the swollen fibrils break across to form short, stubby structures, which on prolonged heating are reduced to ill-defined masses of glue-like material. These changes appear to take place with all the leathers so far examined, but are best illustrated in the case of chrome and oil-tanned leathers where the fibrils are not obscured by the presence of amorphous material such as vegetable tannin.

On the basis of these results suggestions were put forward for the structure of the native collagen fibril, its stabilisation by tannage and its shrinkage by hot water.

Aliphatic Aldehyde-Ketone Resins

THE alkali-catalysed reaction between aliphatic aldehydes and ketones provides condensates which can be resinified by further treatment with alkali. This provides the basis for a process of resin tannage consisting of:

(i) impregnating hide with a suitable condensate.

(ii) Resinifying the condensate *in situ* by alkali treatment. The method gives a range of light leathers, pale cream to yellow in colour, having shrinkage temperatures raised as much as 14° C, and containing up to 20 per cent of resin.

Conventional methods of tannage can be applied if the condensates are converted to water-soluble resins containing sulphonic acid groups by treatment with alkali sulphites or bisulphites. Tannage with these products gives a range of light leathers, cream to orange in colour, having shrinkage temperatures raised as much as 5° C, and having a degree of tannage of up to 60.

The analysis of such solubilised resins by the Official Method gives unreliable results. This can be shown by varying the time of contact with hide powder, the ratio of resin to hide powder, and the extent of acidification of the analytical solution. Like other sulphonated materials, these solubilised resins leach inorganic salt from the hide powder—a feature that can introduce as much as five per cent error into the tannin estimation.

The role of the sulphonate group in these solubilised aldehyde-ketone resins is discussed in relation to the results presented, and to published data on analogous sulphonated tanning materials. It is suggested that the products may have a certain potential value if used in conjunction with other tanning materials.

Mechanism of Liming and Bating

THE MAIN function of bating is to reduce the tendency of the leather fibres to stick together on drying. A similar effect is obtained by drying the leather under tension or with acetone. With some skins, bating can be completely replaced by scudding. A skin re-limed after bating or scudding requires to be re-bated. Bating is effective at a low temperature providing the skins are pre-heated, e.g. to 40° C for calf and 45° C for goatskin. On the basis of this evidence the following scheme is proposed:

$$\text{Intact collagen} \xrightarrow{\text{lime}} \text{progelatin} \xrightarrow{\text{heat}} \text{gelatin} \xrightarrow{\text{trypsin}} \text{low molecular weight peptides}$$

SLTC Meeting

Progelatin consists of filamented collagen fibrils. Liming, or other swelling treatment, causes splitting-up of the fibre bundles with the formation of progelatin on the newly formed fibre surfaces. The polar nature of progelatin causes it to act as a glue when the fibres are dried, thus nullifying the beneficial splitting action of the lime. Alkali causes hydrolysis of the amide groups and rapid lowering of the iso-electric point to about *p*H 5.0. This accounts for the partially plumped condition of limed pelt delimed to *p*H 8-9. Removal of progelatin restores the iso-electric point and causes 'falling', development of flaccidity, scud loosening, air-permeability, and, to some extent, silkiness of the grain of the pelt. The main cause of silkiness is, however, loss of occluded particles of calcium carbonate.

Very little progelatin is produced, but in bating a relatively large amount of intact collagen is also attacked. Reliming after bating, but not after scudding, causes serious loss of substance (progelatin formation) due to the bating enzymes assisting the action of the lime.

The optimum *p*H for bating coincides with the optimum for gelatinase activity, and bating power is directly related to gelatinase activity.

Rate of Tannage of Sole Leather

THE EFFECT of temperature on the rate of tanning of sole leather has been investigated in two liquors of different strengths, and with respect to pelt of three levels of compactness.

Rate of tannage was followed by the non-destructive method of weighing pieces of pelt/leather in the liquors in which tanning was proceeding. Four temperature levels were used, 8°C, 18°C, 28°C and 38°C. Increase of weight in liquor was taken as being proportional to tanning matter uptake. Tanning was still proceeding when the experiment was concluded at 56 days though at a slow rate. The total uptake of tannin matter was determined by analysing the air dry leathers. Rates of tanning were characterised by the time taken to absorb 0.5, 0.75 and 0.875 of the maximum tanning matter for each piece. Generally speaking, total tannin uptake increases with increasing temperature as does rate of uptake.

Relative rates of tanning for the less dense fore-end pelt, for the average pelt comprising most of the butt and for the densest part over the kidneys, were obtained at each temperature. Virtually complete liquor equilibrium was always attained and differences in total tannin taken up were due to tannin removed from solution under the conditions of the experiments. Degrees of tannage at near equilibrium were calculated for each piece of leather tanned, by two methods. One method made use of the analytical data as referred to the wet leather. From a knowledge of free water in the wet leather, a division of the total tanning matter into fixed tannin and that corresponding to the interfibrillary liquor was made and a degree of tannage figure obtained. The other method was based on the assumption that when the wet leather was weighed in the corresponding liquor, the weight obtained related only to the extent to which hide substance, bound water and fixed tannin were heavier in density than the liquor in question, and that the interfibrillary liquor was weightless. Degrees of tannage obtained by the two methods were substantially in agreement.

Impregnation of Sole Leathers

THE competition from synthetic soling materials makes it necessary for tanners to improve the abrasion resistance and water repellence of sole leathers, as these are the most important characteristics claimed by the manufacturers of composition soling material.

It has been suggested that the introduction of polymeric materials into leather will improve its properties, and the purpose of this paper was to report the results obtained in a number of laboratory scale experiments carried out with this object in view.

The methods of applying polymers may be classed under three headings: (a) from aqueous emulsions, (b) from solvent solutions, (c) by polymerising monomers *in situ*.

Aqueous Emulsions

The application from aqueous emulsions depends upon such factors as the nature of the tannage, the *p*H stability of the emulsion, the particle size of the polymer etc., and it is necessary to find the optimum conditions for each type of tannage.

Impregnation from solvent solutions can be achieved provided that the polymer is of suitable molecular weight and viscosity. Difficulties associated with this method of application are those of solvent recovery and fire risk. The extent of the deposition depends upon the available air space which is determined by the nature of the fibre structure.

Many of the monomers, which, on polymerisation, would give the type of elastomer required, are very volatile, and this has been one of the difficulties in this phase of the work. One *in situ* method of polymerisation has been developed which gives a leather with much improved properties.

Analytical data and physical tests on some of the experimental leathers were presented.

Fertiliser Shortage

Hungary May Overcome by New Process

ALTHOUGH fertiliser production has trebled in the past 11 years, Hungary is still short of fertilisers. It is hoped, however, that a new and cheaper artificial fertiliser manufacturing process, using nitric acid instead of sulphuric acid, which Hungary has to import, may overcome this shortage. Laboratory experiments have shown that the new fertiliser contains about 40 per cent of active agent, a much higher concentration, it is claimed, than is to be found in the 'traditional' fertilisers. Also, it is stated that Nifosz can be stored for 'several years' without absorption of moisture. All by-products of the manufacturing process can be utilised, it is reported. Lime can be made from one by-product and cryolite, now imported for use in the aluminium industry, is prepared from another.

Production of Nifosz has already started at the Pét nitrogen works and it is planned to build a 10,000 ton capacity plant for the new fertiliser at the new Borsod chemical works. It is also proposed that the Tiszapalkonya Chemical Combine, which will mainly supply basic materials for the Hungarian plastics industry, will also produce 15,000 tons of Nifosz.

Norwegian Ilmenite Deposits

DISCOVERY of new deposits of ilmenite ore with a high titanium content has recently been reported by the most important Norwegian producer of titanium oxide. The deposits are located in the Jossing-fjord on the west coast and are estimated to contain over 100 million tons of ore. Most of the ilmenite is accessible for open-pit burning. The company now plan to increase its annual production of ilmenite concentrate from 160 thousand tons to about 200 thousand tons. Norway supplies about 16 per cent of the total world production. Norwegian ilmenite concentrate contains 45-55 per cent of titanium dioxide.

by
Peter Pain M.A.

Restrictive Trade Practices

THE MACHINERY OF REGISTRATION

MY FIRST article dealt with the types of agreement which have to be registered under the terms of the Restrictive Trade Practices Act. I shall explain what has to be done about agreements which are registrable, and the machinery which is being established on the official side to deal with them. Later I shall consider the very pertinent question of what happens to the parties to a registrable agreement if they do not register it.

King-pin is the Registrar of Restrictive Trading Agreements. He has been appointed and is now building up his official structure. His first function is the keeping of the register. This will be a public document and will be open to inspection. It will be possible to obtain certified copies from the registrar upon payment of the appropriate fee, as is the case with other public registers.

Secret Section

Provision is made for a secret section of the register in which will be included particulars giving information, publication of which would be contrary to the public interest. It will also contain particulars of any secret process of manufacture; the presence, absence or situation of any mineral or other deposits; or any other similar matter, being information which, in the opinion of the Board of Trade (not the registrar) could not be published without substantially damaging the legitimate business interests of any person.

Presenting Agreements

Second function of the registrar is to present agreements to the Restrictive Practices Court. It appears from the Act that the registrar must present every registered agreement to the Court. He is left a discretion, subject to direction from the Board of Trade, as to the order in which he will present agreements. He will be represented before the Court and will presumably be prepared to argue either for or against an agreement in accordance with the view which he takes of it. He is specifically given power to consult the Law Officers of the Crown—no doubt he will require their assistance during the early years. When the Restrictive Practices Court has made a declaration or order, the registrar must cause notice of it to be entered in the register.

Particulars of the agreement must contain the names of the parties to the agreement and the whole of the terms of the agreement, whether or not these relate to the restrictions which make registration necessary. The original of the written agreement must be produced.

The Act says nothing as to which party to such an agreement must furnish the particulars. It is sufficient if they are furnished by one party. A party who fails to furnish particulars does not commit any offence, until official action is taken as mentioned below. A variation of an agreement must be notified in the same way as the original agreement.

Penalties

Powers to Obtain Information.—If the registrar has reasonable cause to believe that a person carrying on business in the UK in the production, supply or processing of goods, or a trade association with members carrying on such business is or may be a party to a registrable agreement, he can require notification to be given within a specified time whether the person or association is a party to any agreement containing any of the specified restrictions (set out in my first article) and if so to furnish the particulars required by the notice. It is an offence not to comply with such a notice without reasonable excuse; the penalty is trifling compared with the magnitude of the matters that may be covered—a maximum fine of £100 and £10 per day for which the offence continues.

The registrar can apply to the High Court for an order requiring the person on whom the notice was served to attend for examination with regard to the matters specified in the notice. A regular hearing will then take place at which both the registrar and the party summoned may be represented.

Notes on the examination must be taken down in writing and read over to or by the person examined and signed by him; they can thereafter be used in evidence against him. The Court can require the person examined to produce any particulars, documents and information in his possession or control, provided these were mentioned in the original notice served by the registrar. In the case of a limited company, any company official may be examined in this way.

Within a Specified Time

Where default is made in furnishing particulars, the High Court can authorise the registrar to treat such information as he has as particulars and to register these. The Court can also order the party to supply the information within a specified time. Failure to do so will be contempt of court. The Court may also declare such an agreement to be invalid and restrain the parties from giving effect thereto. In this way a body refusing to register may have its agreements invalidated, without the benefit of the judicial inquiry which would otherwise take place before the Restrictive Practices

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TITANIUM DIOXIDE & SILICA

Reduction by Calcium Hydride

REDUCTION of titanium dioxide and of silica by calcium hydride is described by Michel Bichara in *Annales de Chimie*, 3rd Series, 1956, Vol. I (May-June), 399 (paper in French). Firstly the conditions for reduction of titanium dioxide to titanium metal or hydride have been determined. A radio crystallographic study of TiH completes this section. The reduction of silica is then described, and the calcium-silicon mixtures formed are specified. Various secondary reactions which occur have been studied in detail. Lastly, the reduction of titanium dioxide by calcium silicides was studied and also the titanium silicides which result.

The action of calcium hydride on titanium dioxide establishes the possibility of obtaining very pure titanium. Thus a mixture maintained at 900°C for 15 minutes, then cooled under vacuum gives, after washing with acetic acid, a grey, very fine powder containing 99.5 per cent titanium. (In a study of the formation of the hydride, it was found that temperature, purity of the products used and previous treatment of the metal were important. The absorption of hydrogen liberated by dissociation of calcium hydride, using freshly reduced titanium, reached a maximum limit corresponding to TiH_2).

Reduction is Complex

The reduction of silica by calcium hydride is complex. Besides the formation of silicon, other reactions occur: (1) the interaction between silicon and calcium hydride to form calcium silicides, (2) the formation of $2CaO, SiO_2$, refractory to reduction as well as oxides of silica and by the action of calcium silicides on silica. With regard to the nature and composition of the final product the molecular ratio, CaH_2/SiO_2 is the determining factor, states Bichara. With the ratio, $CaH_2/SiO_2 = 1$, silicon is obtained. By progressively augmenting the proportion of hydride, the silicides, $CaSi_2$, Ca Si and Ca_2Si result.

Suggested Uses

Calcium silicides fix free oxygen to give calcium silicate and free silicon. Ca Si is oxidised directly,

$$2\,CaSi_2 + 2\,O_2 \rightarrow 2\,CaO, SiO_2 + 3\,Si$$

then Ca Si and Ca_2S change to the silicate through the intermediate $CaSi_2$.

$$4\,CaSi + O_2 \rightarrow 2\,CaSi_2 + 2\,CaO$$
$$4\,Ca_2Si + 3\,O_2 \rightarrow 2\,CaSi_2 + 6\,CaO$$

These silicides also combine with oxygen. This property, together with the compounds' reducing properties, is of particular interest. Thus, Ca Si reduces silica at a low temperature (950°C) and silicon of great purity is obtained. These notable chemical properties of calcium silicides suggested their use in the preparation of binary metallics of silicon. Used in the reduction of titanium dioxide, the three silicides are differentiated by the fixation of free oxygen. $CaSi_2$ reduces TiO_2 directly; Ca Si and $CaSi_2$ reduce it in two stages through the intermediate $CaSi_2$. Reduction of TiO_2 finally gives Si and Ti. For 3 atoms of silicon there are 2, 3 or 5 atoms of titanium according to whether reduction is by $CaSi_2$, Ca Si, or Ca_2Si. These two elements unite to form three binaries: Ti_5Si_3, Ti Si and $TiSi_2$. With $CaSi_2$ and Ca Si, free silicon is stated to be always present in the final product. On the other hand, using Ca_2Si in the ratio $Ca_2Si/TiO_2 = 4/5$ and at a temperature of 1,200°C, Ti_5Si_3 has been obtained in a pure state.

The conditions for the formation of titanium silicides were studied separately. These depend on the Ti/Si ratio and temperature. Ti_5Si_3 is formed first at 700°C. If the ratio is Ti/Si = 1/2, $TiSi_2$ appears at about 800°C. Its formation is complete at 1,200°C. For the ratio Ti/Si = 2/3, formation of Ti_5Si_3 increases with temperature and is complete at 1,200°C. For the ratio Ti/Si = 1, at 1,250°C, a new phase, probably Ti Si, is added to Ti_5Si_3 and $TiSi_2$.

The Restrictive Trade Practices Act

Court. It is noteworthy that the preliminary questions are all dealt with by the High Court; the Restrictive Practices Court does not become seised of an agreement, until the agreement is brought before it by the registrar.

Any person aggrieved by the inclusion of an agreement in the register and who wishes to contend that it is not registrable, may apply to the High Court for the rectification of the register.

There may also be doubts as to whether an agreement falls within the scope of the Act at all. In such a case, application may be made to the High Court for a declaration whether the agreement is within the Act or whether it falls within any order made by the Board of Trade as to registration.

Time Limits

In the normal case a party will probably wait until a notice has been served by the registrar requiring registration, before testing whether an agreement is registrable. There is no time limit within which an application for a declaration may be made. But a party who waits too long may find that the High Court, which always has a discretion as to whether it will grant a declaration or not, is not disposed to act.

The Board of Trade has power to authorise the registrar to remove from the register particulars of agreements which appear to be of no substantial economic significance.

It is an offence to make a false statement in connection with any registration or to alter, suppress or destroy any document. An official of a limited company may be made personally liable for any offence which has been committed with his consent or connivance, or through his neglect. It is also an offence to disclose any information obtained under the Act with respect to any trade or business without the consent of the person carrying on that trade or business, except for the purposes of the Act.

(to be continued)

by
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Fire Extinguishing by Chemical Agents

AT ONE time the scientific study of fire and its suppression was rather neglected. But during the last few years there has been much interest in the practical aspects of fire prevention and suppression and in the more fundamental problems involved. In this review it is proposed to deal with two types of fire extinguishing agent, namely, the vaporising liquid type and the dry powder type and to consider briefly the results of recent work undertaken in an attempt to find out how they function in suppressing flame.

It is well known that some of the halogenated methanes are valuable as vaporising liquid fire extinguishing agents. Recent developments include the testing of compounds such as trifluorobromomethane and tetrafluorodibromoethane which are said to be of low toxicity and high stability **(1)**. Tests have also demonstrated that chlorobromomethane is superior to carbon tetrachloride **(2)**. The effect of various halogenated methanes on the inflammability limits of n-hexane in air has been studied **(3)**. It has been found that the total inhibitory effect as assessed by the values for the limiting safe mixtures increases with increasing chlorine content in the series $CH_3Cl < CH_2Cl_2 < CHCl_3 < CCl_4$.

Calculations of Burning Velocities

Zentler-Gordon **(4)** from approximate calculations of burning velocities from flame heights, found that organic halides cause a reduction, with bromides more effective than iodides or chlorides. Burgoyne **(5)** has shown that methyl bromide reduces the burning velocities of methane/air and hydrogen/air mixtures and the reduction increases with further addition. Simmons and Wolfhard **(6)** have shown that methyl bromide reduces the burning velocity of ethylene/air mixtures. Garner, Long and Graham **(7)** have recently pointed out that the order of effectiveness of additives when present in mole percentages of less than 1 per cent in reducing the maximum burning velocity of propane/air mixtures is:

$$H_2O < HCl < CH_3Cl < CH_2Cl_2 < CHCl_3 < CCl_4 < CH_3I < CH_3Br < CH_2ClBr$$

The last three additives show a markedly higher inhibiting effect than that of the series of chlorinated methanes.

Additives might influence flame propagation in three ways by:

(1) altering the properties of the unburnt mixture so as to influence heat conduction or radical diffusion,
(2) altering the flame temperature,
(3) specific chemical inhibition of the combustion reactions.

It seems most unlikely that the very small concentrations of additive employed in the above work could have any appreciable influence upon the physical properties of the unburnt mixture. There is little information on the effect of small amounts of additives upon flame temperatures, but calculations by Simmons and Wolfhard **(6)** indicate that the flame temperatures of stoichiometric hydrocarbon/air flames are not greatly affected by the introduction of small amounts of bromine.

It appears that the halogenated methanes exert a specific chemical inhibition of the flame reactions. This supports the conclusions of Burden, Burgoyne and Weinberg **(8)**, and of Simmons and Wolfhard **(6)**.

Halogenated Methane

It seems reasonable to suppose that the halogenated methane additive acts not merely as an inert diluent, but causes a reduction in the concentration of active free radicals in the flame boundary. Consequently there is a more important function of the fire extinguishing agent than merely to act as an inert blanket of heavy vapour and so prevent access of oxygen to a fire.

Work in the US has led to similar conclusions **(9, 10, 11)** and the mode of action postulated is that of chain-breaking reactions with such active radicals as H, O, and OH in the reaction zone of the flame.

Dry-powder fire extinguishers have been in use for many years; the most usual chemical employed is sodium bicarbonate and other substances are sometimes added to prevent moisture absorption.

The effectiveness of this agent has been attributed to the release of carbon dioxide from the sodium bicarbonate, but there is now considerable evidence to show that this is not a factor of great importance.

Extinction Efficiency

Investigation of such extinguishing agents has been carried out by the Fire Research Board **(12)** and it has been shown that the quantity of powder necessary to extinguish a fire is less for a fine powder than for a coarse one. The efficiency of extinction depends upon the total surface area presented by the powder to the fire.

Recent work in the US by McCamy, Shoub and Lee **(13)** indicates that salts of the alkali metals are more effective than other materials tested, and that there appears to be a correlation between the fineness of powders and their effectiveness in extinguishing fires. On the other hand there appears to be no such correlation between heat capacity and effectiveness. These workers conclude that the effectiveness of dry

Fire Extinguishing by Chemical Agents

powder does not depend primarily upon excluding oxygen, diluting the atmosphere, cutting off the fuel supply, or blowing out the fire. Experimental work **(13)** indicates that dry powders probably have two most important functions; they act as chain-breaking agents in the combustion process and also cut-off much of the radiant energy from the fire.

Dolan **(14)** has studied the suppression of methane/air ignitions by fine powders. He, too, finds that the one factor above all others which plays a part in enabling the powder to affect flame propagation is the surface area of the material in suspension. Some 40 substances have been examined but the order of effectiveness does not fit into any single pattern. In general, salts with melting points below 200°C are more effective than those which melt at higher temperatures. With isolated exceptions, salts of the alkali metals are the most effective class. Salts which decompose are also effective, although the class can be divided into those which decompose below 200°C (which are partially or wholly effective) and those which decompose above 200°C (which are ineffective). Salts with water of crystallisation are generally ineffective as inhibitors.

Dolan attributes the dependence of the suppression effect on surface area, in the first instance, to the more complete heating of the smaller particles and consequently the greater cooling of the burning gases. In the case of the highly efficient alkali halides, however, a purely thermal explanation is unsatisfactory and some form of surface activity is postulated.

It appears therefore, that there is no unanimity of opinion regarding the mechanism of dry powder extinguishing agents. Probably a combination of mechanisms is involved in the suppression of fire by such materials; cooling, chain-breaking and radiation shielding.

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Italian Exports of Plastics

EXPORTS of Italian plastics materials and synthetic resins up to the end of June rose by 31.7 per cent over the figures for the first five months of 1955. The principal customer has been the US. Exports to Germany, France, Hong Kong, Australia and South Africa are also reported to have increased.

DEVELOPMENTS IN BRAZIL

Chemicals and Mining Affected

PLANS have been announced for the establishment of a new factory in Brazil to manufacture formal and synthetic resins at an initial rate of 30 tons a day. It is hoped that methanol will be produced in the same plant at a later date. The new plant will be part of the Alba S.A. organisation, in association with the Karl Fischer Company of Berlin. In order to produce substantial quantities of ferro-sulphate and sulphuric acid, the Cia. Siderurgica Nacional plans to import new equipment from Germany. Production of sufficient supplies of aluminium oxide to meet the needs of abrasive manufacturers in Brazil has now been partly realised. A recently opened factory at Salto de Itu near São Paulo has increased the total Brazilian production to 600 tons per month.

The German company, Roehm & Hass of Darmstadt is negotiating with chemical manufacturers in Rio Grande do Sul with a view to manufacturing a type of synthetic rubber. The same company is said to have decided to participate in a new chemical undertaking at São Leopoldo in Rio Grande do Sul. The United States Steel Corporation is reported to be negotiating privately for a manganese concession near Urucum in Matto Grosso. Deposits in this area are stated to be among the richest in the world, but transport difficulties have hindered their successful exploitation. Important deposits of zinc near Vazante in north west Minas Gerais are reported by a US geological survey. Samples are said to average 35 per cent zinc. It is reported that at Itaiacoca, in the state of Panama, there are large deposits of talc. Reserves are stated to be not less than 150,000 tons of good quality.

Ductile Zirconium

VERY PURE metallurgical and ductile zirconium made by the van Arkel method, i.e., thermal decomposition of zirconium iodide on a tungsten or zirconium filament heated to 1,400°C under vacuum, is reported by F. Plzak (*Hutnické Listy*, 1956, **11** [9] 518. Paper in Czech, English summary). An all-glass production unit composed of Supremax refractory glass and molybdenum glass for the part of the unit containing metallic parts melted into it, was designed. The methods used and the results achieved are reported. Plzak claims he has obtained zirconium filaments, 50 centimetres long and 3 millimetres in diameter, of a high degree of chemical purity.

Pumps for Industrial Processes

A LAVISHLY illustrated catalogue showing some of the typical duties for which Plenty pumps are being used in industrial processes all over the world has been produced by Plenty & Son Ltd., Newbury, Berkshire. Plenty pumps are designed for easy maintenance. Records are kept of all pumps supplied and spare internal components of standard materials are always available ex stock.

Commercial Intelligence

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

Mortgages & Charges

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

GLAMORGAN ALKALI & ACID CO., LTD., London EC.— 21 September, deed varying the terms of two debentures dated 1 October 1952 and 1 June 1955, to Industrial & Commercial Finance Corporation Ltd.; charged on property charged by said debentures and a general charge. *£186,000. 4 April 1956.

MICRO-BIOLOGICALS LTD., London SW.—25 September, £5,000 debentures, part of a series already registered.

SUPRA CHEMICALS & PAINTS LTD., Tipton.—20 September, charge to Barclays Bank Ltd. securing all moneys due or to become due to the Bank; charged on land at Hainge Road, Tividale, Tipton. *Nil. 4 April 1956.

Satisfaction

CLODOL INDUSTRIES LTD., Newcastle-on-Tyne, chemical manufacturers.—Satisfaction 24 September, £11,000 registered 4 August 1951.

Increase of Capital

W. G. MACNAMARA LTD. (171,582). Chemical engravers, etc., 251 Aston Brook Street, Birmingham, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £5,000.

New Registrations

Great Lakes Trading Co. Ltd.

Private company. (572,499). Registered 5 October. Capital £100 in £1 shares. Objects: To carry on the business of manufacturers of, dealers in and importers and exporters of, suppliers of and traders in crude and refined tar, pitch, creosote, crude and refined tar acids, all grades of naphthalene, phenol, phenolic resins, plastics and plasticisers, insecticides and all other kinds of industrial chemicals etc. The subscribers (each with one share) are: T. C. Robey and A. E. T. Menzies, solicitors, both of 3 Finch Lane, London EC3. The first directors are to be appointed by the subscribers. Solicitors: Allen and Overy, 3 Finch Lane, London EC3.

L. M. Anderson & Co. Ltd.

Private company. (572,635). Registered 9 October. Capital £15,000 in £1 shares (5,000 founders and 10,000 ordinary). Objects: To acquire the business of a chemical lead plumbing contractor now carried on by Lawrence M. Anderson at Rodwell Place, Whitchurch Lane, Edgware, Middlesex, as L. M. Anderson & Co. The permanent directors are: Lawrence M. Anderson (managing director), 2 Pembroke Place, Edgware; David Kleppin, 88 Littlefield Road, Burnt Oak, Edgware; and Leonard H. Monk, 138 Malford Grove, South Woodford, London E18. Secretary: L. H. Monk.

Tank Cleaning Equipment Ltd.

Private company. (572,531). Registered 5 October. Capital £100 in £1 shares. The subscribers (each with one share) are: R. A. Clark and R. M. Sears, both solicitors, of 18 Austin Friars, London EC. The first directors are to be appointed by the subscribers. Solicitors: Slaughter & May, 18 Austin Friars, London EC2.

Mesco Laboratories Ltd.

Private company (572,758). Registered 11 October. Capital £5,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in pharmaceuticals, chemicals, antibiotics—vials and tablets etc. The subscribers (each with one share) are: Thomas W. Scott, 190 Willesden Lane, London NW6, accountant; and Leslie H. Roberts, 26 Whitethorn Gardens, Enfield, Middlesex, solicitor's clerk. The first directors are to be appointed by the subscribers. Solicitors: Henry Boustred & Sons, 115 Moorgate, London EC2. Registered office: 35 New Broad Street, London EC2.

MARKET REPORTS

LONDON Demand has been quietly steady in most sections of the market and the movement to the chief consuming industries against contracts, in the aggregate, has covered good volumes. Export trade continues to be fairly active with a good flow of orders for shipment despite the keen competition in many overseas markets. The price position for most industrial chemicals is steady at recent levels with few alterations to record. The basis price for white lead was reduced to £147 15s per ton, red lead to £142 15s per ton and litharge to £144 15s per ton as from 10 October. Firm conditions prevail in the coal-tar products market with a good home and overseas demand for creosote oil and cresylic acid. Pitch is in good request on home account.

MANCHESTER Quotations for heavy chemical products on the Manchester market during the past week have maintained a steady to firm undertone and few changes of any consequence have occurred since last report. The alkalis and other leading heavies are going into consumption against contracts in satisfactory quantities and shipping business keeps up reasonably well. New enquiries have been on a fair scale. Activity in fertiliser materials is confined to a relatively few sections, but a steady demand for most of the by-products is reported.

GLASGOW Reports from various sources covering the merchant consumer trade indicate that business continues to be brisk in the various sections of the heavy chemical market. No particular emphasis can be placed on any one section; an increased demand is being experienced generally throughout the trade. Prices, with the exception of some of the metallic salts, have been steady. As far as export is concerned, there is little or no change in the position. The general opinion is that satisfactory business is being conducted covering a varied range of chemicals.

Shawinigan Water & Power Co.

At a meeting of the board of directors of The Shawinigan Water & Power Co. on 24 September, a dividend of 45 cents was declared on the no par value common shares of the company for the quarter ending 30 September 1956, payable 23 November to shareholders on record 15 October.

"Fluor acid air is procured by dissolving the earthy substance called fluor in vitriolic acid. This kind of air extinguishes a candle and, like vitriolic air, one measure of it saturates two of alkaline air. It is peculiar to this kind of air to dissolve glass when it is hot.

It seems to consist of a peculiar acid vapour, united to the strong substance of the fluor; for water being admitted to it absorbs the acid vapour, and the stony substance is deposited. By this means it exhibits an amusing appearance, whether water be admitted to a glass jar previously filled with that air, or the bubbles of air be admitted, as they are formed, to a quantity of water resting on mercury."

. . . an amusing appearance

So, in 1797, Joseph Priestley described his early observations on hydrofluoric acid to students at the New College in Hackney, and recorded them under the title of *Heads of Lectures on a Course of Experimental Philosophy*. Today, using fluor acid air dissolved in aqua destillata, and costly vessels of silver and platinum, B.D.H. chemists make vast quantities of a great variety of fluorides of high purity, free from all stony substances, for which the B.D.H. sales departments will happily quote for deliveries by the pound, the cwt. or the ton.

Such fluorides are used industrially for all sorts of purposes from increasing the light transmitting properties of lenses to aiding the production of atomic energy.

B.D.H. LABORATORY CHEMICALS

THE BRITISH DRUG HOUSES LTD. B.D.H. LABORATORY CHEMICALS GROUP POOLE DORSET

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Are you a prospective **PLANT MANAGER**? Does your present position allow for increasing responsibilities to satisfy your ambitions?

DEPARTMENT MANAGER required for Compounding Section of American Latex dipping plant. Can you qualify?

Write or call: Mr. H. F. Bader, International Latex Corporation, Port Glasgow, Scotland. Telephone, Port Glasgow 41631.

PARANTHAN CHEMICALS CORPORATION, CEYLON.

PRODUCTION MANAGER required for 2 years in first instance. Salary up to £2,500 a year according to qualifications and experience. Free quarters and First class passages. Candidates must be qualified Chemical Engineers of a recognised University with experience of the erection and operation of an Electrolytic Caustic Soda Plant (diaphragm cells). The person selected will be responsible for the erection and subsequent operation of the D.D.T./Caustic Soda Factory at Paranthan. Write to the Crown Agents, 4 Millbank, London. S.W.1. State age, name in block letters, full qualifications and experience and quote M3B/43709/CAJ.

Closing date for receipt of applications, 31st October.

THE STOURBRIDGE REFRACTORIES CO. LTD., of Pensnett, Brierley Hill, Staffordshire, require a **WORKS' CHEMIST** to take charge of their modern and extremely well equipped Laboratory. A Science degree or equivalent and technical experience in the manufacture and firing of refractory products are necessary qualifications. The post is progressive and pensionable and offers good scope to the right man.

Salary according to qualifications and experience.

Applications to be made in writing to the Secretary at the above address.

OFFICIAL APPOINTMENTS

EASTERN REGION, NIGERIA

INDUSTRIAL CHEMIST, DEPARTMENT OF HEAVY INDUSTRIES

QUALIFICATIONS: Honours degree in chemistry or Membership of Institution of Chemical Engineers and at least 10 years' experience as a chemist in industry since qualifying.

DUTIES: To advise on the design of laboratory and subsequently direct its work. To undertake research into local raw materials, organic and inorganic, and their potential utilisation either alone or in combination with imported material.

The post calls for wide interests and a pioneering spirit rather than for highly specialised research.

TERMS OF EMPLOYMENT: Contract for one tour 18-24 months, consolidated salary £2,244 per annum and gratuity of £37. 10s. for each completed period of 3 months residential service on the satisfactory completion of contract. Furnished quarters provided at rental of 10% of salary. Free first class passages and generous leave. Income tax at low local rates.

Apply to Director of Recruitment, Colonial Office, London, S.W.1. State age, qualifications and experience. Quote BCD. 461/411/02.

OFFICIAL APPOINTMENTS: continued

NORTH THAMES GAS BOARD

A SENIOR DRAUGHTSMAN, aged 30-45, is required at the Chemical Products Works, Beckton, E.6. Candidates should have considerable experience in the design and layout of plant from flow diagrams, and in the preparation of schemes and contract specifications both for development and maintenance work. Starting salary will be within the range £750 to £900 per annum according to age, qualifications and experience. The successful candidate will be required to join the Staff Pension Scheme.

Applications, giving age and full particulars, to Staff Controller, North Thames Gas Board, 30 Kensington Church Street, W.8, *quoting reference 666/324.*

NORTH THAMES GAS BOARD

CHEMISTS and **PHYSICISTS** holding University degrees are required in the Laboratories at Watson House, Fulham, S.W.6. to undertake research work on the utilisation and design of domestic and industrial gas and coke appliances, particularly on cookers, water heaters, gas and coke fires, refrigerators, and industrial apparatus.

The Laboratories have recently been modernized and extended and are responsible for research work for the Gas Industry throughout the country.

The appointments will be permanent and pensionable and the starting salary will be within the range of £680—£900 per annum, according to age, qualifications and experience.

Applications should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, W.8, quoting reference No. 666/280, to reach him within ten days of the appearance of this advertisement.

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CHARCOAL, ANIMAL AND VEGETABLE, Horticultural, burning, filtering, disinfecting, medicinal. Also lumps, ground and granulated. **THOMAS HILL-JONES, INVICTA WORKS, BOW COMMON LANE, LONDON, E.3. (TELEPHONE: EAST 3285).**

For disposal, surplus stock of Terpeneless Lemon Oil, Sicilian Lemon Oil, Allyl Caproate etc. **BOX NO. C.A.3506. THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

VACUUM OVEN, 4 ft. 7 in. by 3 ft. 3 in. by 3 ft. internal, with 3 Steam Heated Shelves. Quick clamping Balanced Door.

GARDNER SIFTER-MIXERS. Two H, 5 cwts. size.

MIRACLE MILL with 30 H.P. Motor

JACKETED 'U' BLENDER/DRYER, 3 cwts.

HOBART MIXER, 4-speeds, 80 qrt. removable Bowl.

MIXING PAN, 100 gallons, water jacket. Bottom Outlet.

WINKWORTH MACHINERY LTD., 65 High Street, Staines. Telephone 1010.

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

FOR SALE: continued

600

CHEMICAL PLANT

COMPLETE VACUUM DRYING PLANT by Scott, comprising Horizontal Band Drier, approx. 35 ft. by 6 ft., with Service Feed Hoppers, Shaker Feeder, Condensate Receivers for Hot-plates, Vacuum Augmentor, Kek Mill, Screening and Finished Material Hoppers, Tailings Elevator, Wet and Dry Vacuum Pumps. Fully motorised.

COMPLETE DRYING PLANT by Dunford & Elliott, comprising Rotary Louvre Drier, approx. 18 ft. by 4 ft. diam., geared Motor drive, complete with Keith Blackman Steam Heater with Motor driven Fan, steam traps, Exhaust Fan, cyclone, etc.

TWIN-CYLINDER STEAM HEATED DRUM DRIER with rolls 40 in. long by 28 in. diam., for steam pressure of 100 lb. sq. in., fitted splash feeder.

STEAM JACKETED VACUUM MIXER, 20 in. by 18 in. by 16 in., cast iron construction single spur gearing, double 'Z' bladed, glanded shafts, hand tilting. Vacuum cover secured by swing bolts. Jacket suitable 30 lb. sq. in. w.p. Mounted on robust stand.

DOUBLE TROUGH MIXER by Morton, 18 in. by 18 in. by 16 in. deep, mild steel construction twin 'Z' blades. Hand tilting. Glanded shafts. Driven by 3 h.p. 400/440/3/50 motor.

NEW STAINLESS STEEL STORAGE VESSELS AND TANKS, with capacities ranging from 8 gallons to 1,000 gallons.

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20 sets available.

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MIXERS—1 Baker Hand-tilted Trough, 16 in. by 24 in. by 20 in Fast and loose pulleys and clutch. "Z" blades.
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S.S. ENCLOSED ELEVATOR 40 ft. centres.
S.S. AND CHROME EMULSIFIERS/MIXING ARMS.
'Z' and FIN BLADE MIXERS, PUMPS, FANS, HYDROS, CRUSHERS, DRYERS, OVENS, REFINERS, PULVERIZERS, and (275) **TANKS** in stock up to 13,000 galls.

HARRY H. GARDAM & CO. LTD.

We offer 35 tons Marine Rope, U.S.A. origin. 3 million sheets Abrasive Papers and Cloths. Chevrolet Fire Trucks. 3 International Mobile Cranes, excellent condition, 5-ton fixed Jib, U.S.A. origin. Ethylene Oxide Derivates, powerful detergent Neutronix. 22 tons Waterproofing Tar. 230 tons "Passivating" medium, with a phosphoric acid base. 20 tons Product for developing colour photographs. 2 tons. **SOCOMO, 10 RUE D'HAUTEVILLE, PARIS 10, FRANCE. TEL.: PRO. 40-23.**

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VESSELS of all shapes and sizes, jacketed or unjacketed—with stainless steel mixing gear to requirements; also stainless steel storage tanks and vauum vessels.

" MORWOOD " "U"-shaped TROUGH MIXERS—up to 2 tons, in stainless steel, with agitators, scroll or paddle type, jacketed or unjacketed.

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

These items can also be fabricated in mild steel.

JACKETED PANS

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

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

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THREE 30 c.f.m. at 100 lb. pressure, water cooled, automatic overloads, with or without motors.

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Selection of new MONO and second-hand Pumps in stock—2 in. to 5 in.

Inquiries Invited.
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SIMPLITE PUMPS are the World's Simplest, Lightest, Safest and Cheapest diaphragm type. 2 in. Suction completely self priming. Water, mud or chemicals. Petrol, Electric or Hand models from £20. Illustrated leaflet from the makers: **WM. R. SELWOOD LTD., 3 CHANDLER'S FORD, HANTS.** Phone 2275.

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TWO ROTARY KILNS by Newell, 70 ft. by 5 ft. diam., welded steel construction on two roller paths. Gas heated, each with Rotary Cooler, 24 ft. by 4 ft. diam.

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AHF is the most important agent for the production of organic fluorine compounds either by replacement of chlorine atoms or by addition to unsaturated substances. Another important use is as a catalyst in the production of high-octane fuels by alkylation. Other alkylation and acylation reactions are also catalysed by AHF. It is the raw material for producing fluorine and has been used as a solvent medium for certain reactions.

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Boiling Point (760 mm.)	19.9°C.
Freezing Point	- 83°C.
Specific Gravity (Liquid 0°C.)	1.01
Specific Heat (Liquid 0°C.)	0.85

The vapour is polymerised to a degree which varies rapidly with temperature and pressure producing a corresponding variation in the heat of vaporisation.

SPECIFICATION

The normal grade of AHF contains at least 99% HF, and impurities to the following limits:-

H_2O	0.5% max.
SO_2	0.25% max.
Si (calc. as SiF_4)	0.25% max.
H_2SO_4	0.01% max.
H_2S	may be present in traces

Higher grades up to 99.9% HF can be supplied according to need.

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