The Chemical Age

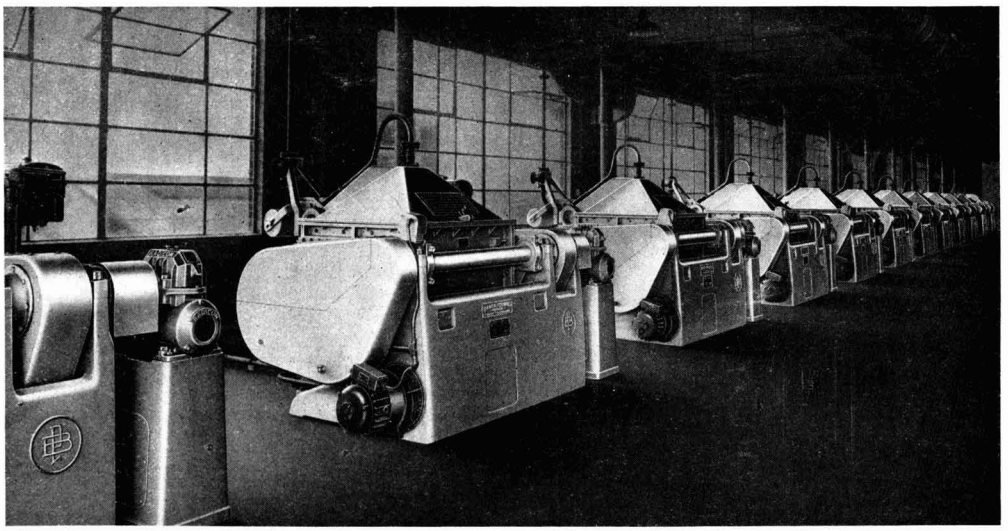
VOL. LXXVI No. 1946

27 October 1956

Hazards of Radioactive Materials

(See page 172)

UNIVERSAL MIXING MACHINES



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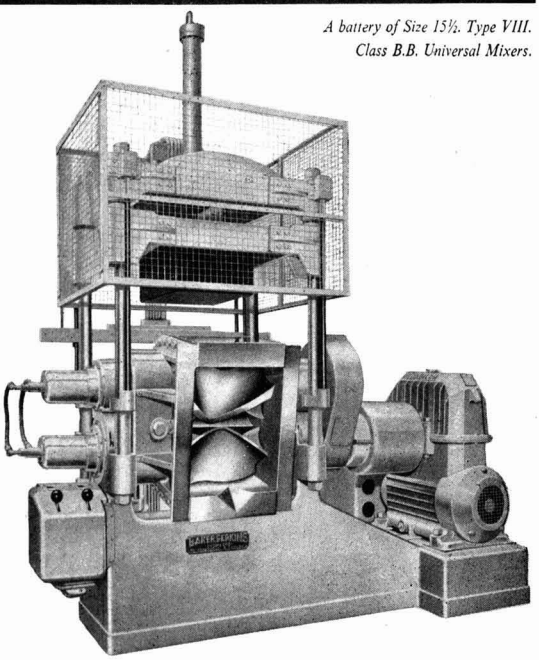
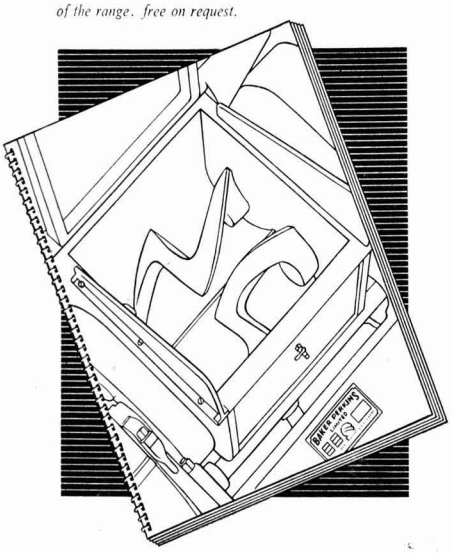


This booklet illustrates and describes Universal Mixing Machines in types, sizes and capacities characteristic of the range. free on request.



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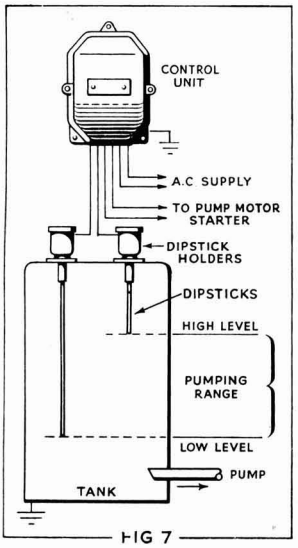
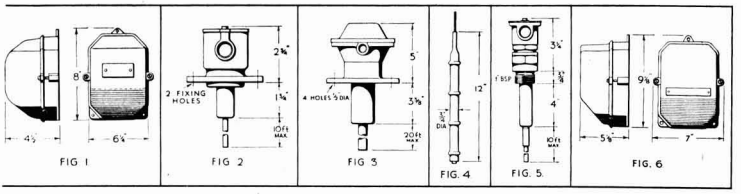


FIG 7

FLUID LEVEL CONTROLS



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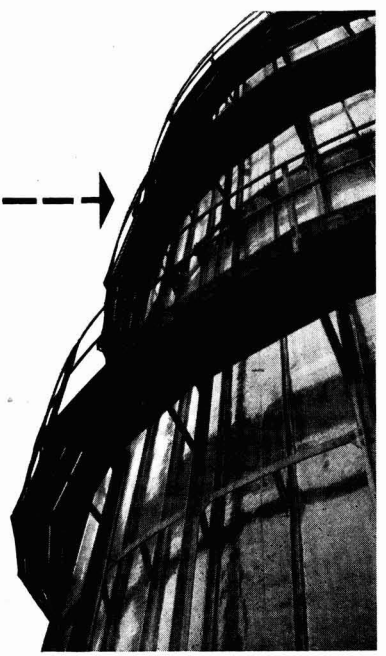

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VOL. LXXVI No. 1946

27 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

After Graduation

AN IMPORTANT BOOK, *Graduate Employment*, the results of a survey by Political and Economic Planning (PEP), was published on 11 October. The survey was begun in 1954 when a questionnaire was sent to 6,841 men, i.e. one in two of all men graduating in the faculties of art, science and technology in 1949-50 at British universities, university colleges and technical colleges. A 66 per cent response (4,535 replies) was obtained. Of these replies 3,961 were used, a reduction not made selectively but due to wastage, late return, etc. Broadly, then, the survey sample covered 30 per cent of *all* male graduates in 1949-50.

Before this survey no reliable knowledge existed as to the post-university history of graduates. PEP's effort to fill this gap was undertaken at DSIR request and financed by a grant from the Conditional Aid Scheme sponsored by US economic aid.

When a rising proportion of the country's youth receives university education, it is of far-reaching importance to learn what happens after the B.A., B.Sc., or Diploma has been acquired. Nor are background factors that influence degree-subject choice any less important. One salient passage from the survey states: 'Just over half (52 per cent) read for an arts degree, 28 per cent for a science degree, and 20 per cent for a technology degree. Nearly two-thirds of the public or independent school men read for an arts degree as against under half of those from other schools.'

Of the arts graduates, one-third became teachers compared with about one-fifth of the science graduates. There is, therefore, some danger of a semi-vicious circle in the educational system—with steadily more arts graduates teaching and producing an output of more arts graduates. A case can be presented for the arts, but it seems that the urgent essentiality of the sciences has yet to be insisted upon with sufficient force.

One of the unavoidable weaknesses of the survey is that it covered a year of graduation when the direct impact of the war was still being felt. Thus, only one graduate in three was 22 years or less and only a third had gone straight from school to university; and one in four had graduated in a shortened course as a result of war service years. The sample may not be typical of graduates for later years in that a larger number of men were older or had already married. This must be considered when such results as 'influences upon choice of career' are studied.

Half the graduates said they did not know what employment to aim at before entering universities; two out of three acknowledged no influence upon their choice other than their own decisions in the matter. Three classes of employment—industry, teaching and the civil service—were the most attractive, being chosen by 29.4, 23.4, and 8.6 per cent respectively. (But only 6.7 per cent chose mathematics and science teaching!) These major classifications of choice perhaps do nothing more than reflect the fact that they are the three biggest employment-offering classes.

It is of interest to note that 70 per cent of those with early preference to enter industry did in fact do so, and of those who had looked upon industry as a second-choice career, 24 per cent eventually chose it. The missing 30 per cent of industry-preferring students is explained by the fact that 25 per cent eventually took teaching posts. However, there is more than a suggestion that this change of intention mainly involved arts graduates, and had industry been more prepared to offer openings to arts graduates, teaching's gain would have been much smaller.

Average starting salary (for this 3,357 cases were considered) was £464 while technologists started at about £433. Salaries above this average were paid in the following groups of employment—oil, teaching, mining and quarrying, university posts, the scientific civil service, research association posts. Industry's demands upon each year's flow of graduates are certainly not strongly shown by the odd coincidence that the starting average salary paid by industry was the same as that received for all types of employment.

There is a firm relationship between starting salary and employment-stability. Over half the graduates who received low salaries, but only one in six of those who began with high salaries, had changed their first post in the 1950-54 period. Twenty per cent who started at under £400, 15 per cent who started at £400-500, and 10 per cent who started at £500-600 also changed jobs between graduation and the survey date. That two-fifths of the graduates covered in the survey left their first place of industrial employment within four years is disturbing. Men from the universities are normally attracted by long-term prospects.

Graduates seem to justify themselves readily enough. The average increase upon starting salary during 1950-54 was 53 per cent; by 1954 80 per cent of the graduates were earning from £500 to £1,000, with half in the £600-800 range. Incidentally, technologists had by 1954 overtaken both in earning power.

These are but a slender selection of the findings recorded by this survey. The plea made for annual surveys, and for surveys that cover women graduates and other faculties besides arts, science, and technology, deserves immediate official support. It is not enough to have statistics on the university end-product at the single moment of degree award.

Oxycat

New Firm to Market Anti-Effluent Device

OXY-CATALYST CO. and Vokes Ltd. announce the formation of Oxy-Catalyst Sales Ltd. to market the Oxycat, which is described as 'a new, revolutionary and practical solution to the ever growing problem of air pollution by industrial fumes.'

The Oxycat, invented by E. J. Houdry, the originator of the petroleum cat-cracking process, is said to have been in successful operation in the US for several years. Its primary function is to eliminate the obnoxious nature of industrial effluents but in many operations it is claimed to have an important heat-recovery or fuel conservation function. It consists of two end plates, a tie-rod and a number of streamlined elements coated with a film of catalytic alumina and platinum alloy. This film, resistant to high temperatures and thermal shock, converts foul and waste material such as obnoxious gases or fumes into their oxides with evolution of heat.

To start the catalyst reaction, the gaseous stream entering the unit has to be at a minimum temperature of 500°F. Once started, the reaction is said to increase the Oxycat temperature until a state of equilibrium is reached. The normal procedure is to fit a pre-heat burner ahead of the catalyst to assist in starting up. Various automatic means of controlling this burner can be adopted so that it only remains in operation as long as necessary.

Copper Sulphate Association

EXPORTS of copper sulphate increased by about 10,000 tons in the year ended 31 July. Total value of exports amounted to about £4½ million, of which £800,000 was for dollar markets. These figures were given by Mr. J. D. McKechnie, chairman of the British Sulphate of Copper Association Ltd., at the annual meeting in London on 23 October.

'Home trade deliveries unfortunately showed a decrease,' said Mr. McKechnie.

'Although copper sulphate is supposed to have been on the way out for many years, it is still very much in demand and figures of world consumption show that it has not lost much ground during the past 18 years.

'The extremely severe frosts last spring destroyed large numbers of vines in parts of Europe and this may reduce the consumption of copper sulphate. However, on the whole, prospects for the present year are good.'

GERMAN PLASTICS IN UK

London Demonstration of Farbenfabriken Bayer Products

THREE plastics made by Farbenfabriken Bayer, Leverkusen, were demonstrated in London recently. They were: Cellidor B (cellulose acetobutyrate), Durethan BK (a nylon 6 polycaprolactum) and Durethan U (a polyurethane linear polymer.

Cellidor B, which has previously only been available from dollar sources, is claimed to have superior properties to other injection moulding compounds based on organic cellulose esters. Crude oils will not stick to Cellidor B, a property of importance in the oil industry. It was found in the case of one oil well that steel pipes needed cleaning after about four months use. Pipes made of Cellidor B, on the other hand, were found to be quite free of any deposit after the same length of time.

High resistance to shock, temperature, abrasion, chemicals (except concentrated acids), oils and fats is claimed for Durethan BK which is said to be complementary to the nylons produced in this country. It can be applied in the form of a fine powder to a hot metal surface to produce a continuous coating which possesses great mechanical strength.

It is claimed for Durethan U that no material with quite the same properties has been available to manufacturers before. It is similar to the nylon types of plastics, and has applications in the construction of chemical engineering plant.

These materials are imported into this country by J. M. Steel & Co. and marketed by R. H. Cole & Co. Ltd., 2 Caxton Street, London SW1. Adequate stocks are held in this country and it is believed that there will be no delay in meeting orders.

ALFA-LAVAL'S NEW LABORATORIES

EXTENSIVE new process laboratories have recently been opened by Alfa-Laval Company Ltd., at their premises on the Great West Road, Brentford, to meet an ever increasing demand for experimental work in the application of De Laval equipment, including centrifugal separators, pumps, heat exchangers, filters etc. in the chemical, engineering and process industries. The building includes process, engineering and chemical laboratories, photographic section, library and technical offices.

For processing of customers' samples a range of pilot scale centrifugal separators is included in the process laboratory. These machines are exact replicas of the full scale commercial centrifuges and hence results obtained in this way on samples of one or two gallons of material can be translated with every confidence to full scale industrial operation. This work is closely allied with the sales departments and several hundred samples are treated annually in the Brentford laboratories alone. This service is offered free to customers.

Engineering Research

An engineering laboratory is used for larger scale development, particularly on new equipment, including special washing equipment for machine parts, oil purifying equipment for turbine, Diesel and transformer oils, plate heat exchangers for all heat transfer problems, as well as stainless steel pumps, oil filters etc.

Chemical checks on works carried out in the process laboratory and also on field work carried out on full-scale centrifuges etc. are handled in the extensive chemical laboratories. These laboratories also maintain material checks for the production factory.

Union Fears

AN AMENDMENT of the law relating to river pollution was called for by a regional committee of the Transport and General Workers Union at Shotton on 22 October.

The resolution was presented by representatives of 1,500 members of the union employed by Monsanto Chemicals Ltd., Ruabon, which was recently involved in heavy damages for alleged pollution of the River Dee (see THE CHEMICAL AGE, 14 July, p 89; 28 July, p 164; and 4 August, p 205).

As the law now stood, said Mr. Tom Jones, regional secretary of the TGWU, it appeared that the well-being of a few fresh-water fish was more important than the well-being of human beings and the country's economy. Monsanto had spent £1,000,000 to build an effluent bay to prevent pollution.

Union employees feared that if the company was constantly harassed by the costly problem of river pollution it would restrict its expansion programme.

NOTE & COMMENT

FUEL RESEARCH PROGRESS

'CONTRIBUTIONS of Chemical Engineering to the Processing of Coal' was the title of the fifth coal science lecture of the British Coal Utilisation Research Association, which was delivered by Professor D. M. Newitt, Courtauld's Professor of Chemical Engineering, the Imperial College of Science and Technology, London. In his address Professor Newitt stated that the role of the chemical engineer was of special importance to the fuel industries. Fundamental research into the physical structure and chemical constitution of coal was leading to the introduction of more refined methods.

Professor Newitt referred to the coal-water system which is involved in the processes of drainage, flotation, washing and granulating, and plays a part in the reactions associated with carbonisation and combustion. He discussed the mechanism by which capillary, diffusional and gravitational forces control the movement of liquid and vapour in beds of sand. On the basis of Poiseuille's treatment of capillary flow, quantitative expressions for the rates of drainage and of drying of such beds can be derived to provide data upon which the design of de-watering and drying equipment can be rationalised.

He said that when applied to coal and coke, however, modifications to the simple theory are required. Porosity significantly affects moisture distribution and the rates of drainage and drying. Where the pores are very fine there is evidence that the abnormal physical properties of the adsorbed water influence water movement.

The lecturer showed how, on the basis of curves relating the suction potential of a moist bed with its average moisture content, the optimum conditions for drying could be predicted. He concluded by stressing the importance of an understanding of the detailed mechanisms of mass and heat transfer as a prerequisite for designing plant in which inter-related changes of physical state and chemical composition take place.

SOLELY STYRENE

SYNTHETIC SOLES for shoes and boots have made much slower advance here than in North America (THE CHEMICAL AGE, 13 October). The percentage of synthetic-soled British shoes is now about 15, with some 20 per cent rubber-soled and 65 per cent leather-soled. The main market here is with children's shoes; as synthetic soling is said to last two or three times as long as leather, it has made its strongest entry into this class of footwear. Figures in *The Financial Times* show that in 1955 33 per cent of children's shoes, 22 per cent of women's, and 10 per cent of men's were produced with modern synthetic soling.

High styrene copolymer is the basic chemical material. This is blended with rubber—natural or synthetic—to produce toughness. Blending is done by the rubber companies; the styrene copolymer is sold to them as the major raw material by the chemical industry. The fact that both ICI and Monsanto have new styrene copolymer plants scheduled for full output in 1957 is hardly a comforting thought to the leather industry. The Monsanto plant will produce 4,000 tons a year of the polymer—the ICI plant will have an even larger tonnage output of butadiene products (the soling copolymer is made from styrene and butadiene) but only part of this output will be in the form of the copolymer for making shoe soles. It may be fair to say that 6,000 tons of the copolymer will become available. This must be compared with the import tonnage from Canada upon which synthetic soling here has so far relied—2,200 tons a year, a figure determined by Board of Trade quota. Indications are that the imported copolymer will remain slightly cheaper than the British product; for this reason, a good deal of Canadian copolymer may still be used. Thus, quite shortly three times as much high styrene copolymer may be annually available as the restricted imported tonnage of the past, and the real struggle between leather and synthetic soles will begin.

SYNTHETIC AND LEATHER

SYNTHETIC soling is not very different in price from leather so far as the manufacturer of shoes is concerned, although the price of leather is more variable for quality reasons. However, there is less wastage in making soles from a sheet of synthetic than from a bend of leather, and this seems to give some manufacturing cost advantage to the synthetic. But in shoe manufacture the share of cost represented by the soles is not high, and the principal virtue of the synthetic soling is embodied in the sales-claim that it lasts so much longer. Against this, leather producers are claiming that leather allows the foot to breathe, keeps its shape better, and will not, for juvenile shoes, tempt parents to keep children wearing sizes they have outgrown. As a counter-claim the last point seems an injudicious one for leather to back.

Perhaps the biggest market of all may be the inestimable one of shoe-repairing, although it has been widely rumoured that many repairers will not encourage a material that gives them less repeat work. One point is abundantly clear—chemical industry is going to contribute a greatly enlarged share of the footwear industry's materials. This is inevitable though the extent to which synthetic soles will displace leather cannot be predicted.

US Raw Materials

Titanium & Aluminium Production Demands Increase

PRODUCTION of titanium sponge metal in the US in the year ending 30 June 1956 was 8,803 tons; consumption was 6,656 tons of which 901 tons were imported. Most of the excess production went into Government stocks. Because they anticipate a rapid increase in consumption, the Titanium Metals Co. has recently announced plans to increase titanium sponge output by 50 per cent. The Office of Defense Mobilization has also announced its intention of making 'a new evaluation' of the titanium programme. The Climax Molybdenum Co. has increased the prices of its products by about 7 per cent. This increase is due partly to recent general wage increases and partly because growing demand has led to processing of lower grade ores. The Aluminium Co., Alcoa, US, expects to increase its annual production capacity to 962,500 tons by 1958 as a result of extension of facilities at Point Comfort, Texas, and the commencement of production at its new works at Evansville, Indiana. Recently the chairman of the Kaiser Aluminium and Chemical Corp. in his annual report expressed the conviction that by 1965 annual consumption of aluminium in the US will increase to over four million tons.

Key Industry Duty

THE Board of Trade has made the Safeguarding of Industries (List of Dutiable Goods) (Amendment No. 11) Order, 1955, adding vinylacetate to the list of chemicals liable to key industry duty. The order came into operation on 1 October and was published on 28 September, 1956, as Statutory Instruments, 1956, No. 1518. Copies may be obtained from HMSO, Kingsway, London WC2.

New Shell Fertiliser

SHELL Chemical Co. has announced that it is marketing a new fertiliser, Nitra-Shell. It will be imported in considerable quantities from the Netherlands and will be available for the 1957 agricultural season.

Chemical Society Library

IT is announced that the library of the Chemical Society at Burlington House, London W1, will close at 1 o'clock on 22 December until 10 in the forenoon of 28 December.

NUCLEAR POWER IN ACTION

Natural Uranium as Fuel at Calder Hall Station

DETAILS of some of the chemical aspects of Calder Hall, Britain's first atomic power station, appeared in THE CHEMICAL AGE for 6 October (p. 23). Calder Hall has been an expensive project and, despite the publicity given it in the national Press and the glamour of its royal commissioning on 17 October, is really only a prototype marking the pattern for things to come.

Britain's programme for nuclear power reactors is based on natural uranium as fuel. Uranium occurs as an important constituent in nearly 100 mineral species and as a minor element in about 50 others. Natural uranium consists of 1 part by weight of ^{235}U and 140 parts by weight of ^{238}U.

Real Fuel

The real fuel in the reactors at Calder Hall is ^{235}U since it undergoes fission readily even with thermal or slow neutrons; ^{238}U would require fast neutrons of at least 1 MeV to induce fission to any extent. But ^{238}U is fertile; it absorbs neutrons to form ^{239}U which changes to the highly fissionable ^{239}Pu. When the neutrons emitted by fission are slowed down they are more likely to strike further ^{235}U targets and cause further fissions than to be absorbed in atoms of ^{238}U.

Fast reactors of the future, such as that under construction at Dounreay, will require considerable amounts of plutonium.

Operation of a power reactor starts with the slow withdrawal of the boron steel coarse control rods until the working temperature is reached. Further withdrawal takes care of the effect of fuel depletion and poisoning by xenon and other neutron-absorbent fission products. A fast acting fine control rod maintains the neutron density at the required power level. Loss of the initial reactivity entails removal of the fuel elements for chemical processing.

Element Rods

The fuel elements at Calder Hall are rods of natural uranium (density 18.7 g. per cc.) in magnesium alloy cans with helical fins so that the coolant CO_2 flows in the annulus between the graphite and the fin tips.

The gas enters the bottom of the reactor at 140°C and 100 p.s.i. and rises through the reactor core to emerge at 336°C and pass into four heat exchangers whence it is returned to the reactor for recirculation.

A heat output of 3,000 MW-days per ton of fuel is the declared aim for these reactors before removing the uranium for processing because poisons have built up and the rods become distorted. The need to give early fuel supplies to the Windscale plutonium plant, where spare processing capacity is available, will overrule this objective with the initial charges at Calder Hall.

If the spent fuel rods are processed and the fission products and the plutonium formed separated, the plutonium being again used in the same reactor, it is estimated that over one per cent of the natural uranium could be burnt. In this case 1 lb. of natural uranium would be equivalent to 30,000 lb. of coal (c.v. 12,000 BThU) instead of the present 10,000 lb. of coal. In the fast breeder reactor a figure of 1 lb. of uranium equivalent to 60,000 lb. of coal should be available in the near future, and an equivalent of one million lb. of coal should be attainable ultimately.

As the programme of nuclear power develops, different types of reactor being investigated by the Atomic Energy Authority will replace the original designs. Six different systems are under investigation.

Accelerator Bought

PORTUGAL'S Junta de Energia Nuclear, the country's atomic energy commission, has purchased a 2-million-volt Van de Graaff particle accelerator from High Voltage Engineering Corp., Cambridge, Mass., US, to be used in research and training of nuclear physicists. This is the first US-built particle accelerator to be shipped to Portugal; it will be installed and operated in a Lisbon suburb. Principal programmes to be carried out with the accelerator will be in nuclear physics, radiation chemistry and in general studies of radiation effects.

The accelerator will be used for investigations of protons, deuterons and heavier ions, and it will be equipped with a beryllium target for use with positive-charged particles to produce neutrons. The machine will also be supplied with a gold target for production of super-voltage X-rays for radiography of metal fabrications. Research on methods of radiation detection and measurement will be carried out simultaneously with accelerator programmes.

People in the NEWS

● On 2 October MR. C. M. HOULTON, general sales manager of Borax Consolidated Ltd., flew to the Far East for a visit of several weeks. In Hong Kong and Japan he is meeting the company's agents, members of Government departments, industrial and agricultural research centres, and industrial users of boron products.

● MR. W. T. BUCKLEY has joined the staff of James A. Jobling & Co. Ltd. as area export manager, with responsibility for markets in the Middle East, Far East and South and East Africa.

● MR. L. A. BRADBURY, sports goods technical manager at Dunlop's Speke factory, has retired. He joined Dunlop in 1915 as an assistant chemist and was a senior assistant in the chemical laboratory at Fort Dunlop, Birmingham, before beginning his association with making sports goods. He developed for Dunlop in Germany the waterproof silk tennis strings.

● MR. F. W. MARTIN has been appointed a director of Tube Investments.

● Among those presented to the Queen on the occasion of the opening of Calder Hall power station were MR. C. M. SPIELMAN, of Whessoe Ltd.; SIR KENNETH HAGUE, of Babcock & Wilcox; MR. A. J. HILL, Taylor Woodrow Construction Co. Ltd.; MR. R. PARKIN, resident engineer of Whessoe Ltd.; MR. E. G. GALE, foreman erector of Strachan & Henshaw Ltd.; and MR. E. RICHARDSON, chargehand, Matthew Hall & Co. Ltd.

● CHARLES G. CHISHOLM has been appointed General Sales Manager of Haynes Stellite Company, a division of Union Carbide and Carbon Corporation.

● At the annual general meeting of the Association of British Chemical Manufacturers on 11 October the following were elected to the council for 1956-57: *president*: SIR GRAHAM HAYMAN; *vice-presidents*: DR. F. H. CARR, C.B.E., SIR ROGER DUNCALFE, DR. E. V. EVANS, O.B.E., SIR HARRY JEPHCOTT, MR. C. F. MERRIAM, M.C., MR. L. P. O'BRIEN, MR. W. J. WORBOYS; *elected members*: *chairman*: MR. G. F. WILLIAMS; *vice-chairman*: MR. B. HICKSON; *honorary treasurer*: MR. J. L. HARVEY, M.B.E.; *council*: MR. D. J. BIRD, MR. I. V. L. FERGUSSON, MR. E. M. FRASER, C.B.E., DR. W. H. GARRETT, M.B.E., MR. J. C. HANBURY, MR. E. LE Q. HERBERT, DR. W. G. HISCOCK, MR. L. G. MATTHEWS, MR. F. G. PENTECOST, MR. F. S. POOLE, MR. H. V. POTTER, MR. W. D. SCOTT, MR. E. STEIN; *co-opted members*: MR. E. L. BUSH, MR. G. H. W. CULLINAN, MR. R. S. HASKEW, DR. J. E. TAYLOR; *honorary vice-presidents*: MR. C. E. CAREY, MR. NORMAN N. HOLDEN, LORD MCGOWAN, K.B.E., MR. K. H. WILSON, O.B.E., J.P.; *director & secretary*: MR. J. DAVIDSON PRATT, C.B.E.; *manager*: MR. A. J. HOLDEN.

● Each year the Gas Council awards five research scholarships to students who have recently graduated in physics, chemistry or engineering. Scholarships awarded this year went to: ROY SALTER, B.A., University of Oxford, department of inorganic and physical chemistry; ALAN WINT, B.Sc. (Eng.), University of Cambridge, department of chemical engineering; JOHN W. ARNOLD, B.Sc., A.R.C.S., Imperial College of Science and Technology, University of London, department of chemical engineering; PHILIP OWENS, B.Sc., University of Birmingham, department of chemical engineering; and DOUGLAS H. GRANT, B.Sc., University of Glasgow, Department of Chemistry.

● THE RIGHT HONOURABLE LORD GODBER, chairman of the Shell group of companies, has accepted an invitation to be president of the festival of industrial films to be held at Harrogate in October next year. To be called 'Films in the Service of Industry', the festival will show how films are being used in industry.

● MR. J. E. SAXTON has been appointed lecturer in the department of organic chemistry, University of Leeds, from 1 September 1956.

● Union Carbide Development Co., a Division of Union Carbide and Carbon Corporation has appointed DR. D. M. YOUNG associate technical director. Dr. Young will be located in Geneva, Switzerland, as a European representative of the Development Company. He joined the Union Carbide organisation in 1936 as a research chemist in the research laboratories of Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, in South Charleston, West Virginia. In 1955 he was appointed assistant to the director of the Research Department.

● SIR ALEXANDER FLECK, chairman of ICI Ltd., received the honorary degree of Doctor of Science in Convocation at Oxford on 18 October.

● An ICI Ltd. director, MR. W. J. WORBOYS, has been appointed a member of the panel which is to advise the British Transport Commission on the best means of attaining a high standard of appearance and amenity in the design of their equipment.

Japanese Synthetic Rubber

A REQUEST for budgetary appropriations to finance a plan for establishing a semi-official synthetic rubber company has been submitted to the Finance Ministry by the Japanese Ministry of Trade. Production is planned to start by 1959.

Of the 12,380 million yen required for the plan, 1,500 million yen will be provided by direct fiscal investment from the Government and 7,800 million yen by a low cost loan from the Japan Development Bank. Private industrial companies will put up 1,500 million yen, while commercial banks are expected to supply the remaining 1,580 million yen.

Initial annual production will amount to 27,000 tons of GR-S and 3,000 tons of latex. Total production for the following years is expected to be: 1960, 35,000 tons; 1961, 40,000 tons; and 45,000 tons annually from then onwards. Selling prices are estimated to be: GR-S, 220 yen per kg. and latex 300 yen per kg.

After initial deficits in 1959 and 1960 it is estimated that the company will show a profit and should declare a dividend of 10 per cent after 1962. It may then be placed in the hands of private businessmen.

The Ministry of Trade is trying to persuade private industrial groups to drop plans to build synthetic rubber plants capable of producing 15,000 tons annually and to support the Ministry's project. Japan's rubber requirements were expected to increase from 112,000 tons this year to 150,000 tons in 1962.

DIARY DATES

MONDAY 29 OCTOBER

Chemical Society

Durham: Science Laboratories, The University, 5.15 p.m. 'Nucleotide Structure and Function' by Professor J. Baddiley.

Leicester: University College, 4.30 p.m. 'Recent Advances in the Chemistry of Bile Salts' by Professor G. A. D. Haslewood.

Institute of Industrial Administration

Manchester: Lesser Free Trade Hall, 7 p.m. 'Operational Research—Its Application to Industrial Problems' by Professor R. W. Revans.

TUESDAY 30 OCTOBER

Chemical Society

Belfast: The Queen's University, 7.45 p.m. 'Metal Atoms, in Covalent Compounds, as Aromatic Systems' by Dr. J. Chatt.

WEDNESDAY 31 OCTOBER

Chemical Society

Manchester: College of Technology, 6.30 p.m. Meeting for the reading of original papers.

THURSDAY 1 NOVEMBER

Royal Society

London: Burlington House, Piccadilly W1, 4.30 p.m. The Leeuwenhoek Lecture: 'The Biochemical Organisation of the Bacterial Cell' by E. F. Gale.

Royal Institute of Chemistry

Kingston: Technical College, Fassett Road, 6.30 p.m. 'Chromatography' by Dr. Tudor S. G. Jones.

Chemical Society

London: Chemistry Department, University College, Gower Street WC1, 2.30 p.m. and 7.30 p.m. Symposium on 'Newer Interpretations of Reactions and Structure in Carbohydrate Chemistry.' Afternoon session, 2.30 p.m.-5.30 p.m.: 'Some Physical Methods used in the Determination of Carbohydrate Structures' by E. J. Bourne; 'Tosyl Esters and Three-membered Oxide Rings' by J. C. P. Schwarz; 'Conformational Aspects of the Formation and Reactions of Certain Cyclic Derivatives of Carbohydrates' by A. B. Foster. Evening session, 7.30 p.m.-9.30 p.m.: 'Hydrolysis of Glycosides' by W. G. Overend; 'Reactions of Halogenosugars' by R. U. Lemieux.

Bristol: Chemistry Department, The University, 7 p.m. Tilden Lecture: 'Physical Properties of High Polymers in relation to their Chemical Structure' by Professor G. Gee.

Liverpool: Chemistry Lecture Theatre, The University, 5 p.m. 'Chemistry at Extreme Temperatures' by Professor G. Porter.

Nottingham: Lecture Theatre, Chemistry Department, The University, 4.45 p.m. 'Elaboration Products of Eucarvone' by Professor R. A. Raphael.

St. Andrews: Chemistry Department, St. Salvators College, St. Andrews, 5.15 p.m. Lecture by Professor Wilson Baker.

Institute of Metals

London: Royal School of Mines, South Kensington SW7, 7 p.m. 'Primitive Metallurgy' by Professor F. C. Thompson.

Leeds Metallurgical Society

Leeds: Large Chemistry Theatre, The University, 2 p.m. 'Powder Metallurgy Applied to Mechanical Parts' by H. Davies.

Institute of Metal Finishing

Manchester: Engineers' Club, Albert Square, 7.30 p.m. 'Cleaning Technique in the Metal Finishing Industry' by H. G. Patching and J. E. Entwistle.

FRIDAY 2 NOVEMBER

Royal Institute of Chemistry

London: St. Ermin's Hotel, Caxton Street SW1, 7 for 7.30 p.m. Eighth annual dinner and dance.

Chemical Society

Dublin: Chemistry Department, Trinity College, 7.45 p.m. 'The Birth and Death of Free Radicals in Polymerisation' by Dr. C. H. Bamford.

Southampton: Chemistry Department, The University, 5 p.m. 'Some Applications of Radiochemistry' by Dr. R. Spence.

Society of Chemical Industry

Manchester: The University, 4.30 p.m. 'Optical Effects in Polymers under Strain' by Dr. L. G. R. Treloar.

Liverpool: Nicholson Theatre, The University, 7.30 p.m. 'Synthesis of Fat by Micro-Organisms' by Professor T. K. Walker.

Society of Cosmetic Chemists

London: Royal Society of Arts, John Adam Street WC2, 7.30 p.m. 'Silicones in the Cosmetic Industry' by T. W. Watson.

Continuous Power

Free Piston Engine System for ICI Plant at Billingham

INSTALLATIONS for a new chemical plant project at the Billingham Division of ICI Ltd. include the Pescara free piston engine system to drive, through gas turbines, several large rotary gas compressors. Fifteen 1,000 h.p. GS-34 gasifiers are to be used. The majority are being supplied by Sigma and the remainder by the Free Piston Engine Co. Ltd., in conjunction with Alan Muntz & Co. Ltd.

The free piston engine system is considered to be particularly suitable for the supply of continuous power for a chemical processing plant for the following reasons: Insensitivity of the gasifier to any kind of oil fuel so that the cheapest available fuel can be used; total power is divided between a number of independently operating units each of 1,000 h.p. and thus an additional and predetermined number of stand-by units can be arranged giving an inherent reliability to the plant as a whole; final power drive is through turbines, the characteristics of which can be matched to the performance of the rotary compressors. It is to these latter that technical attention is being increasingly attracted.

'Blown Up' Hut

DEVELOPED by Elliot Equipment Ltd., Llwynpia, Rhondda, S. Wales, the Numax hut is composed of an inflatable low pressure framework with a rubberised fabric covering. It provides a clear floor space of 30 ft. by 19 ft. with a height of 9 ft. The floor of tough rubberised fabric is detachable; windows are made of best flexible clear plastic and can be opened. Doors at each end can be opened from either side by quick fasteners. One man can erect the hut in less than three minutes by means of a small electric blower connected to a car battery, or by hand or foot pump in 30 minutes. Fastening points are provided for electric light and telephone fittings. Paraffin stoves may be used for heating.

The Numax hut has been used as temporary accommodation on building sites, as temporary offices or canteens, store sheds, garages etc.

CHEMICAL EXPORTS 15% UP

But Position Not Satisfactory in UK

SPEAKING at the annual general meeting of the Association of British Chemical Manufacturers on 11 October, Mr. G. F. Williams, chairman, said that in the dollar markets, in the face of powerful American competition, Britain exported chemicals to the value of £22 m. in 1955 which represented seven per cent of all dollar exports of manufactured goods. This year, to date, there was an increase of nearly 15 per cent.

'But,' continued Mr. Williams, 'we must not rest on these laurels.' A recent Board of Trade report showed that between 1951 and 1955 the UK share of the world's trade in chemicals dropped from 17.3 per cent to 16.7 per cent while the German share increased from 13.5 per cent to 17.4 per cent. The overall export picture is worse; from 1950 to 1955 the UK share dropped from 25.5 per cent to 19.8 per cent while the German share rose from 7.3 per cent to 15.6 per cent. This is a clear indication of the growing German competition which we have to meet. Therefore, price restraint by itself will not solve the problems with which the country is faced, unless the breathing space which it gives is used to bring down costs in order to maintain and, if possible, improve our competitive position in the export markets.'

Council's Report

Presenting the report of the council and the accounts for the year ending 30 June 1956, Mr. Williams referred to the instrumentation appreciation conference held in April. 'In summing up the proceedings of the conference, Mr. A. J. Young, chairman of our instrumentation advisory committee, invited firms to submit details of any of their plants which they thought would benefit from instrumentation. The instrumentation advisory committee,' continued Mr. Williams, 'was willing to select one of them and prepare a complete plan with estimates of cost for its instrumentation, together with an economic statement indicating the likely financial benefits to be gained. The committee would supervise the execution of the job and the only proviso was that when the work had been done and the economic benefits ascertained in practice, the firm would give permission to use and publicise the information as a case history. This,' said the chairman, 'is a generous offer of which firms with little or no instrumentation should take full advantage.'

Referring to the special report on the chemical industry which was prepared and submitted, at his request, to the President of the Board of Trade in 1949 and the supplement of factual data published four years later, the chairman said that the council had now decided to prepare a second supplement, indicating the position at the end of 1956. The questionnaire will follow the lines of that used for 1953, which was much simpler than that of 1949, and members should be able to answer it from their normal records without much trouble. The council hopes that all members concerned will submit their returns as soon as possible after the end of 1956 to ensure the early publication of the supplement.

Joint Safety Council

Mr. Williams went on to draw attention to the establishment of the joint British Chemical Industry Safety Council by the ABCM and the Association of Chemical & Allied Employers. 'It is hoped that all members will give it their utmost support. The need for obtaining complete accident and sickness statistics is imperative and I certainly hope that members who, for one reason or another, have not supplied their figures in the past will do so regularly in future, in their own interests and those of the industry in general,' added Mr. Williams.

Pfizer Antibiotic

PFIZER LTD., Folkestone, simultaneously with the parent company in New York, announced on 17 October a new antibiotic named Sigmamycin.

A statement issued from the company's British headquarters at Folkestone said that it marked 'a striking advance in the treatment of all infections for which antibiotics are used' and was the answer 'to one of medicine's great and growing problems today—the patient's toleration to antibiotic treatment and the emergence of microbial resistant strains.'

The statement goes on to say that the combined spectra of two antibiotics—tetracycline and oleandomycin—have produced the desired result. 'The Americans are calling it a multidimensional antibiotic. It demonstrates the phenomenon of synergistic activity. By this is meant that the action of each antibiotic is greater in combination than when used singly. It is a new concept of the principle of antibiotic therapy.'

Rumanian Chemicals

Large-Scale Development Programme Worked Out

A LARGE scale programme for developing the chemical industry in Rumania has been worked out for the next 10 to 15 years, according to an article in the September issue of the *Information Bulletin* published by the Rumanian Chamber of Commerce.

Rumania, according to the article, possesses considerable resources of raw materials required by the chemical industry: Crude oil, dry gas, coal, reed, timber, salt, non-ferrous and non-metallic ores, together with electrical energy needed for processing.

Work is under way at present for the completion of a number of constructions for the chemical industry, which were begun during the first Five Year Plan. Before the end of the year a new superphosphates unit will be commissioned at the Petri Poni plant at Valea Calugarescea, as well as a sulphuric acid factory of 30,000 tons a year output.

New Units

Also during 1956 units producing acetic acid and acetone from acetylene made from dry gas were put into service. At the Turda chemical plant a new unit for the manufacture of polyvinyl chloride is being constructed.

The capacity of the Colorom factory at Codlea and of the Spic factory at Bucharest will be considerably increased by the commissioning of new sections for intermediary products and fast dyestuffs.

An important chemical works is to be built in Moldavia, where the construction has already begun of an electrolytic soda plant fitted with the latest type of machinery. It is estimated that the annual output of this factory will be 30,000 tons of soda a year. In the same region the construction will begin this year of an azotic fertiliser factory with an annual output of 150,000 to 200,000 tons, and of a synthetic fibre (Perlon) factory, the first of its kind in Rumania.

Developments are also planned in the petrochemicals field.

An oxygen factory in course of construction at Bucharest will consist of two units, each producing 200 cubic metres of oxygen an hour. The phosphate fertiliser factory of Navodari, with 100,000 tons estimated annual capacity, and the soda factory of Govora, with 150,000 tons estimated annual capacity, are other plants whose construction has recently started.

Footnote **Rumanian imports of chemicals from this country in September of this year amounted to only £377, compared with £7,453 for September 1955.**

Fire Hazards of Radioactive Materials

IN A RECENT LECTURE to Manchester Insurance Institute on the fire hazards of radioactive materials, Mr. D. I. Lawson pointed out that such materials are not more flammable than their non-radioactive counterparts. However, the danger is that radioactive substances may be dispersed by fire and either the materials themselves or the radiations they give off could be absorbed in sufficient quantity to give rise to untoward biological effects. The lecturer dealt first with the biological effects of radiation and then considered what steps can be taken to avoid dispersing radioisotopes in fires.

Reducing Hazards

Accepted ways of reducing radiation hazards are shielding, remote controlled manipulation or handling, distance from radioactive materials and least possible exposure to radioactivity. It is these latter two measures which can be considered the most important in a fire emergency. Fortunately the range of alpha and beta particles in air is limited, so that at a distance of a foot or so from the source of radiation, radioactivity falls to an insignificant level. Also, exposure to radiation over a limited period of time, as in fire fighting, would not cause sustained damage.

Radioactive materials are to be found, at present, in Government research laboratories, nuclear power stations, and to some extent, in industrial and chemical research laboratories and hospitals. Personnel in Government departments handling radioactive substances and fire brigades attached to the departments all receive special instructions as will persons engaged for nuclear power stations. It is largely in chemical separation processes for uranium and plutonium and in the treatment of waste materials that there is a danger of dispersing radioactive compounds should fire occur rather than through explosions or fires in reactors.

Radioactive substances are now being used more widely in industry. Thus they are used in the petroleum industry for tracing the flow of oil in pipes, in the motor industry for lubrication studies on cylinders, and in metallurgical laboratories for measuring infinitesimally small quantities of metals. Chemical research laboratories are now using radioactive atoms to track any one particular element in a reaction and similarly radioactivity is used in plant and animal nutrition experiments and in medicine. The future will undoubtedly see further applications of radioactivity.

At the present time there are no factory regulations dealing with general handling of radioactive isotopes in industry but advice can be obtained from the factory department of the Ministry of Labour and National Service, and the industrial section of the Atomic Research Establishment at Harwell. The former is informed of all deliveries of radioactive materials, and the appropriate district staff are then notified. Visits are made to establishments where it is thought that advice may be necessary.

Mr. Lawson dealt with the transport of radioactive materials by post, rail and road, and then considered fire-fighting and radioactivity. He quoted the following advice given by Mr. Edward J. Keyhoe of the US Atomic Energy Commission when fire-fighting involves radioactive substances. Thus, firemen should consult and comply with on-the-spot recommendations from trained personnel associated with the project; breathing apparatus should be worn to avoid the intake of radioactive particles through mouth and lungs; unnecessary disturbance, or stirring-up of any materials, or smashing laboratory glassware or apparatus should be avoided, the use of water should be minimised to prevent radioactive materials being washed away and dispersed; handling of apparatus, materials etc., with bare hands should be avoided; and stay in the fire area should not be longer than is necessary. Such precautions are the same as those which would be taken in dealing with a fire in any chemical plant.

The lecturer concluded with a consideration of insurance for atomic projects. Up to now no settled policy has been formulated in this country, but current belief in the US is that reactors are insurable at commercial rates; and they will be considered in the category of the more hazardous types of chemical reaction.

FLUID LEVEL CONTROLS

Automatic Switching Device

AN ECONOMICAL and trouble-free means of automatically switching electrically powered pumps, signal lamps and alarm devices in relation to the level of electrically conductive fluids, or their foams, contained in storage tanks, sumps, boreholes and process vessels has been devised by Electronic Switchgear (London) Ltd. One or two metal dipsticks are employed to detect the rise or fall of level above or below one or two pre-selected points in the containing vessel. Effective operation is independent of vibration, turbulence, temperature or pressure. As there are no moving or intricate parts, clogging and failure to contact with floating debris, or harbouring of contaminating matter in tanks used for processing foodstuffs and pure chemicals etc., do not occur.

There is a selection of control relay units available to suit almost every industrial application. Type RC1 control is stated to be suitable for all installations handling water or other fluids which have specific resistances of less than 50,000 ohms/cm^3. Type RC2 control is suggested for a liquid resistance of up to 20 megohms. Both controls are available in two forms—Form 'H', in which the relay is energised when the level is beneath both dipstick electrodes and Form 'L' in which the relay is de-energised when fluid is beneath both electrodes. Various dipstick electrode holders are available.

by
Peter Pain M.A.

Restrictive Trade Practices

INVESTIGATION OF AGREEMENTS

IN PREVIOUS articles I have outlined the classes of agreement which are registerable under the Restrictive Trade Practices Act and the machinery by which registration is effected. This brings me to the third and vital stage provided for by the new machinery —the examination of agreements before the Restrictive Practices Court.

It is the duty of the registrar to lay agreements which have been registered before the Court. The Court must then examine them and declare whether any of the specified restrictions (set out in my first article) are contrary to the public interest. If they are, the Court has certain powers to prevent their being acted upon.

Burden of proof lies upon the parties to the agreement; they must show that the restrictions are not contrary to the public interest. The Act lays down seven sets of circumstances which may justify a restriction. The parties must show that their restriction falls within one of these seven headings and must then go on to show that, having regard to the balance between such circumstances and any detriment to the public or persons not parties to the agreement, the restriction is not unreasonable.

Sets of Circumstances

The seven headings are as follows:

(a) *Safety of the Public.* A party must satisfy the Court that the restriction is reasonably necessary, having regard to the character of the goods to which it applies, to protect the public against injury (whether to persons or to premises) in connection with the consumption, installation or use of those goods. This is of considerable importance in the chemical industry, where many goods are inherently dangerous or require special skill in their installation. Manufacturers could use this heading to justify the restriction of the supply of dangerous goods to persons with the necessary know-how as to their use and the attendant dangers.

(b) *Benefit to the Public.* A party must satisfy the Court that the removal of the restriction would deny to the public as purchasers, consumers or users of any goods, specific and substantial benefits or advantages enjoyed or likely to be enjoyed by them, whether by virtue of the restriction itself or of any arrangements or operations resulting therefrom. It is under this heading that the most difficult cases are likely to arise. The whole problem of the benefits of a stable market controlled by the producer, as against a free market, will arise time and time again. The earlier decisions of the Court on this ground will give an important indication of its whole attitude to the problem of restrictive trading.

(c) *Protective Counter-Measure.* The Court must be satisfied that the restriction is reasonably necessary to counteract measures taken by any one person not party to the agreement, with a view to preventing or restricting competition in or in relation to the trade or business in which the parties to the agreement are engaged. This justification can be called in aid only where the restriction is undertaken as a means of protection against a single competitor. For this purpose interconnected companies or partners are regarded as being one person. If the single competitor is sufficiently large, it may be subject to investigation under the Monopolies Act.

(d) *Protection Against Monopoly Buyer or Seller.* The Court must be satisfied that the restriction is reasonably necessary to enable the parties to the agreement to negotiate fair terms:

(i) for the supply of goods to, or the acquisition of goods from, any one person not party thereto who controls a preponderant part of the trade or business of acquiring or supplying such goods; or

(ii) for the supply of goods to any person not party to the agreement and not carrying on such a trade or business who, either alone or in combination with any other such person, controls a preponderant part of the market for such goods.

Justification

In order to justify their restrictions under this head, the parties must show that it is necessary in order to obtain fair terms, whereas under (c) it had only been shown as a necessary counter-measure; or (d) would not provide a justification where the monopoly had acted fairly throughout and there were no grounds for suggesting it would do otherwise.

(e) *Effect on Employment.* A party must satisfy the Court that, having regard to the conditions actually obtaining, or reasonably foreseen at the time of the application, the removal of the restriction would be likely to have a serious and persistent adverse effect on the general level of employment in an area, or in areas taken together, in which a substantial proportion of the trade or industry to which the agreement relates is situated.

(f) *Effect on Export Trade.* The Court must be satisfied that, having regard to the conditions actually obtaining or reasonably foreseen at the date of the application, the removal of the restriction would be likely to cause a reduction in the volume or earning of the export business which is substantial, either in relation to the whole export business of the UK or the

The Restrictive Trade Practices Act

whole business (including export business) of the trade or business to which the restrictive agreement relates.

(g) *Ancillary Restrictions.* The Court must be satisfied that the restriction is reasonably required for purposes connected with the maintenance of any other restriction accepted by the parties, whether under the same agreement or under any other agreement between them. This latter restriction must be one which has been found by the Court not to be contrary to the public interest upon one of the grounds (a) to (f).

Court to Consider

Once an agreement is brought within one of these seven headings, the Court has to consider whether the restriction is or is not unreasonable having regard to the balance between the circumstances which have been proved and any detriment to the public. The Court has to consider any detriment to the public as a whole or detriment to persons who are not parties to the agreement and who are purchasers, consumers or users of goods produced or sold by the parties to the agreement. This includes persons purchasing, consuming or using such goods for the purpose or in the course of a trade or business, or for public purposes, or detriment to persons who are not parties to the agreement and who are engaged or seeking to become engaged in the trade or business of selling goods produced by the parties to the agreement, or producing or selling similar goods.

Reasonable or Unreasonable

Although the burden of proof lies on the parties to the agreement, they do not have to go so far as to prove that the agreement is reasonable. They have to establish that it is not unreasonable. Whatever the practical man may say, there is to the lawyer a substantial difference and in this case it is a great deal easier to establish the double negative.

Having regard to the importance of its task, it is fitting that the Restrictive Practices Court should be invested with the highest authority. It is to be a 'superior court of record' having the same powers, rights, privileges and authority as the High Court in England and Wales, the Court of Session in Scotland and the High Court of Northern Ireland. It does not form part of these courts or of the Supreme Court of Judicature.

The Court consists of five High Court judges and 10 lay members. Three of the judges are from England and Wales, and one each from Scotland and Northern Ireland. One of the judges will be nominated president. The lay members are appointed by the Crown on the recommendation of the Lord Chancellor for three-year periods. Unlike the judges they are removable; the qualification is knowledge of or experience in industry, commerce or public affairs.

The Court may sit as a whole or in divisions; there must be at least one judge, who presides, and two other members. The opinion of the judges is final on any question of law.

A restriction becomes void upon the Court declaring that it is contrary to the public interest. The Court may enjoin the parties to the agreement from giving effect to the restriction or making any other agreement to the like effect. Whether the whole agreement will be void depends upon the circumstances; broadly speaking it will be void where the extinguishing of the agreement destroys the whole foundation of the agreement. Where there has been a material change in the relevant circumstances the Restrictive Practices Court may vary a previous decision.

The Lord Chancellor is to make rules of procedure for the Court. The right of audience is safeguarded to a party by the Act itself. It seems probable that the rules will in the main follow fairly well established principles of judicial procedure.

Appeal lies on a question of law only to the Court of Appeal, Court of Session or Court of Appeal in Northern Ireland as the case may be. A further appeal on a point of law lies to the House of Lords.

(To be continued)

RESISTANCE THERMOMETERS

Remote Reading Type Developed

WHAT are claimed to be the most accurate remote reading resistance thermometers available commercially have been developed by Savage & Parsons Ltd., Watford, Herts. Overall accuracy is stated to be within plus or minus one degree—according to the meter employed—and a sensitivity of within plus or minus 0.1 degree C, thus allowing wide ranges of temperature variations to be accurately shown on the 4½ in. uniform scale of the meter.

The thermometers operate on the temperature/resistance change of a platinum sensing element, the small heat capacity of which makes the instrument extremely sensitive to temperature changes, with little time lag. Four models are available at present covering a range of temperature variations of: −50°C to 0°C; 0°C to 50°C; 50°C to 100°C; or 100°C to 150°C. Extensions to this range are being considered by the makers.

Self-Contained Unit

Sensing elements, which can be used at a distance from the instrument, are available in flat form, for attachment to surfaces and for interleaving, or alternatively in the conventional immersion form. The thermometer, with its heavy duty battery, forms a completely self-contained unit housed within the casing, and accurate thermometer readings are obtained throughout the 400-hour life of the battery. A strong, compact case encloses the unit, which weighs 12 lb. and measures about 12 in. by 11½ in. by 9½ in. The instrument has a wide range of applications in all branches of the process industry, from the manufacture of petroleum products and plastics materials, to biochemistry, baking and brewing.

Further details can be obtained from Savage & Parsons Ltd.

Food Additives

Recommendations in Stationery Office Report

EMULSIFYING and stabilising agents which can be added to foodstuffs are listed in *Food Standards Committee Report on Emulsifying and Stabilising Agents* (HM Stationery Office, 9d). It is recommended that, apart from certain substances which are natural constituents or common ingredients of food and need not be regulated, official approval should be restricted at present to the following substances:

Super-glycerinated fats, synthetic lecithin, propyleneglycol alginate, propyleneglycol stearate, methyl cellulose, methylethel cellulose, sodium carboxymethyl cellulose, stearyl tartrate, diacetyl tartaric acid esters of superglycerinated fats, monostearin sodium sulphoacetate, sorbitan esters of fatty acids.

The report, which was prepared by the Preservatives Sub-Committee of the Food Standards Committee, says that only substances which do not, on the available data or in certain cases by reference to their chemical formulation, present a health hazard in the amounts customarily used in foods should be regarded as suitable for inclusion in the permitted list of foodstuffs.

Rapid Development

In view of the rapid development of new substances the sub-committee consider that appropriate arrangements should be made for substances to be added to the permitted list if a strong case can be made for them on the grounds of advantage to the consumer, and provided there is adequate evidence that their use will present no health hazard.

The report recommends that the addition of emulsifying and stabilising agents to milk should not be allowed; that of the permitted substances only super-glycerinated fats and stearyl tartrate should be allowed in bread and that the existing prohibition on the use of thickening substances in cream should be extended to cover reconstituted cream.

The sub-committee do not consider it necessary or practicable to specify limits to the amount of a permitted emulsifying or stabilising agent which may be present in food. They stress, however, that the amount used should always be the smallest quantity consistent with the best commercial practice and recommend that specifications of purity for the permitted substances should be drawn up to ensure that they are of a high standard of purity when used in food.

Seaweed Research Institute

THE Institute of Seaweed Research, Inveresk, Musselburgh, Scotland, is being taken over by Arthur D. Little Inc., an US industrial research organisation. It is anticipated that considerable scientific staff will be employed. The Institute was set up to determine the scope for an industry based on seaweed, but the useful employment of the premises has been a matter of discussion since the decision to close down the Institute was announced earlier this year.

Portuguese Fertilisers

REPORTS on the use of chemical fertilisers appear in the Decree-Law dated 28 August. The following figures (in metric tons) are given:

Cereal Year	*Nitrates*	*Phosphates*	*Potassium*	*Total*
1952-53	178,009	365,076	9,716	552,801
1953-54	207,324	415,974	11,565	634,863
1954-55	232,932	361,087	12,360	606,379
1955-56 (provisional)	249,211	391,055	14,421	654,687

Average consumption of chemical elements in kilograms per cultivated hectare is shown in the following table:

	Nitrogen	*Phosphoric Anhydride*	*Potassium*	*Total*
1937	4.3	9.3	0.7	14.3
1953-54	12.1	21.0	1.7	34.8
1954-55	13.6	18.8	1.8	34.2
1955-56	14.6	20.9	2.1	37.6

This notable increase is considered to be due to the policy of the Portuguese Government, in force since 1937, of subsidising the sale of fertilisers. The Government recognise that further advances need to be made in the use of potash fertilisers. Also in view of the high acidity of a great proportion of the cultivated soil in Portugal (86.8 per cent) they wish to encourage the use of lime and they propose, therefore, to extend the subsidies in future to cover lime for agricultural purposes.

Sasol Progress

OUTPUT of ammonium sulphate at Sasol—the oil-from-coal organisation—is reported to be of the order of 40,000 tons a year. This is stated to meet about half of South Africa's demands for this fertiliser. Saving in foreign exchange is about £750,000. The chairman of Sasol, Mr. F. J. du Toit has, however, issued a warning that if the basic chemicals produced by the plant are not absorbed by local manufacturers, the organisation will have to depart from its present policy and process them.

Esso Refinery in Wales

Development Permission Being Sought

PERMISSION for the industrial development of approximately 1,000 acres of land in the Milford Haven area is now being sought by Esso Petroleum Co. Ltd.

Sir Leonard Sinclair, chairman and managing director of the company, has said that Esso is considering the erection on this site of a major oil refinery, but 'no final decision can yet be made to build the plant, and no forecast is possible of the timing of the project'.

Esso's plans provide for a refinery with a capacity of five million tons a year throughput, and with marine facilities for berthing tankers of the largest forseeable tonnage.

£20 Million Cost

Such a plant would require a capital investment of about £20 million, and would provide regular employment for approximately 2,000 persons. Construction would occupy up to 5,000 men over a period of two and a half years. At least a year would be needed to complete the design and planning stages before building began.

It is understood that these developments are the outcome of long-term planning of the company's future expansion. The initial purchases of land were made more than 18 months ago, and further purchases have been made subsequently. There is no connection between the present proposals and recent international events.

German Aluminium

CONSUMPTION of aluminium in the Federal Republic is rising rapidly and dependence on imported supplies has become more marked. There is full utilisation of productive capacity but completion of the reconstruction of the plant at Grevenbroich will raise it by 12,000 tons to a total of about 150,000 tons. The state-owned United Aluminium Company of Bonn which is responsible for more than 70 per cent of German aluminium production is considering the building of a new plant. A major factor is the problem of obtaining adequate supplies of electric power at low cost. The choice of site, therefore, is likely to fall on the Rhineland area where new generating plants based on their own coal resources are planned by electric power producers.

★ PUBLICATIONS AND ANNOUNCEMENTS ★

WITH the newer developments in electronic design, in television, radar and communications has come demands for new and more efficient components, for conductive ceramics, for semi-conductors and resistors, for magnetic ceramics, for new insulating materials, and for chemical and metallurgical materials possessing closely defined electrical or magnetic properties. The Chemical and Metallurgical Division of the Plessey Co. Ltd., has now introduced just such a new range of components and materials to meet developments in electronic design. Technical information, applications and performance data are available to design engineers in a brochure entitled *Plessey at Towcester*. The company will issue from time to time technical data sheets which will describe fully the properties of products of the Plessey Chemical and Metallurgical Division. The present brochure has a pocket to provide for the storage of these sheets. The brochure (and further information) is available from the Plessey Co. Ltd., Chemical and Metallurgical Division, Wood Burcote Way, Towcester, Northants.

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CARBON BLOCK heat exchangers are being made in UK in two sizes, standard and small, under licence from Le Carbone-Lorraine of Paris by Robert Jenkins & Co. Ltd., Rotherham. The company has issued a leaflet (number 11) describing these heat exchangers which are said to have proved popular in France, but are entirely new to this country. Both sizes of exchanger consist of a pile of impermeable cylindrical graphite blocks having two groups of flow passages for two different heat exchange fluids. One group is parallel with the axis and the second group is arranged radially.

★

THE ELIMINATION of electro-static charge from the surface of polystyrene materials is discussed in technical service bulletin No. P6/3 *Anti-Static Finishes for Polystyrene* published by Monsanto Plastics Ltd., 10-18 Victoria Street, London SW1. Among temporary destaticisers may be mentioned common household detergents which are best used in the proportion of 1 part detergent, 1 part glycerine and 64 parts water. Buffing compounds are also suitable temporary destaticisers as are deionising salt sprays. There are a number of proprietary anti-static agents on the market. Arquad 18, made by Armour & Co. Ltd., has been tested by Monsanto and found satisfactory. Permanent removal of static charge can be obtained by the use of certain lacquers. Lacquers have the advantages that they can be combined with colourants and used as a decorative finish. Lacquered polystyrene has an improved scratch resistance and gloss.

A CATALOGUE describing goods manufactured for the chemical, food and distillation trades has been issued by Bennett, Sons & Shears Ltd., 9-13 George Street, Manchester Square, London W1. Included in this catalogue is an account of an absolute alcohol plant which is in operation at the Government central laboratory, Nasik Road, Bombay, and a sea water distillation plant which is part of the second stage of a water supply scheme for the state of Qatar. For each stage of this scheme a sea water distillation plant consisting of three sets of triple-effect evaporators with an output of 150 tons of distilled water a day per set, has been supplied by Bennett, Sons & Shears.

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VACUUM ultra-violet spectroscopy and stellar spectra are considered in a recent *Hilger Journal* (Vol. III No. 1. August 1956). Vacuum spectroscopy has been of academic interest since 1919 but today industrial spectroscopists are finding the vacuum ultra-violet a useful region of the spectrum for analytical purposes, Mr. J. R. Stansfield lists the desired criteria for the spectrography and deals with problems encountered in vacuum spectroscopy.

★

TWO TECHNICAL bulletins describing p.v.a. emulsions for paint manufacture have been issued by British Oxygen Chemicals Ltd. *Technical Bulletin No. 12* and *Technical Bulletin No. 13* describe the properties and main uses of Vandike emulsions 1100, 1107, 1115, and 1120. This series has been specially formulated for use in the manufacture of emulsion paints. It also has uses such as in the production of textile finishes. Vandike 1100 is unplasticised and Vandike 1107, 1115, and 1120 contain seven per cent, 15 per cent and 20 per cent dibutyl phthalate respectively. Vandike 5100, which is described in *Technical Bulletin No. 12*, is a general purpose unplasticised p.v.a. emulsion of higher viscosity.

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TECHNICAL BULLETINS to cover the complete range of products manufactured by Price's (Bromborough) Ltd., at Bromborough Pool have now been issued. One publication concerns fatty alcohols, another is on the subject of fatty acids and a third deals with oleines and stearines. In addition to setting out the specification for each individual product, the typical composition is featured, together with suggested uses and the type of pack employed. Copies of these technical bulletins can be obtained on application to Price's (Bromborough) Ltd., Bromborough Pool, New Ferry, near Birkenhead.

Chemical Plant & Equipment

SOME RECENT DEVELOPMENTS

AT ITS new fermentation plant near Sandwich, Pfizer Ltd. cultivates antibiotics effective in the treatment of over 100 diseases. Within the refining area, which is the final sterile state of the manufacturing process, and the filling rooms, pharmaceutical products are handled under strictly controlled aseptic conditions. Air is supplied at 65° F dehumidified by a Birlec direct dehumidifier, manufactured by BIRLEC LTD., BIRMINGHAM, capable of maintaining relative humidity well below 20 per cent.

Activated alumina, the drying agent employed in Birlec direct dehumidifiers, is a granular, porous material, which is chemically inert and does not break into powder in service. It will readily dry gases to dew points of minus 70°C (1.5 p.p.m.) or lower.

SMOKE density equipment Mk. 1, manufactured by KELVIN & HUGHES LTD. was being shown for the first time at the Fuel Efficiency Exhibition. It was designed to meet the need for a simple, low cost, accurate and reliable means of measuring smoke emission and is said to be suitable for all types of boiler plants.

The basic equipment comprises a smoke detector assembly (transmitter and receiver units). This can be supplied with any one, or combination of, three additional instruments—indicator, recorder and alarm circuit. The equipment is unaffected by voltage variation.

The design of the equipment is based upon the principle of absorption of light by solid matter in the flue gas. A beam of light from the transmitter unit is focused across the stack or flue to the receiver unit containing a barrier layer photo cell. The output of this is fed to the indicating, recording and alarm units.

AN AUTOMATIC bagging scale, manufactured by RICHARDSON SCALE CO. CLIFTON, NJ, incorporates an important safety feature. The pneumatic mechanism that closes the bag clamps around the spout is designed to apply high pressure only during the last 1/16 in. of the clamps' travel. In this way all danger of the operators' hand being hurt in the mechanism is eliminated. Opening and closing of the Richardson bag holder is controlled by a foot valve and an air control unit, leaving the operator's hands free to attach and remove bags, thus increasing filling speeds and bagging rates.

The system operates on air pressure from 30 to 40 p.s.i. and requires two cu. ft. of free air per minute compressed to 60 p.s.i. for 10 cycles per minute. Standard bag holders are equipped with round or oval spouts in various sizes to suit the bags to be filled. A small-diameter slip-on spout is available for manual filling of small bags, with the spout held in place by the Richardson Universal bag holder. Burlap, cotton, paper or lined bags can all be held by this holder and also gussetted multi-wall paper bags without damaging the gussets.

The Universal bag holder can be combined with automatic scale and packer operation, so that opening and closing of the clamping device can be synchronised with weighing and packing. It is also available in a manually operated model. Other Richardson bag holders include the Swellgrip, airtight system for handling toxic materials; the Cablegrip for large bags; and a cam grip holder.

THE Wayne contactless self-winding electric cable reel has been specially developed for use where there is a danger that fine particles of dust in the atmosphere as a result of a number of chemical processes might be ignited by a spark. Manufactured by POWER HOUSE COMPONENTS LTD., NOTTINGHAM, the cable reel has an unbroken rubber cable between the point of contact with the machine being supplied with current and where it is connected up to the electric supply point.

CHEMICAL drying trays made with Cellobond polyester resin and glass fibre are now being employed in the works of John & E. Sturge Ltd. These trays are manufactured by MICROPLAS LTD., MITCHAM, who use a special chemical resistant filler with the resin. Rigidity is achieved by moulding a cruciform member into the bottom of the tray.

In use the tray is loaded with 30 to 40 lb. of wet chemical paste, which is then dried in an oven at a temperature of up to 250° F.

The manufacturing specification for the chemical requires that the maximum metallic contamination must not be greater than one or two parts per million. With enamelled iron trays formerly employed, this specification was difficult to meet. The manufacturers claim that the new type of tray has successfully overcome this problem. Cellobond polyester resins are manufactured by British Resin Products Ltd.

THE British Transport Commission and the Port of London Authority have just placed orders with F. E. WEATHERILL LTD., WELWYN GARDEN CITY, for Epping auto-shunters.

Powered by the Fordson four-cylinder Diesel engine and designed to cross or work over high railway track, the Epping shunting tractor can move loads of up to 180 tons. With a fuel consumption of only half a gallon per hour, this machine is claimed to provide one of the cheapest means of dealing with many shunting problems.

HANDLING and storage costs for jute and multiwall paper sacks can, it is claimed, be reduced by using the Strong-Scott bag flattener, an American machine now distributed by WILLIAM PALFREY LTD., LONDON. The machine smooths and flattens filled sacks, expelling surplus air, thus eliminating wasteful air space and so speeding up stacking rates. Loaded onto a conveyor belt the sacks pass beneath a pressure roll, with adjustable pressure and clearance of seven to 12 inches. The machine is powered by a one h.p. enclosed electric motor (60 cycle, 3 phase, 220 volt). Overall dimensions of the standard model are 32 in. wide, 44 in. high and 82 in. long. The belt, 20 in. wide, moves at 32 ft. per minute, and 300 to 500 bags of up to 100 lb. in weight can be flattened per hour.

Chemical Plant & Equipment

For bags from 125 to 250 lb., there is a Jumbo model, similar to the standard, but with a 30-in. belt and overall dimensions 42 in. by 54 in. high by 96 in. long. All models, which are constructed of steel throughout, are completely portable on swivel casters. For convenience in loading hand trucks, flatteners which operate on an incline can be supplied.

BY MAKING use of gamma radiation, the nucleonic level indicator, designed by BALDWIN INSTRUMENT CO. LTD., DARTFORD, KENT, has the advantage that nothing needs to be inserted in the container. Both the isotope and the detector are simply fixed to the outside. The gamma-emitting isotope is placed on one side of a container and a detector on the other. Radiation passes from the isotope, through the container, to the detector (a Geiger counter). The output from the detector is proportional to the amount of radiation which it receives. Thus, when the contents of a container are below the radioactive 'beam', maximum radiation will be received by the detector. When the contents rise the beam is cut and the radiation reaching the detector will be substantially smaller. The difference in radiation reaching the detector is shown as a difference in electrical output from the Geiger counter, and this is arranged to operate a relay. An indicator unit houses the relay and two lamps show whether the 'beam' is broken or not. The relay can be incorporated in an automatic control circuit.

Two heads can be fitted to the container to indicate maximum and minimum levels, or a movable head can be fitted so that the level can be determined at any given time.

As the operation of the relay is dependent in the first instance on the difference in radiation, it is possible to detect the boundary between, for example, two liquids having substantially different densities (the lower the density, the greater will be the amount of radiation passing through).

A LIQUID level switch has been developed by TEDDINGTON INDUSTRIAL EQUIPMENT LTD., SUNBURY-ON-THAMES, MIDDLESEX, for the control and indication of liquid level in tanks, boilers, sterilisers and industrial vessels.

Operating on a new principle, this switch (type WX) has no moving parts. It is said to be suitable for installation where the interior of the vessel being controlled is not readily accessible for cleaning or repair.

The switch is a thermal instrument operating on a difference in heat transfer between the sensitive element and the liquid in the vessel, or the sensitive element and the vapour.

This principle, patented in the UK, gives a sensitive response; changes of level in the order of $\frac{1}{2}$ in. are sufficient to operate the switch. The operating mechanism is temperature compensated.

Two models are available offering alternative methods of mounting. Production will commence during December.

NEW TYPES of protective gloves for men and women concerned with chemical handling and manufacture are being introduced by MARTINDALE ELECTRIC CO. LTD., LONDON. One type of glove has a chrome leather palm and thumb with a knitted 2-in. wrist and twill back, for protection of the hand during light manual (and assembly) work. Another type of glove for similar work is of cotton twill.

A NEON signal lamp with snap-in fixing for ease of installation has been introduced by ARCOLECTRIC (SWITCHES) LTD., WEST MOLESEY, SURREY. A standard model is available for 200/250 V. Other models are available for all mains voltages. The built-in neon tube is mounted lengthwise to obtain maximum light output. The prismatic lens may be coloured red or amber, or clear.

A NEW RANGE of p.v.c. fans under the trade name 'Turbro-Cyclone' has been designed by TURNER & BROWN LTD., chemical plant engineers, of Bolton, in association with MATTHEWS & YATES LTD., fan engineers, of Swinton, Manchester. The fans are fabricated throughout from olive green 'Cobex' rigid p.v.c. sheet, which is tough and light, dimensionally stable and non-inflammable. It also possesses inherent corrosive-free characteristics against both weathering and chemical attack. Such construction makes these fans ideal for all kinds of fume removal installations which handle chemical and corrosive fumes and moist gases etc., at temperatures not exceeding 140°F.

Especially designed for fume cupboards, cabinets and small laboratories is a small fan unit with direct coupled motor. Other fans have larger outputs, and are available either direct coupled or with vee-rope drives. In all cases a totally enclosed motor wound for either single or three-phase electrical supply is employed. Eight angles of discharge can be arranged with either rotation. The multivane impeller incorporates a mild steel hub which has a p.v.c. covering extending over the shaft and to the outside of the casing to ensure protection against chemical elements. All motors-support frames and bases are in a matching stove enamelled finish. Delivery at present for all sizes is four weeks.

HEPBURN CONVEYOR CO. LTD., ROSA WORKS, WAKEFIELD, have obtained sole manufacturing rights in Great Britain of the shot blasting and dust control equipment of the Pangborn Corporation of Hagerstown, Maryland, US, and the selling rights for Great Britain, the sterling area and non-exclusive rights for many other countries including Germany and India. Pangborn Corp. have been manufacturing this type of equipment for fifty-two years and are probably the greatest authority on this type of machinery in the world.

The company hope to be in production on the 6 ft. Rotoblast table room model and the 6 cu. ft. Blastmaster before the year end, and to have prototypes ready in the spring of 1957. There are more than 28,000 Pangborn machines serving industry today.

Leaflets on the above machines will be available at an early date.

AN ANSWER to the problem of corrosion of laboratory sink traps is the new glass sink trap marketed by QVF LTD., of Stone, Staffordshire. The QVF sink trap has the advantages of chemical stability and transparency. The latter property means that the trap can be visually inspected at all times and blockages can be dealt with in the earliest stages.

Traps and sink wastes are in standard fittings and can be fitted in the normal manner to all sink waste outlets. The company can also supply the QVF standard range of Visible Flow pipelines, thus enabling a drain system to be constructed entirely in glass.

Algerian Petroleum Research

OIL has been struck at Tiguentourine (70 kilometres west of Edjele, near the frontier between Algeria and Lybia) by the Compagnie de Recherches et d'Exploitation de Petrole au Sahara (Creps) which reported finding oil at Edjele last March. Initial output of the new sounding was 4 cubic metres per hour.

Chemist's Bookshelf

CALDER HALL. *By* KENNETH JAY. Methuen & Co. Ltd., London. *1956.* Pp. vii+88. *5s.*

Sub-titled 'The Story of Britain's First Atomic Power Station' this book tells in straightforward terms the history of the design and building of Calder Hall, the first atomic power station to operate on an industrial scale. Although intended for the layman (and this does not necessarily mean the non-scientist), the background information contained here will be of interest to many directly concerned with atomic energy.

The first two chapters describe the preliminary ideas and plans and show how these culminated in the choice of reactor. The building of Pippa, the chosen reactor, is then described in considerable detail.

A further chapter, called 'Answers for the Engineers: The Role of Research,' gives an account of the many details, large and small, which had to be studied by the research groups of the Atomic Energy Authority.

The final chapter considers the future of atomic power and is probably the most important chapter in the book. It is a pity it is so short for much is hinted at that could well be expanded into a book the length of the present one. Nevertheless this final chapter should give a fair idea of the potentialities, limitations and, most important to the general public, cost of atomic power in the future. J.P.S.J.

QUANTITATIVE CHEMICAL ANALYSIS. *By* CUMMING & KAY. 11th edn. revised by R. A. CHALMERS. Oliver & Boyd Ltd., Edinburgh. *1956.* Pp. xvi+540. *30s.*

In its previous 10 editions, 'Cumming & Kay' has formed the basis of the analytical training of countless students in universities and technical colleges throughthe country. This new revised edition will perform this same service even more satisfactorily. Dr. Chalmers is to be congratulated in his careful selection of those older methods which had to be omitted from the new text and for his wise choice of new material. He has succeeded most admirably in introducing those trends in the practice of modern analytical chemistry which have obviously come to stay, for example, ion-exchange methods, chromatography, solvent extraction processes, radioactivation methods, polarography, etc. Indeed one wishes that the author had developed this side of the book somewhat more thoroughly and provided more practical exercises than he eventually decided. However it is difficult to decide where to draw the line and, in this respect, it is noteworthy that the text avoids the all too common pitfall of giving experimental details for the use of, say, one particular firm's polarograph etc.

New features in the present edition are: A new section on colorimetry and spectrophotometry with very many exercises; a brief non-mathematical treatment of the nature of precipitates in gravimetric analysis; and a chapter on the elementary aspects of modern physiochemical methods of analysis. The chapter on water analysis has been deleted on the grounds of specialisation and the main subject matter of the text has been brought up to date. The specifications of the BSI have been used in the treatment of volumetric measurements and calibration of titrimetric apparatus.

It is debatable whether water analysis is more specialised than, say, gas analysis. Indeed the latter topic has changed little over the past few years, while the technique of water analysis has been influenced greatly by recent advances in reagent chemistry. For example, it would have made an excellent peg on which to hang the fascinating new topic of complexometric titration which has arisen as a result of Schwarzenbach's 'Complexone' work. Dr. Chalmers has by no means neglected the use of ethylenediaminetetraacetic acid (EDTA) in writing his text, although it might be thought that modern usage would justify a special chapter devoted to these new-found complexometric methods.

Reference is made on p. 163 to the use of mercurous nitrate as a reductimetric titrant. The method given for the standardisation is a most unsatisfactory one. Recent work has shown that potassium dichromate may be used as a primary standard. The scope of mercurous nitrate is much wider than is indicated in the text and the use of a stoppered bottle for the titration is superfluous since stoichiometric relationships exist when open conical flasks are used in the normal way.

This is only one minor blemish in a book which is well-balanced, well-written and refreshingly modern in outlook. It still carries the solid backbone of fundamental analytical chemistry which is so essential to the education of the chemist, even in these days of push-button instrumentation. The eleventh edition can be recommended with confidence. T. S. WEST

Antifreeze Properties

INFORMATION about the basic properties of various antifreezes is contained in *Automotive Antifreezes,* National Bureau of Standards Circular 576, from the Government Printing Office, Washington 25, DC, US. Certain types of antifreeze, says the publication, have potentially hazardous effects which are not generally known. In addition to giving technical data on the corrosion that may result from their use, information is also provided on the identification of the various types. A by-product of the Bureau's activities in connection with the development of standards of physical measurement, the circular contains information accumulated over a period of 35 years. Price is 15 cents and foreign remittance must be in US exchange and should include an additional one-third of the price for postage.

British Chemical Prices

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

LONDON The industrial chemicals market has been without any special feature during the past week and prices generally are unchanged at recent levels. Home users have been calling for steady deliveries against contracts. Interest in new business, although fairly widespread, is inclined to be restricted to spot and nearby requirements. Export trade continues good and, with few exceptions, the supply position is adequate. In the coal-tar products market there has been a good outlet for the light products; cresylic acid and carbolic acid continue in active request.

MANCHESTER Leading Lancashire consumers of heavy chemical products, including the textile bleaching and finishing sections, are taking reasonably satisfactory deliveries under contracts and a fair number of additional inquiries have been dealt with on the Manchester market during the past week, including some from shippers. Quotations generally are on a steady basis. There is a fair movement in several sections of the fertiliser market, including basic slag and the compounds. The position of the tar products is much the same as of late, with the leading light and heavy materials being called for steadily.

GLASGOW A reasonable week's trading is reported from the Scottish heavy chemical market. A varied range of chemicals have been demanded, with the bulk required for immediate delivery, although deliveries against contracts are being fairly well maintained. Prices show little or no change and, generally speaking, have been steady. Exports continue satisfactorily, with a good volume of inquiries received.

General Chemicals

Acetic Acid.—Per ton: 80% technical, 10 tons, £91; 80% pure, 10 tons, £97; commercial glacial, 10 tons, £99; delivered buyers' premises in returnable barrels (technical acid barrels free); in glass carboys, £8; demijohns, £12 extra.

Acetic Anhydride.—Ton lots d/d, £132 per ton.

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

Aluminium Sulphate.—Ex-works, £15 10s per ton d/d. MANCHESTER: £15 15s to £18 10s.

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

Ammonium Chloride.—Per ton lot, in non-returnable packaging, £29 2s 6d.

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

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

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £106 and £97 10s per ton.

Antimony Sulphide.—Crimson, 4s 5d to 4s 10½d; golden, 2s 8½d to 4s 1¾d; all per lb., delivered UK in minimum 1-ton lots.

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

Barium Carbonate.—Precip., d/d; 4-ton lots, £40 10s per ton, bag packing.

Barium Chloride.—£49 per ton in 2-ton lots.

Barium Sulphate (Dry Blanc Fixe).—Precip., 2-ton lots, £35 per ton d/d.

Bleaching Powder.—£28 12s. 6d per ton in returnable casks, carriage paid station, in 4-ton lots.

Borax.—Per ton for ton lots, in hessian sacks, carriage paid: Technical, anhydrous, £62 10s; granular, £42; crystal, £44 10s; powder, £45 10s; extra fine powder, £46 10s; BP, granular, £51; crystal, £53 10s; powder, £54 10s; extra fine powder, £55 10s.

Boric Acid.—Per ton for ton lots, in hessian sacks, carriage paid: Technical, granular, £71; crystal, £79 powder, £76 10s; extra fine powder, £78 10s; BP granular, £84; crystal, £91; powder, £88 10s; extra fine powder, £90 10s.

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

Chlorine, Liquid.—£38 5s per ton, in returnable 16-17-cwt. drums, delivered address in 3-drum lots.

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

Chromium Sulphate, Basic.—Crystals, 8⅛d per lb. delivered (£75 16s 8d per ton).

Citric Acid.—1-cwt. lots, £10 5s cwt.

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

Copper Carbonate.—3s 9d per lb.

Copper Sulphate.—£94 10s per ton f.o.b., less 2% in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £11 12s.

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

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

Glycerine.—Chemically pure, double distilled 1.260 SG, £12 9s 0d per cwt. Refined pale straw industrial, 5s per cwt. less than chemically pure.

Hydrochloric Acid.—Spot, about 12s per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s 6d per lb.

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

Iodine.—Resublimed BP, 16s 2d per lb., in 28-lb. lots.

Iodoform.—£1 5s 5d per lb., in 28-lb. lots.

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

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

Lead Nitrate.—About £135 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red, £142 15s; orange lead, £154 15s. Ground in oil: red, £160 15s; orange, £172 15s.

Lead, White.—Basis prices: Dry English in 5-cwt. casks £147 15s per ton. Ground in oil: English, 1-cwt. lots 194s per cwt.

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

Litharge.—£144 15s per ton, in 5-ton lots.

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

Magnesium Carbonate.—Light, commercial, d/d, 2-ton lots, £84 10s per ton, under 2 tons, £92 per ton.

Magnesium Chloride.—Solid (ex-wharf), £16 10s per ton.

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

Magnesium Sulphate.—Crystals, £16 per ton.

Mercuric Chloride.—Technical powder, £1 3s per lb., in 1-ton lots; smaller quantities dearer.

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

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

Nitric Acid.—80° Tw., £35 per ton.

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

Phosphoric Acid.—Technical (s.g. 1.700) ton lots, carriage paid, £100 per ton; BP (s.g. 1.750), ton lots, carriage paid, 1s 3½d per lb.

Potash, Caustic.—Solid, £93 10s per ton for 1-ton lots; liquid, £34 15s.

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

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

Potassium Dichromate.—Crystals and granular, 1s 1½d per lb., in 5-cwt. to 1-ton lots, d/d UK.

Potassium Iodide.—BP, 12s 6d per lb. in 28-lb. lots; 12s 0d in cwt. lots.

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

Potassium Permanganate.—BP, 1-cwt. lots, 1s 9d per lb.; 3-cwt. lots, 1s 8½d per lb.; 5-cwt. lots, 1s 8d per lb.; 1-ton lots, 1s 7¾d per lb.; 5-ton lots, 1s 7¼d per lb.; Tech., 5-cwt. packed in 1-cwt. drums, £8 14s 6d per cwt.; packed in 1 drum, £8 9s 6d per cwt.

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

Salicylic Acid.—MANCHESTER: Technical 2s 8½d per lb. d/d.

Soda Ash.—58% ex-depot or d/d, London station, about £16 8s per ton, 1-ton lots.

Soda, Caustic.—Solid 76/77%; spot, £32 6s 6d per ton d/d (4 ton lots).

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

Sodium Bicarbonate.—Per ton lot, in non-returnable packaging, £17.

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

Sodium Carbonate Monohydrate.—Per ton lot, in non-returnable packaging, paid address, £57.

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

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

Sodium Dichromate.—Crystals, cake and powder, 11¼d per lb. Net d/d UK, anhydrous, 1s 1d per lb. Net del. d/d UK, 5-cwt. to 1-ton lots.

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

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

Sodium Iodide.—BP, 15s 11d per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, paper sacks, £133 per ton.

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

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

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

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

Sodium Phosphate.—Per ton d/d for ton lots; di-sodium, crystalline, £40 10s, anhydrous, £88; tri-sodium, crystalline, £39 10s, anhydrous, £86.

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

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

Sodium Sulphate (Glauber's Salt).—£9 5s to £10 5s per ton d/d.

Sodium Sulphate (Salt Cake).—Unground, £6 per ton d/d station in bulk. MANCHESTER: £7 per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot, £33 2s 6d per ton, d/d, in drums in 1-ton lots; broken, £34 2s 6d per ton, d/d, in drums in 1-ton lots.

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

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

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

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

Titanium Oxide.—Standard grade comm., with rutile structure, £172 per ton; standard grade comm., with anatase structure, £154 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d, white seal, £115; green seal, £113; red seal, 2-ton lots, £110 per ton.

Solvents & Plasticisers

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

Butyl Acetate BSS.—£165 per ton, in 10-ton lots.

***n*-Butyl Alcohol BSS.**—10 tons, in drums, £152 per ton d/d.

***sec*-Butyl Alcohol.**—5 gal. drums, £159; 40 gal. drums: less than 1 ton, £124 per ton; 1 to 10 tons, £123 per ton; 10 tons and over, £119 per ton; 100 tons and over, £120 per ton.

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

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

Dibutyl Phthalate.—In drums, 10 tons, 2s per lb. d/d; 45-gal. drums, 2s 1½d per lb. d/d.

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

Dimethyl Phthalate.—In drums, 10 tons, 1s 9¼d per lb. d/d; 45 gal. drums, 1s 10½d per lb. d/d.

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

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

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

Ethyl Alcohol (PBS 66 o.p.).—Over 300,000 p. gal., 2s 11¼d; 2,500-10,000 p. gal., 3s 1¾d per p. gal., d/d in tankers. D/d in 40/45-gal. drums, 1d p.p.g. extra.
Absolute alcohol (75.2 o.p.) 5d p.p.g. extra.

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

Methylated Spirit.—Industrial 66° o.p.: 500 gal. and over in tankers, 5s 4d per gal. d/d; 100-499 gal. in drums, 5s 8½d per gal. d/d. Pyridinised 64 o.p.: 500 gal. and over in tankers, 5s 6d per gal. d/d; 100-499 gal. in drums, 5s 10½d per gal. d/d.

Methyl Ethyl Ketone.—10-ton lots, £140 per ton d/d.

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

***iso*Propyl Acetate.**—In drums, 10 tons, £130 per ton d/d; 45-gal. drums, £136 per ton d/d.

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

Rubber Chemicals

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

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

Carbon Tetrachloride.—Ton lots, £81 per ton.

India-Rubber Substitutes.—White, 1s 7¾d to 1s 11½d per lb.; dark, 1s 4d to 1s 6¾d per lb. delivered free to customers' works.

Lithopone.—30%, about £55 per ton.

Mineral Black.—£7 10s to £10 per ton.

Sulphur Chloride.—British, about £50 per ton.

Vegetable Lamp Black.—£64 8s per ton in 2-ton lots.

Vermilion.—Pale or deep, 15s 6d per lb. for 7-lb. lots,

Coal-Tar Products

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

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

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

Cresylic Acid.—Pale 99/100%, 6s 4d per gal.; 99.5/100%, 6s 6d per gal. D/d UK in bulk: Pale ADF from 7s 3d per imperial gallon f.o.b. UK, 95 cents per US gallon, c.i.f. NY.

Naphtha.—Solvent, 90/160°, 5s per gal.; heavy, 90/190°, 3s 11d per gal. for bulk 1,000-gal. lots, d/d. Drums extra; higher prices for smaller lots.

Naphthlene.—Crude, 4-ton lots, in buyers' bags, £18 6s 0d to £29 19s 6d per ton nominal, according to m.p.; hot pressed, £41 19s 0d per ton in bulk ex-works; refined crystals, £61 10s 0d per ton d/d min. 4-ton lots.

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

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

Toluole.—Pure, 5s 9d; 90's 5s 0d per gal. d/d. 1,000 gal. in bulk. MANCHESTER: Pure, 5s 9d per gal. naked.

Xylole.—5s 11½d to 6s 3½d per gal., according to grade, in 1,000 gal. lots d/d London area in bulk.

Intermediates & Dyes
(Prices Nominal)

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

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

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

Dichloraniline.—4s 6d per lb.

Dinitrobenzene.—88/99°C., 2s 1d per lb.

Dinitrotoluene.—SP 15° C., 2s 1½d per lb.; SP 26° C., 1s 5d per lb.; SP 33° C., 1s 2½d per lb.; SP 66/68° C., 1s 11d per lb. Drums extra.

***p*-Nitraniline.**—5s 1d per lb.

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

Nitronaphthalene.—2s 5½d per lb.

***o*-Toluidine.**—1s 11d per lb., in 8/10-cwt. drums, drums extra.

***p*-Toluidine.**—6s 1d per lb., in casks.

Dimethylaniline.—3s 5d per lb., drums extra, carriage paid.

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.

LANGSTON JONES & SAMUEL SMITH LTD., London E., oil & tallow refiners. —25 September, series of £20,000 debentures, present issue £15,000; charged on Compton Works, Bow Common, & fixed plant etc. Nil. 12 December 1955.

WILBERFORCE TURNER & CO. LTD., Manchester, soap manufacturers etc.— 27 September, mortgage & charge to Midland Bank Ltd. securing all moneys due or to become due to the Bank; charged on Irwell Mills, Broughton, Manchester & Clough Mills, & cottages, Little Hayfield, with machinery, fixtures etc. Also a general charge.

Increases of Capital

HOECHST CHEMICALS LTD. (432,234), 50 Jermyn Street, London SW1, increased by £50,000, in 48,000 ordinary and 2,000 non-voting non-redeemable shares of £1 each, beyond the registered capital of £50,000.

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

Changes of Name

CAN CHEMICALS LTD. (535,355), 46 Brook Street, London W1, changed to Soapmaster Ltd., on 28 August, 1956.

ROMAC-OCP LTD. (382,501), manufacturers of water conditioning apparatus, The Hyde, London NW9, name changed to RDE Ltd., on 17 August 1956.

New Registrations

Irish Methyl Ltd.

Private company. (16,239). Registered in Dublin, 21 September. Capital £25,000 in £1 shares. Objects: To carry on the business of manufacturers of industrial and mineralised methylated spirit and finishes etc. The directors are: Norbert Murphy and Ronald Murphy, both of Lauriston, Glanmire, Co. Cork; and Stephen Murphy, Myrtlehill, Tivoli, Co. Cork.

Metallic Surfaces Research Laboratories Ltd.

Private company. (573,120.) Registered 18 October. Capital £1,000 in £1 shares (900 seven per cent redeemable cumulative preference and 100 ordinary). The permanent directors are: Robert L. Samuel, 32 Dordrecht Road, Acton, London W3; and Norman A. Lockington, 19 Spring Grove, Loughton, Essex. Secretary: R. L. Samuel. Registered office: The Market House, Uxbridge, Middlesex.

Pestcure Sales Ltd.

Private company (572,838). Registered 12 October. Capital £100 in £1 shares (75 'A' ordinary and 25 'B' ordinary). The directors are: Edward H. B. Boulton and Mrs. Dora I. Boulton, both of 'Detillens', Limpsfield, Surrey. Solicitors: J. R. Greenop & Co., 212 High Holborn, London WC1.

September Exports

Chemicals Nearly £3 Million Less Than a Year Ago

EXPORTS of chemicals for September were nearly £3 million less than for September 1955. The actual figures are £17,937,879 compared with £20,738,155. On the other hand the total figures for the nine months ended 30 September are higher at £179,812,457 compared with £172,256,211 for the previous year.

India and Australia were again the largest importers of British chemicals at £1,507,767 and £1,178,147 respectively.

The following is a short breakdown of the export figures:

Basic chemical elements and compounds	£4,561,100
Coal tar products	£452,277
Synthetic dyestuffs	£703,404
Paints, pigments and tannins	£1,714,168
Medicinal and pharmaceutical products	£2,434,386
Essential oils, perfumes, soaps, polishes etc.	£2,155,660
Fertilisers	£42,883
Plastics	£1,948,324

Beckton Model

A SCALE MODEL of the plant built by the APV Co. at the Beckton by-products works of the North Thames Gas Board was presented to the Science Museum on 16 October. Also made by APV, the model, which is built to a scale of $\frac{3}{8}$ inch to one foot, will form a permanent part of the display in the new organic industrial chemistry gallery of the Science Museum.

The model was formally handed over by Dr. Richard Seligman, chairman of APV, and received on behalf of the museum by the director, Dr. T. C. S. Morrison-Scott.

Constructed by Mr. A. F. Spittle of Southall, Middlesex, the model is three feet wide by three feet high by one foot nine inches deep and took one and a half years to build.

WILL

MR. NOEL DOUGLAS RIDSDALE, of 21 Bedford Road, Nunthorpe, Middlesbrough, Yorks, analytical chemist, managing director of Ridsdale & Co., metallurgical analysts, Middlesbrough, of the Bureau of Analysed Samples, Middlesbrough, and chairman of Glycoline Lubricant Co. Ltd., Stillington, who died on 17 July, left £34,870 7s 11d gross, £34,635 6s 8d net value. (Duty paid £10,529).

CANADIAN EXPANSION

Petrochemical Industry's Output

CANADA'S petrochemical industry, a result of western oil development, is advancing with a programme of full scale expansion.

The industry estimates its current investment in capital equipment at almost $500 million. Since 1945 the industry's output has quadrupled to 700 million lb. and is rising rapidly. Estimates for expansion total $200 million.

Dow Chemical of Canada Ltd., a relative newcomer to the Canadian petrochemical field, illustrates the pace of expansion. Since breaking ground for its first plant about 10 years ago, Dow of Canada has increased its investment at a rate of about $500,000 per month. The company's current $10 million programme for its Sarnia, Ontario, plant will raise the total investment to more than $50 million.

Developments in western Canada's oil and gas fields have an important bearing on the petrochemical industry. Dow of Canada, for instance, has recently ordered stepped-up construction for its new $1 million ethanolamines plant at Sarnia.

The company expects that demand for ethanolamines, used in the purification of natural gas as well as for detergents and other uses, will soar as the Trans-Canada pipe line natural gas line moves eastward. Other projects high on the list of Dow expansion projects are: Ethylene, a basic material for anti-freeze, synthetic fibres, resins, plastics, production of which is being expanded 100 per cent. Dow, already the biggest producer, is increasing production of ethylene glycol by 30 to 35 per cent.

New plant now being built for the manufacture of pentachlorophenol will go on stream early in 1957. This is claimed to be Canada's first plant for manufacturing this chemical which is an ingredient of wood preservatives.

Engineering work on a new plant to manufacture Styrofoam is under way. Styrofoam is a combined insulator and plaster base. Expansion in the manufacture of Styron is under way, and planning of additional plant facilities for producing latex is reported.

India's Dyestuffs Industry

THE GOVERNMENT of India has received project reports from three leading dyestuffs manufacturers, Montecatini (Italy), Imperial Chemical Industries (Great Britain) and Bayer (Germany). There is fundamental agreement among the three companies over the practicability of establishing a dyestuffs industry in India.

Italian Nuclear Research

A NEW company, the Societa Richerche Impianti Nucleari (Sorin), with a capital of 100 million lire, which is to be raised later to 1,000 million lire has been set up in Milan by Fiat and Montecatini. It will concentrate on experimental work with nuclear power plant. A draft law providing 3,300 million lire for research in the field of nuclear energy has been approved.

Classified Advertisements

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

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

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

SITUATIONS VACANT

ASSISTANT METALLURGICAL CHEMIST required for important work on new metal finishing processes. Minimum qualifications Inter.-B.Sc. standard and preferably experience of development work on cleaning and phosphating.—Apply, in confidence, to the Managing Director, Roto-Finish Ltd., Mark Road, Hemel Hempstead.

LATEX OR RUBBER CHEMIST
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.

OFFICIAL APPOINTMENTS

COUNTY BOROUGH OF ROCHDALE
SENIOR SEWAGE WORKS CHEMIST

Applications are invited for the above appointment at a salary within Grade A.P.T. IV, £710-£885.

Associate Membership of the Institute of Sewage Purification will be an advantageous though not necessary qualification. If qualified, the person appointed will act as Assistant to the Sewage Works Manager.

Housing accommodation will be provided by the Council in appropriate circumstances.

Further particulars may be obtained from the Borough Surveyor, Town Hall, Rochdale, to whom applications should be sent by 9 a.m. on Wednesday, 7th November, 1956.

Canvassing will disqualify and candidates must disclose whether they are related to any member or senior official of the Council.

K. B. MOORE,
Town Clerk.

GOVERNMENT OF NORTHERN RHODESIA
PHYSICIST/CHEMIST (MALE OR FEMALE), MINES DEPARTMENT

QUALIFICATIONS: M.Sc. or B.Sc. (Hons.) with majors in chemistry and physics. Knowledge of microscopy essential.

AGE LIMIT: Up to 44 years.

DUTIES: To undertake research into the problems of Silicosis particularly in connection with analysis of mine dust samples by X-ray diffraction and by chemical methods. To set up and equip a laboratory at the Headquarters of the Mines Department in Northern Rhodesia.

TERMS OF APPOINTMENT: On probation to the pensionable establishment with salary in the scale £905—£1,850 p.a. (for a woman the scale is lower). Free passages. Furnished quarters at rental. Free medical attention Generous leave. Income tax at local rates.

Apply to Director of Recruitment, Colonial Office, London, S.W.1. State age, qualifications and experience. Quote BCD 99/3/04.

OFFICIAL APPOINTMENTS: continued

CHEMIST

A vacancy exists in the Technical Policy Branch of the Industrial Group of the **UNITED KINGDOM ATOMIC ENERGY AUTHORITY**, at its Headquarters at Risley, Warrington, Lancs.

DUTIES:— To work in a team engaged in the preparation of long-term programmes dealing with the overall demands likely to be made on the various Establishments of the Industrial Group—such as reactor operations, chemical processing, metal fabrication and gaseous diffusion plants and on all other activities connected with the production organisation. Active participation in this work will provide a very good introduction to the whole field of Atomic Energy.

QUALIFICATIONS AND EXPERIENCE:—Applicants should have an Honours Degree in Chemistry or have equivalent qualifications. Some experience in the analysis and presentation of plans and programmes is desirable.

The successful candidate will be given a period of training in the specialised processes of Atomic Energy.

SALARY:—will be assessed within the scale £1,235 to £1,655 per annum.

A contributory Pension Scheme is in operation.

An Authority house for renting by the successful candidate, if married, may be available in due course, or alternatively, substantial assistance may be given towards legal expenses incurred in private purchase.

Suitably qualified persons are invited to send a **POSTCARD** quoting ref. 1658 for application form to the Recruitment Officer, U.K.A.E.A., I.G.H.Q., Risley, Warrington, Lancs.

Closing Date—9th November, 1956.

COUNTY BOROUGH OF BRIGHTON WATERWORKS DEPARTMENT
ASSISTANT CHEMIST AND BACTERIOLOGIST (MALE OR FEMALE)

Applicant should possess either Degree in Chemistry or A.R.I.C. Waterworks experience desirable but not essential.

Salary Grade A.P.T. III (£640-£767).

Appointment superannuable subject to medical examination terminable by one month's notice on either side.

Application forms from Waterworks Engineer, 12 Bond Street, Brighton.

W. O. DODD, Town Clerk, **BRIGHTON**
19th October, 1956.

GOVERNMENT OF HONG KONG
Chemist, Medical Department.

QUALIFICATIONS: Honours degree in chemistry or A.R.I.C. or F.R.I.C. Minimum of 3 years post-qualification experience. Preferably under 35.

DUTIES: General analytical and supervisory work.

TERMS OF APPOINTMENT: Permanent and pensionable terms with emoluments in the scale £1245-£2179 p.a. temporary cost of living allowance, free passages for officer and family, furnished quarters if available at rental, free medical attention and generous leave. Income tax at local rates.

Apply to Director of Recruitment, Colonial Office, London, S.W.1 State age, qualifications and experience. Quote BCD.117/51/018

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STAINLESS STEEL TANKS, PANS, CONDENSERS, PLATES, VALVES AND COCKS. Very wide selection.
4 new **ALUMINIUM CONDENSERS,** 14 ft. long, 2 ft. 3 in. dia., 386 tubes $\frac{7}{8}$ in. o.d.

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BROADBENT 36in. HYDRO EXTRACTOR for sale, Vulcanised fibre basket, open type lid with electrical interlock. 10 h.p. B.T.H. motor and starter for 400/3/50. Excellent condition. **F. J. EDWARDS LIMITED, 359, EUSTON ROAD, LONDON N.W.1.**

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Stothert & Pitt Type 95 Screw Displacement Pumps with Flameproof E.E.C. $3\frac{3}{4}$ h.p. Motor mounted on cast iron bedplate complete with Flameproof Automatic Star Delta Starter. Capacity 100 G.P.M. of spirit.

20 sets available.

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Telephone: L.B. 3400.

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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" MORWOOD " "U"-shaped TROUGH MIXERS—up to 2 tons, in stainless steel, with agitators, scroll or paddle type, jacketed or unjacketed.
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100g., 150g., and 200g., new, in mild steel, for 100 lb. p.s.i. w.p.—with or without mixing gear.
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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.
200g. cast-iron **JACKETED MIXING VESSEL** with nickel-chrome impellor type agitator driven through bevel gears from fast and loose pulley.

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21 in. **EQUAL TO NEW,** galvanized baskets, electrically driven through centrifugal clutch or belt driven. Safety inter-locks.

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Inquiries Invited.

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PORCELAIN LINED BALL MILL by Torrance, 7ft. 6 in. by 6 ft. diam. ext. mild steel casing, 16 in. sq. manhole with two strainers. Motorized 400/440/3/50, Charge of flint pebbles included.
SILEX LINED BALL MILL by Glabour, 64 in. diam. by 58 in. ext. mild steel casing, fitted $9\frac{1}{2}$ in. diam., inlet and 17 in. by 12 in. manway. Pulley drive through internal girth gear.
STEEL SILEX LINED BALL MILL, approx. 54 in. by 54 in. diam. inside linings, lining approx. 3 in. thick. Pulley drive through girth gear and pinion. Two rectangular feed openings with covers and grinding media retaining grids. Pedestal mounted. Grinding charge.
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2,400 gall. **PRESSURE TANK** 24 ft. by 4 ft. 6 in.—125 w.p.
1,750 and 1,350 gall. **REC: ALUMINIUM TANKS.**
625, 850, 2,000, 2,500, 3,750 and 5,000 gall. **GLASS LINED TANKS.**
"Banbury" Type Twin Blade Jac: **PUG MIXERS** 18 in. by 12 in. by 20 in.—10 h.p. 400/3/50.
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S.S. 100 gall. **JAC: PAN** and **MIXER** 60 and 25 w.p.
S.S. AUTOCLAVE 6 ft. by 3 ft.—100 w.p.
8 ft. 6 in. **MONEL CASED WORM CONVEYOR** 11 in. diam.
'Z' and FIN BLADE MIXERS, PUMPS, PANS, HYDROS, CONDENSERS, etc.

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