Chemical Age

I.C.I. WILTON POLYPROPYLENE PLANT STORY

(page 989)

VOL. 84 No. 2161

10 December 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

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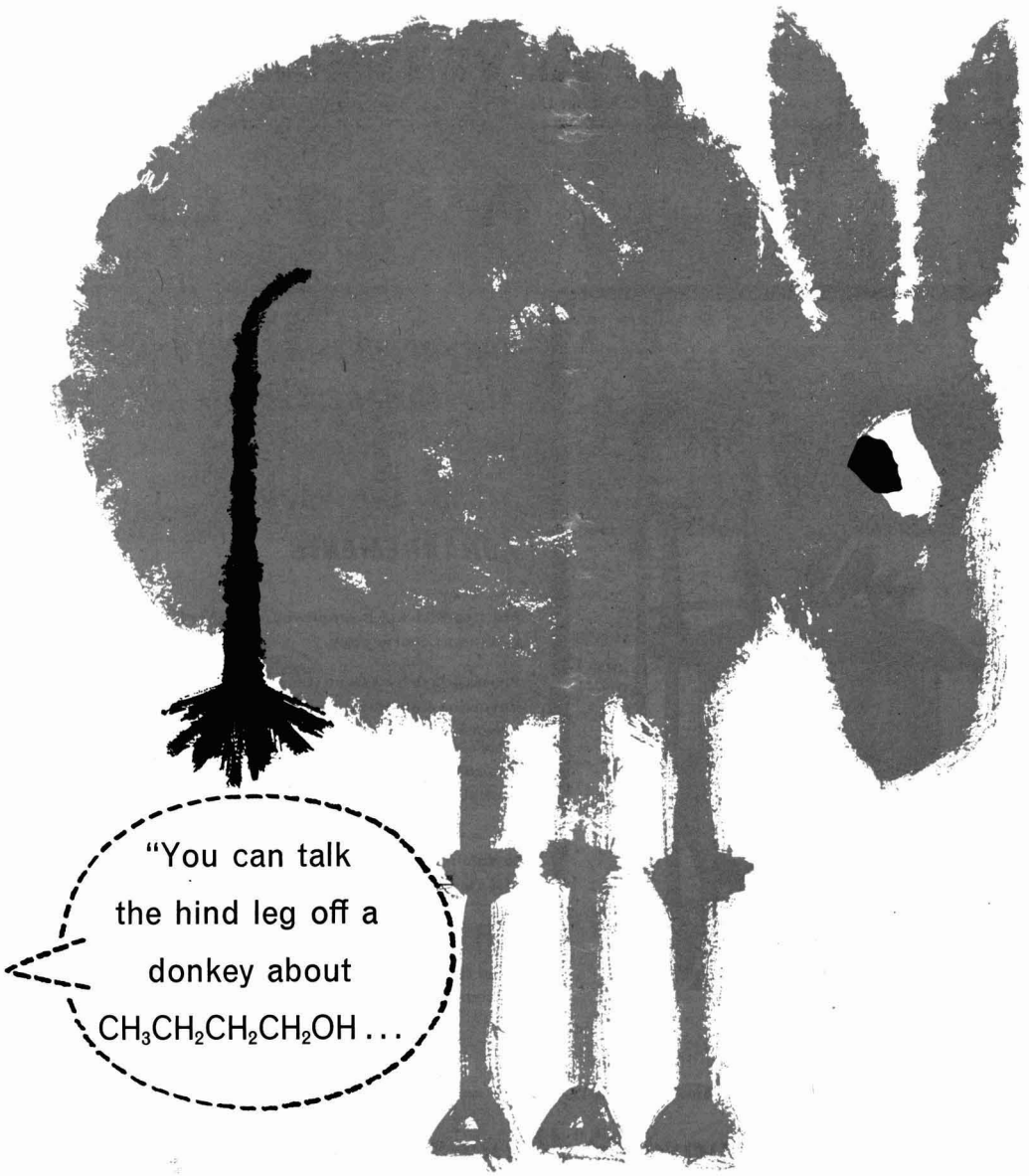

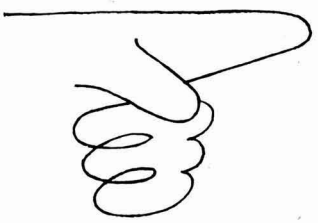

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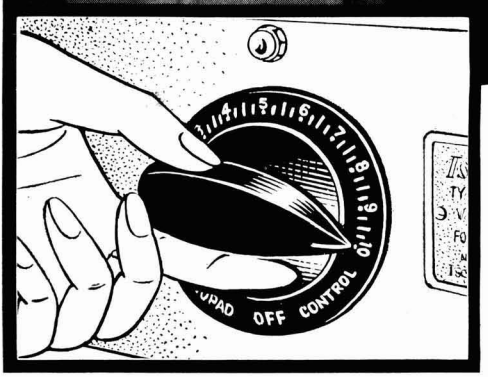

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IN THIS ISSUE

Annual subscription is: home, 52s 6d, overseas, 60s, single copies 1s 6d (by post 1s 9d)

CHEMICAL AGE

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NYLON FOR THE U.K.

THE news that Imperial Chemical Industries are hoping to acquire a new, cheaper process for caprolactam manufacture from the U.S.S.R., as revealed by the company's chairman during his Soviet tour (see page 987) adds to the steadily mounting evidence that lively competition in the U.K. nylon market is impending. Early this year Algemene Kunstzijde Unie N.V. (A.K.U.) of the Netherlands declared their plans to manufacture nylon in the U.K. in collaboration with their associate British Enka Ltd.—who in 1956 obtained licences from British Nylon Spinners to produce nylon 6. Next, it was revealed that Courtaulds Ltd. had acquired rights to produce caprolactam in the U.K. by the Snia Viscosa process, developed by Società Nazionale Industria Applicazione Viscosa of Milan. Courtaulds' subsidiary British Celanese had also been granted nylon 6 licences by British Nylon Spinners, and are believed to have carried out a considerable amount of development work on nylon 6 yarn.

Meanwhile, I.C.I. had given an inkling of their plans to build a £10 million, 15,000 tons/year plant for production of nylon 6, the location of which has yet to be revealed. At an I.C.I. meeting in Blackpool on 18 November, the company's chairman, Mr. S. P. Chambers, referred to the fact that British Nylon Spinners (in which I.C.I. have a joint interest with Courtaulds) were again increasing the scale of their operations, and said that I.C.I. were adding to their polymer capacity to meet requirements.

Figures for production of nylon polymer in the U.K. are not published but the latest reliable estimate for yarn production is that of 47 million lb. in 1958, while British Nylon Spinners' expansion programme is expected to bring capacity to 70 million lb. in 1961. Total production of all non-cellulosic fibres, of which nylon is thought to take a share of about 70%, was around 66 million lb. in 1958. Imports of nylon yarn from the U.S. took a big jump from 399,000 lb. in 1957 to some 1 million in 1958.

It is difficult to prophesy the ultimate position of nylon production in the U.K. but the interest in nylon 6 (and hence in the raw material, caprolactam) is intriguing because the bulk of U.K. and U.S. production at present is of the 66 polymer, while Germany (both East and West), the U.S.S.R. and its associated countries tend to show more favour to nylon 6 production.

The caprolactam production process chosen in a particular case will obviously depend very largely on the raw materials available to individual producers as well as on localised production economics. The nature of the Soviet caprolactam process for which I.C.I. hope to obtain a licence is not clear but it would be surprising if it proved to have any edge over the simple and elegant Snia Viscosa process, which, using toluene as the starting material, has decided advantages over processes which start from phenol or use the complex benzene-via-cyclohexane route. It was reported in CHEMICAL AGE, 19 November (page 865) that Allied Chemical, New York, who are the only U.S. producers of caprolactam, and who have hitherto used phenol, have obtained exclusive U.S. and Canadian rights of the Snia Viscosa process.

It is possible to foresee that nylon will in the future face much stiffer competition from Terylene and other new fibres in meeting the demands

(*Continued on p. 986*)

Big U.S. Expansion Plans for Isocyanate Production

THE U.S. boom in polyurethane foams is responsible for the current expansion plans of isocyanate producers. Foam demand is expected to increase by some 200% by 1965. As already announced, Allied Chemical are tripling their capacity at Moundsville, W. Va., with from 8 to 25 million lb./year. Construction is in hand and is scheduled for completion by the middle of next year. Allied are also to make polyethers at a 20 million lb./year plant, with completion scheduled for mid-1961.

Also due on stream by the middle of next year is an extension to Mobay's tolylene diisocyanate capacity at New Martinsville, W. Va. This will raise capacity to 40 million lb./year. A few months ago the company completed an expansion from 18 million to 25 million lb./year.

According to *Chemical Week*, 12 November, Du Pont are raising their isocyanate capacity from an annual 25 million lb. to 35-40 million lb. with extensions to their Deepwater, N.J., plant that are due for completion in the first half of 1961.

Nopco, who are installing a new polyurethane foam unit at Chattanooga, Tenn., with a capacity for 4 million lb./year of foam, are planning to produce their own isocyanates. Capacity will be about 10 million lb./year with production due to start early in 1962. Their new foam plant is due in production early in 1961. In addition, Nopco have capacity at North Arlington, N.J.. for an annual 14 million lb. of foam.

Carwin Co. will shortly come on stream with a 500,000 lb./year plant at Houston, Tex., to produce special isocyanates for high-temperature foams.

(As stated in CHEMICAL AGE, 27 August, p. 311, I.C.I. Dyestuffs Division is currently building a major isocyanates plant at Fleetwood, Lancs.)

Distillation Trays Solve Waterworks CO_2 Removal Problem

A NINETY-FIVE per cent reduction of the CO_2 content of water is achieved at one of the works of the East Surrey Water Co. by the use of a specially designed deaeration unit comprising five Glitsch 'ballast' distillation trays mounted in an asphalt-lined brick tower 11 ft. high and with internal dimensions of 8 ft. by 5 ft. The plant treats up to 40,000 gall./hr. of water, the CO_2 content being reduced from 40 p.p.m. to 2-3 p.p.m.

Removal of carbon dioxide from public water supplies is desirable to prevent corrosion trouble. When the East Surrey Water Co. increased the output of its Westwood station by the addition of two boreholes, which supplied water with a CO_2 content of 40-45 p.p.m., it was desired to aerate this water in such a way that the station could be run on a semi-automatic basis with the minimum of maintenance, and at the same time remove enough of the CO_2 to render chemical treatment unnecessary.

The company approached Metal Propellers Ltd., of Croydon, who designed the special unit. The design duty was to reduce the CO_2 content from 45 p.p.m. to 5 p.p.m. (the latter figure being guaranteed) when the pumping rate was 40,000 gall./hr. Further, the plant was required to be capable of treating a minimum flow of 10,000 gall./hr. The design problems were difficult since economics only permit a very small quantity of air to be used, which must be evenly spread out across the tray area necessary to handle this high water flow rate. In this particular case the problem was further complicated by the requirement for at least 4:1 flexibility.

The plant is now stated to be working satisfactorily and giving the performance indicated above. At full output two blowers are used giving 1,430 cu. ft./min. of air at 25¼ in. w.g., with a current consumption of about 9 kw/hr., i.e. at a cost of about 1s/hr. The air inlets to the blowers are fitted with filters.

Metal Propellers Ltd. have recently installed a large pilot column containing Glitsch ballast trays, and this will be used for further investigation of processes similar to the one described.

Plan to Use Aircraft as Oil Pollution 'Watch-dogs'

A plan to combat oil pollution of beaches which involves dividing the coastal resorts into zones, each to have an aircraft for spraying Oilsink chemical on oil-contaminated water, has been put before the South Coast Resorts Association, by Sir Bernard Docker, chairman of Specialist Business Services (London) Ltd. The scheme envisages the use of about ten American light aircraft, Cessna 180's, which would be on dawn to dusk call to deal with oil pollution before it reached the shores.

As reported in CHEMICAL AGE, 6 August, p. 201, Specialist Business Services hold exclusive rights for Oilsink in the U.K. and Commonwealth countries. Oilsink, a Danish invention, is a pulverised mixture of various solvent minerals which, when sprayed on oil patches, sinks them.

Johnson Matthey's New Precious Metal Interest

JOHNSON, Matthey and Co. Ltd. have acquired a controlling interest in the Swedish precious metal company A/B Gösta Nyström of Stockholm. Mr. Gösta Nyström, who founded the business in 1917, has retired and a new board has been appointed consisting of four Swedish and two British directors, with Mr. Ove Trulsson as chairman.

A/B Gösta Nyström supply precious metal products for all industrial purposes as well as for jewellery, silversmithing and dental requirements. Since 1932 they have acted as agents in Sweden for some of the products of Johnson Matthey.

The company will in future be known as A/B Nyström & Matthey.

Regional Distribution Plan for Calor Gas

INDUSTRIAL Division of the Calor Gas (Distributing) Co. Ltd. is organising its administration, distribution and servicing in England and Wales on a regional basis, in view of rising demands for liquefied petroleum gases.

The southern region covers an area south of a line from Bristol to London, and has an office at Millbrook, Southampton, in the charge of Mr. A. P. Hill.

The northern region should be organised early in the New Year when a regional office will be opened at the new Sheffield offices of the company's subsidiary Calor-Midgley Ltd. The region's gas delivery needs will continue to be looked after by the transport depots at Ellesmere Port, and Port Clarence near Billingham.

New Factory for Sifam

The new factory of Sifam Electrical Instrument Co. Ltd., Woodland Road, Torquay, Devon, is to be opened on 9 December. The complete manufacturing unit has been designed and built for the sole purpose of manufacturing electrical measuring instruments and pyrometers, and carrying out associated development and research work. The company manufactures a wider range of this type of instrument, together with pyrometer indicators, controllers and thermocouples.

Nylon in the U.K.

(*Continued from page* 985)

of the apparel trade, but increased production and reduced prices should see a considerable expansion of its uses in industry, particularly for tyre cord—in the U.S. there are already signs that viscose rayon is being ousted from its place in this use. Other promising outlets for nylon include conveyor belting and industrial fabrics such as filter cloths. Certainly those companies who are now jockeying into position to capture the major share of the market are aware of the big stakes in the offing.

Project News

I.C.I. HOPE TO ACQUIRE SOVIET CAPROLACTAM LICENCE

A 'KNOW-HOW' licence giving I.C.I. the U.K. manufacturing rights to a Soviet process for the manufacture of caprolactam is to be the subject of negotiations expected to open shortly in Moscow. This was stated in Moscow last week by Mr. S. P. Chambers, I.C.I. chairman, who had been visiting Soviet leaders in politics, economics and the chemical industry.

Mr. Chambers believes that this caprolactam process is a better and cheaper one than could be obtained elsewhere. I.C.I. need a caprolactam process for the nylon 6 plant—Britain's first that is to be built at a cost of £10 million at a site not yet named.

I.C.I.'s present nylon 66 facilities utilise adipic acid. British Enka, who have announced plans to build a nylon 6 plant in the U.K., have a caprolactam process and Courtaulds, whose subsidiary British Celanese hold a nylon 6 licence, recently purchased U.K. rights to the Snia Viscose caprolactam process.

According to Mr. Chambers I.C.I.'s negotiations for a Soviet caprolactam process could be the first of many for U.K. technical experts are already exploring conditions for the purchase of Soviet licences for other processes. Within a few years, Mr. Chambers believes that Britain will buy more licences from the Soviet Union than the U.S.S.R. will buy from the U.K.

Expected soon from Moscow is the news that Soviet import authorities have purchased polythene 'know-how' from I.C.I. and that a complete plant is to be supplied. Negotiations now in hand between the company and the U.S.S.R. stemmed from the plastics exhibition that I.C.I. held in Moscow earlier this year.

In addition to an I.C.I. negotiating team, also in Moscow at present are representatives of Simon-Carves Ltd., who are expected to be appointed main contractors for the construction of an I.C.I.-licensed polythene plant. Simon-Carves have already co-operated with I.C.I. in contracts for the supply of polythene know-how and plants in India and Yugoslavia.

News is also expected to be released from Moscow shortly concerning three contracts in which Fisons Ltd. and their subsidiary Whiffen and Sons Ltd. have an interest. No details have yet been released concerning the nature of these projects.

While in Moscow, Mr. Chambers said that I.C.I.'s exports to the Soviet Union, likely to be worth £3 million in 1960, could well be doubled or quadrupled within the next two or three years. He is reported by Tass News Agency as having stated that he favoured full freedom of trade and that he would like to see the lifting of all restrictions on the sale of some chemical products now on the embargo list.

Among the Soviet leaders that he met was Mr. Kosygin, a first Deputy Prime Minister, and Mr. Petukhov, chairman of the U.S.S.R. Scientific and Technical Committee. As stated in C.A. last week, Mr. Chambers did not go to Moscow to negotiate anything. He described his talks with various Soviet authorities as having been frank and that they would undoubtedly yield good results.

Gibbons Coke Ovens for South Durham

● THE South Durham Steel and Iron Co. Ltd. have ordered a £2.7 m. coke oven and by-product plant for their Cargo Fleet Works, Middlesbrough, from **Gibbons Brothers** of Dudley. The new installation will have 60 ovens, with coal and coke handling plant, and by-product plant, and will replace a 90 oven installation of similar capacity. It is due to be completed by the end of 1962.

Since 1927 Gibbons have built 30 coke ovens for the South Durham Steel and Iron Co. Ltd.

Humglas Equipment Flown to Japan

● ESSENTIAL equipment for the Japanese gas industry, ordered by the Tokyo Gas Co. from **Humphreys and Glasgow Ltd.**, the U.K.-based contracting engineers, has been the subject of a large scale air freight operation taking place over four months. The tenth consignment necessitated the charter of a complete aircraft; this consignment was flown out of Speke on 3 December, for Tokyo, the weight involved being 5 tons. Altogether some 20 tons of equipment have so far been flown to Japan.

It is hydraulic equipment, including control valves, pumps, cylinders and accumulators, manufactured for Humglas by Lockheed Precision Products Ltd., of Speke Trading Estate, Liverpool. The hydraulic systems for three Tokyo oil gas plants have been designed by Humphreys and Glasgow. The plants produce town's gas for the city of Tokyo.

Australian Oxygen Plant Equipment Order

● AN order has been received from Australian Electrical Industries (Pty.) Ltd. by the Heavy Plant Division of **Associated Electrical Industries Ltd.**, for synchronous and squirrel-cage induction motors valued at £120,000 to drive compressors in a new oxygen tonnage plant in New South Wales. The plant, which is being supplied by Linde Eismaschinen A.G., of Munich, will produce oxygen in large quantities for steel manufacture.

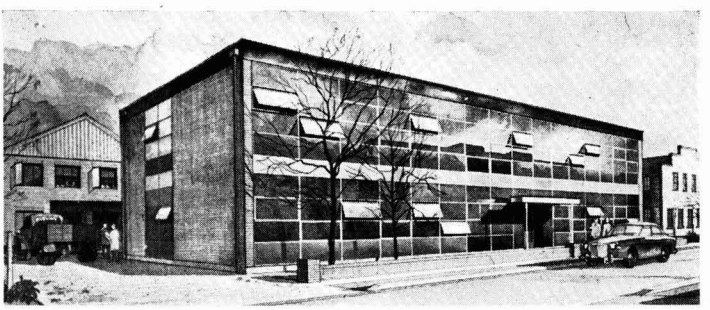
Three 3,500-h.p. synchronous motors will be used to drive centrifugal air compressors; two 2,200-h.p. synchronous motors will drive centrifugal oxygen compressors; and two squirrel-cage induction motors of 1,500-h.p. will drive reciprocating oxygen compressors. Starting equipment and switchgear are included in the order.

U.K. Equipment for Italy-Germany Pipeline

● ORDERS have been received by a British firm, **Rotork Engineering** of Bath, for electric actuators for use in an oil pipeline to be built by the Italian E.N.I. from Italy through Switzerland into Southern Germany.

The actuators will be manufactured under licence in Italy by Nuovo Pignone, a member of the E.N.I. group.

New Office and Canteen Block for Light's



Artist's impression of a new office and canteen block that is now being built for L. Light and Co. Ltd., makers of a wide range of fine chemicals, Poyle, Colnbrook, Bucks

★ "BRITISH industry as a whole probably errs on the side of excessive secrecy," says a contributor to a recent issue of *Monsanto Mail*. I thought it particularly gratifying that this typically British understatement should appear in the organ of one of the leading members of an industry which, next to the armaments manufacturers, must have the top record for keeping things dark. However, I hasten to dispel the impression that the quoted statement was in any way a confession; in fact, it was not even aimed at the chemical industry itself. It appeared in an 'open letter' addressed to the Minister of Science by John Davy, science correspondent of *The Observer*, who suggests that anything the Minister can do to stimulate the flow of new knowledge and discovery from firm to firm, and between Government research establishments, universities and industry is likely to be good for the nation.

Among other interesting suggestions, Mr. Davy urges the Minister to encourage private industry to sponsor fundamental research even more than it does already—"with larger tax inducements?" He goes on: "Urge, in return, six months sabbatical leave every five years for specialised industrial scientists to be spent broadening their outlook at other establishments".

Though this suggestion is likely to be regarded as Satanic rather than sabbatical, I would urge, in turn, that certain industrial executives who are responsible for excessive secrecy should spend a certain amount of time exploring for themselves how beneficial a little give and take could be.

★ PLASTICS have found a new use; after several years of research and experiment, The Royal National Institute for the Blind has perfected a method of printing braille which uses solid p.v.c. dots. This is a considerable improvement on the conventional printing method since the dots are uncrushable and can be printed on thinner paper, thus reducing by almost a half the bulk of braille volume. The new process will also substantially reduce the cost of embossed volumes.

Until now braille, which consists of permutations of six dots, has been embossed on special manila paper by distorting the fibres of the material to form hollow dots. The new method consists in the baking of a solid dot of plastics ink on to the surface of a thin but strong paper. Simple though the process is in theory, a number of difficulties had to be overcome one of the greatest of which was the fact that p.v.c. paste used as the ink has a gelling temperature near the flash point of the paper. Also to preserve the uniformity of the dots, essential to the sense of touch, the drops of p.v.c. have to be gelled almost instantaneously.

However, G.E.C. came to the aid of the Institute and the problem was solved by using infra-red sheathed wire heating panels mounted horizontally one above the other to heat the paper which passes between them. The present throughput speed is 110 ft. per minute at which the p.v.c. braille dots are satisfactorily gelled.

★ AUTOMATIC processing; automatic quality control; computer controlled processing; and now—an industrial chemical plant that will automatically improve the quality of its product. Such is the aim of the experimental plant to be set up at the University of Wisconsin under a grant of $97,000 from the U.S. National Science Foundation.

The model plant will automatically improve its product by continuously making slight changes in its operating conditions and seeking those which produce the highest quality. The design of the plant is an adaptation of the principle which every housewife knows—that the quality of a cake does not depend solely, or even mainly, on the basic ingredients, but on the right combination of materials, temperature and time—a factor which is found only by guesswork, modified by experience. The experimental plant will not make any changes in the basic recipe, but will take the guesswork out of finding the right conditions for production.

The automatic improvement plant is an outgrowth of evolutionary improvement of industrial production, a manual operation in which men make changes in the operating conditions and note the effects on the production. In the University of Wisconsin plant, the machinery both carries out the changes and notes their effects.

★ PROBLEMS involved in the construction of Union Carbide's new ethylene oxide and derivatives plant at Hythe, recently completed, are described in a booklet issued by George Wimpey and Co. Ltd., Hammersmith Grove, London W.6, who were responsible for design, procurement and construction. The 25-acre site—a wooded slope interrupted by mounds and transverse valleys with an overall fall of 80 ft., provided construction problems requiring careful planning and co-ordination. Site work included excavation and removal of a large peat morass.

Mechanical construction work started in April 1959, when negotiations for a comprehensive site agreement with the six main unions concerned were successfully concluded. Such was the measure of mutual understanding reached that only one trade was involved in any stoppage and that lasted just one hour. At the peak period of construction 650 men were working on site,. Some 4,000 separately identified items of material and equipment were being controlled and handled through stores.

★ "FORTY Round the Stomach". That is one translation of the letters 'F.R.S.' that I would hesitate to apply to such an eminent body of men as the Fellows of the Royal Society. I am sure there are many whose girth measurements are not as ample as that.

This layman's description of what 'F.R.S.' stands for was repeated by an after-dinner speaker at one of Scotland's most important chemistry functions of the year—the Ramsay Chemical Dinner. Loudest to laugh were the two Fellows present—Sir Alexander Fleck and Professor J. Monteath Robertson.

The speaker—Dr. W. A. Caldwell, research director of I.C.I.'s Nobel Division, also made his audience laugh when he let them into a company secret. He told those present that in I.C.I. the chairman's position—until recently filled by Sir Alexander—was looked on as "something of a dead-end job, with not much in the way of prospects".

★ AHOY there! Monsanto Chemicals' Fawley polythene factory has been boarded—by Capt. J. W. Caunce, master of the giant Cunard liner *Queen Mary*. He passes the factory every time he enters or leaves Southampton Water, so the factory's safety committee, chaired by works accountant, J. M. O'Connell, thought it a good idea to invite him in to present awards in their current safety competition.

Taken on a tour of the factory by the works manager, Dr. E. W. Bodycote, before making the awards (despite the recent floods, he left the *Queen Mary* behind on this occasion) Capt. Caunce said it was a joy to see such modern equipment so safely manned.

"Safety consciousness is only achieved by developing the powers of observation," he told employees. "Take a pride in being able to spot hazards before they cause accidents." He also commented that after going over a polythene plant he would have to revise his navy ideas on what constituted high pressure!

Alembic

C.J.B.'s RECORD TIME FOR BUILDING I.C.I. PROPATHENE PLANT—TEAMWORK WAS KEY

THE story behind the record-breaking construction of I.C.I. Plastics Division's polypropylene plant, recently brought on stream at Wilton (see CHEMICAL AGE last week) can now be told. It starts in April 1959 when Plastics Division issued a letter of intent for a polypropylene plant to be built. Construction began on 1 June and the roads and sewers were complete by the end of August.

First sections of the plant were handed over for commissioning in April 1960 and the completed plant was producing polypropylene by November 1960 (within 18 months).

Record times for a major construction project were established by careful planning, efficiency, team spirit, and full co-operation with the unions concerned. To enable the plant to be built in what at first seemed an impossible time limit, C.J.B. made full use where feasible of existing I.C.I. designs. For instance roads and sewers, offices, control room, etc., were built to I.C.I. standard designs that had been set up for other projects.

The remaining design load was then widely dispersed in the following approximate proportions: one half to C.J.B. and one-quarter each to I.C.I. Wilton Works and to I.C.I. Heavy Organic Chemicals Division. All this effort was then co-ordinated as a complete entity. Headquarters for the operation were at C.J.B. House, Eastbourne Terrace, Paddington, London W.7, which enjoyed full co-operation from I.C.I. Plastics Division.

I.C.I. design staff were housed in C.J.B. House, where an early part of the work was the construction of piping models. These were later taken to the sites at Wilton.

The main contractors could at all times call on the full help of I.C.I. at all levels to provide assistance where required, such as the calling of co-ordination meetings, to ensure that the project schedule was maintained. Thus the management of both I.C.I. and C.J.B. were close to the ground when difficulties arose, and it was always possible to bring high level pressure to bear to correct any divergence from the programme.

In view of the shortages and delays that have beset the British chemical plant industry, it is obvious that an out-of-the-ordinary procurement organisation with strong resources was necessary to ensure that installation of process equipment was maintained at rapid speed and—most important—in ordered sequence. One of the major procurement difficulties, as indicated in CHEMICAL AGE last week, p. 942, arose in connection with stainless steel. Apart from heavy purchasing by other U.K. users, notably the Atomic Energy Authority, the project coincided with the U.S. steel strike, when American users had been buying stainless steel in Europe to offset the effects of the prolonged dispute. In fact to get the stainless steel needed for the polypropylene project, C.J.B. left "no source unenquired".

A large proportion of the plant and equipment needed on site was procured in the U.K. specialised equipment being acquired overseas.

Following completion of roads and sewers, the next major step was erection of the polymerisation building. This was erected and clad before Christmas 1959, with hand-over for commissioning taking place in early September 1960. Following erection of this building, the next stage was to divide the project into about 12 conveniently manageable sections, construction of which was then staggered to a carefully prearranged plan. The first stage was something of an experiment in which the snags were discovered and avoided in later stages.

As a result of this planning, the first sections were handed over to I.C.I. commissioning teams in the course of April this year. Meanwhile other sections were nearing completion, while others were partly constructed. Thus the various sections were dovetailed and from April onwards construction and commissioning overlapped. By the time that final construction was completed in September, most of the plant had already been commissioned.

The whole contract was carried through without any major industrial dispute whatever. This was largely due to the extensive co-operation between contractor and unions before site work started. During the early stages every attempt was made by C.J.B. and the unions to build up mutual confidence. These smooth and happy industrial relations should point the way in future construction work in the chemical industry. Throughout the project a great spirit of co-operation existed between C.J.B. construction staff, the men on the job and I.C.I.'s inspectors responsible for maintaining quality control. It is stated that quality of workmanship in no way suffered because of the speed of operations.

Labour was drawn from Tees-side and the North Riding of Yorkshire. In addition to the excellent labour relations, the work of specialised sub-contractors was fully co-ordinated. Planning ensured that the hours of good weather were fully exploited and due precautions were taken to ensure that bad weather did not hold up operations.

C.J.B.'s construction manager for the project was Mr. F. B. Kerrigan. As stated last week project manager for C.J.B. was Mr. D. J. Westall; senior project engineer was Mr. W. G. F. Verdon.

Low-cost Furnace Atmospheres from Blast Furnace Gas

MIXTURES of nitrogen and hydrogen from blast furnace gas are in increasing use in treatment of steel strip and sheet. Hy-Nitrogen—sometimes termed HNX—consisting of nitrogen with 1 to 7% hydrogen, provides a truly inert atmosphere for bright annealing, and does not form soot during cooling, since it contains no carbon monoxide. Hydrogen is present in sufficient quantities to combine with any oxygen leaking into the furnace and also to prevent water vapour from causing bluing.

At the recent Sheffield Industrial Exhibition, the Gas Atmospheres Division of the Incandescent Heat Co. Ltd., Smethwick, announced a new low cost process for the production of the nitrogen/hydrogen mixture.

Blast furnace gas (containing about 30% carbon monoxide with a small amount of hydrogen and the balance nitrogen and carbon dioxide) is first partially burned through a specially designed burner firing into a well insulated refractory lined chamber. From here the gases pass through a heat exchanger and cooler to reduce the temperature to within a few degrees of ambient. CO_2 is then removed through an absorber using monoethanolamine solution. Steam is introduced at this stage and the gases are preheated prior to entering the shift reactor where CO is converted to CO_2 and an equivalent volume of hydrogen is produced. After removal of CO_2 through a second absorber—again using MEA—the wet hydrogen/nitrogen mixture leaves the plant. Final drying may be effected to any desired level by cooling the gas through a refrigerator unit followed by passage through an Incandescent dessicant type 'Hydromaster' dryer.

The basic utilities cost less than 1s. per 1,000 s.c.f. of prepared atmosphere. The plant is designed for continuous operation with the minimum shut down.

Conference on Interaction Between Fluids and Particles

The first part of the Third Congress of the European Federation of Chemical Engineering will be held in London from 20-26 June 1962 on the occasion of the Chemical and Petroleum Engineering Exhibition at Olympia. The major event in the programme is a three-day meeting Engineers on the subject 'Interaction organised by The Institution of Chemical between fluids and particles'. Suggestions for papers for inclusion in the programme should be sent to The General Secretary, The Institution of Chemical Engineers, 16 Belgrave Square, London S.W.1, not later than 30 April 1961.

A.E.C. SURVEYS WORLD URANIUM RESOURCES

LACK of knowledge about uranium reserves in large areas of the world, particularly Latin America, Australasia and Africa, is shown up in a report on world uranium reserves and resources that has been published by the U.S. Atomic Energy Commission. However, figures compiled by R. D. Nininger and C. I. Gardiner, of the A.E.C. Division of Raw Materials, are believed to represent the best estimates of U.S. and free world uranium supplies which can be made on the basis of the incomplete information currently available.

U.S. domestic uranium resources are estimated at some 87 million short tons of ore, containing 240,000 short tons of U_3O_8, while a geologic estimate of possible future discoveries puts the ore figure at 150 million and the contained U_3O_8 at 400,000 short tons. All these figures are based on estimated U_3O_8 recoverable at an average of approximately $8-$10 per lb.

Going on to hazard possible free world resources at twice the current prices, the accompanying table is arrived at. In this table, the figures given in the extreme right-hand column for the United States and for Africa assume 50% availability of uranium in phosphate rock deposits. The large phosphate rock deposits contain uranium which may be recovered as a by-product in the production of phosphate fertilisers and chemicals. The rate of production depends on the quantity of rock acidulated for production of phosphate products. The cost of uranium by-product would depend on the grade of rock, the size of the plant and other conditions. Total free world potential by-product uranium recovery from existing phosphate plants is less than 1,000 tons/year. A portion of this could be sold profitably at $8-$10/lb. of U_3O_8 and most of it should be available if U_3O_8 prices were in the $16-$20 range. The projected continuing expansion of the phosphate industry will increase the by-product uranium production potential. However, for many decades by-product uranium from phosphate is not likely to be an important factor in total uranium production.

The potentially workable low-grade deposits in Europe are primarily the uraniferous alum shales of Sweden, while the figure given for potentially recoverable uranium from Latin American low-grade deposits refers primarily to the pyrochlore deposits in Brazil, with which uranium is associated.

Further figures for free world resources, prepared on the same basis but assuming prices of $24-$30/lb., i.e. three times the current prices, bring the 'presumed, etc., submarginal' uranium up to 300,000 short tons for the U.S., 400,000 for Canada, and 40,000 for Australasia. Potentially recoverable resources from known low-grade deposits at these prices remain the same except in Europe, which then doubles its figure to 2 million short tons.

In considering the foregoing figures it must be borne in mind that the relative youth of the uranium mining industry, and the fact that intensive exploration has been confined to relatively few countries, make the appraisal of world resources extremely difficult. Quantitative estimates of potential discoveries are of necessity tentative and confined to the general areas of known uranium deposition. Also, they exclude large unexplored areas of the world and are therefore incomplete. Estimates of availability of uranium at two or three times present costs also involve evaluation of the economics of uranium extraction from ores of a grade or type for which there is little or no production experience and limited laboratory data.

The report goes on to summarise available coal resources, and then compares the maximum heat energy from both uranium and coal reserves. The maximum energy from uranium reserves is shown to exceed considerably that from coal, but the position would be reversed if the uranium reserves were used in converter instead of breeder reactors.

The report (TID - 8207), entitled 'Energy from Uranium and Coal Reserves', is available from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C., price 50 cents.

FREE WORLD URANIUM RESOURCES

(Estimated U_3O_8 recoverable at an average of approximately $16-$20 per lb.)

	Reasonably assured at $8-$10/lb short tons of U_3O_8	Possible additional discoveries, short tons of U_3O_8	Presumed available from sub-marginal material in presently exploited areas, short tons of U_3O_8	Potentially recoverable from known low-grade deposits, short tons of U_3O_8
United States ...	240,000	400,000	200,000	400,000
Canada ...	400,000	200,000	200,000	?
Europe ...	40,000	100,000	?	1,000,000
Latin America	3,000	?	?	100,000
Australasia ...	10,000	?	20,000	?
Africa	380,000	?	?	1,200,000
Totals (Rounded)	1,000,000	1 to 4,000,000	?	?

U.S. Government to Buy and Store Helium Under New Law

PLANS for implementing the long-range helium conservation programme authorised by legislation signed on 13 September by President Eisenhower have been outlined by the U.S. Department of the Interior. The programme is designed to save for future use about 52,000 million cu. ft., useful for defence purposes, now being wasted in fuel gas. The new legislation, which becomes effective on 1 March 1961, authorises the Secretary of the Interior to enter into long-term helium purchase contracts with private industry.

It is expected that under the programme the Government will contract to buy crude helium for periods not to exceed 25 years from plants financed, constructed, operated, and maintained by private industry. Prices paid for helium delivered to the Government will be negotiated and will assure participating companies of recovering fixed costs plus payment for the volume of helium delivered. Helium purchased by the Government will be designated as crude helium and will need to contain from 50 to 80% helium by volume. This crude helium will be delivered by producers to a pipeline which will transport the helium to the Government-owned Cliffside field for underground storage.

The Government-owned plants will continue to produce the helium, and when needed in the future, will be utilised to recover and purify the helium stored in the Cliffside field. Helium from these plants will be sold to Federal agencies and commercial consumers.

The new legislation is expected to encourage private industry to enter into contracts with the Government to extract helium from helium-bearing natural gas. However, firms not choosing to enter into contracts to recover helium for the Government are not precluded from extracting and selling helium on the open market. The new legislation requires Federal agencies to obtain their supplies of helium from the Government.

University Reactors Would Cost £250,000 Each

Pressed for a decision on the applications made by universities for low-power nuclear reactors (see C.A. last week, p. 940), Sir David Eccles, Education Minister, on 2 December said that a decision would be announced as soon as possible. These applications were being considered by the Department of Scientific and Industrial Research which was advised by the National Institute of Research in Nuclear Science. Capital cost of each reactor was £250,000, plus annual maintenance costs. The applications raised considerable issues of finance and principle and must also be assessed in relation to other requirements for research grants to universities.

It was stated that the London University application had been made two years ago and that universities in West Germany, France, U.S.S.R. and the U.S. already had such reactors.

Distinguished Chemists at Ramsay Dinner

Sir Alexander Fleck on Chemical Profession Today

Seen here before the Glasgow dinner are, left to right: Hector Macarthur (Castrol Ltd.), Mrs. Macarthur, Mrs. Leitch and J. Muil Leitch (Royal College of Science and Technology, Glasgow), Mrs. Amos, Dr. A. J. Amos (D. W. Kent Jones and Partners), Hugh C. Moir (Beatties Bakeries Ltd.) and Mrs. Moir

GLASGOW had always been a leader in the chemical industry, said Sir Alexander Fleck, president, Society of Chemical Industry, when he proposed the toast 'The Profession of Chemistry' at the Ramsay Chemical Dinner held in Glasgow on 1 December. In 1747, one of the earliest lectureships in chemistry was set up in Glasgow. The Andersonian Chemical Society was founded in about 1800 and in its early days it instituted lectures to instruct the ladies of Glasgow to become experts in chemistry.

Sir Alexander declared that he had entered chemistry because he thought it would be a simple profession, but it had now become very complex. They were moving away from the simple idea of chemistry—from sulphuric acid to more complex chemicals like methanol and ammonia.

After speaking of his early days as a student of chemistry at Glasgow, Sir Alexander pointed out that, under present conditions, chemists must now spread themselves over the whole range of science, entering other professions such as the complex one of nuclear science.

Replying to the toast, Mr. R. C. Chirnside, president, Society for Analytical Chemistry, who presided, spoke of Glasgow's contribution to the profession of chemistry. What Ramsay did for one end of the periodic table, Soddy, Fleck and Cranston did for the other.

Dr. W. A. Caldwell, research director of the I.C.I. Nobel Division, who proposed the toast of 'The Guests,' brought laughter when he said that in I.C.I., Sir Alexander Fleck's former position as chairman of the company, was looked on as 'rather a dead end job with not much in the way of prospects." He congratulated Sir Alexander on his election a few days earlier as hon. treasurer of the Royal Society and another distinguished guest, Professor J. Monteath Robertson (Glasgow University), on having been awarded the Society's 1960 Davy Medal.

Mr. E. LeQ. Herbert (managing director, Shell Refining), president, Royal Institute of Chemistry, replied on behalf of the guests.

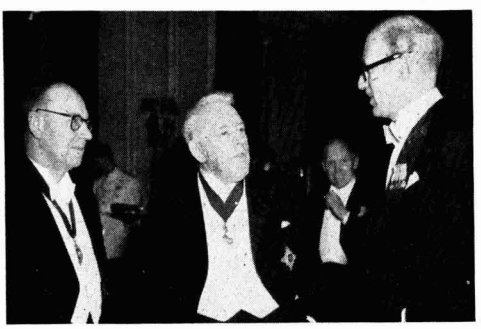
As traditional, the toast of 'Sir William Ramsay' given by Mr. Chirnside, was received in silence.

Convenor of the 1960 Ramsay Dinner was Mr. J. Brooks (I.C.I. Nobel Division), hon. secretary, Scottish Section, Society for Analytical Chemistry. The dinner is held each year under the auspices of the Glasgow Section, Society of Chemical Industry, with the co-operation of the Alchemists Club, Glasgow University, Scottish Section, S.A.C.; Andersonian Chemical Society; Anthraquinone Club; Ardeer Chemical Club; Chemical Society, and the local groups of the Institution of Chemical Engineers, Institute of Fuel, Royal Institute of Chemistry, Institution of the Rubber Industry, Oil and Colour Chemists' Association, Plastics Institute, and Society of Dyers and Colourists.

L.C.C. Praise Building Mastics Based on Polythene

BUILDING mastics for binding and sealing, based on polythene, did well in tests by the London County Council. In the Annual Report of the Scientific Adviser for 1959; L.C.C. (price 1s 3d). It is stated that these mastics, tested under severe conditions, showed no deterioration in plasticity or surface. Also approved were the use of nylon and p.v.c. for protecting hand rails; nylon, p.v.c. and polystyrene for household ware; and some plastics coatings for the prevention of corrosion of metals.

The report criticised paints, stating that nearly three-quarters of the hard gloss paints and more than half the emulsion paints examined were rejected. In the case of hard gloss paints, main reasons for rejection were that the paint had insufficient covering quality, were not flexible enough, had poor finish or poor light fastness. Main fault with emulsion paints was low washability.



Left to right: R. C. Chirnside (Research Department, G.E.C., and president of the Society for Analytical Chemistry), Sir Alexander Fleck and Col. F. R. Griffin (secretary, Society of Chemical Industry)

150th Anniversary of Scientific Instrumentation Firm

A brochure has been published recently to celebrate the 150th anniversary of C. F. Casella and Co. Ltd., makers of scientific, meteorological and industrial instruments. The brochure gives a short history of the company and illustrated descriptions of selected instruments of the present range.

Studies of Pipeline Transport of Oil and Gas Show Way to Lower Operating Costs

ECONOMIC pipeline transportation of natural gas is dependent on at least one of the following factors: low prime cost of the gas ex field; a maximum transport distance of 200 to 300 kilometres (approx. 125 to 190 miles); a minimum transport volume of 2,000 million to 3,000 million cu. m. annually; and transportation to areas with good gas processing facilities. This is due to the fact that although investment and operating costs for natural gas pipelines are approximately similar to those for mineral oil pipelines of the same diameter and the transportation capacity of a pipeline of a given diameter has a ratio of 200-250 cu. m. of natural gas: 1 cu. m. mineral oil, calorific value equivalents are 1,000 cu. m. of natural gas to 1 cu. m. of mineral oil. The conversion of natural gas into electric current and its transportation in that form by high-tension cables is probably less economic than pipeline transport of natural gas.

A study by D.P. Tran. (*Ind. Pétrole Pétrochimie* **28**, 48 (1960)) states that the transportation costs of mineral oil by pipeline can be reduced by the use of thin-walled, and therefore cheaper and lighter, pipes, a greater number of pumping stations and low operating pressure —rather than thick-walled pipes, few pumping stations and high operating pressure. However, each case must be considered on its merits, as a decision depends to a great degree on such local conditions as density of population, the stand of industrialisation and the availability of skilled staff (*Erdöl und Kohle* **13**, 441 (1960)).

Specific cases The Franco-German mineral oil pipeline from Lavéra to Carlsruhe, the laying of which is soon to begin, will be some 470 miles in length and have a pipe diameter of 80 cm. In the first construction stage, which will be completed by the end of 1962, three pumping stations will be erected, permitting a transportation speed of 0.75 m/s and an annual transportation capacity of 10 to 12 million tonnes. Investment costs are put at some 52,500 million Old Francs. In the second construction stage annual capacity will be increased to 30 million tonnes and transportation speed to 2 m/s by the building of five further pumping stations and the capacity increase of the existing three. The second stage will involve the investment of a further 22,500 million Old Francs. According to an article by A. Lascaud (*Ind. Pétrole Pétrochimie* **28**, 24 (1960)), operating costs in the first stage of the project will cost the equivalent of 14s 3d per tonne, this falling to only some 5s 9d per tonne at the completion of the second construction stage.

The North African mineral oil pipeline opened with 60 cm. pipe diameter at the end of last year to cover the 410-mile stretch Hassi Messaoud-Bougie at a cost of 332,000 million Old Francs has an annual capacity of 13 to 15 million tonnes and transportation costs estimated at 600 Old Francs per tonne. This figure is 750 Old Francs per tonne for the oil pipeline of similar diameter and capacity laid at a cost of 55,000 million Old Francs to cover the 440 miles from Edjéleh to La Skhirra in North Africa.

The study of operating cost accounts of a number of existing or projected pipelines in various countries shows that mineral oil transportation costs per tonne/kilometre along pipe of a given diameter can be reduced by the raising of capacity, these costs falling from about 0.32d at a capacity of 1,000,000 annual tonnes to 0.17d at 10,000,000 annual tonnes and only 0.09d at 25,000,000 annual tonnes to 30,000,000 annual tonnes.

In the field of natural gas transportation, it is estimated that pipeline transport of Saharan gas to France and West Germany would involve costs of between 0.7d and 0.9d per cu. m.

The foregoing is a translation of an article which appears in Chem. Techn. October 1960.

Atmospheric Moisture Upsets Balance in Microchemical Weighing

IN microanalysis, significant errors can result from changes in relative humidity which may seriously alter the rest point of microchemical balances; work at the National Bureau of Standards, U.S., has shown that enough moisture can collect on balance parts to move the pointer off scale.

In this study, the effects of changes in humidity on four balances of different design were determined. Each of the balances tested reacted to changes in relative humidity, reaching a new rest point quite rapidly. The magnitude of this change was different for each balance, one actually going off scale during the test. The effect on this balance was greatly reduced by removal of lacquer and excess cement. The performance of another balance that showed large deviations improved after cleaning. Changes in rest point from over 8μg for each per cent humidity change before treatment to 0.8μg after treatment.

The investigation showed that moisture can collect on a balance through absorption by hygroscopic materials such as lacquer, cement, and dust, and by adsorption on all surfaces. To improve the performance of microbalances, the use of hygroscopic materials should be eliminated wherever possible, and balance parts should be kept free of foreign matter. Design considerations should include uncompensated differences in the coefficient of adsorption, and correction for inequalities in the surface area on either side of the beam.

The response of a balance to changes in relative humidity is unpredictable, and can be determined only by testing of individual instruments.

P.V.C. Coating Solves Corrosion Problem in China Clay Plant

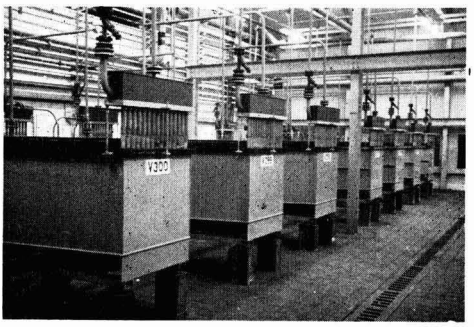
MORE effective protection against corrosion and abrasion, and savings in installation costs, are claimed for a p.v.c. paste lining which has been applied to the cyclone chimney and hopper of a china clay pulverising and drying machine at the works of Watts Blake and Bearne Ltd., Newton Abbot. Dehydrated particles of clay are forced into the chimney by a blast of hot air, and collect there before being released into the hopper for packing. Besides the corrosive effect of sulphur trioxide fumes, the chimney has to withstand attack by clay particles—any erosion of the unprotected chimney would contaminate the clay with metal particles.

Natural rubber lining was previously tried, but had to be abandoned because of poor ageing properties. On the other hand, Vylastic paste, based on Geon p.v.c., does not suffer from this disadvantage, providing a corrosion and abrasion resistant coating with good adherence to the substrate metal. Not only is it intrinsically cheaper than rubber lining, but as both internal and external surfaces are coated, Watts Blake and Bearne expect to avoid the need for lagging the chimney, which was previously necessary to ensure that the temperature inside the chimney did not reach dew point before clay could be packed.

The ducting carrying the dried clay to the cyclone chimney is also p.v.c. lined. Coating was carried out by Plastic Coatings Ltd., Guildford, Surrey.

SODIUM CHLORITE PLANT ON STREAM

Laporte Uses Kesting Process in Britain's First Chlorite Plant



Electrolytic cells in series

THE first sodium chlorite plant in the U.K.—that of Laporte Industries Ltd.—has started production at the firm's Luton plant. Previously, sodium chlorite has been imported from Europe.

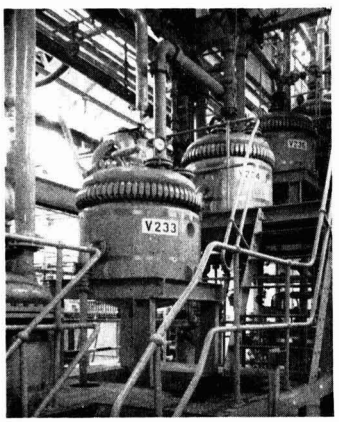
The Kesting process, licensed by Electrochemische Werke Muchen, is used. The process may be divided into four main parts: the chlorate cycle; the chlorine dioxide generating plant; chlorite production; and the hypochlorite plant.

The chlorate cycle. A solution of sodium chlorate and sodium chloride flows by gravity from the main storage to electrolytic cells through which it is circulated. In passing through the cells some of the chloride is converted into chlorate with the evolution of hydrogen which is removed from the system. The solution enriched by chlorate flows, again by gravity, from the cells to a sump for treatment before return to the main storage.

The cells are coupled in series and provided with direct current of approximately 6,000 amps. at full production by a rectifier supplied by a transformer from the mains. This rectifier is of the germanium type giving high efficiency at the voltage required.

Chlorine dioxide generating system. A small proportion of the solution which circulates through the chlorate cycle is taken as feed to the reaction cascade. This solution is mixed with hydrochloric acid in the first of six vessels in the cascade. These are so arranged that the reacting solutions overflow from one vessel to the bottom of the next by gravity, whilst a counter-current stream of air removes the chlorine and chlorine dioxide formed by the reaction.

This chlorine and chlorine dioxide in the air from the cascade are separated in a system consisting of two vessels, one absorbing and the other stripping. In the first vessel chlorine dioxide is absorbed allowing a chlorine/air mixture to go forward to the hypochlorite plant. The chlorine dioxide solution from the absorber passes to the stripping vessel where chlorine dioxide is removed with air.



Reaction cascade

Chlorite production. The air-chlorine dioxide mixture from the stripper passes into a reaction vessel where it combines with sodium hydroxide and hydrogen peroxide to form an aqueous solution of sodium chlorite which is passed to storage vessels. From here it is pumped to a spray drier to give the dried anhydrous product.

Sodium hypochlorite plant. The chlorine/air mixture separated above is passed to a reaction vessel in which the chlorine is absorbed in dilute sodium hydroxide solution to produce sodium hypochlorite of 14 to 15% concentration.

The plant is largely constructed of plastics, glass, ceramics, stainless steel and titanium metal. It is housed in the building which was previously used for the production of hydrogen peroxide by the electrolytic method. The Luton plant was closed down following the opening at Warrington in September 1958, of the hydrogen peroxide plant based on the autoxidation process.

Sodium chlorite will be marketed in the usual industrial concentration of 80% as a crystalline powder. It is used for textile bleaching, particularly of cotton, linen and synthetic fibres and for bleaching paper pulp, flour, oils, fats, waxes, shellac and straw. It is also useful for the purification of water supplies where it overcomes the problem of residual odours sometimes associated with chemical treatment.

Laporte's anticipate that sodium chlorite will find application in a yet wider range of industries. It has already gained a reputation as a safe bleaching agent which is capable of being used by relatively unskilled labour.

Aerodynamic Technique Used To Study Gaseous Reactions

CHEMISTRY is often called to the service of aerodynamics to provide new materials that can withstand the condition of supersonic speeds, but it is unusual for the reverse to be the case. However, in one instance chemists of Shell Development (U.S.) have been using a technique, usually found in aerodynamic research laboratories for the study of hypersonic airflow, to investigate the chemical reactions of gases. This is the shock tube technique, used in aerodynamics to produce shock waves travelling at speeds of up to 7,000 m.p.h.

Shell are using the shock wave to heat molecules of gas in its path thousands of degrees in millionths of a second. After a given interval of time the gas molecules are cooled equally quickly. By this means of starting and stopping a chemical reaction instantaneously, it is hoped to shed some light on problems concerning rapid reactions of gases at high temperatures and pressures.

The shock tube technique overcomes many of the difficulties associated with the more conventional physical methods. Mixing, heating and cooling tend to obscure the true results of the reactions taking place in the usual apparatus. For example, a gaseous reaction may take place in which two products are formed, a small amount of A and a large amount of B. The quantity of A may be so minute that the conclusion could be drawn that the result of the reaction was formation of B, whereas what may, in fact, have happened is that, in the relatively long time required to heat the reaction materials to a temperature of say 5,000°C and cool them down again, a large amount of B is formed—even though A may be the major product at 5,000°C.

COMPLETE COMPUTER CONTROL OF AMMONIA PRODUCTION AT MONSANTO'S LULING PLANT

INCREASED production and higher efficiency have been achieved at the Barton ammonia plant of Monsanto Chemical Co., U.S., at Luling, La., by the use of a digital computer system for complete automatic control of the plant. Successful attainment of the computer project objectives after several months' try-out at the plant marks the culmination of a three-year joint effort by Monsanto engineers and Thompson-Ramo-Wooldridge, who supplied the RW-300 computer system used. The plant is one of the first continuous multi-stage chemical plants to be computer controlled.

The computer calculates optimum instrument settings and makes precise adjustments to compensate for variations in process conditions. Housed in the central control room, the console is linked with two automatic typewriters which provide a complete day-to-day record of the whole operation.

The ammonia plant at Luling has a capacity of 450-500 tons/day, using a high pressure reaction. Steam and natural gas are treated in a reforming furnace to give hydrogen and carbon monoxide, and nitrogen is obtained by using hydrogen to burn out the oxygen in air. Carbon monoxide is converted in a water-gas shift reaction and the synthesis gas that goes to the reactor for conversion to ammonia contains hydrogen and nitrogen in the approximate proportion of 3 to 1.

Monsanto and Thompson-Ramo-Wooldridge embarked on a joint feasibility study on computer control in 1957 and the ammonia plant was selected as being the most suitable of Monsanto plants for the try-out. System engineers defined variables and developed a mathematical model simulating process operation. As the study proceeded, continual modifications were made to the computer circuit, plant equipment and mathematical model.

Important control variables to be taken into consideration included the flow of feed gas to the primary reformer, the flow of air to the secondary reformer, and other flows such as flue gas, steam (both high and low pressure) and fuel gas.

The RW-300 computer was put in partial control of the Luling plant early this year, and is now in full control. With the plant working at full capacity, the computer installation has undergone a period of successful operation and Monsanto feel that the advantages gained far outweigh the trouble and expense of the preliminary studies and the installation of the computer.

However, for other plants, Monsanto's experience points to certain criteria of size and complexity which must be met before a computer is justified. Unless a relatively small percentage increase in profit will support the necessary investment, the plant is probably too small for digital computer control. If the preliminary studies show that large increases in yield or efficiency are possible, it is quite likely that these can be gained by engineering changes or better instrumentation.

As discussed in CHEMICAL AGE, 29 October (p. 710), Badische Anilin-und Soda-Fabric AG are planning to achieve complete automatic control of a chemical plant at Ludwigshafen am Rhein using an RW-300 digital computer and B.A.S.F. engineers are working with Thompson-Ramo-Wooldridge on the project. Another instance of a chemical plant already controlled by an RW-300 computer is a vinyl chloride plant of B. F. Goodrich Chemical Co. at Calvert City, Ky.

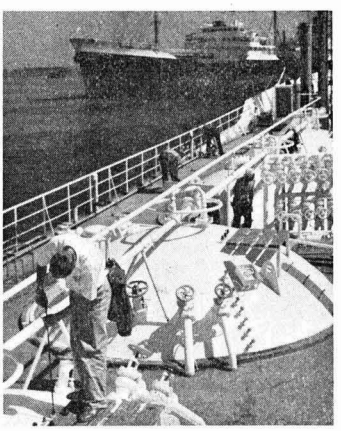
I.S.M.A. Form 'Outer Seven' Fertiliser Trade Committee

An Outer Seven Committee of the International Superphosphate Manufacturers' Association has been formed, to which all members of the European Free Trade Association are providing delegates. The committee, following a decision taken at a meeting in London in June, has two basic objects—co-operation between members and co-operation with the parallel Common Market Committee.

Members are co-operating in two ways. First, there is a wide exchange of information, so that members can assess their own position. Second, members agree to help one another against dumping.

The committee has already established contact with the parallel Common Market Committee. Preliminary meetings have shown that already there exists a desire to co-operate, which may prove most valuable if the two trade blocs come together.

BUTADIENE AFLOAT



The m.t. "Signe Tholstrup', owned by A/S Kosangas, Copenhagen, leaves Teesport with a cargo of butadiene from I.C.I Heavy Organic Chemicals Division for synthetic rubber production. The special storage spheres for liquefied petroleum gases such as butadiene are clearly shown. The division has done much pioneer work in the bulk transportation of organic chemicals

Individual Firms Direct Members of F.B.R.A.M.

From 1 April 1961, individual firms, side by side with trade associations may become direct members of the Federation of British Rubber and Allied Manufacturers. This decision was taken at a meeting of Council last week.

The new arrangement is designed to enable a wider and more representative section of the rubber manufacturing industry to share in work which is inevitably undertaken, not for members only, but for the industry as a whole. All firms engaged in the manufacture of rubber and allied products are therefore urged to apply for membership as early as possible so that they may be fully represented under the new scheme next year.

Particulars of membership can be obtained from the Director, F.B.R.A.M., 43 Bedford Square, London W.C.1.

Ilford Exhibition of U.K.A.E.A. Photographs

An exhibition staged by Ilford with the co-operation of the U.K. Atomic Energy Authority will be held at Ilford House, 133/135 Oxford Street, London W.1, from 14 December to mid-February. Admission is free.

Called 'Atom in Camera,' the purpose of the exhibition—the first of its kind to be seen by the general public in London—is to show by means of photographs and working models exactly what atomic energy is. The exhibition is devoted entirely to the peaceful uses of atomic energy and has been compiled from the Authority's library of many thousands of prints.

Ilford's have made special emulsions for fundamental research in nuclear physics since 1945.

'Heretical' Views Expressed at Royal Society Anniversary

ON the occasion of the anniversary meeting of the Royal Society held on 30 November at Burlington House, London, Sir Cyril Hinshelwood delivering his last address as President, recalled some of the outstanding events which had taken place during the five years of his office—the Antarctic expedition which sailed to Halley Bay during the International Geophysical Year; the biological expedition which carried out investigations in South America; and more recently the Tercentenary Celebrations.

In the last address from the Presidential chair, Sir Cyril returned, as it were, to the laboratory by deliberate choice. Turning to his own research on the adaptation of micro-organisms to new conditions, he repeated his belief that, in the development of resistance to drugs, not one but several mechanisms exist and, in particular, the accidents of DNA code replication are not the sole or even necessarily the most important source of resistance.

Sir Cyril showed that there is a race between the adaptive adjustments in the cells and lethal processes which, given time, stop the cells from forming colonies at all. The conception of adaptive and lethal processes in competition might be thought difficult but it could be likened to a man dying of destitution while struggling to finish a job which will furnish the means of his physical salvation.

Some of the views he expressed, Sir Cyril admitted, might seem on the verge of the heretical, but he believed that we need a re-synthesis of some of the widely accepted views with the kind of approach that appeals more to the chemist and physicist.

New officers of the Royal Society were elected at the anniversary meeting.

Sir Howard Florey was elected President in succession to Sir Cyril Hinshelwood. Sir Howard is Professor of Pathology at Oxford University, a position he has occupied since 1935, and has made a number of outstanding contributions to experimental pathology and medical science. He is best known for his work in connection with the isolation and detailed study of penicillin and its development as a non-toxic anti-bacterial agent, for which work he shared the Nobel Prize for Medicine in 1945 with Professor E. B. Chain and Sir Alexander Fleming. He was elected a Fellow of the Royal Society in 1941 since when he has been awarded a Royal Medal in 1951 and the Copley Medal in 1957.

Other officers of the Society include Sir Alexander Fleck, K.B.E., elected treasurer, who recently retired as chairman of Imperial Chemical Industries; Sir Patrick Linstead, C.B.E., Rector of Imperial College of Science and Technology, elected Foreign Secretary. Among the newly elected members of the Council are Mr. R. P. Bell, Reader in Physical Chemistry, University of Oxford, Sir Christopher Ingold, Professor of Chemistry in the University of London at University College, Dame Kathleen Lonsdale also Professor of Chemistry at University College, Professor R. A. Morton Johnston Professor of Biochemistry in the University of Liverpool and Sir Gordon Sutherland, Director of the National Physical Laboratory.

First 'Sandwich' Chemical Engineering Diplomas Presented at West Ham

THE usefulness of chemical engineering not only in the chemical industry but in every production industry was stressed by Prof. D. M. Newitt, M.C., D.Sc., F.R.S., Courtaulds Professor of Chemical Engineering at Imperial College, London, when he presented College Diplomas and Higher National Certificates in chemical engineering to successful students at the West Ham College of Technology. Prof. Newitt pointed out that while the colleges provided a good basic training in chemical engineering, practical industrial training was a matter for industry itself—without practical training the entry of the chemical engineer into industry was followed by a gap of about a year during which he could not be regarded as a fully useful member of the industry.

Prof. Newitt paid tribute to the West Ham College of Technology as an important, as well as one of the oldest, centres of chemical engineering education in the U.K. He hoped that any future plans for the expansion of the College would include adequate provision for improving the facilities of the Chemical Engineering Department and providing it with additional up-to-date equipment.

Prof. Newitt presents a chemical engineering diploma to a successful student. Centre: Dr. Mulholland

Prof. Newitt was introduced by Dr. D. B. Mulholland, M.Sc., Ph.D., A.R.I.C., M.I.Chem.E., head of the Department of Chemical Engineering at West Ham, who was, in turn, introduced by Mr. G. Bulmer, M.A., Ph.D., F.R.I.C., principal of the College. A four-year sandwich study course has recently been introduced, in which alternate six months' periods are spent in industry, students being either college-based or sponsored by a company. The first successful candidates for the College Diploma awarded at the end of this course received their awards on this occasion, as did also successful Higher National Certificate students.

The audience included a number of representatives from chemical and allied firms which support the West Ham chemical engineering courses. At an earlier meeting, Dr. Mulholland addressed the industrial representatives on the subject of 'Opportunity, experience and responsibility', in which he examined the industrial need for chemical engineering and the way in which the College was trying to meet this need.

New Methods in Titrimetry

DEVELOPMENTS in titrimetry (especially potentiometric), colorimetry and gas/liquid chromatography were discussed by Dr. J. Haslam at a meeting of the Kent sub-section of the Royal Institute of Chemistry held at the Medway College of Technology, Chatham, recently. Automatic titrimetry could now be applied not only for straight-forward acid-alkali titration but also for the determination of such things as NH_4^+ Cl^-, Zn^+ by the EDTA reagent, and Fischer determinations. The determination of Ca^{++} and Mg^{++} in water samples proved more difficult probably because of the HCO_3^- present. Prior removal of this ion by boiling led to correct results.

Dr. Haslam then went on to describe some of the newer colorimetric methods. He mentioned in particular the determination of phosphates, nitrates by Peach's reaction, the positive method for fluorine (Belcher, Leonard and West) and the use of chloranilates. The determination of small amounts of ammonia by the indophenol and ninhydrin methods and the Saville method for mercaptans were also mentioned.

Dr. Haslam ended by describing some new methods of gas/liquid chromatography used in solution of problems in the plastics industry.

More Jobs at Marchons

Extensions to the Whitehaven works of Marchon Products Ltd. are expected to lead to the employment of a further 500 men and 100 women. As reported in CHEMICAL AGE, 5 November, p. 757, the company are building a plant to manufacture sulphamic acid, and are also contemplating the manufacture of ammonium sulphamate.

New Chemical Plant Materials at Corrosion Exhibition

MATERIALS of construction, linings and coatings for chemical plant figured prominently at the Corrosion and Metal Finishing Exhibition, held in London this week (29 November to 2 December). Following is a brief summary of a selection of the exhibits.

A.C. Plastics Ltd. The positive bonding of polyester resin to rigid p.v.c. was illustrated as being especially suitable for the construction of chemical plant, providing temperature resistance of over 65°C as well as excellent impact strength and rigidity. A new range of fans are completely moulded from p.v.c. and reinforced externally with polyester glass fibre.

Ciba (A.R.L.) Ltd. Examples of the uses of Araldite epoxy resins included formulations for protecting and strengthening the insulation of pipes in chemical plants, and resins for making glass-cloth ducting and other chemical plant. Solvent-free resin systems enable coatings 0.020 in. thick to be applied in one operation.

Dorman Long and Co. Ltd. showed a new product consisting of specially prepared steel sheets, coated on both sides and edges with Vynasol p.v.c., which is bonded to the steel by processing at high temperature. The adhesion is such that the coated sheets can be bent and formed without damage to the coating, which is stated to be completely resistant to caustic soda solution, ammonia (S.G. 0.88), xylol, toluol, benzene, naphtha, mineral spirits, 25% detergent solution (synthetic), soap solution, fruit juices, 50% sulphuric acid solution, and concentrated hydrochloric acid solution. For cladding of industrial buildings, sheets are available either corrugated or as 'Scandinavian' tiles.

Dunlop Rubber Co. Ltd. have developed a composite laminate of polythene or polypropylene on rubber, which is applied to metal surfaces (e.g. as a tank lining) using the rubber backing as a bonding layer, which also serves the purpose of accommodating expansion differentials between the polythene/polypropylene and the metal. The plastics layer is bonded chemically to the rubber backing layer and the linkage is stated to be extremely strong.

Prodorite Ltd. Corrosion resisting materials shown by this company included Orglas resin/glass laminates, which are claimed to have outstanding strength/weight ration and to be resistant to practically all oxidising and non-oxidising acids, alkalis and solvents up to temperatures of 120°C. For temperatures of 120-160°C, Orglas Y50 is available.

Protective Rubber Coatings (Bristol) Ltd. developed a range of liquid-applied self curing synthetic rubbers under the trade name Limpetite which are stated to be suitable for applications where non-permeability, high bond strength and excellent resistance to abrasion and chemical attack are all of prime importance.

Market Reports

FLOODS AFFECT FERTILISER TRADE

LONDON There has been a steady movement into consumption in most sections of the industrial chemicals market with contract deliveries to the textile and kindred trades well maintained. The supply position, with few exceptions, is fairly easy but prices continue steady at recent levels.

Conditions in the fertiliser trade have been restricted owing to the widespread floods and the large areas affected by foot-and-mouth disease. A good outlet exists for most of the coal tar products particularly creosote oil, phenol and the cresylic acids, whilst offers of naphthalene are scarce.

MANCHESTER On the market for heavy chemical products the textile industries are taking reasonably steady deliveries of bleaching, dyeing and finishing products, and demand from most other industrial outlets has been maintained at about the level of recent weeks. On the whole the export movement of chemicals is on a fair scale, though somewhat below the level of the earlier months of the year in a good many sections.

There has been little change in the general price position. With one or two exceptions, available supplies of light and heavy tar products continue to find a ready outlet.

SCOTLAND On the whole the past week was a fairly active one in most sections of the heavy chemical market, and in particular demands from the paper, textile and allied industries featured well. Quantities showed little change and the range of chemicals was quite varied.

Although the majority of prices have continued firm, there were some increases, mostly the result of the recent alteration in some of the transport charges. Enquiries have been quite numerous and those affecting contract requirements for next year are still very much in prominence. The export market continued satisfactorily although there is always room for improvement.

Computer Design of Refinery Columns

CALCULATIONS for the design of superfractionating columns for the refineries of a major British oil company (not named) are being carried out using the Radic analogue-digital computing system introduced by Redifon Ltd., Gatwick Road, Crawley, Sussex, earlier this year (see CHEMICAL AGE, 30 July, p. 158). The calculations are mainly concerned with heat transfer and mass and heat balance problems.

There are about 100 trays in each distillation column, and for each tray it is necessary to solve a second-order differential equation in six variables. The volume of calculation is far too great to be handled by normal methods, and even a conventional analogue computer would require a large and expensive assemblage of operational amplifiers to do the job.

The advantage of the Radic system for this work is said to lie in the fact that the system incorporates a digital storage unit which can be used for holding partial results of calculations. If this unit is arranged to store the initial and end values for each tray in the distillation column, the whole set of calculations can be performed with a relatively small number of operational amplifiers. Using such a method, the calculations take about one minute per tray to perform, or about three hours for the whole distillation column.

A.E.A. as Big User of Stainless Steel

ONE of the main reasons for the acute shortage of stainless steel in the U.K. was referred to by Sir Leonard Owen, production member of the U.K. Atomic Energy Authority last week when he stated that A.E.A. consumption of stainless steel has amounted to about 14,000 tons at a capital value of £9 million. One single nuclear fuel processing plant alone absorbed the total U.K. stainless steel output for about two years.

Speaking at the British Nuclear Engineering Conference, he said there was great scope for improvement arising from the availability of higher strength steels. Better quality steel which might arise from more modern methods, such as electric furnaces and larger converters were awaited keenly. The full benefit of nuclear power could not be realised so long as the engineer was limited by the materials available. If suitable steels were not available, the nuclear engineer might have to explore alternative materials.

Higher Fees for Trade Marks

From 1 May next the Board of Trade state that higher fees will be charged for applications, registrations and renewal of trade marks. Present fees will be raised from £2, £3 and £5 to £4, £4 and £6 respectively. Before the new rates are effective an opportunity will be afforded for representations to be made.

Overseas News

U.S. CHEMICAL PRODUCTION FOR 1960 EXPECTED TO BE 7% UP ON LAST YEAR

ACCORDING to estimates issued by Du Pont de Nemours, United States chemical production will in the current year reach an all-time record, with a total some 7% higher than for last year. In 1961, when the company reckons with a general industrial production fall of 5%, chemical production should stay at 1960 levels. Should the expected industrial production decrease amount to 10% next year for the whole of American industry, chemical output would fall by an estimated 5%.

Detailed forecasts include a production increase of 4% for synthetic fibres for 1960 over 1959, an increase of 3% for plastics for 1961 over this year and a production decrease, dependent on the textile market, of 3% for synthetic fibres for 1961 over 1960. Synthetic rubber production is expected to rise by 9% this year and fall by 4% in 1961.

Production of dyes and colours is expected this year to be slightly higher than in 1959, while experiencing a production decrease of 2% next year. Pharmaceutical and toilet article production, however, should follow an 8% increase this year with a further 5% increase in 1961. Inorganic chemicals production should be 5% up this year and 1% down next year and that of organic basic chemicals 14% up in 1960 and perhaps 3% down in 1961.

Poland Forms Emergency Chemical Plant Body

Owing to the failures of the Polish chemical plant production industry, a Corporation for Chemical Plant Construction has been set up in that country as chief co-ordinator in the industry and general supplier of chemical plant. It has been pointed out in the Polish trade press, however, that the mere formation of this body will still not solve the problem of how to feed enough equipment to the Polish chemical industry in the period ending 1965.

New Dead Sea Chemical Projects in Israel

A test plant for the production of magnesium oxide and hydrochloric acid is to be opened at Sodom in Israel next Spring at a cost of some £1,400,000. The unit, to be built with Government backing, will use magnesium waste from the Dead Sea chemical works as feedstuff.

A United Nations technological advisory team has recommended the setting-up of a chemical complex near Dimona in the Negev desert for the production of synthetic fertilisers with products of the nearby Dead Sea potash plant and the Oron phosphate works in a special nitrogen-from-air process. The same body advises the building of a plant in Haifa to produce high-quality phosphoric acid using a process developed by the State company Israel Mining Industries. A plant working to this process is already under construction in Japan. Further recommended is the spending of £16½ m. on the production of 200,000 tonnes/year of high quality calcinated phosphates in the Oron area of Israel and the use for purposes other than fuel production of the natural gas reserves found recently in the Zohar and Kidod areas. These gas reserves, of some 40,000 million cu. ft., can be exploited at the rate of 8 million cu. ft. of 98% methane daily for 10-15 years and could be the basis for a local petrochemical industry.

C.I.L. Firm to Set-up Paint Works in Jamaica

Brandram-Henderson, Montreal, a subsidiary of Canadian Industries Ltd., are to build a $400,000 plant in Jamaica to make paint for the West Indian market. Construction of the factory will begin shortly.

U.S. Report on Lithium and Borax Recovery on Open File

Laboratory-scale experiments in recovering lithium and borax from tailings of a Kern County, Calif., borax mine are described in a Bureau of Mines technical report made available for public inspection as an open-file report by the Department of the Interior, Washington D.C.

The report, 'Experiments to recover lithium and borax from California borax tailing,' was written by A. L. Engel, Bureau metallurgist at Reno, Nev.

Chemical Research Projects in U.S.S.R.

Important chemical research programmes being carried out in the Soviet Union include work on the production of nitryl by a direct synthesis of propylene and ammonia, the production of acetaldehyde from ethylene via a direct combination with oxygen and the production of polyisoprene and polydivinyl rubbers.

Czechs Cut Chemical Production Target

It is announced in Prague that a production increase of 97% has now been set for the Czech chemical industry over the period 1961-1965. This compares with a target of 86% increase originally set for the period. Stress will be on plastics and synthetic fibres, and overall imports will be cut considerably. Two large synthetic rubber combines are planned and a number of chemical plants are scheduled for reconstruction. By 1965, Czechoslovakia hopes to be producing 197,000 tonnes of plastics and 105,000 tonnes of chemical fibres annually, this latter total to include at least 23,000 tonnes of synthetic fibres.

Continuous Pressure Digestion Process for Alum

The perfection of continuous pressure digestion process for the production of alum is claimed by the U.S. company, Chemical Construction. With their pressure system, say Chemico, they can cut the processing time for alum, which is produced by the reaction of powdered bauxite with sulphuric acid at a temperature above 100°C, from 3 days to less than 3 hours, reduce the space needed for equivalent output by 30%, increase yields up to 10% and use relatively course bauxite feed. Details of the pressure used is not disclosed beyond the fact that it is above atmospheric.

1961 I.U.P.A.C. Congress for Montreal

The 18th International Congress of Pure and Applied Chemistry is being held in Montreal from 6-12 August 1961, in connection with the 21st Conference of the International Union of Pure and Applied Chemistry (2-5 August 1961).

The programme of scientific papers for the congress will consist of five plenary lectures and approximately 50 invited sectional lectures in addition to the general schedule of contributed papers. The main divisions of the congress programme are: A, physical chemistry; B, applied chemistry; C, analytical chemistry; D, organic chemistry symposium.

Two New Plastics Chemicals Plants for Monsanto

Monsanto Chemicals Co., U.S., are to build two new plants for the production of plastics auxiliaries on a 650-acre site in Gloucester County, N.J. One plant is to produce some 50 million lb. of the company's Santicizer softening agent annually and the other 20 million annual lb. of benzolchloride for production of this softener.

Steel Alloy Developed for Cryogenic Conditions

Increase in the use of liquefied gases such as oxygen, nitrogen and methane, involving service temperatures of the order of −200°C, has focused attention on the need for materials for handling them with safety and economy.

Many steels become excessively brittle when cooled to sub-zero temperatures but the presence of nickel greatly improves the toughness of steels down to temperatures as low as −200°C. A new alloy developed by The International

Nickel Co. Inc. containing 9% nickel has passed all laboratory tests and a practical demonstration organised by the International Nickel Co. Inc., The Chicago Bridge and Iron Co. and the U.S. Steel Corp. was designed to test the steel's stability.

Tonnage oxygen plants being installed in increasing numbers near steel works and other industrial plants and the liquefaction of methane from petroleum fields all provide potential markets for this new steel.

Foster Wheeler to Build Dow's Greek Polystrene Plant

The new Styron polystyrene manufacturing facility for Dow Hellenic Chemical Industry Ltd., located at Lavrion, near Athens, Greece, will be built by Foster Wheeler Italiana of Milan, Italy. Award of the final contracts has been announced by Dow Chemical International Ltd. S.A. Plastics technical service facilities are also included in the construction plans for the plant; completion is scheduled for late November, 1961.

Dow Hellenic is a Dow subsidiary whose formation was announced earlier this year.

S.D. Process for Belgium Maleic Anhydride Plant

The Société Chimique de Selzaete, Brussels, is building a maleic anhydride plant at Selzaete, Belgium. The plant, using the Scientific Design Process, will have a capacity of about 5,000 tonnes per year and is scheduled to be on stream at the beginning of 1962.

Two New Metal Ammonium Phosphate Compounds from Grace

A magnesium ammonium phosphate fertiliser that will not burn or injure roots or foliage has been developed by the Research Division of W. R. Grace and Co., U.S. It is composed of 8% nitrogen, 40% phosphate and 24% magnesium oxide (8-40-0). Under laboratory conditions seeds germinate and plants grow without the presence of soil. Field tests indicate that a second metal compound, ferrous ammonium phosphate (7-35-0) is equally effective in some forestry applications.

Removal of Detergents From Waste by Ion-exchange

A potentially cheap ion-exchange method of removing detergents from waste water has been reported by the American Chemical Society. One of the ingredients of the detergents, the alkyl benzene sulphonate materials, resists most disposal methods. However, when waste water is passed through a column containing a plastics-like material called Duolite, most of the detergent in the water is removed in exchange for a harmless substance. The only disadvantage at present is the difficulty of regenerating the Duolite. If an inexpensive method can be found to do this, it may mean that an easy and economical way of preventing detergents from contaminating surface water has been discovered.

U.S. Firm Produces Hydraziniums for Textiles

The first hydrazinium compounds to be commercially produced for textile application, marketed under the names of Aquazine-100 and Aquazine-88, are being manufactured by Moretex Chemical Products Inc., South Carolina, under licence from W. R. Grace and Co. Unlike conventional softeners, Aquazine-100 can be successfully applied to yarns in a package dyeing machine, and Aquazine-88 is an anti-static agent which can be used in the same processing systems as Aquazine-100.

Capital Increase for German Pfizer Concern

Pfizer GmbH, Carlsruhe, the German subsidiary of Chas. Pfizer and Co., New York, have increased their capital from DM500,000 to DM8 million.

U.S. Firm to Use Dutch Urea Process

Solar Nitrogen Chemical Inc. are to use the Dutch State Mines urea process at a new £2.5 million plant to be built at Joplin, Mo. Capacity is not disclosed. Construction is due to start in February next with completion expected for October 1961. Ammonia supplied from a new plant at Joplin which is due for completion in April next, will be used.

Canadian Natural Gas for Export to U.S.

A $C.20 million (approximately £7 million) gas processing and sulphur manufacturing plant is to be built in the Pincher Creek District of Southern Alberta by Shell Oil Company of Canada Ltd.

It will initially be designed to produce approximately 100 million cu. ft. of processed gas per day for delivery to Alberta and Southern Gas Co. Ltd., of Canada, for export to the U.S. In addition, approximately 1,000 tons of sulphur per day, and between 3,500-4,000 barrels of liquid products per day, will also be produced.

About 70 men will be employed at the plant when completed, which is expected before the end of 1961.

Australian A.E.C. Forecasts Bigger Uranium Demand

Forecasts that the market for uranium will become highly competitive within the next decade were made in the eighth annual report of the Australian Atomic Energy Commission. At present the biggest element in demand was the military one, but from 1970 a growing number of nuclear power stations were expected to be commissioned and would need substantial tonnages of uranium.

After 1970 it was expected that an expansion of production would be needed. The report said the Western world's uranium production capacity had trebled since 1956. The present level of production was 42,000 tons of uranium oxide a year.

Mexican Chemical Industry Developments Include Fertilisers and Plastics

A NUMBER of new chemical industry developments are reported from Mexico. Next spring a plant for the production of hydrofluoric acid and fluorcarbons is to be opened at Monterrey by Grupo Quimico de Monterrey, a joint subsidiary of Celulosa y Derivados S.A., Sosa de México S.A. and Quimica Industrial de Monterrey S.A. Production is being planned in co-operation with the General Chemical Division of the Allied Chemical Co., U.S. Raw materials for feed will be carbon tetrachloride, sulphuric acid and fluorite from Grupo participants.

Meanwhile the Nalco Chemical Co., Chicago, are building a pharmaceuticals production unit at Saltillo, in the Mexican State of Goahuila. To open next February, it will be the U.S. concern's fourth foreign plant.

The Dolomitas cellulose company of Mexico is planning to start erection of a cellulose plant at Sant Margarita in Chiapas State. This unit will have an annual capacity of 30,000 tonnes of sulphite cellulose and will cost an estimated Pesos 15 million. A test plant is already producing on the site of the Instituto Mexicano de Investigaciones Tecnológicas. Mexico at present has to import some 20,000 tonnes of sulphite cellulose worth Pesos 423 million annually. This demand will be met and quantities will be available for export.

The announcement has been made also of the opening in Mexico of a plant for the production of phosphoric acid, triple sodium phosphate and tetrasodium phosphate by Hooker Mexicana S.A., a Mexican subsidiary of the Hooker Chemical Corporation, U.S., Hooker built the plant after the imposition of an import ban following the opening of a similar plant in Mexico by the Monsanto group. Both Hooker and Monsanto may export.

In the plastics production field a new plastics plant is being opened in Mexico City by Materiales Modeables S.A., a joint concern of British Industrial Plastics Ltd. and the U.S. Borden Co. Mexican participation in the project is hoped for.

The Campo de Mexico S.A. is to take up plastics output by taking over plant operated at present by Celanese Mexicana S.A. The Campo company will work in co-operation with the Chicago Molded Plastics Corporation.

Bookshelf

LABORATORY TECHNIQUES IN 81 UNIT EXPERIMENTS

UNITIZED EXPERIMENTS IN ORGANIC CHEMISTRY. By *R. Q. Brewster, C. A. Vanderwerf* and *W. E. McEwen*. D. van Nostrand, Princeton, 1960. Pp. xiv + 200. 41s 6d.

This book consists of 81 'unit' experiments which are intended to provide the basis for an introductory course of laboratory work. Each unit contains (a) a full theoretical introduction which provides the necessary theoretical background and puts the work in perspective; (b) an account of the experimental procedure, which is often supplemented by notes on the reagents, the reactions and the apparatus; (c) a number of questions. The first eight units cover the most important fundamental techniques, including chromatography. The remaining units, which can be selected as required, illustrate the reactions of the most common functional groups and cover a wide range of compounds, mainly aliphatic and aromatic. Experiments on carbohydrates, proteins, dyes and optical resolution are also included. The units are based on a three-hour laboratory period.

Most of the preparations are on a macro scale. Although the experiments can, of course, be scaled down, some details about semimicro working might well have been included.

Only one unit is devoted to qualitative organic analysis and the discussion of this topic does not come up to the high standard of the remainder of the book. This is unfortunate as organic analysis seems to be one of the best ways of stimulating thought in the student laboratory.

The book is spiral-bound and it seems less durable than might be desired. Students will also regret that its price is rather high.

J.C.P.S.

Oxidation Reduction

OXIDATION-REDUCTION POTENTIALS OF ORGANIC SYSTEMS. By *W. Mansfield Clark*. Baillière, Tindall and Cox, London, 1960. Pp. xi + 584. 108s.

This book is divided into two parts—a valuable reference work containing over 100 tables of data, with appended critical notes and a comprehensive bibliography of over 1,300 items (215 pages) and an account of the most important techniques and concepts written with the non-specialist as well as the expert in mind.

The volume contains 14 chapters including a discussion of the pertinent parts of thermodynamics, the relation of e.m.f. to the cell reaction, the modifications of primary equations to account for the formation of dimers and of intermediate free radicals, the complications associated with the formation of co-ordination compounds, the effects of junctions between dissimilar solutions, standard cells, techniques, and the criteria of the reliability of oxidation-reduction potentials.

The book, which contains 81 figures and an index, is well produced and should prove most useful to specialists and workers in allied fields.

Water De-salting

DEMINERALISATION BY ELECTRODIALYSIS. By *J. R. Wilson*. Butterworths, London, 1960. Pp. xiii + 378. 60s.

As the result of studies by members of the South African Council for Scientific and Industrial Research, and others, the world's largest electrodialysis plant has been built in the Orange Free State goldmining area, which can de-salt about 100,000 gall./hr. of water containing 3,000 to 500 p.p.m. of sodium chloride. The monograph gives a technical record of the laboratory, pilot plant and full-scale development processes. In addition there are chapters on the chemical and physical aspects of electrodialysis and the membranes used for such purposes. It is essentially a book for the specialist such as physical chemists concerned with ion-exchange membranes and electrodialysis and chemical engineers who seek guidance on plant construction which treats waters by this method.

Silicon Carbide

SILICON CARBIDE—A HIGH TEMPERATURE SEMICONDUCTOR. Edited by *J. R. O'Connor* and *J. Smiltens*. Pergamon Press, London, 1960. Pp. xix + 521. 90s.

This symposium volume contains the 46 papers given and an edited version of the oral discussion that took place at the International Conference on Silicon Carbide held in Boston, U.S., in 1959. The programme was divided into five sections and this division is retained.

The five papers (38 pages) of Section I, introduced by F. N. Rhines, deal with the silicon-carbon binary and the silicon-carbon-germanium ternary systems. The growth of silicon carbide single crystals is dealt with in Section II (introduced by R. E. Davis) which contains 11 papers (92 pages); the techniques discussed are sublimation, gaseous cracking and growth from solutions. The 11 papers of Section III, introduced by M. J. Buerger, deal with the crystal structure, morphology, chemical imperfections and the oxidation of silicon carbide (116 pages). The main section (IV) (introduced by K. Lehovac) contains 15 papers (144 pages) dealing with semiconductor properties. Topics dealt with are the bond structure, electrical and optical properties, and radiation effects on silicon carbide. In the final section, introduced by I. A. Lesk, various two and three terminal silicon carbide devices are discussed (115 pages).

These contributions, by the leading workers in the field, are most valuable in view of the very great need for a stable high temperature semiconductor material. The volume is indexed.

Aromatic Substitution

HOMOLYTIC AROMATIC SUBSTITUTION. By *G. H. Williams*. Pergamon Press, London, 1960. Pp. vii + 133. 45s.

This monograph is one of a series on Organic Chemistry. Much of the material has been covered by the author in a recent 'Chemical Review'. It is written for specialists and does not devote much space to the correlation of the results with the general behaviour of free radicals. The account of the work of Professor Hey's school of which the author is a member is particularly full as is indicated by the allocation of the chapters: General Introduction (5 pages), Theoretical Treatments (21 pages), Homolytic Arylation Reactions (18 pages), Quantitative Investigation (25 pages), Intramolecular Arylation (14 pages), Alkylation (16), Hydroxylation and some other Substitution Reactions (17 pages). References, none of which are to work published since 1958, are given at the ends of chapters by a cumbersome version of the Royal Society system.

Physical Chemistry

PRINCIPLES OF PHYSICAL CHEMISTRY. By *William H. Hamill* and *Russel R. Williams, Jr.* Oliver and Boyd, Edinburgh and London, 1960. Pp. x + 607. 30s.

This new book covers in 19 chapters, illustrated by 164 figures, the major portions of physical chemistry with which pass degree students are expected to be familiar. The material is presented in an orderly sequence and numerous valuable exercises are included in the text as well as at the end of each chapter. Concise summaries of the important results derived in each section are given.

In addition to the obligatory chapters on thermodynamics, chemical and phase equilibria, non-electrolytes, electrolytes, reaction rates, colloids and atomic structure, up-to-date features such as nuclear chemistry, photochemistry and radiation chemistry are included. The final chapter on chemical statistics, a topic not usually included in textbooks of this level, is a valuable addition.

The book is indexed, well bound and represents amazingly good value for its modest price.

PEOPLE in the news

● **Mr. Ian MacLeod** has been appointed technical director of Lightnin Mixers Ltd., the company formed by Stockdale Engineering Ltd., of Poynton and the Mixing Equipment Co. Inc., of Rochester, N.Y., to manufacture Lightnin mixers in the U.K. (C.A., 29 Oct., p. 710). For the last two years Mr. MacLeod has been technical director of Stockdale Engineering Ltd., and has been largely responsible for the development of the new range of U.K. mixers manufactured by the company. With Lightnin Mixers he will be devoting his time to sales and engineering development.

● **Mr. H. G. Lazell,** chairman and managing director of the Beecham Group Ltd., of London, and **Sir Graham Larmor,** managing director of The Ulster Weaving Co. Ltd., of Belfast, have accepted invitations from **Sir William McFadzean** to become members of the Export Council for Europe.

● **Mr. Howard A. Acheson, Jr.,** has been appointed general manager of Acheson Dispersed Pigments Co., Dukinfield, near Manchester, a Division of Acheson Industries (Europe) Ltd., effective from 1 January 1961. At present he is production engineering manager, Acheson Dispersed Pigments Co., Philadelphia. A chemical engineer, Mr. Acheson was at one time engaged on refinery operations for the Standard Oil Co. of New Jersey. He joined Acheson Dispersed Pigments Co., Philadelphia, as assistant to the general manager in 1954, being later promoted to plant manager and then production engineering manager.

H. A. Acheson

J. McN. Bruce

● **Mr. J. McN. Bruce, A.M.I.Chem.E.,** has been appointed engineering manager of Blaw Knox Chemical Engineering Co. Ltd. For the past ten years he has been employed with the Quickfit group of companies as technical director of Q.V.F. Ltd. He previously served with the Ministry of Supply, Lever Brothers and other firms in the process industries.

● **Mr. H. M. Davis, B.Sc., A.R.I.C., A.Inst.P.,** joined Southern Analytical Limited as chief engineer and director where he will be responsible for the design and development of all the chemical analysis instrumentation at present manufactured, and contemplated for the future.

● **Mr. W. J. McBride, M.I.Mech.E.,** a director of Edgar Allen and Co. Ltd., Sheffield, and general manager of the company's engineering division began an eight-day visit to the U.S.S.R. on 8 December 1960. He is accompanied by **Dr. A. D. Merriman, D.Sc., C.I.Mech.E.,** consultant to Edgar Allen's engineering division. Mr. McBride will lecture in Moscow on the design and manufacture of cement plant and kindred equipment, to top Russian executives and technicians, who will come from all parts of Russia. Dr. Merriman will lecture on some physico-chemical aspects of cement manufacture, and in addition will give a lecture on certain aspects of steel manufacture. The visit has been arranged through the State Science and Technical Committee, U.S.S.R. Council of Ministers.

● The exchange of technical developments for the chemical industry was to be discussed in the German Democratic Republic this week by representatives of Humphreys and Glasgow Ltd., London, the contracting engineers, and officials of the Republic's department responsible for chemical affairs. **Mr. G. Gresle Farthing,** deputy chairman and managing director, and **Mr. D. C. Lennon,** in charge of overseas chemical sales and negotiations, are representing the British company, and left for East Germany on 5 December. They have been invited by **Dr. W. Singer,** deputy head of the Republic's department. The invitation follows the visit made to Britain in July this year by Dr. Singer and a delegation.

● **Viscount Amory,** former Chancellor of the Exchequer, who has joined the board of I.C.I. as a non-executive director, has been appointed to succeed the **Earl of Limerick** as chairman of the Medical Research Council.

● **Professor Lev Landau,** professor for theoretical physics at the University of Moscow, was this month awarded in his absence, the Max-Planck Medal by the West German Society of Physical Associations at their annual congress in Wiesbaden. Professor Landau's work embraces studies in magnetism and the superfluidity of helium. Among former holders of the Max-Planck Medal are Albert Einstein, Otto Hahn and Niels Bohr.

● **Mr. Gordon Mercer** has been appointed technical representative to the plastics industry for Charles Lennig and Co. (G.B.) Ltd., subsidiary of Rohm and Hass Co., Philadelphia. He will be handling the technical and sales aspects of the company's Oroglas acrylic moulding powder and Implex high impact modified acrylic. He will be located in the company's London offices at 26-28 Bedford Row, London W.C.1.

● **Mr. Frank Cousins,** general secretary of the Transport and General Workers Union, has been appointed a member of the Council for Scientific and Industrial Research, in succession to **Mr. H. Douglass,** general secretary of the Iron and Steel Trades Confederation, who has retired from the council.

● **Mr. T. E. Greenfield** has been appointed sales development manager of the Industrial Process Control Division of Gresham Automation Ltd., Hanworth, Middlesex.

O. Secher, newly appointed vice-chairman of Marchon Products and Solway Chemicals, see C.A., 3 December

Obituary

Mr. William Wilde, works manager at the chemical works of John Riley and Sons Ltd., Hapton, Nr. Burnley, Lancs, died at Preston on November 30, aged 79. He had worked at Riley's all his life. His father, Mr. James E. Wilde, had been secretary of the firm for over 40 years.

Will

Mr. Lionel Blundell, who founded the North British Chemical Co., which later merged with the Calico Printers' Association, died on 14 August, aged 81 years, leaving £23,733 net (duty paid £3,572). He left £5,000 to Manchester College of Technology for the establishment of a fellowship to be called "The Lionel Blundell Overseas Fellowship," to enable graduates in the Departments of Applied Chemistry and Textile Chemistry to continue their studies overseas.

Bradford Meeting on New Developments in Plastics

A symposium on 'New Developments in Plastics' will be held at the Bradford Institute of Technology on 11 February 1961 under the auspices of the Bradford Chemical Society, Plastics Institute, Yorkshire Division, and the Department of Chemical Technology, Bradford Institute of Technology, and in conjunction with the Yorkshire Council of Further Education. The papers to be read cover 'The nature and properties of plastics', 'New plastics', 'The effects of structural modification on the properties of p.v.c.', and 'The new approach to fast speed and fully automatic moulding of thermosets'.

Commercial News

- Cowan Bros. Join Johnson, Matthey Group
- More European Projects for Du Pont?
- S.A.I. Final Dividend Makes 12%
- Dow Chemical's Year of Expansion

Anglo-Lautaro Nitrate

Profit of Anglo-Lautaro Nitrate Corporation for the year ended 30 June was $1,908,648 or 43 cents per 'A' share ($3,168,601 or 71 cents). Dividend is 40 cents on 'A' shares (70 cents). Higher production costs in Chile were mainly responsible for the drop in earnings, competitive conditions again reduced the sale price of nitrate. Growing disparity between internal costs in Chile and foreign exchange rates has steadily cut margins. Increased costs of labour, raw materials and losses suffered during the recent strike will seriously jeopardise results for the current year unless some form of relief from the unrealistic rate of exchange is forthcoming promptly, says chairman Mr. Harry F. Guggenheim.

Cowan Brothers

Cowan Brothers (Stratford) Ltd., who specialise in the production of inorganic colours, pigment dyestuffs and lakes, have joined the Johnson, Matthey group of companies. The company will continue manufacturing and trading as hitherto and will retain all their existing staff. Sir Christopher Cowan is remaining as chairman and managing director, together with the present directors, and the Board has been increased by the addition of two representatives of Johnson, Matthey and Co. Ltd.

The Johnson, Matthey group comprises nine other companies in Great Britain and 13 companies overseas—in Canada, Australia, New Zealand, South Africa, Rhodesia, U.S.A., Holland, France, Italy and Sweden. The products of the group already include high-purity chemicals, cadmium pigments and materials for the ceramics, plastics, paint, printing inks and kindred industries. Their interests in refining and metallurgy are known throughout the world.

Cowan Brothers explain that association with the group will give the company the benefit of greater facilities in research, process development and marketing, leading to considerable expansion and better service to customers.

Olin Mathieson

Sales and profits of Olin Mathieson Chemical Corporation for the first nine months of 1960 were approximately the same as for the comparable 1959 period. In the third quarter, however, sales and operating revenues totalled $179,471,000, compared with $182,486,000 in the same 1959 period. Net profits in the quarter amounted to $7,771,000, or $0.58 per share, compared with $9,248,000, or $0.69 per share, a year ago.

For the nine-month period, sales and operating revenues in the U.S. and Canada totalled $527,752,000 ($529,782,000) while net profits amounted to $26,437,000, or $1.98 per share ($26,752,000, or $2.01 per share).

Profits of the Chemicals Division had a moderate decline, principally because of the large expansion in organic chemicals which interrupted production of certain facilities and caused higher production costs.

Reckitt and Colman

Reckitt and Colman Holdings Ltd. will acquire for cash the ordinary capital of Westminster Laboratories Ltd., manufacturing chemists, Chalcot Road, London N.W.

S.A.I.

Sales of Scottish Agricultural Industries Ltd., an I.C.I. subsidiary, for the year ended 30 September, were £24,836,744 (£24,863,605). After all charges, the balance attributable to the company is £677,783 (£610,984). A final dividend of 8%, making 12%, is announced (same, but on capital increased by a scrip issue).

Soc. d'Auby

The fertiliser producers, Société de Produits Chimiques d'Auby, record a net profit of N.Fr.1,980,000 for the year ended 30 April (N.Fr.2,310,000). Gross profit fell from N.Fr.9,220,000 to N.Fr.8,670,000. Dividend is unchanged at 6.24%.

Chimindus

Chimindus chemical holding concern of Belgium, have increased their capital from B.Fr.180 million to B.Fr.288 million and taken over 146,340 shares of the Belgian chemical producers.

American Viscose

The American Viscose Corporation reports a net profit for the third quarter of the current year of only $500,000 ($3,400,000) or 11 (66) cents/share. Over the first three-quarters of the year net profit totalled $4.3 m. ($11.2) or $2.19 ($0.90) per share.

Sales for the nine-month period were $156.6 m. ($185 m.). Together with the Chemstrand Corporation and the Ketchikan Pulp Co., the company recorded $14.6 m. ($22.9 m.) net profit for the first three-quarters of 1960, or $3.08 ($4.48) per share.

Dow Chemical

1960 has been a year of continuing expansion for Dow Chemical, Midland, Mich. Earnings after tax have risen by 31% to $82.4 million as sales reached a new peak of $781 million. Chemical sales increased in proportion to the overall sales growth though plastics were somewhat below expectations. The foothold the company gained in the fibre market with Zefran was consolidated.

Agrochemical sales increased by 10%. Dow transparent films continued to gain popularity.

Capital additions rose to $102 million and it is expected that about $150 million will be invested this year in new plant and expansions. In Holland, facilities for manufacturing styrene butadiene latexes are nearing completion at Rotterdam.

E.I. Du Pont

Record sales of about $2,160 million ($2,114 million) are expected for 1960 by E.I. Du Pont de Nemours. But earnings are expected to total between $8.20 and $8.45 per share ($8.92). Sales and profits for 1961 are expected to be on a level with 1960. The company's plants during 1960 ran at between 75 to 80% of capacity, or several points less than a year ago.

Construction in 1960 will cost between $210 million to $220 million, with similar plans for 1961. Project authorisations will be higher next year and will cover some construction which will not be on stream before 1962. Much stress will again be placed on projects outside the U.S. and a du Pont spokesman in Wilmington said he would not be surprised if one or two more projects were announced for Europe within the next 12 months.

INCREASES OF CAPITAL

LAPORTE INDUSTRIES LTD., Hanover House, Hanover Square, London W.1. Increased by £2.5 million beyond the registered capital of £12 million.

Q.V.F. LTD., chemical plant manufacturers, etc., Duke Street, Fenton, Stoke-on-Trent. Increased by £100,000 beyond the registered capital of £100,000.

ANTHONY PRODUCTS (BOLTON) LTD., manufacturers of and dealers in powders, dyes, etc., Albany Chambers, 21 Mawdsley Street, Bolton. Increased by £1,400 beyond the registered capital of £100.

NEW COMPANIES

POLYMER FABRICATIONS LTD. Cap. £1,000. Manufacturers of plant, equipment and all manner of goods used for electro-chemical plating and processing, etc. Directors: G. H. Cashmore, J. G. Trott, B. Sims and J. P. Wilkinson.

LABORATORY SERVICE AND PACKING CO. LTD. Cap. £1,000. To provide a service for chemical and other manufacturers for the preparation and packing of their own products, etc. Directors: L. Harris. Reg. office: 131 Hill Lane, Blackley, Manchester.

TRADE NOTES

Vyon Porous Plastic

To give prospective customers a broad outline of some of the main applications for which Vyon, a new porous plastics material, can be used, a special booklet has been published by Porous Plastics Ltd., Dagenham Dock, Essex. Vyon is made from high density polythene and permeability may be varied to suit different applications. Temperature limitations are determined by the working conditions to which it is subjected, but, as a general rule, if it is lightly stressed it will withstand 100°C without distortion. In the lower temperature range, Vyon does not become brittle above −70°C.

Latex Coating in Packaging

By coating Carbion, a recently introduced packaging material, with a latex solution, a new system of packaging has been developed. So claim the developers of this special process, Spicers Ltd., Loughton, Essex, who also make and market the material. Carbion consists of a strawpaper or similar base passed through heated profiled pressure rolls which impart a characteristic double-wave resilient pattern. The addition of a latex coating in many cases eliminates the need for other means of fastening.

Main application of this new material is the protection of small parts, which are placed on a piece of self-adhesive Carbion of appropriate size, the piece is folded over and firmly pressed down along the edges and around the enclosed parts. The material can be used several times. The latex does not adhere to any surface, unless it also has a coating of latex. The cost of the material is 61s 6d per roll, 42 in. by 200 ft.

Additions to B.D.H. Range

New entries in the B.D.H. catalogue include 10 rare earth oxides of 99.9% purity. They are the oxides of dysprosium, erbium, europian, gadolinium, holmium, neodynium, praesodymium, samarium, terbium and ytterbium. The other additions are: sorbic acid, which has found widespread application as a fungistat and for inhibiting the growth of yeast and certain bacteria; and two microscopical stains, J.B.S. Stain No. 1 and No. 2.

Organic Chlorine Compounds

A new 44-page booklet describing the use of organic chlorine compounds as solvents, extractants, fumigants, intermediates, and special-purpose fluids, is now available from Union Carbide International, 30 East 42nd Street, New York 17. The booklet contains data on 13 organic chlorine compounds: ethylene dichloride, propylene dichloride, 1,1,2-trichlorethane, 1,2,3-trichlorpropane, dichlorethyl ether, dichlorisopropyl ether, triglycol dichloride, butyl chloride, 2-ethylhexyl chloride, iso-decylchloride (mixed isomers), ethylene chlorhydrin, epichlorhydrin, and Chlorasol fumigant (mixture of ethylene dichloride and carbon tetrachloride).

High Load-Bearing Foam

A new polyether foam, claimed to be of exceptionally high load-bearing capacity, is being produced by Aeropreen Products Ltd., High Wycombe, Bucks. This foam, designed to replace AOP 20 and APP 20, is made possible by further chemical advances in the higher molecular weight of the polyols which contribute to the characteristics of polyether foams. The new 'one-shot' foam, AOP 26, has the following characteristics: hardness at 40% deflection 44.5 kg; density 1.8 lb./cu. ft.; compression set under 10% when tested at 90% deflection for 22 hours at 70°C and measured 30 minutes after release.

Changes of Address

J. M. Steel and Co. Ltd. have moved to larger offices at 73-79 King Street, Manchester 2. Telephone and Telex numbers and telegraphic address are the same.

The Electric Resistance Furnace Co. Ltd., a member of the Efco group of companies, have changed their name to Efco Furnaces Ltd.

Electric Furnace Elements

'Build your own electric furnace' says a leaflet, TD23, issued by the Morgan Crucible Co. Ltd., Battersea Church Road, London S.W.11. Diagrams show details of a small laboratory crucible furnace and a tube furnace, both employing Crusilite elements.

Pocket Book for Welders

There is a light-hearted yet sound approach to a technical subject in a new 56-page booklet 'Weld-ability,' produced by the Welding Division of English Electric, East Lancashire Road, Liverpool, 10. Designed to go in the welder's pocket and liberally illustrated with cartoons and simple diagrams, the booklet is full of tips for better welding. The first half deals with the principles of good welding, detailing the necessary equipment and types of welds and explaining terms, symbols and British Standards. The second part covers English Electric arc welding equipment.

Decontaminant Powder

SDG3 powder is a detergent composition designed to remove radioactive contamination from metallic and other hard surfaces, textile materials, etc. It is used in decontamination processes by research personnel of the United Kingdom Atomic Energy Authority, and is manufactured and sold under licence from the A.E.A. by Standard Chemical Co., Cheadle, Cheshire. It is available as a white granular free-flowing powder, packed in polythene lined fibreboard kegs containing 56 lb.

DIARY DATES

MONDAY 12 DECEMBER

Inst. Metal Finishing—London: Northampton Coll. of Technology, St. John St., E.C.1, 6.15 p.m. 'Unusual anodising methods and their practical significance', by J. M. Kape.

Plastics Inst. with I.R.I.—Birmingham: James Watt Memorial Inst., 6.30 p.m. 'Urethane polymers for non-cellular applications', by D. J. B. Coulter.

TUESDAY 13 DECEMBER

C.S. with R.I.C. & S.C.I.—Belfast: Chemistry Dept., Queen's Univ., 7.15 p.m. 'Catalytic mechanisms of hydrolytic enzymes', by Dr. O. T. Elmore.

I.Chem.E.—Chester: Blossoms Hotel, 7.30 p.m. 'Analytical instrumentation of process gas streams', by J. C. Hawkes.

Plastics Inst.—Edinburgh: North British Hotel, 7.30 p.m. 'Rigid p.v.c. piping', by E. J. Hoskins.

S.A.C.—Birmingham: Sale Room, Regent Hse., St. Philip's Pl., 6.30 p.m. 'Analysis of waters used in industry', by K. B. Coates.

S.C.I. with C.S. & R.I.C.—Belfast: Chemistry Dept., Queen's Univ., Stranmillis Rd., 7.45 p.m. 'Catalytic mechanisms of hydrolyitc enzymes', by Dr. D. T. Elmore.

S.C.I.—Birmingham: Birmingham & Midland Inst., 6.30 p.m. 'Natural & synthetic diamonds', by Prof. S. Tolansky.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6 p.m. 'The control of mainetenance', by R. H. Keach and 'Electrical maintenance problems of the chemical industry', by D. Marshall.

WEDNESDAY 14 DECEMBER

S.A.C.—London: 'The Feathers', Tudor St., E.C.4, 6.30 p.m. Discussion meeting on 'A review of topics in organic micro-analysis'.

S.C.I. with C.S. & R.I.C.—Aberdeen: Robert Gordon's Tech. Coll. 'Rocket propulsion', by Dr. C. H. Johnson.

S.C.I.—London: 14 Belgrave Sq., S.W.1. Paper & Textiles Group a.g.m., followed by 'Cellulose ethers', by Dr. F. C. Hall.

THURSDAY 15 DECEMBER

S.A.C.—Nottingham: Coll. of Technology, Burton St., 7 p.m. 'Development of the analytical balance', by K. M. Ogden.

S.C.I.—Edinburgh: Film Guild, 3 Randolph Cres., 7.30 p.m. Scientific film evening.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 2.30 p.m. 'The use of microviscometer for measuring viscosity of bitumens', by F. A. Wadelin, & 'X-ray fluorescence analysis', by J. R. Stansfield.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 5.30 p.m. 'The determination of the total & effective rubber contents of rubber-bitumens', by W. Szatowski & 'The mineral composition of portland cement by X-ray diffrachometry', by Dr. H. G. Midgley.

FRIDAY 16 DECEMBER

Inst. Metals—London: Church Hse., Gt. Smith St., S.W.1, 2.30 p.m. Symposium on 'Practical aspects of pressing metal powders'.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 5.30 p.m. Film evening.

NEW PATENTS

By permission of the Controller, H.M. Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 11 January

Polyurethane foam. United States Rubber Co. **858 689**

Production of expanded polyamides. Badische Anilin- & Soda-Fabrik AG. **858 254**

Process for the production of 4-methyl-4-phenyl-1:3-dioxan. Distillers Co. Ltd. **858 487**

Process for preparing 1,1,1-trisubstituted hydrazinium chlorides. Grace & Co., W. R. **858 488**

Production of fibres from thermoplastic materials. Compagnie de Saint Gobain. **858 696**

Sugar esters. Drew & Co. Inc., E. F. **858 440**

Process for the preparation of trivinyl cyclohexanes. Studiengesellschaft Kohle. **858 256**

Production of diamines. Wyandotte Chemicals Corp. **858 698**

Production of benzofurans. Distillers Co. Ltd. **858 470**

Preparation of cyclopentadienylmanganese tricarbonyls. Union Carbide Corp. **858 442**

Clarification of acidic phosphatic solutions. International Minerals & Chemical Corp. **858 443**

Process for the production of copolymers of 2-chlorobuta-1,3-diene and acrylonitrile. Farbenfabriken Bayer AG. **858 444**

Polyisocyanates containing aromatic ester groups and a process for their production. Farbenfabriken Bayer AG. **858 612**

Cyclododecatriene- and trivinyl-cyclohexane-maleic anhydride adducts and derivatives thereof. Studiengesellschaft Kohle. **858 257**

Water-soluble azo dyestuffs containing acryloylamino groups. Badische Anilin- & Soda-Fabrik AG. **858 183**

Silanes. Midland Silicones Ltd. **858 445**

Process for the production of higher boron alkyls and derivatives thereof from boron alkyls of lower molecular weight. Ziegler, K. **858 446**

Preparation of crystalline titanium chloride. Esso Research & Engineering Co. **858 185**

Purification of uranium hexafluoride. Allied Chemical Corp. **858 161**

Dibenzoheptaenes and salts thereof and a process for the manufacture of same. Hoffmann-La Roche & Co. AG, F. **858 186**

Method for the preparation of alkylneimidophosphoric acid-diakyl esters. Benckiser GmbH. Chemische Fabrik, J. A. **858 453**

Separation of hydrocarbon mixtures. Compagne Francaise de Raffinage. **858 645**

Piperazine preparations for treatment of worm infections. Westminster Laboratories Ltd. **858 455**

Polymerisation of cis 1,4-polyisoprene. Goodyear Tire & Rubber Co. **858 620**

Complex cobalt-organo compounds containing carbon monoxide and their production. Badische Anilin- & Soda-Fabrik AG. **858 494**

Nitrile polymers. Goodrich Co., B. F. **858 495**

Method of producing alkyl borate esters. United States Borax & Chemical Corp. **858 496**

Refining of maleic anhydride. Montecatini. **858 622**

Transalkylation of aromatic hydrocarbons. Continental Oil Co. **858 649**

Production of cyanuric chloride. Röhm & Haas GmbH. **858 650**

Butyl rubber vulcanisate and method of vulcanising butyl rubber. Goodyear Tire & Rubber Co. **858 625**

Production of organo-aluminium compounds. Badische Anilin- & Soda-Fabrik AG. **858 498**

Chemical composition. Du Pont de Nemours & Co., E. I. **858 269**

Process for the preparation of hydrocarbon mixtures suitable for use as premium gasoline. Shell Internationale Research Maatschappij NV. **858 270**

Preparation of acetoacetamide. Lonza Electric & Chemical Works Ltd. **858 529**

Quaternary ammonium compounds and a process for their manufacture. Schering AG. [Divided out of 858 718.] **858 719**

Polymerisation of ethylene. Hercules Powder Co. [Divided out of 849 855.] **858 750**

Dibenzocycloheptaenes and salts thereof and a process for the manufacture of same. Hoffmann-La Roche & Co. AG, F. [Divided out of 858 186.] **858 187, 858 188**

Open to public inspection 18 January

Siloxane elastomers. Union Carbide Corp. **859 234**

Water-repellent aminoplastic resinous compositions. American Cyanamid Co. **858 860**

Polymerisation of alpha olefins. Du Pont de Nemours & Co., E. I. **859 324**

Tertiary-amino substituted amides. Upjohn Co. **858 903**

Ion-exchange fibres, films and the like and their production. Rohm & Haas Co. **858 864**

Fibres, films and the like of polymers of alkoxyalkyl vinyl or α-methylvinyl sulphides. Rohm & Haas Co. **858 865**

Sulphur burning process and apparatus. Stone & Webster Engineering Corp. **858 939**

Stabilisation of convertible siloxanes and materials coated therewith. Union Carbide Corp. **858 764**

Polymerisation of ethylene and catalyst therefor. Phillips Petroleum Co. **858 945**

Process for producing hydrogen and apparatus therefor. Pintsch Bamag AG. **859 254**

Terephthaldiamide derivatives and their use in lubricating oil compositions. California Research Corp. **859 218**

Synthetic rubber-like materials. Imperial Chemical Industries Ltd. **858 757**

Production of herbicidal and fungicidal compositions. Yorkshire Tar Distillers Ltd. **858 758**

Polymerisation of acrylonitrile. Montecatini. **858 759**

Polymerisation of propylene oxide. General Tire & Rubber Co. **859 257**

Stabilisation of polymer solutions. American Cyanamid Co. **859 262**

Manufacture of pure hexachlorocyclopentadiene. Schering AG. **858 769**

Production of hydrogen peroxide. Food Machinery & Chemical Corp. **859 219**

Pyrrolidyl esters and salts thereof. Beecham Research Laboratories. **859 260**

Control of oxidative reactions. Worrall, R. L. **859 261**

Method for preparing aromatic aminoazo compounds. Goodrich Co., B. F. **859 221**

Production of adhesives. Monsanto Chemical Co. **859 274**

Metalliferous mono-azo dyestuffs containing cyano groups and process for their manufacture. Ciba Ltd. **859 275**

Processing of uranium carbide. United Kingdom Atomic Enery Authority. **858 970**

2-Imino-thiazolidines and their acid addition salts and compositions thereof. Ciba Ltd. **858 911**

Manufacture of polymeric materials. Imperial Chemical Industries Ltd., Gee, E., Gudgeon, H., and Johnson, P. C. **858 971**

Plastic compositions. Union Carbide Corp. **858 776**

Copolymers of styrene and alkyl fumarates and impregnating compositions containing such copolymers. Montecatini. **858 916**

Molecular sieve separation process for organic substances, particularly hydrocarbons. Esso Research & Engineering Co. **858 917**

Substituted 3.5-dioxotetrahydro-1,2,6-thiadiazine-1.1-dioxides. Geigy AG, J. R. **859 316**

Process for manufacturing cyanuric and isocyanuric acid derivatives. Fukui, K., and Kitano, H. **858 810**

Flotation processes. Fairweather, H. G. C. **859 062**

Substituted quinolinium and quinzolinium salts. May & Baker Ltd. **858 814**

Production of sucrose esters. Distillers Co. Ltd. **859 305**

Boron-containing synthetic resins. Napier & Son Ltd., D. **858 817**

Process for producing crystalline trimethylolphenol. Union Carbide Corp. **858 780**

2-Phenylbenzamide derivatives. Imperial Chemical Industries Ltd. **859 342**

Curable compositions and resins made therefrom. Union Carbide Corp. **859 307**

Ion-exchange resins. Permutit Co. Ltd. **859 282**

Water-soluble dyestuffs of the anthraquinone series and a process for the preparation of same. Badische Anilin- & Soda-Fabrik AG. **859 283**

Production of calcium borates. United States Borax & Chemical Corp. **859 344**

Water-soluble-methylhesperidins and their production. Takeda Pharmaceutical Industries Ltd. **858 784**

Silicone rubber. Midland Silicones Ltd. **859 284**

Process and apparatus for manufacturing mixed fertilisers. Lummus Co. **859 353**

Process for the production of aryl sulphonic acid arylamides. Geigy AG, J. R. **859 345**

Method for oxidising trivalent titanium in solid titanium oxide-containing materials. Titan Co., A. S. **858 785**

Phosphate coating processes. Imperial Chemical Industries Ltd. **858 960**

Organosilicon diols. Midland Silicones Ltd. **859 285**

Process for regenerating used alkaline reagents. Universal Oil Products Co. **859 286**

Sulphomides. British Drug Houses Ltd. **858 786**

Triazolopyrimidine derivatives and their preparation. Imperial Chemical Industries Ltd. **859 287**

Process of polymerising 3,3-Bis(chloromethyl) oxetane. Hercules Powder Co. **858 789**

Resin-drug compounds. Clinical Products Ltd. **859 348**

Triazine dyestuffs. Imperial Chemical Industries Ltd. **859 198**

Substituted azulenes. Studiengesellschaft Kohle. **858 839**

Process for the production of ortho-quinones of the naphthalene series. Farbenfabriken Bayer AG. **859 291**

Methacrylate polymers. Imperial Chemical Industries Ltd. **859 151**

Vinyl and vinilydene polymers pigmented with carbon black. Crylor. **859 292**

Copolymers of 2-chlorobuta-1,3-diene and α-chloroacrylonitrile and a process for their production. Farbenfabriken Bayer AG. **858 841**

Metal-containing monoazo dyestuffs. Farbenfabriken Bayer AG. **858 842**

Process for the preparation of organophosphines. Koppers Co. Inc. **859 373**

Method of stabilising polyamides. Phrix-Werke AG. **858 843**

Production of alkali metal cyanides. Du Pont de Nemours & Co., E. I. **858 844**

Siloxane anti-foam emulsions. Midland Silicones Ltd. **859 329**

Pyridazine derivatives and their processes for their manufacture. Sandoz Ltd. **858 792**

N^1-acylated sulpha drugs and preparation thereof. American Cyanamid Co. **858 847**

Hydrogen peroxide adducts of pyridine compounds and process for the manufacture thereof. Chemische Fabrik Schweizerhall. **858 848**

Copolymerisation process. Koppers Co. Inc. **859 330**

Aryloxyaliphatic compounds. Rhone-Poulenc. **859 243**

Epoxidation. Union Carbide Corp. **858 793**

Process for stabilising siloxane polymers. Midland Silicones Ltd **859 295**

Preparation of thiophosphoryl bromide. Dow Chemical Co. **859 244**

Production of an alkyd resin from an epoxy resin. Bataafse Petroleum Maatschappij NV. **858 827**

Hydroxyalkyl acrylates and methacrylates and method of preparing same. Rohm & Haas Co. **859 297**

Treatment of sulphidic molybdenum-containing materials. Ferrolegeringar Trollhätte-Verken AB. **859 263**

Elastomer-resin compositions. United States Rubber Co. **859 075**

Purification and stabilisation of derivatives of phenlylene diamine. Badische Anilin- & Soda-Fabrik AG. **858 850**

Alkali metal bichromate purification. Diamond Alkali Co. **859 264**

Organotitanium acylates. National Lead Co. **858 930**

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Continued from page 1006

SITUATIONS VACANT: continued

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THEORIES OF VALENCY
A correlation of modern ideas. Six lectures on Wednesday evenings at 7 p.m., commencing 25th January, 1961, to be given by Dr. T. M. Dunn of University College, London.

Details and registration forms from the Head of the Chemistry Department, Kingston Technical College, Fassett Road, Kingston-upon-Thames.

OFFICIAL APPOINTMENTS

THE NORTHERN GAS BOARD

CHIEF CHEMIST

Applications are invited for the position of Chief Chemist to the Board from chemistry graduates of a British University or persons holding an equivalent qualification.

A wide rather than a highly specialised knowledge of the chemical aspects of industry, with practical experience of chemical control in industrial processes is desired.

The appointment relates to the Board Headquarters as well as the Tyneside Division, the laboratories being situate at Redheugh, Gateshead on Tyne. Duties will be two-fold: to advise upon specific problems concerning any of the Board's operations and development, conducting such investigations as may be necessary for the purpose; and to maintain a general oversight of the work of the chemical control staffs at the Board's Tyneside gas-manufacturing stations.

Salary Scale in Group D Senior Staff, £1,695 per annum 4×£50.

The successful applicant will be required to take up his appointment not later than 31st March, 1961, and will be subject to satisfactory medical examination and agreement to enter the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, giving the names of two referees, should be sent to the undersigned not later than 4th January, 1961.

JOHN F. JACKSON,
Secretary,
30 Grainger Street,
Newcastle upon Tyne

OVERSEAS APPOINTMENTS

CHEMICAL ENGINEER

East African Industrial Research Organisation

Qualifications: Associate Membership of Institute of Chemical Engineers or equivalent University degree and wide chemical engineering experience.
Age Limits: 30-40.
Duties: To undertake research and development, including pilot plant studies, of new chemical and allied industries and to provide technical assistance to similar existing industries.
Terms: On contract for 3 years with gratuity on satisfactory completion. Salary scale: £1,737-£2,241 (under review). Free passages. Quarters at rental. Free medical attention. Local income tax rates.

Apply to Director of Recruitment, Colonial Office, S.W.1, stating full name, age, qualifications and experience, quoting BCD 195/463/02/F1.

PATENTS & TRADE MARKS

The Proprietors of British Patent No. 757,484, for "IMPROVED METHOD AND APPARATUS FOR THE REDUCTION OF FATTY MATERIALS BY HYDROGENATION", desire to enter into negotiations with a firm or firms for the sale of the patent or for the grant of licences thereunder. Further particulars may be obtained from Marks & Clerk, 57 & 58 Lincoln's Inn Fields, London, W.C.2.

PATENTS & TRADE MARKS: continued

KINGS PATENT AGENCY, LTD. (B. T. King, A.I.Mech.E., Patent Agent), 146a Queen Victoria Street, London, E.C.4. City 6161. Booklet on request.

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Oil Jacketed Double Trough Mixer 48 in. by 36 in. by 29 in. deep. Paddle Blades. Bottom Outlets.

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Apply: Winkworth Machinery Limited, 65 High Street, Staines, Middlesex. Telephone 55951.

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Stainless Steel Duplex 'Z' blade Vacuum Mixer. 36 in. by 36 in. by 36 in.—60 h.p. motor with elec. Vac. Pump.
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Stainless Steel Jac. Cyl. Mixers 36 in. by 15 in. deep, A.C. (2).
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INSPECTOR OF EXPLOSIVES: HOME OFFICE. Two pensionable posts in London for men or women at least 30 on 1.11.60 with degree (preferably 1st or 2nd class) in chemistry or chemical technology, or equivalent qualification. Experience of the working of an explosives factory or in petroleum industry an advantage. Duties involve travel to all parts of the country, and include advising on safety precautions for manufacture, storage, and conveyance of explosives; inspecting premises licensed for manufacture and storage; advising on safety precautions for storage and conveyance of petroleum and other dangerous substances. London salary scale: £1,470-£2,080. Starting salary may be above minimum. Promotion prospects. Write Civil Service Commission, 17 North Audley Street, London, W.1, for application form quoting **S/5234/61.** Closing date 10th January, 1961.

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SITUATIONS VACANT

CHEMICAL MARKET RESEARCH

Further opening for Qualified Chemist or Chemical Engineer (age up to 32) interested in the economic side of chemical industry and with a few years of industrial experience.

The post offers an opportunity to gain experience in this expanding field with a branch office of one of the world's largest independent practitioners. The applicant should be accustomed to work independently and be prepared for extensive travel. Salary will be commensurate with experience and personal qualities. Apply in writing to Vice-President, European operations:

Roger Williams Technical & Economic Services Inc.,
20 Hanover Court,
Hanover Square,
London, W.1.

COURTAULDS

MICROANALYST

COURTAULDS requires a Microanalyst, aged under 35, for the Analytical Section of one of its major research laboratories in Coventry. The position involves the application of microanalytical techniques in the field of inorganic and organic chemistry with particular reference to polymer chemistry. While a good knowledge of general chemistry is essential, practical experience of micro-analytical work is regarded as of greater importance than high academic qualifications.

Candidates should write for a detailed form of application to the Director of Personnel, Courtaulds Limited, 16 St. Martins-le-Grand, London, E.C.1, quoting reference number UU/D.8/3.

LAC RESEARCH FELLOWSHIP

A CHEMIST with a good Degree and research experience, preferably in polymers or surface coatings, is required for a special reseach project on Indian lac, involving basic studies of chemical modification and initial evaluation of technical utilisation.

The salary will be fully commensurate with age and experience. Applications, with the names of two referees, should be sent to The Director, Paint Research Station, Waldegrave Road, Teddington, Middlesex.

WORKS CHEMIST

A vacancy exists for a University Graduate or equivalent to join the Technical Department of a leading Domestic Appliance Manufacturer, producing Cookers, Fires and Refrigerators. The duties will include Technical Works Problems, Fuel Efficiency Studies, some Chemical Analysis, etc., etc.

PROGRESSIVE APPOINTMENT

GOOD CONDITIONS

Interested persons should write to:

The Personnel Manager,
R. & A. MAIN LIMITED,
Gothic Works, Angel Road, Edmonton, N.18

SITUATIONS VACANT: *continued*

JUNIOR CHEMICAL ANALYSTS

are required by the
UNITED KINGDOM ATOMIC ENERGY AUTHORITY
Production Group,
Springfields Works, Salwick, Preston, Lancashire
in the
CHEMICAL AND METALLURGICAL SERVICES DEPARTMENT

The work is of a varied character and in addition to general chemical analysis, extensive use is made of physico-chemical techniques, including emission spectroscopy, X-ray crystallography, high vacuum techniques and mass spectrometry. Candidates, who must be at least 18 years of age, will be recruited in two grades, the minimum qualifications for each being:—

(a) G.C.E., or equivalent, in five subjects, including two scientific or mathematical subjects at Advanced Level and English at Ordinary Level.
Salary: £475 (at age 18), rising to £605 (at age 21), to £1,005 per annum.

(b) G.C.E., or equivalent, in four subjects, including English and a scientific or mathematical subject.
Salary: £390 (at age 18), rising to £445 (at age 21), to £740 per annum.

Applicants above the minimum age will be expected to possess an H.N.C. or pass degree, or pursuing a course of study leading to such qualifications.
Experience in the techniques mentioned above is not essential as training will be given.
There are excellent prospects of promotion to higher appointments in the salary range £1,110 to £1,360 per annum.
Contributory Superannuation.
Send postcard for application form, quoting reference SF.81/J.11, to Works Secretary at above address.
Closing Date: 19th December, 1960.

ATOMIC ENERGY ESTABLISHMENT, WINFRITH, DORCHESTER, DORSET,

require a

CHEMICAL ENGINEER

to join the

O.E.E.C., DRAGON PROJECT

to supervise the construction and operation of a pilot plant for the removal of fission product gases and chemical impurities from helium gas.

Applicants must have experience of chemical plant design, construction and operation and should possess either a First- or good Second-Class Honours Degree or be corporate members of a senior professional institution.

Salary in ranges between £1,365 and £1,825 per annum, according to qualifications and experience.

Housing and Superannuation Schemes.

Send postcard for application form to Personnel Branch (W.372/38), U.K.A.E.A., A.E.E., Winfrith, Dorchester, Dorset, not later than 6th January 1961.

ORGANIC CHEMISTS

I.C.I. Nobel Division's interest in the synthesis of silicone polymers is expanding rapidly, and work in this new field of chemistry has significant promise. The effort is being intensified to sustain the advance of an expanding industry.

Organic chemists, with Ph.D. or equivalent qualifications, who would accept the stimulation and challenge of such work are being recruited. Experience in polymer chemistry would be advantageous. Conditions of employment are congenial in a large and well-equipped Research and Development Department, situated on the Ayrshire Coast of the Firth of Clyde, with easy access to country of outstanding beauty.

The Company operates a five-day week, a Staff Pension Fund and a Profit-Sharing Scheme. Married men will receive a refund of reasonable removal expenses and assistance towards house purchase is available.

Apply to The Staff Manager,

IMPERIAL CHEMICAL INDUSTRIES LTD.,
Nobel Division,
460 Sauchiehall Street, Glasgow, C.2

JAMES ROBINSON & CO. LTD.,
DYESTUFFS MANUFACTURERS,
P.O. BOX B.3, HUDDERSFIELD.

will shortly have a vacancy for a

CHIEF CHEMIST

The successful applicant will be required to organise not only the manufacture of present production but of new products including intermediates. Applications invited from men with energy and initiative in works manufacture of organic chemicals and who possess a good Degree in Chemistry. Preferably 30-40 age-group. Knowledge of sulphur dyes not essential. A good salary will be paid. The position offers excellent prospects. Pension Scheme and other benefits. Applications will be treated with strict confidence.

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