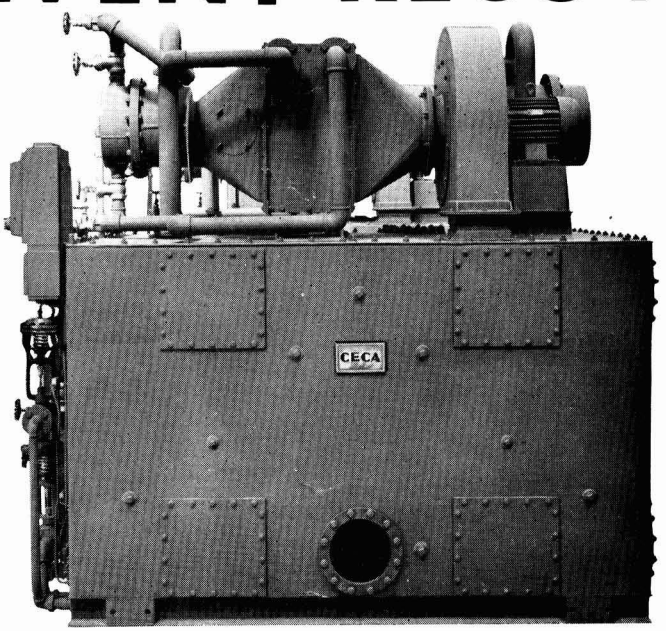
Chemical Age

incorporating
PETROCHEMICALS and POLYMERS

9 June 1962. Vol. 87. No. 2239

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

SOLVENT RECOVERY



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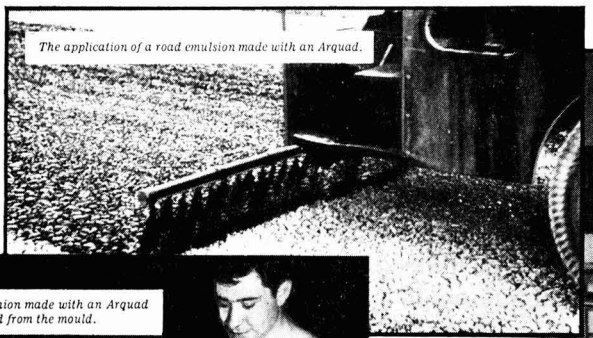
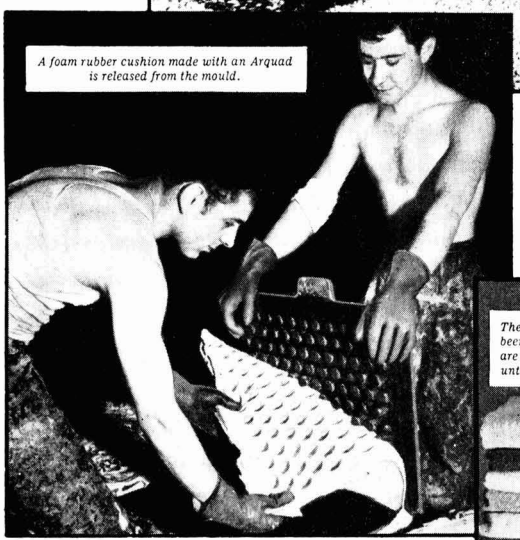
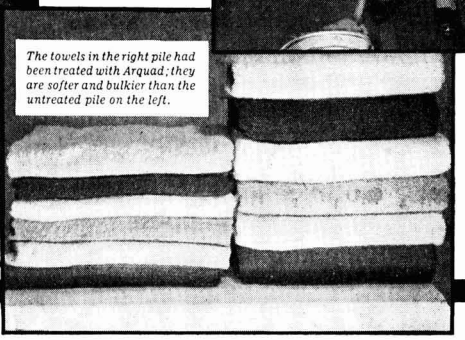


The application of a road emulsion made with an Arquad.



A foam rubber cushion made with an Arquad is released from the mould.

Arquad 16-50% a powerful bactericide, used in a food factory.



The towels in the right pile had been treated with Arquad; they are softer and bulkier than the untreated pile on the left.

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Are a unique series of QUATERNARY AMMONIUM COMPOUNDS

There are twelve Arquads in regular production each having different properties to serve specific purposes.
They are fully described in our 16-page booklet "ARQUADS".
We have also 'Technical Bulletins' describing the uses of Arquads in different industries including the following: No. E-1/1 Arquad 2HT for Textiles and Paper; No. E-2 Arquad 2HT as Laundry Processing Aid; No. E-5/1 Arquads as Non-Toxic Bactericides; No. E-8 Arquads in Liquid starches; No. L-5 Arquads for Latex Foam Rubber, No. L-11/4 Arquad 18 as Antistatic for Plastics; No. L-23 Arquad 16 for sterilising Hospital Blankets; No. L-24 Chemicals for Cationic Road Emulsions; Armour Organics for Increased Oil Production; Memo No. 10 Cationic Flocculants.
We would appreciate an opportunity of discussing your production problems with you. It is probable that one of our Arquads will be of great value to you.

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ARMOUR HESS CHEMICALS LIMITED

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INDEX TO ADVERTISERS

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

(Continued on page 920)

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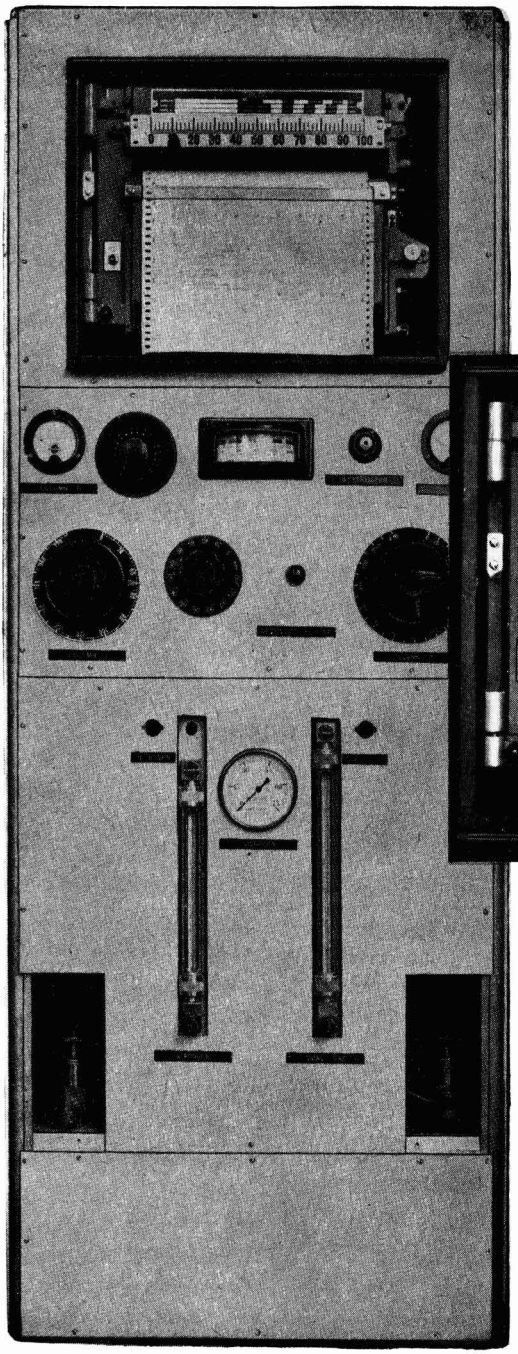
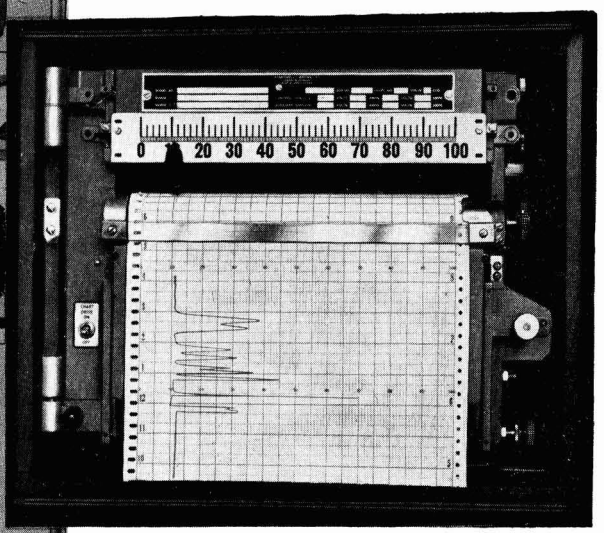


Products of controlled quality...



AROMATIC SOLVENTS

High flash solvent and 90/200°C. naphtha are distilled by U.C.C. from coke oven light oils. In addition two higher boiling materials Solvent 'D' and Solvent 'F' are distilled from heavier oils.

	HIGH FLASH SOLVENT	90/200°C NAPHTHA	SOLVENT 'D'	SOLVENT 'F'
SPECIFIC GRAVITY 15·5/15·5°C	0·895	0·900	1·030	1·033
DISTILLATION RANGE				
5%	162°C	168°C	228°C	232°C
95%	175°C	197°C	264°C	256°C
FLASH POINT	107°F	110°F	180°F	190°F

High flash solvent is a mixture of trimethyl benzenes and hydrindene — 90/200°C. naphtha consists mainly of alkyl benzenes and Solvents 'D' and 'F' are methyl naphthalene concentrates — all are powerful and highly aromatic solvents.

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Tel : Woodhouse (Sheffield) 3211 Telegrams : 'Unichem' Sheffield
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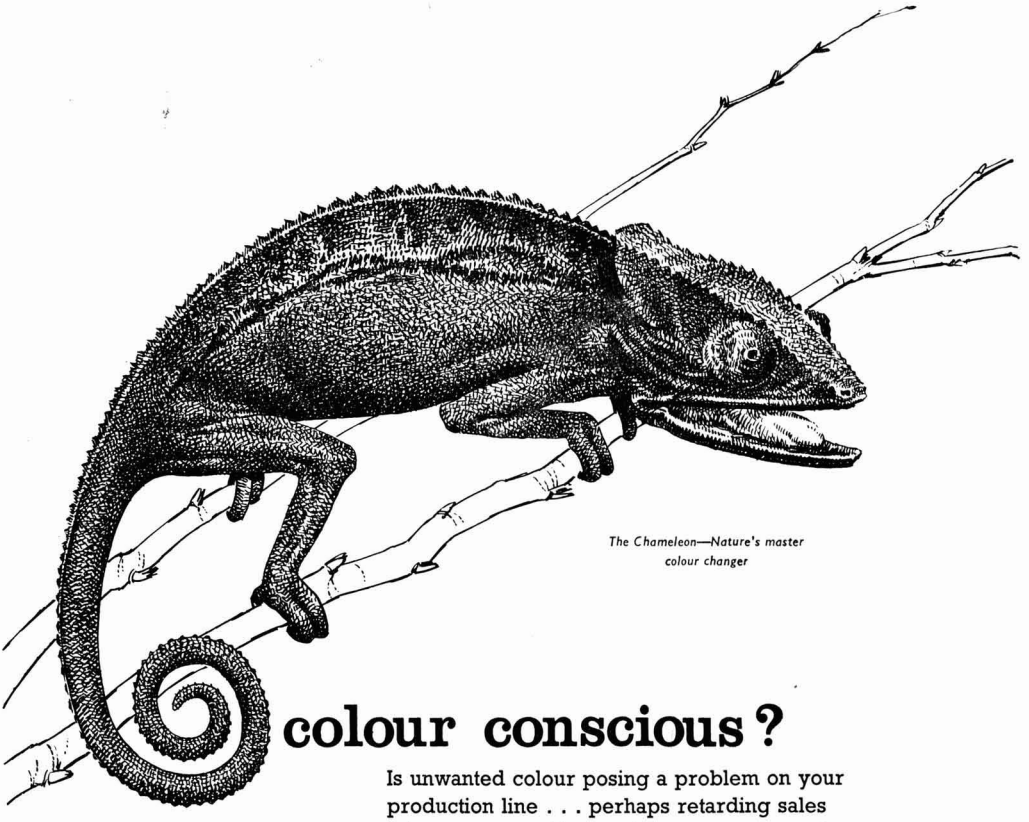

The Chameleon—Nature's master colour changer

colour conscious?

Is unwanted colour posing a problem on your production line . . . perhaps retarding sales volume . . . or affecting the appearance and presentation of your finished product? It sounds like it could be a job for ACTIBON—the Highly Activated Decolourising Carbon, which is doing a "crystal-clear" job for many industries throughout the world. If you are conscious of colour and want to get rid of it, Consult Clydesdale Chemical—the organization that developed ACTIBON—now the recognized leader in the decolourising field.

specify ACTIBON

THE HIGHLY ACTIVATED DECOLOURISING CARBON

. . . FOR SUGARS, FATS & OILS, FOOD PRODUCTS, ALCOHOLIC BEVERAGES, ORGANIC CHEMICALS, BIOCHEMICAL PREPARATIONS, ENZYMES, VITAMINS AND HORMONES.

THE CLYDESDALE CHEMICAL CO., LTD.

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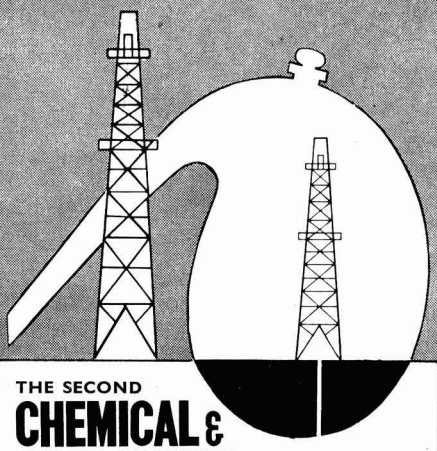
Telephone: Central 5247-8 Telegrams: "Cactus" Glasgow



THE SECOND

CHEMICAL & PETROLEUM ENGINEERING EXHIBITION

THE 2ND CHEMICAL AND PETROLEUM ENGINEERING EXHIBITION, the largest combined exhibition of chemical plant and oil production and refining equipment ever held in Europe, opens at Olympia on June 20th. Over 400 companies serving these two industries will occupy the whole of Olympia, covering more than 450,000 square feet of floor space.

Designed to keep everyone in the industry fully informed on the newest equipment and techniques, the Exhibition will show plant, machinery, instruments and ancillary equipment for the extraction, production and exploitation of chemical and petroleum products of ever-increasing diversity.

THE 3RD CONGRESS OF THE EUROPEAN FEDERATION OF CHEMICAL ENGINEERING
will take place at Olympia concurrently with the Exhibition.

THE 4TH CONGRESS OF THE FEDERATION OF EUROPEAN PETROLEUM EQUIPMENT MANUFACTURERS,
25th-28th June, will be held at Church House, Westminster, S.W.1.

Sponsored by:

BRITISH CHEMICAL PLANT MANUFACTURERS ASSOCIATION

COUNCIL OF BRITISH MANUFACTURERS OF PETROLEUM EQUIPMENT

For further information please apply to the organisers:
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641 Grand Buildings, Trafalgar Square, London, W.C.2.
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JUNE 20TH-30TH 1962
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FACE SCREEN
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Perfect protection when grinding or machining etc., and against chemical splashes and insecticides. Non-splinter visor; all parts replaceable.

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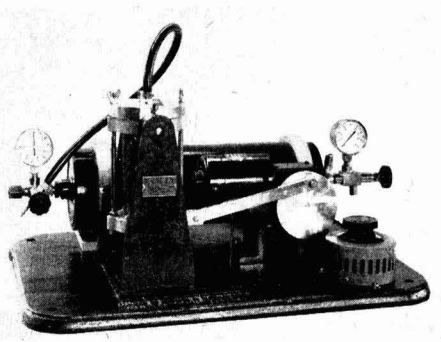
LOW PRESSURE CATALYST HYDROGENATORS



Laboratory scale apparatus for catalyst hydrogenations, pressures up to 60 psi., temperatures up to 70 degs. C. Glass reaction vessel 500ml. capacity, temperature and agitation speed controllers, gas reservoir with valves and gauges.

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WHEREVER AN INERT FILLER IS REQUIRED FULLERSITE IS THE IDEAL MATERIAL

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PORT PENRHYN, BANGOR, NORTH WALES

VOL. 87 No. 2239
JUNE 9 1962

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ONE OF THE BENN GROUP OF TRADE AND TECHNICAL JOURNALS

IN THIS ISSUE

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MANAGEMENT COMMUNICATION

THE continued growth of specialisation in industry, in management areas, is tending to aggravate the problem of communicating technical information and results to those in decision-making positions. The technical man is well aware of the specialisation that has gone on apace in his own field, but he could well be unaware of this change in management. Some of them have been made uncomfortably aware of this change insofar as they now have to report to someone else on the management side instead of, as formerly, the managing director or some director responsible for keeping an eye on technical developments. Generally, however, the breaking-down of management activities into its component parts has taken place without many technical men realising what has happened, and there is a tendency to think that the same routine of communication can be maintained as in previous years. Whereas in the past the managing director could glimpse the several parts of his company activities, the growth of the company has led to the appointment of specialists to assist him.

In many instances it will be to one of these specialists that the technical report will go. On the other hand, if such reports go to the managing director's office, there still remains the problem of making them intelligible to other members of the board if it is a matter for consideration by the directors at a meeting. Narrower profit margins, increasing competition and other factors require the attention of the accountant where formerly the managing director was happy enough to hear the chemist's assessment of the potential of his laboratory results. In some respects this more highly developed approach to technical work benefits the chemists, leading to more security and more long-term planning.

A problem confronting the men in charge of technical work is how to isolate the facts with economic significance. It is this failure to bridge the chasm between laboratory results and board interest which causes so much trouble, and sometimes frustration in the laboratories. Sometimes the difficulties are so great that the technical man draws up his report with the attitude of mind best described as "over-to-you," especially if he has suffered the experience of submitting previous reports and hearing nothing further.

The remedies for this state of affairs lie with the technical man who should study the economic appraisal of projects. It is not practicable for the accountant, or economist, to acquire an understanding of chemistry, but it is possible nowadays for the chemist to study the rudiments of management accountancy, as opposed to accountancy and there are a number of informative courses on this subject for non-accounting men held by educational institutions with management study departments.

The more immediate remedy is for the technical man to study carefully the conclusions of his report, and to see whether, within his limited knowledge, they have economic significance. If so, he should go back over the report and pick out the relevant, or significant, steps leading up to the conclusions, concentrating on those steps by way of simplifying for management. In this way management can follow better the thread of

(Continued on page 930)

C.J.B. director knighted, chemistry professor gets C.B.E.

INCLUDED among the 26 Knights Bachelor created in the Queen's Birthday Honours List published on 2 June were **Mr. Eric Mensforth,** whose appointments include the deputy chairmanship of Constructors John Brown Ltd., and **Mr. David Lowe,** deputy chairman of the Agricultural Research Council.

C.B.

Elkington, R. G., Director of Establishment and Finance, Department of Scientific and Industrial Research.

C.M.G.

Herridge, Geoffrey Howard, managing director, Iraq Petroleum Co. Ltd.

Rhind, D., adviser on agricultural research to the Department of Technical Co-operation.

C.B.E.

Braby, Frederick Cyrus, chairman and joint managing director, Frederick Braby and Co. Ltd.

Edwards, F. D., managing director, Edwards High Vacuum Ltd.

Frazer, Professor A. C., Professor of Medical Biochemistry and Pharmacology, Birmingham University.

Mayer, J., chairman and joint managing director, International Combustion (Holdings) Ltd.

Megson, N. J. L., Director of Materials, Research and Development, Ministry of Aviation.

Mizen, D. H., senior superintendent, Royal Ordnance Factory, Woolwich.

Press, R., chief scientific officer, Ministry of Defence.

Robertson, Professor J. M., Gardiner Professor of Chemistry, Glasgow University.

Viney, T. L., Director (Works and Buildings), Engineering Group, U.K. Atomic Energy Authority.

O.B.E.

Rogan, H., general manager, Springfield Works, U.K. A.E.A.

Smith, A. M., Head of Chemistry Department, Edinburgh and East Scotland School of Agriculture.

Tombs, H. W., manager, pipelines and technical division, engineering department British Petroleum Co.

M.B.E.

Addison, A. G., Works Personnel Officer, I.C.I. Paints Division.

Findley, R. E., Senior Executive Officer, Laboratory of the Government Chemist, D.S.I.R.

Fleming, J. F., Head of Engineering Division, Dounreay, U.K. Atomic Energy Authority.

Garrud, T. V., Commercial Manager, North Thames Gas Board.

Paton, J. T., Industrial and Technical Officer, Technical Section, Scottish Council (Development and Industries).

B.E.M.

Burwell, H. V., Senior Scientific Assistant, National Chemical Laboratory, D.S.I.R.

I.C.I. make progress in establishing good relationships with Courtaulds

WHILE commercial relationships with Courtaulds Ltd. had remained unimpaired, progress was being made in establishing good relationships in other fields. This was stated by Mr. S. P. Chambers, chairman of I.C.I., at the 53rd meeting of the central council at Scarborough. Mr. Chambers said that with their large holding of just over 38% of Courtaulds' equity, relationships with that company were bound to be much closer than they had been.

He stated that misunderstandings arose at a late stage of the merger bid, due partly no doubt to a natural desire among some of those concerned to maintain the independence of a company with a time-honoured name and a fine reputation. "Perhaps emotion prevailed over reason. The whole matter was precipitated by rumours which began to circulate at a most critical point of time."

So far as the I.C.I. board was concerned, its objectives remained the same and, Mr. Chambers added, the directors had remained quite unanimous on the matter. "We are determined to do all we can to improve the efficiency of our industry and to help those industries which are our customers. In this way we are convinced we serve the interests not only of stockholders and of employees, but of the country as a whole."

Turning to current trading conditions, he declared that by maintaining such a large volume of output—and 1961 was a record in that respect—I.C.I. had done much to maintain employment in their works. To continue that it was vital that costs should be reduced by improving efficiency at all stages.

The rate of change within the company was as great as at any time in its history, despite the fact that that was happening against a background of increasing competition. That made it all the more vital that I.C.I. should do all they possibly could to make themselves more efficient. It was not only the big changes that mattered; on the contrary, it was essential that the company should think critically about every phase of its activity. "Nothing is either too small or too traditional to be not worthwhile examining."

U.K. tax query on Du Pont divestment

SELLING of E. I. du Pont de Nemours common stock in the U.K. has followed the widely-held belief that U.K. stockholders may find themselves liable to tax on capital gained by Du Pont's divestment of the 63 million shares held in General Motors.

It was announced in Wilmington, Del., last week that the first distribution would be made on 9 July and that it would represent 36% of the holding in G.M.; it will be made to holders registered on 8 June. This will be the only distribution this year; the divestment will be completed by February 1965. Holders will receive 1.37 of G.M. stock in respect of each share held in Du Pont in the complete distribution.

Oil duty

Damaging effect

'This time last year I foretold the damaging effect that the hydrocarbon oil duty would have on our export trade. Events have unfortunately borne this out as our exports fell by one-third, equivalent to some 300,000 tons. We had no alternative but to withdraw from many of our old traditional markets because the oil duty turned a profit, already only marginal, into a loss . . . 'It is disappointing indeed that the Chancellor did not have second thoughts in his recent Budget about this crippling oil duty. The main advantage to your company of this country joining the Common Market—if and when this takes place—will be the rationalising of our fuel costs as compared with other European countries.'—J. A. Reiss, chairman and managing director, Associated Portland Cement Manufacturers, in his annual statement to shareholders.

Management Communication

(*Continued from page 929*)

technical events. An accountant tends to look for fiscal significance in statements, and therefore, if the report is going to such a man, each technical issue should be, wherever possible, accompanied by a cost aspect. For example, if one of the stages in a process dealt with in the report involves three chemicals, special plant and a significant time factor, each of these should be related to figures, such as cost and duration.

Chemical expressions, well laid out, should not present undue difficulties to an educated layman, in view of the Latin roots. It is in the use of simple, unambiguous English that more attention is required, especially statements leading, syllogistically, to conclusions. A senior manager or official in a large company is, or should be, mentally competent to pick out essentials, provided they are stated accurately and clearly.

Project News

B.H.C. isobutylene plant will be first to use C.F.R./Badger process

PLANT for isobutylene is to be installed by **British Hydrocarbon Chemicals Ltd.** at Grangemouth, to supply the new butyl rubber plant which S. A. Polysar Belgium N.V. are to build near Antwerp. No capacity figure is available for the B.H.C. plant, but it has been stated that the Polysar plant, which will produce about 30,000 tonnes/year butyl rubber, will be on stream by end-1962. Polymer originally planned to make butyl in the U.K., but switched their plant to Belgium owing to patent difficulties.

Isobutylene will be made by B.H.C. under licence from Compagnie Francaise de Raffinage and the new plant, costing nearly £1 million, will be the world's first to use the C.F.R. process. Main contractors will be **Badger Ltd.**, London. Major proportion of the production will, say B.H.C., be shipped to Polysar in bulk in special pressurised ocean tankers.

At their new Balgan Bay site, B.H.C. have contracted to supply C_4 feedstock —a mixed butane/butylene stream rich in isobutylene—to the U.K. subsidiary of W. R. Grace and Co. Grace will, in their first U.K. chemical facility, also at Baglan Bay, convert this feedstock to polyisobutylene. (See CHEMICAL AGE, 4 November 1961, p. 713.)

The new C.F.R. extraction process is said to yield low-cost high-purity isobutylene. It was developed in conjunction with Badger of the U.S. and their European subsidiaries. As stated in CHEMICAL AGE, 8 July 1961, p. 59, this is a counter-current liquid phase solvent extraction process, that uses a low-cost solvent that is highly selective to isobutylene. According to Badger the process will provide a 10 to 15% lower capital investment and operating cost than those of the conventional method.

Wimpey get off-site contract for BP Belfast

● CONTRACT for all off-site work at the new Belfast refinery of **British Petroleum Co. Ltd.** has been awarded to **George Wimpey and Co. Ltd.**, London. Wimpey will handle tank foundations, access roads and pipe works. As revealed in CHEMICAL AGE, 26 May, page 855, Parsons Power Gas Ltd. are to handle engineering, procurement and construction of process units.

Shell isopentane plant contracts awarded

● THE contract for mechanical work on-site for the new £1¼-million isopentane plant now being built by **Shell Refining Co. Ltd.**, at Shell Haven refinery, Essex (CHEMICAL AGE, 18 November 1961, p. 808) has been awarded to **Constructors John Brown Ltd.** Other contracts awarded for the construction and allied work for the plant have gone to **William Press (Contractors) Ltd.** for similar work off-site and to **W. and C. French Ltd.** for civil engineering work (including piling) while piling work was undertaken by Franki Pile Ltd.

Shell Haven refinery has a processing capacity of about 8 million tons of crude oil a year. The new plant, which is expected to be fully operative in 1963, will be the first of its kind in the world.

I.C.I. build 100,000 t.p.a. Dendritic salt plant

● THE **I.C.I. Alkali Division** is building a new plant at Winsford, Ches, primarily for the production of dendritic salt, a low density vacuum salt originally developed to replace a special grade made by open pan evaporation of brine. Demand for dendritic salt is rising in both home and export markets, and a production capacity of about 100,000 tons a year is planned for the new plant.

This grade of salt is used principally for curing and preserving, in water softening and in tanning.

Phosphoric tanks for Lincs fertiliser project

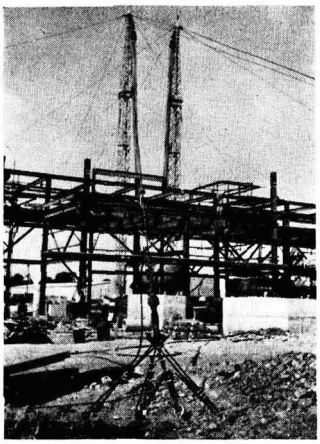
● Two of three large tanks required for the new phosphoric acid plant under construction at the Saxilby works of **Lindsey and Kesteven Fertilisers Ltd.** have now been delivered. These tanks, built in steel and rubber-lined, were sent by road from the works of **Nordac Ltd.**, Uxbridge, who carried out the lining. They were fabricated by **Carrier Construction Co. Ltd.**, Wembley.

The filtrate tank with a capacity of 3,500 gall. is 4 ft. 6 in. high and 12 ft. 9 in. in diameter. The 6,000 gall. attack tank is 9 ft. 6 in. wide and 13 ft. 9 in. high. An even larger attack tank is due to arrive at Saxilby within the new few weeks.

When the new plant goes into production it will be the first complete example of its type in the U.K. and will be able to produce 25 tons of phosphoric acid per day in the first stage of development.

Wimpey use Molex anchors at Severnside site

● THE use of a pair of gin poles, each of 100 tons capacity and secured solely by earth anchors, in the erection recently of several reactors at the new Severnside plant of **I.C.I. Ltd.** has considerably reduced the cost of the operation. The work was carried out by the mechanical and engineering department of **George Wimpey and Co. Ltd.**, the decision to use earth anchors following a series of tests with Molex anchors manufactured by W. E. Waite Ltd., of Aldershot.



Use of Molex earth anchors at I.C.I.'s Severnside works

Four of the manufacturer's larger anchors were provided for the tests, and although ground conditions were poor, the anchors held against a load in excess of 16 tons before a tree, used as a back stay was uprooted. A further test was arranged and their Molex anchors yielded at 14 tons.

The anchors were installed in about 20 minutes and total erection time of the two gin poles including all anchor points was three and a half days. The first reactor, weighing nearly 100 tons, was lifted into position in just under one hour.

For the second lift the gin poles were moved 15 ft., dismantling and re-erection taking five days. Compared with the conventional method of obtaining anchorage by the construction of deadmen, 90% saving in both time and labour was claimed by the contractors.

Fisons open new Leith fertiliser facilities

● NEW premises at Leith Imperial Dock, Leith, have now been brought into use by **Fisons Fertilizers Ltd.** The plant replaces their previous 200-year-old premises in Leith and has been designed to reduce handling to a minimum. There are four units, intake plant tower, bulk store, bagging plant and bagged material store, and fertilisers are moved throughout by conveyors. Total holding capacity is 11,000 tons of compounded fertilisers, and outloading capacity is 110 tons per hour of bagged or bulk materials. The automatic bagging plants are claimed to be the most modern of their type.

£500,000 Rumanian order for Elliott automation equipment

● A CONTRACT worth £500,000 for computing and electronic control systems for the Rumanian oil and chemical industries was signed in London last week with E.-A. Process Automation.

DISTILLATES

★ THE link between British Hydrocarbon Chemicals and Polysar Belgium, under which B.H.C. will supply the Belgium butyl rubber plant with its raw material, isobutylene, could well herald several similar links if Britain joins the Common Market. It is apt that Polysar should come to the U.K. for feedstock because the Antwerp butyl plant was originally planned for this country, but the Polymer Corporation of Canada found that Esso's position with regard to patents was such that it would have been difficult to operate without negotiating licences.

Free world consumption of butyl in 1961 was estimated at 141,000 tons, compared with capacity for 180,000 tons. It seems as though Polysar will be helping to produce overcapacity, despite all the optimism about booming markets.

According to my information, U.K. consumption of this synthetic rubber was about 10,000 tons in 1961. Esso's plant at Fawley will, when on stream, have capacity for 30,000 tons. Consumption in Europe (excluding the U.K.) was an estimated 39,000 tons; capacity of the Soc. du Cacatchouc Butyl plant in France (75% owned by Esso) is 20,000 tons; the new Polysar plant will have capacity for 30,000 tons/year.

★ BP have recently been involved in two pioneering achievements, one in the transport of LPG and the other in the construction of storage tanks. I learn that the recent shipment of the world's biggest cargo of 8,420 tons of propane, stored at −42°C, and 8,060 tons of butane at −29°C, from the Mina-al-Ahmadi LPG plant of Kuwait Oil (a 50-50 BP/Gulf Oil concern) to Japan, was made possible by two significant technical breakthroughs.

One was the development of new steels to withstand very low temperatures; the other was the development of tank insulation techniques aboard ship. Rectangular, rather than the normal spherical pressure vessels, were used to avoid large wasteful spaces. To prevent the slow warm up of material in the tanks, a small amount of the liquid is constantly drained off, refrigerated again and pumped back to the tank.

At the BP Laverton installation in Australia, to help cut construction costs, it was decided to use a Swedish method in tankage erection. This entails starting at the top and working downwards, instead of the conventional way—from the base upwards. In this technique, the floor is laid first, then the roof is assembled six feet above it. Jacks are used and as each line of outer plates is welded round the tanks, all the jacks are synchronously operated from a master pump to raise the assembly for welding the next line. Water level indicators ensure that the tank remains truly vertical as it is lifted.

★ A TIMELY reminder that in joining the Common Market, Britain would not be the first Commonwealth member to abandon 'Imperial Preference'—in fact she is probably the last—comes from Mr. H. J. Hornsby, general sales manager of International Synthetic Rubber, Hythe. Writing in the *Financial Times* on Tuesday, Mr. Hornsby says that I.S.R. are opposing in Canberra a request for an increase in import duties that would give Australia's new SBR plant either a complete embargo on imports of grades made by them, assuring them of 95% or more of the market, or an increase in duty to some 30%; no British preference can be considered.

Australia's consumption of SBR is about 20,000 tons/year, valued at £4 million sterling. If this tariff is raised, I.S.R. would be excluded from the market. On the other hand, out of a U.K. consumption of 86,000 tons in 1961, 20,000 tons were imported. Canadian material enters duty free under British preference, as would Australian SBR. Even on material of non-Commonwealth origin, U.K. duty is shortly to be cut from 10% to 8%.

I.S.R. are not opposed to duty free Commonwealth imports, believing in the principle of free trade. This has always been the pattern of tariff imposition in Commonwealth countries, the total disregard for the Preference system as and when required. Britain, on the other hand, has never deviated from allowing duty-free imports—and rightly so. However, I agree with Mr. Hornsby that it is difficult to be sympathetic with objections being raised by Australia against Britain's plan to enter the Common Market.

★ I LEARN from my Indian correspondent of alarming reports that sodium sulphate is being passed off as ammonium sulphate and sold on a large scale throughout India, particularly in the States of Maharashtra and Gujarat. Attention to this widespread practice was first drawn by Mr. S. K. Patil, Indian Minister for Food and Agriculture.

Swift action is to be taken because the use of sodium sulphate not only destroys standing crops, but also renders the land unusable for a considerable period.

The Governments of the States concerned have been alerted and steps are in hand to see that those responsible are brought to book. The Fertiliser Control Order, 1957, has been amended so that the sale of any other substance as fertiliser is now an offence. Mr. Patil added that proceedings were being taken against National Chemical Fertilisers and Industries of Bombay.

"I wonder what's in it for Them"

(I reproduce this David Langdon cartoon by courtesy of "Safety", published by the British Iron and Steel Federation)

★ THAT old adage 'necessity is the mother of invention' still has application in these modern times. Find a gasket needing no replacement, no maintenance and lasting the life of the tank, I'm told, was the challenge issued to their rubber suppliers some time ago by a French company with a large tanker fleet transporting chemical fluids.

The rubber compounders met the challenge with gaskets of Viton fluoroelastomer supplied in raw material form by Du Pont. The French company now say the gaskets were as good as new after a year's continuous service—to make the test severe every chemical fluid and acid in their range was carried—and they have consequently decided to equip all their fleet with them.

In addition to the large O-ring gasket of Viton to seal the tank manhole, there are gaskets of the same synthetic rubber for the valves and hose connections throughout the tanks. Operating temperatures of the new material run from 200°C in continuous service to over 320°C in intermittent service.

Alembic

SHELL CHLORINE RECOVERY ROUTE

Now available for licensing; may help solve by-product HCl problem

A NEW process for the recovery of chlorine from hydrogen chloride, developed by the chemists of Royal Dutch/Shell in Amsterdam, will be offered for licensing by Shell. The process, which is an adaptation of the catalytic procedure developed by Deacon 100 years ago, was first disclosed in CHEMICAL AGE, 7 October 1961, p. 551.

By-product hydrochloric acid has become an increasing problem in recent years. It is produced in the course of many processes such as the manufacture of vinyl chloride from ethylene, the production of chlorinated insecticides and of solvents, and numerous other substitutive chlorinations of hydrocarbons, and, although demand for hydrochloric acid from the chemical and other industries has also increased, it has nothing like kept pace with the increasing output.

Rise in chlorine demand

There has been a 10% per annum increase in world demand for chlorine over the last few years and it estimated that by 1970 world production will be about 25 million tons. In 1959, of the total world production of hydrochloric acid, 1 million tons was by-product acid from chlorination processes. Current production of hydrochloric acid in the U.K. is around 170,000 tons, 25 to 30% of which is by-product acid.

Not only does hydrochloric acid present difficult and expensive disposal problems, but a process which could yield useful chlorine economically from what is at present a waste product would certainly be welcomed, and therefore an added incentive.

Several processes have been suggested from time to time. The most successful route seems to be the electrolysis of HCl (an Oronzio de Nora 2 ton a day plant was operated successfully by Monsanto at their Anniston works) but, although electrolytic processes are technically attractive, they offer little economic incentive except in locations where electricity is very cheap.

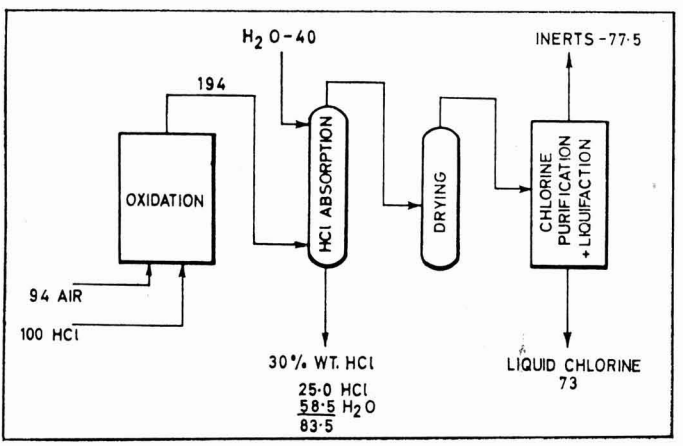
The Deacon process depends on the oxidation of hydrogen chloride by oxygen or air in the presence of copper chloride on an inert porous carrier as catalyst. The problem confronting Shell was to modify the process in such a way that high conversion could be obtained at a satisfactory rate of reaction. The key appeared to be a catalyst of sufficient activity, life and thermal stability to satisfy these reaction conditions. The catalyst used by Shell is a copper catalyst containing one or more chlorides of metals of the rare earth series including scandium, yttrium, zirconium, thorium and uranium, the ratio in atoms of the rare earth metal to copper being at least 0.1 : 1 and lastly one or more alkali metal chlorides. The activity of the catalyst is greatly increased when the mixture of its component compounds is entirely or partly present in the molten state. The catalyst can be supported on any of the conventional carriers used in similar processes, but by far the best results were obtained with silica gel.

As far as Shell are aware there are no other processes for the recovery of chlorine from by-product HCl working on a commercial scale. The Institut Francais du Pétrole has announced a process which uses a mixture of nitric and sulphuric acids to oxidise hydrochloric acid in a liquid phase reaction which can be controlled to avoid formation of by-product nitrosyl chloride. Although full conversion to oxygen free chlorine is claimed, Shell say that the problems posed by the recovery of nitrogen peroxide, separation of the dilute acid mixture and concentration of the sulphuric acid do not seem to present an attractive solution.

The cost of a 30,000 ton a year chlorine plant based on the Shell process and situated in the Netherlands (for the purposes of comparison) would be £470,000, compared with £800,000 for the De Nora process and £735,000 for the I.F.P. process. Profitability (% return on capital) is calculated to be 76% (19% for De Nora process and 35% for I.F.P. process). Return on capital is calculated on the basis of:

$$\frac{\text{gross profit} - 10\% \text{ depreciation}}{\text{capital cost}}$$

Many major companies have by-product HCl which they must sell, dispose of or use in some other way, and who in consequence are likely to be interested in the Shell process. P.v.c. producers, such as Distillers and I.C.I. produce large quantities of HCl by-product, as do chlorinated solvent manufacturers. Other chlorinated hydrocarbons, and chlorinated products for insecticides, herbicides, etc., also give rise to this problem.



Flow-sheet of the Shell process

Agriculture is I.C.I.'s biggest customer

DIRECTLY or indirectly, agriculture is the biggest customer for I.C.I. products, particularly for fertilisers where the increase in consumption has been at a higher annual rate than for most of the company's other products. This was stated by Mr. S. P. Chambers, chairman, at the annual dinner last week of the National Association of Corn and Agricultural Merchants.

I.C.I. spent nearly £10 million on the distribution and selling of fertilisers alone; in reducing those costs, Mr. Chambers said, the company looked to merchants for help. While bulk handling was mainly an advantage to the large consumer who could afford some capital expenditure, the newly introduced polythene sack was an advance for all farmers and merchants. This pack could be stored in the open for months in all weathers.

Mr. Chambers expected that in the coming 12 months I.C.I. would despatch 12 million polythene sacks filled with their own fertilisers, with increasing amounts in following years.

Will

Mr. Frederick Hausmann, a director of the Walker Chemical Co. Ltd., Bolton, who died on 19 June 1961, left £30,847 net (duty paid £7,351).

New N.C.B. plant will boost phthalic grade naphthalene recovery one-quarter

LOWER levels of coke production by the National Coal Board in 1961 were reflected in lower outputs of crude tar, benzole and other products, according to the Board's annual report published last week (H.M.S.O., 3s 6d). Compared with 1960, crude tar production fell by 24,000 tons to 341,000 tons, that of crude benzole by 2 million gall. to 21 million gall., sulphate of ammonia by 2,000 tons to 59,000 tons. Among secondary by-products the amount of crude tar and other material distilled fell by 9,000 tons to 206,000 tons.

A new plant commissioned towards the year end at Avenue, East Midlands Division, and one nearing completion at Caerphilly, South Western Division, will each increase recovery of phthalic grade naphthalene by about one-quarter, the report continues.

It goes on to discuss the conclusions of the Wilson Committee on Coal Derivatives, one of which was that, on economic grounds, the Lurgi process of complete gasification of low grade coal offered the most promising available method for future expansion in the making of town gas from coal. A medium-sized Lurgi plant, built for the Scottish Gas Board, is already making gas at Westfield, Fife, and another is under construction for the West Midlands Gas Board at Coleshill, Warwicks. Various methods of enriching the lean gas produced by the Lurgi process are now being examined.

The N.C.B. is also collaborating with the Gas Council in developing the Otto-Rummel slag bath gasification process for making water gas from coal without using oxygen or pressure. The British Coal Utilisation Research Association continued work until recently on the gasification of low grade coal by means of slagging gasifiers, but the report states this programme has now ended and a further programme of work to be carried out by B.C.U.R.A. has been agreed between the N.C.B., the Gas Council and the Central Electricity Generating Board.

Installation of the U.K.'s first experimental Ruhrgas producer gas plant has been proceeding at the Board's coke oven at Manvers Main, North Eastern Division.

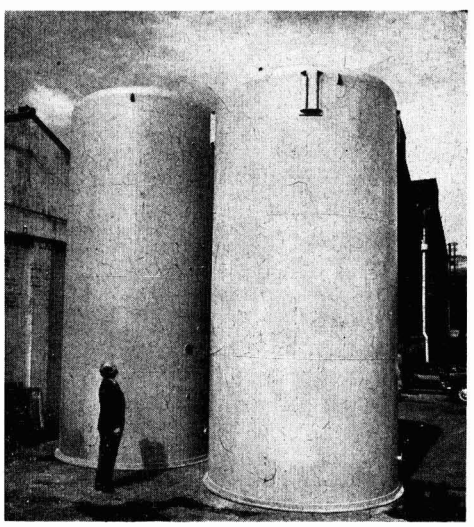
Geigy long-service employees to visit Basle

On 21 June, eight Geigy U.K. employees, all of whom have been with the firm for 25 years or over, will travel to Switzerland for a long weekend as guests of the management of the parent company, J. R. Geigy AG, Basle. The party includes personnel from the Geigy Co. Ltd., Manchester, Geigy Pharmaceutical Co. Ltd., Manchester, and James Anderson and Co. (Colours) Ltd., Paisley.

Evans Medical sales conference

The annual sales conference of Evans Medical Ltd., for home and overseas staff, was held recently at the company's headquarters at Speke, Liverpool.

Bulk chemical tanks at power station



These two tanks, 9 ft. in diameter and 19 ft. 6 in. and 21 ft. 6 in. high respectively, have just been completed by Aberdare Engineering Ltd. for the Neckar Water Softener Co. Ltd. as part of a contract with the Central Electricity Generating Board. They are for the storage of concentrated sulphuric acid and caustic soda solutions, used for the regeneration of a multi-stage deionisation plant

Australian Tariff Board to hold phthalic enquiry

THE Australian Minister for Trade has asked the Tariff Board to report on whether assistance should be given to Australian producers of phthalic anhydride (tariff item 280 (H)). In accordance with normal procedure, U.K. interests may tender evidence. Notice of their intention to do so should be given to the Australian authorities not later than 13 June.

Trade associations or firms intending to submit evidence should advise the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, London S.W.1 before 13 June, quoting reference C.R.E. 5614/62.

D.C.L. to sue over Italian phenol plans

INFRINGEMENT of some of their Italian patents covering cumene/phenol is alleged by the Distillers Company Ltd., who are taking legal action against Soc. Italiana Resine. A petition alleging infringement filed in relation to S.I.R.'s phenol plant at Solbiate Olona, near Milan, has been filed in Milan Court.

U.K. colour sales up, value down

U.K. manufacturers of chemical colours sold nearly 33,000 cwt. of colours, valued at £3.6 million, in the first three months of this year, states the Board of Trade. Compared with the first three months of 1961, these figures show a rise of 2% by weight but a small decrease in value, due mainly to a decrease in the quantity of pigment dyestuffs sold.

Total sales of colours in the whole of 1961 were 5½% down at £14.5 million, again due largely to lower sales of pigment dyestuffs.

Letter to the Editor

U.K. chemical licences sought by Japan

SIR,—Our Japanese agents inform us of interest in their country in acquiring licences for the manufacture of pharmaceutical products, fine chemicals, herbicides, insecticides (particularly for control of rice paddy insects), wood preservatives, fungicides (for wood, textiles and plastics), rodenticides, water repellents more persistent than the usual silicon compounds, and rust-proofing agents, either under patents or under know-how licence arrangements.

Our own experience is that there is an excellent market in Japan for the distribution of know-how under very reasonable and well-honoured licence arrangements.

Further particulars can be obtained from the undersigned.

Yours etc.,

M. A. PHILLIPS.

Dr. M. A. Phillips and Associates,
9 Western Road,
Romford.

A.P.V. heat exchangers for antibiotics and fatty acids

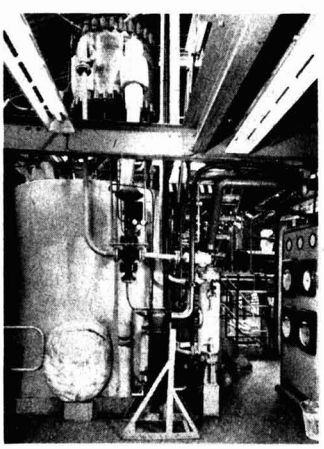
NEW installations supplied recently by the A.P.V. Co. Ltd., Crawley, are evidence of the versatility of spiral heat exchangers. Two such units have been put to use by Pfizer Ltd., Sandwich, Kent, and Price's (Bromborough) Ltd.

In the extraction of penicillin and other antibiotics, Pfizer's employ weak methyl isobutyl ketone (MIBK), a valuable solvent which must be recovered by distillation. To save steam in the distillation process, and A.P.V.-Rosenblad spiral heat exchanger, 24 in. in diameter with a plate width of 18 in., is being used to pre-heat the dilute solvent by means of hot effluent from the base of the distillation column entering at 212°F.

A particular advantage of the high heat transfer efficiency and compact design of the spiral heat exchanger in such duties is the consequent reduction in weight and bulk. This allows units to be installed in elevated positions—for example, on top of the column itself—with considerable savings in space and structural steelwork.

In the mild steel unit supplied to Pfizer's, an effective heat transfer area of only 90 sq. ft. was found sufficient to deal with a load of 1,260,000 B.Th.U./hour.

Another important quality of the spiral construction is the accurately controlled flow of both media, with low pressure drops between inlet and outlet, which derives from the absence of baffles or sudden directional changes in the channels. This was a factor in the choice of an A.P.V.-Rosenblad for cooling a fatty acid product from 175°C to 80°C at the works of Price's (Bromborough) Ltd., since the product was known to solidify



A.P.V.-Rosenblad spiral heat exchanger (top centre) and A.P.V. Paraflow plate heat exchanger type HXC (middle foreground) at the works of Price's (Bromborough) Ltd.

—and therefore become unmanageable—at only a few degrees below the temperature to which it had to be cooled.

In this instance a stainless steel unit with a heat transfer surface of 750 sq. ft., contained within an outside diameter of 36 in. and a plate width of 33 in., has been installed to deal with a heat load of 1,300,000 B.Th.U./hour, by means of water entering at 77°C, leaving at 96°C.

An interesting elaboration is the method used to ensure accurate temperature control of the cooling water on entering. This is done by passing part of the water leaving through an A.P.V.-Paraflow plate heat exchanger, where it is cooled to 41°C by means of bore hole water at 16°C. The cooled water is then mixed with the rest of the water which, after leaving the spiral, by-passes the Paraflow and therefore remains at about 95°C. Careful adjustment of the by-pass valve to govern the amounts of water passing in each direction allows very accurate temperature control of the mixture.

New chemical plant works will increase Turner and Brown's capacity 25%

AN increase in output of 25% will be the eventual outcome of a new factory opened on Tuesday by Turner and Brown Ltd., chemical plant engineers of Bolton, Lancs. Turner and Brown's plastics department was formed in 1948 for the production of chemical plant and equipment impervious to chemical attack. Several years ago it became obvious that further premises would be required as the company's activities steadily expanded. The new works add 10,000 sq. ft. to the working area, and there is land available for further expansion. The company's old factory in Davenport Street, Bolton, will continue in operation.

Turner and Brown produce a series of plastics chemical plant and equipment, including a range of fans in p.v.c., hoods and ductings, also in p.v.c., and tanks and containers made in many sizes to suit customers' requirements and fabricated in p.v.c., polythene, polypropylene or p.v.c.-bonded with glass fibre. Pipes, fittings and valves are also produced in a variety of materials.

Earlier this year Turner and Brown became a member of the Standard Industrial Holdings Ltd. group of companies. This had the effect of cementing their long association with Matthews and Yates Ltd., the established engineers and fan manufacturers of Swinton, Manchester, who were already part of the group.

A new powered roof-mounted ventilation unit made almost entirely from rigid and plasticised p.v.c. was officially announced at the opening of the extension. The unit has been designed to fit in with the modern architectural concept of building exteriors and will be manufactured in 10, 12½, 15, 17½, 20 and 25 in. sizes. Coloured units may also be specified and supplied at no extra cost.

The company claim that the unit provides a maintenance-free dual service. It is suitable for the extraction of corrosive acid fumes but its low cost does not prohibit its use for less arduous duty in conventional ventilation systems.

Mounting can be flush with the roof, and such is the ease of manufacture of the units that flush mounting can be quoted for sloping and corrugated roofs.

New powered roof ventilator, announced at the opening of the new works in Bolton. Two ranges are being produced, incorporating either the backward curved or forward curved blade impellers

The impellers made entirely of p.v.c. have been designed in conjunction with Matthews and Yates. Two distinct ranges are envisaged, one with a backward curved impeller, the other with a forward curved multivaned impeller.

Oxy-propane torch decarbonises B.H.C. heat-exchangers

A SPECIALLY-ADAPTED oxy-propane torch can now be employed instead of drilling for the removal of hard carbon scale formed on stainless steel heat-exchanger tubes. Such a device, the British Industrial Gases K.34 torch, is currently being used at the Grangemouth factory of British Hydrocarbon Chemicals.

The bundle forming the heat exchanger consists of 20 ft. tubes each with an internal diameter of 1 in. and ⅛ in. thick wall. The torch is fitted with a 30 ft. straight tube to enable the standard heating tip to be passed through the heat exchanger tube. When heated, the carbon scale expands more quickly than the tube wall and flakes off. To increase the effect, the temperature differential between the outer and inner walls of the tube is kept as high as possible by water cooling the outside wall.

In Parliament

Pipelines Bill critic fears possibility of I.C.I. monopoly on some routes

AFTER seven sittings the Commons standing committee considering the Pipelines Bill was last week still dealing with amendments to Clause 1 of the 63-clause measure.

Most of the seventh sitting was taken up with discussion of an Opposition amendment, subsequently rejected, that the ownership of cross-country pipelines should not be transferred without the permission of the Minister, who would have discretion to grant or refuse permission for the transfer. Labour spokesmen expressed the fear that a company obtaining authorisation to construct a pipeline might be a front for an oil company which would in due course have the ownership transferred to it, giving it a monopoly position.

Mr. Frederick Lee (Lab., Newton), also suggested the possibility of I.C.I. establishing a vitual monopoly on particular routes and added that the company might find this a more effective way of controlling Courtaulds than buying their shares. This could happen, he said, if the only requirement under the Bill was that the Minister should be notified within three weeks of the transfer.

Mr. Richard Wood, Minister of Power, said he was satisfied that as the Bill was drafted the three objectives of safety, protection for competitors and the preservation of strategic security could still be safeguarded after the transfer of ownership. He pointed out that monopoly tendencies could be thwarted by his granting permission to construct other pipelines to competing companies.

The Minister added that Clause 8 would allow him to impose conditions on the operation of pipelines. He failed to see why transfer of ownership of pipelines should be restricted when transfer of refineries or pumping stations was not.

No change likely in chemical dumping regulations

The President of the Board of Trade (Mr. Frederick Erroll) was asked in the Commons on 31 May by Sir Cyril Osborne (Cons., Louth) if he would publish the data upon which the deputation from the Association of British Chemical Manufacturers, whom he recently saw (CHEMICAL AGE, 2 June, p. 890), asserted that foreign chemical dumping was harming and hampering the growth of British industry; and if he was proposing new anti-dumping legislation based on the Canadian system as requested by some members of the industry.

Mr. Erroll, in a written reply, said that the recent meeting between officials of the Board of Trade and representatives of the chemical industry was one of the frequent exchanges of views which were held with various industries about questions of the day. Dumping was one of the questions discussed. He was not at present considering any proposals for seeking amendment of the Customs Duties (Dumping and Subsidies) Act.

Chemical Workers' Union still seeks Labour Party nationalisation of I.C.I.

FOLLOWING the assurance given by Mr. Gaitskell to I.C.I.'s central council that I.C.I. are not on any Labour Party list of company's for nationalisation should the party be returned at the next General Election (CHEMICAL AGE, 2 June, p. 890), several members and supporters of the party, including members of the executive of the Chemical Workers' Union, have spoken up against him. Miss Jennie Lee, M.P., a member of the party's national executive, said last week-end that the "commanding heights of the economy" must be brought under public ownership.

"I hope no one in our ranks will insult the intelligence of the British public by asking them to believe that water is a commanding height but that the vast private enterprise empire of I.C.I. is a mere obscure hillock," she added. "The British people are entitled to know our long-term socialist objectives as well as our specific problems for the lifetime of one Parliament. No responsible socialist party can give a blank cheque to an organisation as powerful as I.C.I."

Also last week-end, the annual conference of the Chemical Workers' Union was told by the union's president, Mr. Arthur Deane, that the criterion accepted by the movement was a capitalist one, "a situation in which Gaitskell, as reported in the Press, can give certain assurances to the I.C.I. directors.

"In the last analysis, no leader, or misleader, will decide the fate of the movement."

The union's general secretary, Mr. Robert Edwards, M.P., said: "Whatever may be the policy of the Labour Party declared by the Leader of the Opposition, it is certainly not the policy of this union.

"If a Labour Government, with a majority of the votes of the people cannot bring great monopolies like I.C.I. under public ownership and make them accountable to the nation it is not a socialist government. New forces will have to arise to see that the will of the people prevails."

Dunlop to open new Japanese research centre

BECAUSE of the great increase in first class research and scientific thought in Japan, Dunlop's Japanese associates are to open a research centre. It will keep the Dunlop Central Research Division at Birmingham fully informed of technical developments in the East and eventually take part in research work on subjects where special knowledge or facilities exist in Japan.

Dunlop research centres exist also in France, Germany, North America and Malaya, where local specialist knowledge and skills are utilised.

Weir and Westgarth combine for water plants

A LINK-UP between G. and J. Weir and Richardsons Westgarth to develop their combined interests in land-based saline water conversion plants has been announced. The two companies are the largest in this field. Details have yet to be completely finalised but the association has been formed to strengthen their position in this market, which is almost exclusively export.

Viscount Weir, chairman of G. and J. Weir Holdings, reports that in terms of output over the first quarter of the current year, the group is "substantially" ahead of its performance during the first three months of 1961. The company's intake of orders as a whole has maintained the trend established last year, although it is too early in the year to infer that the present level of short-term orders will continue throughout the rest of the year. Viscount Weir adds that he would expect 1962 to show improvement in gross earnings.

3M to build research laboratory at Harlow

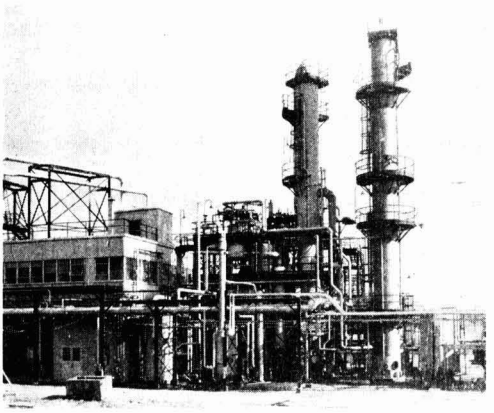
A RESEARCH laboratory with floor area of 22,500 sq. ft. and ultimately employing between 50 and 60 people is being built at Harlow, Essex, for Minnesota 3M Research Ltd., subsidiary of Minnesota Mining and Manufacturing Co. of the U.S. Completion is scheduled for early 1963.

This building marks the first research effort outside the U.S. for 3M, who have extensive research and product development facilities in the U.S. The new laboratory will be under the direction of Dr. John D. Kendall.

Supplement to A.B.C.M. directory

Supplement to the directory of 'British Chemicals and Their Manufacturers,' published at two-yearly intervals by the Association of British Chemical Manufacturers, has now been published. The supplement gives full details of changes and additions to the directory since it was issued last year. Like the directory, the supplement is issued free on request to A.B.C.M., 86 Strand, London W.C.2.

BRIGHT FUTURE FOR ADIPIC ACID IN U.S.



At this plant, phenol is hydrogenated to cyclohexanol which is then converted to adipic acid

BY all indications, adipic acid will enjoy a healthy market growth during the early 1960's. Impelled principally by rising demand for its principal derivative, nylon-66, annual increase in U.S. consumption for adipic acid is variously forecast between 5 and 12% during the period 1961-5. By either expectation, consumption will reach the 500 million lb. per year mark some time between 1964 and 1966, up from an estimated 380 million lb. in 1961.

The problem in making a more accurate forecast for the development demand for adipic acid is four-fold.

Uncertainty in the relative position of nylon-6 and nylon-66. As a class, nylons enjoy a bright outlook with total production in 1962 forecast at 475 million lb., 12% above the level in 1961. In this group, nylon-66 today enjoys some 90% of output, but its main competitor nylon-6 is making rapid progress. U.S. production capacity for nylon-6 has risen from 35 million lb. per year in 1959 to 120 million lb. per year in early 1962 when it constituted 18-20% of total nylon capacity.

However, so far nylon-6 shows no signs of making significant inroads into the nylon fibre market in the U.S., and present forecasts for nylon-6 are concentrated on expansion in the resin field. Nevertheless, this is an uncertain proposition. On the Continent, nylon-6 is the major polyamide resin—only during the last five years has nylon-66 found any significant acceptance (notably in tyre cord). Furthermore, new processes for the production of caprolactam may provide a low-cost raw materials base for nylon-6 which adipic acid and hexamethylene diamine will be hard pressed to match.

A contest between nylon-66 and other fibres for the tyre cord market. This, more than anything else, holds the key to the future growth of nylon-66 and, thus, of adipic acid. Chief present competitor is rayon. Its share of the tyre cord market dropped from 63% in 1959 to some 57% in 1960. In early 1961, a reversal in this trend was observed, however, and rayon returned to 59%, due largely to wider acceptance of the two-ply rayon cord tyre, improved quality and strength of rayon.

Manufacturers of nylon-66, in their own turn, are meeting this development by improvements and price reductions. One independent source, the Rubber Manufacturers Association, foresees 1965 sales of tyre cord in the U.S. split as follows: 350 million lb. nylon, 100 million lb. rayon. In a parallel development, several European producers, including Vereinigte Glanztoffabriken (Germany), Rhodiaceta (France), British Nylon Spinners (U.K.) and Rhodiatoce S.p.a. (Italy) have lately begun to market tyre cord of nylon-66.

A threat to nylon-66 in tyre cord, however, is seen from other quarters. Growing competition is offered by nylon-6 and new fibres offer significant potential. Among them are Du Pont's HT-1 (a high-melting/600°F/polyamide), Air Reduction's polyvinyl alcohol, Huels' Nylon-12, and Goodyear's polyester fibre. Further in the future is the possibility of stereospecific polyolefin fibres for use in tyre cord.

Raw materials for nylon-66. Nylon-66 is a co-polymer of adipic acid and hexamethylene diamine. Direct adipic acid is consumed at the rate of .65 lb./lb. polymer. Hexamethylene diamine, in its own turn, can be made from adipic acid, butadiene or furfural. Chemstrand, who use the adipic acid-based synthesis of HMDA, are reported to have an overall adipic acid consumption of 1.08 lb./lb. nylon-66. But Du Pont, the other major nylon producer in the U.S., derive HMDA from furfural and butadiene, with increasing shift toward the latter base, thus by-passing adipic acid altogether. Some promise is also seen in a development process for producing HMDA by the electrolytic reduction of acrylonitrile followed by hydrogenation.

Other uses for adipic acid. Outside the field of nylon-66 production, uses for adipic acid are relatively minor. One recent estimate reports the following U.S. outlook:

	Adipic Acid Demand (Million lb.)	
	1960	1965
Foods (as acidulant and protein extender)	6	15
Plasticisers	28	34
Elastomers (urethane-type)	2	12
Urethane foams	2	13
Other non-nylon uses (polyesters, alkyls, urethane finishes lube oils)	8-9	8-9

Five producers (Chemstrand, Du Pont, Monsanto, Allied Chemical, Rohm & Haas) are poised to meet the expected demand for adipic acid. Plants now under construction will bring total U.S. capacity to 460-485 million lb. per year, with additional capacity probably needed by 1964.

Key intermediate in the production of adipic acid is cyclohexanol. This may be obtained by hydrogenation of phenol, e.g. by liquid-phase hydrogenation in the presence of palladium catalyst at 150°C, 50 p.s.i. or by vapour-phase conversion over supported nickel catalyst. This approach is practised by National Aniline (estimated plant capacity, 20 million lb. per year adipic acid) and by Monsanto (30 million lb. per year).

The alternative approach to cyclohexanol production involves the liquid-phase air oxidation of cyclohexane to yield a crude mixture of cyclohexanol and cyclohexanol and cyclohexanone plus other oxidation products. Following removal of unconverted cyclohexane, this crude mixture can then be directly oxidised to adipic acid. Air oxidation of cyclohexane is the route to cyclohexanone at all but the two above-mentioned adipic acid plants in the U.S. This includes Chemstrand (annual adipic acid capacity: 180-200 million lb. per year), Du Pont (210 million lb.), and Rohm and Haas (20-25 million lb., under construction in early 1962). Other plants employing air-oxidation of cyclohexane include B.A.S.F. (Germany), Staatsmijnen (Holland), Dow-Badische (U.S.), I.C.I. (U.K.), and Toyo Rayon (Japan).

Regardless of the route employed for the production of cyclohexanol and cyclohexanone, this intermediate must be further oxidised to yield adipic acid. The usual approach involves oxidation by nitric acid. The single exception is Rohm and Haas' new plant where air oxidation will be practised in the second step as well.

The air oxidation of cyclohexane to crude cyclohexanol-one mixtures is carried out in the liquid phase. The conversion may be carried out non-catalytically or in the presence of soluble cobalt sales (such as cobalt naphthenate) as catalyst. The latter approach is predominant.

A non-catalytic process for cyclohexane, developed at Leuna, has been described. Optimum performance is reported at 35 atmospheres and 180°C.

Cyclohexane and air are introduced counter-currently into the continuous oxidation reactor. Contact time is about 10 minutes. Air : hydrocarbon ratio is controlled to a per-pass conversion of 7-8%. A small amount of water (about 5% based on cyclohexane feed) is introduced continuously into the reactor. Its purpose is to wash out acid oxidation products which are only slightly soluble in cyclohexane and, at the same time, to minimise the danger of runaway reactions. Adequate cooling means must be provided to remove the heat of reaction which amounts to about 1,200-1,300 BTU/lb. converted cyclohexane.

In the more commonly employed catalytic oxidation of cyclohexane, an oil-soluble cobalt salt serves as catalyst, with its concentration variously reported between 2 and 40 p.p.m. (on cyclohexane).

Investigations have been carried out on the effect of process variables in this reaction, with the following main conclusions: inherently, batch conversion allows better yield than continuous operation, but performance of a batch process can be approached by carrying out the reaction in a series of autoclaves (the economic optimum calls for three autoclaves); best performance at catalyst concentration of 1-2 p.p.m. is obtained at 155-160°C—pressure is maintained at the level required to maintain the mixture at its boiling point (8-9 atmospheres at 155-160°C); feed rate for both air and cyclohexane may be varied widely.

Thorough stirring is required to achieve good contact between air and cyclohexane. Essentially complete conversion of oxygen may be taken. At a given temperature, pressure, and catalyst concentration, the air : cyclohexane ratio will therefore determine the degree of conversion and thus the operating efficiency.

Best commercial performance

Other work indicates that best commercial performance is attained at per-pass conversion of 8-12%. Typically, the organic, cyclohexane-containing reactor product consists of 3.5% cyclohexone, 3.9% cyclohexanol (of which 2.8% is in free form and 1.1% is present in the form of esters), and 3.2% organic acid (about four-fifths adipic acid, the remainder lower dicarboxylic acids). Combined yield of cyclohexanone-ol, and adipic acid is reported at 80% on converted cyclohexane.

In the catalytic process, water and benzene (and some other hydrocarbons) have an adverse effect on reaction rate and efficiency. To overcome this problem, which is accentuated by build-up of such impurities in recycle cyclohexane, a process has been developed in which hydrocarbon contaminants are removed azeotropically during the reaction. The process is carried out continuously. Three stirred autoclaves, set in series, serve as reaction vessels. Each autoclave is equipped with an overhead reflux condenser, provided with means for water withdrawal. Air enters the bottom of each autoclave.

Effluent from the final reaction stage is steam-distilled for the overhead removal of hydrocarbons. The bottoms is the desired crude oxidation product. This overhead is water-washed and then subjected to azeotropic distillation for overhead removal of benzene and other hydrocarbon contaminants and bottoms recovery of cyclohexane to be recycled to the first oxidiser stage.

The conversion of cyclohexanone-ol mixtures to adipic acid is carried out in a separate oxidation stage. Nitric acid or air serves as oxidising agent.

The first air oxidation plant of this type is now under construction (by Rohm and Haas). Little information is available on the process, but it is indicated that the conversion is carried out in a solvent (such as acetic acid), using mixed acetates of copper and manganese as catalyst. Reaction conditions are of the order of 80-85°C and 100 p.s.i.g.

With this exception, all adipic acid production is based on oxidation by means of nitric acid. In this conversion, particularly favourable performance has been reported by copper-vanadium catalyst (app. 0.25% Cu and 0.1% V). Such a system permits yields of 90 to 93%. Feed is the crude, cyclohexane-free cyclohexanol-one mixture produced as outlined above. Typical operating conditions call for the use of 50-60% nitric acid at 55-85°C with a ratio of HNO_3 : organics of 4.5 : 1. A low concentration of nitric acid must be maintained at all points of the reactor. In continuous operation, oxidising agent and cyclohexanol-one mixture are therefore added continuously to a relatively large, well-agitated body of reaction liquor.

Cooling must be provided. In tubular reactors, the hazard of local over-concentration is minimised by using large external recirculation (recirculating liquor : organic feed may be as high as 50 : 1), and by means of efficient injection systems and turbulent flow of the circulating liquid.

In single-stage operation, an optimum yield of about 90% is reported by one worker. An additional 3% yield can be attained by two reactors in series.

Sichel, Brown and Polson complete amalgamation of adhesives interests

AMALGAMATION of the selling and manufacturing activities of Sichel Adhesives Ltd. and Brown and Polson Ltd., who merged last year, has now been completed. All the activities of the Brown and Polson liquid adhesives division have been finally merged with those of Sichel and from now on the joint unit is to be known as Sichel Adhesives Ltd., the adhesive division of the Brown and Polson group. A single sales force, comprising Sichel and Brown and Polson adhesives representatives, will cover the country.

This new division will sell the liquid and powdered adhesives in both ranges with the exception of corrugating adhesives, both powdered and liquid, and foundry adhesives, which will be handled by the Brown and Polson starch group.

Manufacturing facilities are being established at three centres—at the Friars Lane, Richmond, factory of the old Sichel company, at the Royal Starch Works, Paisley, and at the Brown and Polson factory at Trafford Park, Manchester. Each factory will also house an adhesives division sales office.

9% nickel steel exempt from thermal treatment

THE 9% nickel steel, patented in 1948 by the International Nickel Co. Inc., New Jersey, and introduced to industry in 1960 as a material with excellent very low temperature properties, was recently the subject of a case ruling by the boiler and pressure vessel committee of the American Society of Mechanical Engineers which has waived the need for thermal treatment after welding. Previously it was required that all vessels in 9% nickel steel should be stress-relieved after welding.

The new ruling means that equipment for the production and storage and transport of liquid gases at temperatures as low as −196°C can now be constructed in either quenched and tempered, or double-normalised and tempered, 9% nickel steel, with no post-weld heat treatment.

A.B.C.M. packaging conference proceedings now available

The proceedings of the third packaging conference of the Association of British Chemical Manufacturers, held at Harrogate from 26-29 March (CHEMICAL AGE, 7 April, p. 561), have now been published by the association as a 50-page booklet, details of which may be obtained from 86 Strand, London W.C.2.

D.S.I.R. publish new booklet on lime applications

In a recently issued D.S.I.R. booklet, 'New Ways with Lime,' available from the department's library, State House, High Holborn, London W.C.1, M.A.P. Harnett describes how modern technology is still discovering uses for this material whose industrial history dates back to the Romans.

AUSTRIA'S STEEL SLUMP HITS CHEMICALS OUTPUT

SINCE 1953 the index of production for Austria's chemical industry has increased far more rapidly than that for the country's two other main industries—steel and textiles. In the chemical industry there was a 4% increase in production between 1957 and 1958, a 16% increase between 1958 and 1959, and an 18% increase between 1959 and 1960. Figures available for the first quarter of 1961 indicate that this trend is continuing, particularly in the plastics industry where the production figure was 31.3% higher than the similar period in 1960. The picture of growth in the chemical industry, particularly in plastics, is shown in the table:

	Production in tonnes	
	1953	1960
Fertilisers	491,448	937,068
Plastics	nil	34,595
Viscose	28,464	52,668
Paint	19,740	46,464

Fertilisers comprise the biggest single export of the Austrian chemical industry, over 80% of the 1960 production having been exported. This industry is now, however, very seriously threatened by the slump in the steel industry and the consequent decrease in supplies of coke oven gas.

Production of gas from coke ovens dropped by 1 million cu. m. between 1960 and 1961. This shortage has badly affected the main producer of nitrogenous fertilisers, Oestereischishe Stickstoffwerke, who are threatened with having to close down part of their plant at Linz.

The situation would have been less drastic had the proposed scheme for a new refinery at Linz (which was to have been operated jointly by Royal Dutch/Shell, BP, Mobiloil and Esso) been adopted. However, it has recently been announced that this scheme has been shelved in favour of expanding the O.M.V. refinery at Schwechat. This refinery is currently producing 1,800,000 tons per annum and capacity is to be raised to 3,600,000 tons per annum.

Higher gas prices

Oestereischishe Stickstoffwerke are faced with higher prices for gas and with greater difficulties in a severely competitive export market. This will constitute a setback to the chemical industry where there is already growing concern at the increasing imports over exports. Although foreign trade in chemical products was higher in 1960 than in 1959, imports increased by $18 million whereas exports only increased by $5 million. In 1953, Austria imported 33⅓% more chemicals than she exported—by 1960 this figure had risen to well over 100%.

The recent increase in imports over exports may partly be accounted for by the plastics industry, for which most of the raw materials are imported. Currently three-quarters of the plastics materials produced in Austria are required for home consumption. The table shows what Austria was importing and exporting last year in the plastics industry:

Imports	*Exports*
polythene	urea
polystyrene	formaldehyde
copolymers	phthalic anhydride
acrylic resins	maleic anhydride
polyamides	plasticisers
polyurethanes	solvents
esters	phenol
cellulosic esters	maleic acid
silicones	
fluorine resins	

The growth of the plastics industry has been very rapid and between 1959 and 1960 there was an increase of just under 20% in sales of plastics materials. Figures are given in metric tons for home and export consumption.

	Sales of plastics materials (home & export, tonnes)	
	1959	1960
Thermosetting plastics ...	8,630	12,145
Thermoplastics	520	810
Cellulose plastics	1,900	2,640
Plasticised p.v.c. (this figure also includes hardened proteins)	17,000	19,000
Totals ...	28,050	34,595

Whereas in the steel and fertiliser industries the prospects for the immediate future are not bright, the plastics industry continues to grow.

Wavin, the Dutch chemical company, have announced their intention to establish a subsidiary plant in Austria for the production of p.v.c. pipes. Semperit und Kunstoff Werke Heinrich Schmidtberger have formed Interplastic AG to produce thermoplastic foils and slabs. The company's plant is due on stream in 1963 with a capacity of 20,000 metric tons, about 50% of which will be exported. Reichhold Chemie are to invest a further $5.8 million, most of which will go into increased production of resins. Halvic are hoping this year to double their present output of 7,500 tonnes/year of p.v.c.

On 30 June this year the polypropylene plant at Danubia Petrochemie AG is scheduled to come into full operation with 5,000 tonnes polypropylene per annum. Danubia are a joint subsidiary of Montecatini and Oestereischishe Stickstoffwerke, and at present the unit is producing between 200 and 300 tons of polypropylene/month.

Vereinigte Chemische Fabriken Kreidl, whose largest market is now plastics and resins for use in textiles, paper, furniture, adhesives and foundry moulds, plan to double their capacity of melamine and urea moulding powders and polyvinyl acetate. This company recently put into operation a plant for impregnating paper (with melamine) 7 ft. wide—one of the few machines in the world that can handle such widths.

Although the pattern of increasing imports over exports in Austria has been reflected strongly in the chemical industry, exports of certain chemicals, in particular copper sulphate, were up since 1960:

	Jan.-June 1960 (Aust. Sch.)	Jan.-June 1961 (Aust. Sch.)
Lead oxide	2,000,000	3,800,000
Copper sulphate	800,000	6,400,000
Calcium carbonate ...	6,000,000	7,400,000
Naphthalene	—	1,800,000

In an attempt to check the rising imports, the Austrian Government have approved an anti-dumping bill which will shortly be submitted to Parliament. The new regulations will be applied if the import price is lower than what is described as the 'normal' price and if the imports in question might prove a threat to a domestic industry. The anti-dumping duty aims to cancel out the difference between the 'dumping' price and the 'normal' price.

Bulk tanker deliveries of synthetic resins

Resins and chemicals are now being delivered in bulk by this new Leyland Octopus tanker of Vinyl Products Ltd., Carshalton, Surrey. Also used to pick up vinyl acetate, the Leyland has a 3,200-gall., four-compartment stainless steel tank built by Butterfields of Shipley. It was supplied by Pratt's of Sutton; pump equipment was by Mono Pumps Ltd., London

Bookshelf

I.C.I.-sponsored text-book gives balanced view on fluorine

THE MANUFACTURE AND USE OF FLUORINE AND ITS COMPOUNDS. By *A. J. Rudge*. Oxford, 1962. Pp. xiv + 87. 10s 6d.

This is the fourth of a series of text-books sponsored by I.C.I. with a view to providing up-to-date information on industrial processes. They are primarily intended for schoolteachers and their pupils but this volume, at least, should reach a much wider audience. The book is a pleasure to read and to handle; the production is well up to Oxford standards. The author has nicely balanced his eight short chapters so that about a quarter of the book is on the production of fluorine and half is on its compounds and their properties. The organic compounds rightly get about double the space allotted to inorganics. It is difficult to see how the presentation could have been improved or better value given for money.

Radiation and polymers

RADIATION CHEMISTRY OF POLYMERIC SYSTEMS. By *Adolphe Chapiro*. Interscience Publishers, New York, London. 1962. Pp. xvi + 712. 158s.

This is volume XV in the High Polymer series edited by Mark, *et al.* In the past 15 years extensive studies of very varied importance have been made in the interaction of radiation and polymers; space projects have markedly multiplied such efforts. Not surprisingly, the literature is burdened with experimental and theoretical material of at best an *ad hoc* and often of a trivial character. The author has made a major contribution to this field by giving three years to the writing of a critical and systematic account of what might well appear to be a very confused and challenging state of affairs.

He has boldly attempted to produce a coherent account of published material. In so doing he has re-assessed and even re-written many features. These new versions will certainly not all survive further examination, but the volume may well prove to be most valuable as a 'definitive' summary of many aspects is not now possible.

Semiconductors

THE ELECTROCHEMISTRY OF SEMICONDUCTORS. Edited by *P. J. Holmes*. Academic Press, London and New York, 1962. Pp. xi + 396. 84s.

A natural consequence of the development of transistors is that studies of the electrochemical behaviour and properties of semi-conductors have been intensified. The present book is a series of articles by nine contributors who deal with various aspects of the surface phenomena of these materials, particularly germanium and silicon.

The first two chapters deal mainly with theoretical treatments, covering the relation of electrochemical and thermodynamic terms to semiconductor parameters and electrical behaviour at semiconductor-gas or metal interfaces. These are followed by three contributions on the current-voltage relationships of germanium electrodes, the electrochemical reactions which occur at the surfaces of germanium and silicon electrodes and the oxidation reactions and the potentials developed by these two elements. Chemical etching is dealt with from two aspects, firstly those features which are of interest to chemists and secondly the procedures necessary to obtain satisfactory electrical contacts. A number of recipes of etchants are given together with photographs of etched surfaces. Finally, to complete this outline, there is a section on electrolytic etching and plating of semiconductors which contains very clear and useful sketches of experimental arrangements.

In general, this particular volume will be useful to all those concerned with solid-state processes and the applications of semiconductors.

High pressure techniques

MODERN VERY HIGH PRESSURE TECHNIQUES. Edited by *R. H. Wentorf*. Butterworths and Co. Ltd., London. Pp. xiv + 233. 60s.

This volume is a collection of 11 articles on very high pressure (above 20 k-bars) techniques. Each article is written by workers experienced in very high pressure methods. The main emphasis lies on the description of the apparatus, but some experimental results are included in order to illustrate the potential of a particular method. Equipment is described for X-ray, optical and electrical measurements at these pressures and also, in some cases, at elevated temperatures. There is also an article on high pressure-low temperature (below 100°K) techniques, as well as one on the synthesis of minerals, and on phase equilibria in silicate systems. In most cases the very high pressures are achieved in statically loaded specimens, but one article on dynamic high pressure techniques is included. The problems of pressure calibration are treated in detail, and note is made of some revised electrical transitions. There are two appendices. The first discusses pressure units, the second, pressure reference phenomena. Generally, references to the original literature end with 1960 publications, but a few articles include 1961 references.

Newcomers to very high pressure techniques, and also experienced workers, will find this book useful. It is well produced, but one regrets its high price.

Scientific Russian

SCIENTIFIC RUSSIAN. By *A. Holt*. Chapman and Hall. 1962. Pp. 195 + xviii. 36s.

The author of this book is both a linguist and a chemist and has had considerable experience of teaching Russian to scientists. The essentials of the Russian language for an understanding of the scientific literature are introduced through 22 graded exercises, each containing a vocabulary, grammar and a passage for reading and translation. Then follow useful sections on transliteration and Russian chemical nomenclature, and a grammatical summary. The book is completed by a series of exercises of increasing difficulty for translation, with explanatory notes on points not previously raised, and a Russian-English glossary listing all the words needed. Obviously designed for use with a teacher, this book would suit its purpose very well; again, however, it is necessary to deplore the extremely high price of volumes of this type, to be compared with that of a comprehensive Russian grammar for purely literary purposes which costs only one-third as much.

Analytical chemistry

COMPREHENSIVE ANALYTICAL CHEMISTRY Volume 1c, CLASSICAL ANALYSIS: GRAVIMETRIC AND TITRIMETRIC DETERMINATION OF THE ELEMENTS. Edited by *C. L. Wilson* and *D. W. Wilson*. Van Nostrand, London, 1962. Pp. xxx + 728. 140s.

The two Wilsons editing this massive treatise on analytical chemistry are getting into their stride and with the appearance of the third part since 1959 it is possible to discern something of the pattern of the work as a whole. Clearly all large chemical libraries need a compendious reference work on analysis and this is the one that they are likely to choose. The scale seems to have been well judged both for the needs of the analyst and the general chemist.

The present volume makes rather dull reading. This should not be regarded as a slur on the 30 authors. It is impossible to describe systematically gravimetric and titrimetric methods for the determination of each element in the periodic table, giving some 10 pages and 100 references to each, without producing a catalogue.

Among the many good features of the book are the concise clear descriptions of some suitable procedures that are detailed for each element and the lists of references which give a summary title for the papers cited. This part can be read independently of the other parts of the volume.

Overseas News

Hooker license phenol process to two Japanese producers

TWO major Japanese chemical firms have been licensed by Hooker Chemical Corporation to use their phenol process. Mitsui Chemical Industry Co. Ltd. and Mitsubishi Chemical Industries Ltd., with headquarters in Tokyo, are the first companies in Japan to be licensed under the process. Each has applied to the Japanese government for permission to proceed with design and construction of phenol production facilities, locations to be announced when government permits are granted. Announced capacities are between 20 and 25 million lb. each.

The Hooker phenol process is two-stage and continuous. In the first stage, benzene undergoes an oxidative chlorination to monochlorobenzene using hydrochloric acid or chlorine. In the second stage, monochlorobenzene is catalytically hydrolysed to phenol and hydrogen chloride. The hydrogen chloride is recycled into the first stage. Principal advantages of the improved process, compared with the Raschig process, are substantially reduced plant investment costs and elimination of by-products.

In the U.S., Hooker manufacture phenol by the modified Raschig process at North Tonawanda, N.Y., while another plant is under construction at South Shore, Ky., and will be completed in the third quarter of 1962. The Hooker phenol process was also licensed in Argentina in 1960 when Hooker formed a 50-50 joint venture, Duranor S.A., with Atanor S.A.M. The Duranor plant, under construction at Rio Tercero, will be completed by end-1962.

Settlement for cancelled U.S. naphthalene contract

Stepan Chemical of the U.S., who last year announced plans to build a phthalic anhydride plant in Puerto Rico based on naphthalene purchased from Commonwealth Oil Refining Co.'s nearby plant and who later decided to locate the plant in the U.S., have now agreed to pay C.O.R. $400,000 for the cancelled contract. Stepan are constructing the phthalic anhydride plant at Millsdale, Ill; the unit is due on stream by end-1962.

Esso-Standard plan new refinery at Berre

Esso-Standard are to build a new refinery on the Etang de Berre, France, which will be the fourth refinery of the Berre complex. Capacity should reach 2.5 million tonnes/year which, with the 1.5 million tonnes/year of the projected refinery at Feyzin, near Lyon, will help meet the expected rise in French consumption. The fourth State plan foresees, in addition to the 7 million tonnes of the Strasbourg refineries, an extension of 4 million to 5 million tonnes in French refining capacities by 1965. To undertake their Berre projects, Esso-Standard have acquired a site at Fos-sur-Mer, on the side of the Arles to Port-de-Bouc canal.

Italian-built nitric acid plant in Spain

Work is progressing rapidly on the construction of a nitric acid plant in Seville, which is being built by Ansaldo on designs prepared by Montecatini. When ready the new plant will produce over 400 tonnes of acid a day.

Pemex ammonia plant now on stream

The second anhydrous ammonia plant, with capacity for 200 tonnes/day of ammonia, has now come on stream at Salamanca, Guanajuato, Mexico, for Petroleos Mexicanos (Pemex). Based on a natural gas feedstock, it was designed, engineered and constructed by Lummus who also have under construction at Salamanca a 33,000 b.p.s.d. refinery.

About half the ammonia produced will be used directly on the land, the other will serve as feedstock for the nearby Lummus-engineered urea plant of Fertilizantes del Bajio SA (Ferba). Plant and equipment for the ammonia plant was purchased in Belgium, France, Germany, Italy, the Netherlands, the U.K. and the U.S.

India to be advised by E.N.I. on new refinery project

The Indian Government has retained E.N.I., the Italian state-owned oil group, to advise it on the setting up of refinery in South India, which, it is hoped, will be on stream by 1966.

E.N.I. are to make an exhaustive survey of the economics of the project from the points of view of return on capital and possible savings to India in foreign exchange.

Interhandel/G.A.F. suit will be heard next year "at the earliest"

ACCORDING to the 1961 annual report of the Swiss holding company Internationale Industrie- und Handelsbeteiligungen AG (Interhandel), of Basle, the trial dealing with Interhandel's claims to the freeing of their holdings in the General Aniline and Film Corporation, New York, will start next year "at the earliest".

G.A.F. were taken over during the war by the U.S. Government under the Alien Property regulations and plans are in hand to sell the concern to private industry. The current year, say Interhandel, will see a continuation of pre-trial preparations. Last year the Swiss company spent S.Fr. 1,870,000 on legal costs and fees.

Antwerp will be site of U.S. pyridine plant

Antwerp will be the site of the synthetic pyridine-picoline plant announced early this year by Parke-Davis and Reilly Tar and Chemical of the U.S. as a joint venture. Capacity is scheduled at 4 million lb./year, with production due to begin in 1963. Midland Tar Distillers Ltd. are due on stream later this year with plant to raise capacity from 200 tons/year to more than 600 tons of pyridine and to yield higher outputs of α-β- and γ-picolines and lutidines.

India seeks third BHC producer

The Indian Government is seeking tenders for a third 5-10 tons/day BHC plant to be built on a turn-key basis using benzene and chlorine. The Indian Ministry for Industry estimates that by 1967, the country will need some 14,400 tons of BHC-a-year. Current capacity is rated at nearly 4,000 tons/year with Tata Chemicals and Alkali and Chemical Corp. of India as the two producers.

Japan to pay more for Indian salt

Japan will import 500,000 tons of salt from India over a two-year period, beginning next July, under an agreement signed recently in Tokyo between Japanese representatives and Mr. Govind Narain of the State Trading Corporation, who headed an Indian delegation.

Under this Rs.7,500,000 contract, Japan will pay 22s/tonne f.o.b. Indian ports for the salt, an increase of nearly 26s per ton over the price paid under the old contract which expired in June 1961, and under which Japan imported 4.5 million tons over a period of 18 months.

Rayon plant approved for Pakistan

The Pakistani Government has granted permission for the construction at Karnafuli, East Pakistan, of a viscose rayon plant. The unit, to cost some 75,000,000 rupees, will be a project of the Pakistani firm Dawood Industries Ltd.

Overseas news

Dutch chemical industry's wages and social costs will rise

COMPLEMENTARY to the 1961 export figures of the Dutch chemical industry published in CHEMICAL AGE, 31 March, it is now known that actual exports of Dutch chemical products were last year worth some Fl.1,800 million, or 11.7% of total Dutch exports. Imports of chemical products into Holland were the same as in 1960, or about Fl.1,500 million, the share of chemical products in total imports falling from 8.7% to 8.1%.

At the same time Mr. D. de Jong, chairman of the Association for Dutch Chemical Industry (Vereniging van de Nederlandse Chemische Industrie), has stated that over the coming five years, wages plus welfare costs must be expected to increase by 5-7% per year within the Dutch chemical industry. This development, which applies only to Holland and not to other Common Market countries, linked with the E.E.C.'s anti-cartel legislation and falling prices, was associated by Mr. de Jong with the expectation in the future of lower profit margins and difficulty in increasing turnover volumes.

Although he stressed that the Dutch chemical industry was not on the brink of a crisis—there were reserves enough in hand—he said that the tide had now turned against the upward tendency of the past 10 years. Nevertheless, he indicated that in this year as in 1961 investments in the Dutch chemical industry would be high, and this state of affairs could be expected to continue in 1963 and 1964.

Very pure bromine will soon be available from Dow

Bromine of 99.95% purity will soon be available from Dow Chemical at no increase in cost when their new 30 million lb.-a-year bromine expansion programme comes on stream. The new facilities incorporate a new process for producing commercial quantities of high purity bromine. Previously the highest purity bromine available was 99.8%. Sales of the chemical have not been particularly good lately, but Dow hope that selling the higher purity bromine at no extra cost will give them a bigger share of the market as well as speed the development of new uses.

Sumitomo's plant for acetylene-ethylene

The acetylene-ethylene plant of Sumitomo Chemical Co., Niihama, Japan, which was started up in October, has just been put into normal commercial operation. The plant produces 25 tons/day of acetylene and 50 tons/day of ethylene, and is operated according to the process of Soc. Belge de l'Azote et des Produits Chimiques du Marly (S.B.A.), Liége. Sumitomo, licensees of the process, conducted detailed engineering and construction in co-operation with S.B.A. Acetylene is said to be 99.9% pure and is used for the production of acrylonitrile monomer and p.v.c., while ethylene is used as raw material for polythene.

This is the first industrial plant to use S.B.A.'s process for the simultaneous production of acetylene and ethylene from naphtha.

Hoechst set up Egyptian subsidiary

Farbwerke Hoechst AG, Frankfurt, have set up an Egyptian subsidiary, Hoechst Orient S.A.A. for the manufacture of ethical pharmaceuticals. Hoechst hold 60% of the ordinary capital of £E130,000, the remainder being held privately in Egypt.

Legal status of French oil companies revised

Revisions in the legal status of French oil investment companies have been approved by the Minister of Finance, according to the Finance Minister.

The main change will be that investment companies which were able to use their funds only for the financing of exploration will now be permitted to add their operations to other petroleum activities such as investing in oil transport, refining, distribution, and petrochemical operations.

Changed consumption pattern of Italian natural gas

Pending the results of the discoveries at Ferrandina, in Sicily, and elsewhere, most of Italy's production of natural gas is concentrated in the north. Details are: Lombardy, about 44%; Emilia, about 24%; Piedmont, about 14.5%; Venetia, about 12.5%; Liguria, about 4.5%; rest of Italy, about 0.5%.

The change in the pattern of Italy's consumption of natural gas in the past 10 years is:

Use	1951 %	1960 %
Fuel, industrial	77.8	64.6
Chemical industry	0.6	17.3
Power stations	4.2	3.1
Automotive traction	12.9	2.2
Domestic use	4.5	12.8

D.S.M. holding in Mysore nitrogen complex must not exceed 40%, says government

SPONSORS of a 100,000 tons-a-year nitrogenous fertilisers plant at Mangalore, Mysore, have been told by the Government of India that a licence would be granted subject to certain conditions. One of these is that the foreign collaborators should not now hold more than 40% of the share capital; the overseas partners originally sought a 48% interest. The project will cost an estimated Rs.270 million; joint sponsors are Shaw Wallace and Co., Calcutta, and the Dutch State Mines.

Fertiliser needs of Mysore State are about 85,000 tons/year of urea, 132,000 tons of ammonium sulphate and 75,000 tons of ammonia. Power shortage is one of the major handicaps to the start-up of more fertiliser plants in the State. The new plant will produce 300 tons/day of urea, 375 tons/day of ammonium phosphate, and 300 tons/day ammonium sulphate.

Erection of the Neyveli fertiliser works, Madras, will start early next year, with full production scheduled for 1964.

Thiourea to be produced commercially at Lacq

Soc. Nationale des Pétroles d'Aquitaine are to undertake commercial scale production of thiourea, until now manufactured on a pilot plant. The new Lacq works will have a capacity of 1,000 tonnes/year. The company is also to start the production of another derivative of sulphur—dimethyl-sulphoxide, a solvent with many applications.

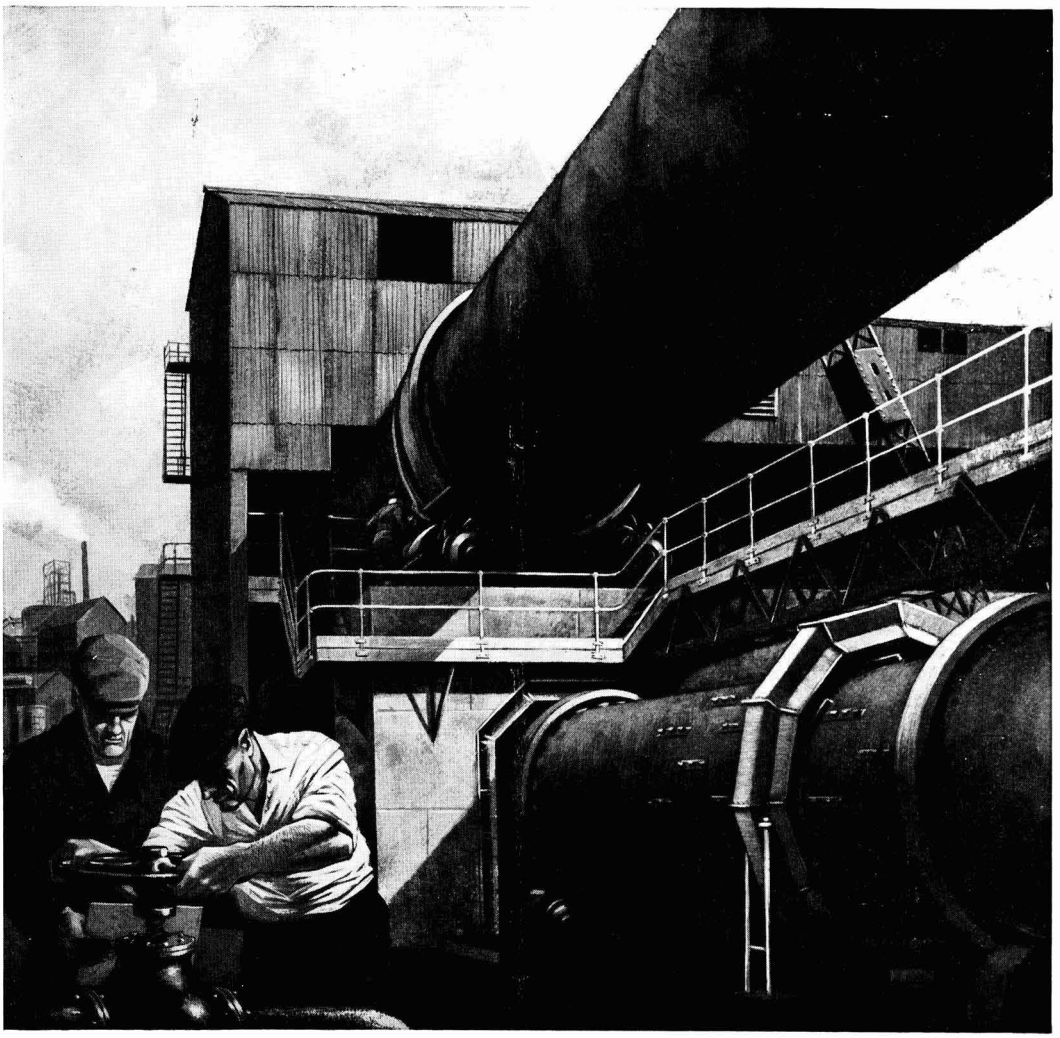
A new company, Aquitaineplastique, has been formed to undertake the sale of plastics materials. S.N.P.A. will hold most of the capital of NF100,000.

More fertiliser material available in U.S.

According to the U.S. Department of Agriculture, some 8.8 million tons of fertilisers (in terms of nutrient) will be made available by U.S. producers in the 1962/63 farming year, or 12% more than in 1961/62. Of this total, nitrogen is expected to total nearly 3.3 million tons, a rise of 6%, with phosphate estimated at nearly 3 million tons (higher by 8%) plus some 2.6 million tons of potash (up nearly 21%).

New Dutch oxygen plant at Gouda

The Schiedam, Holland, chemical company W. A. Hoek's Machine- en Zuurstoffabriek are building at Gouda a new oxygen plant to come into operation a few months from now.



THE ACID TEST OF SERVICE

Marchon has recently built a new kiln, which, together with the Company's two existing kilns, has increased Marchon's production of sulphuric acid to 500 tons a day. Most of the acid is used by Marchon for the production of condensed phosphates and for the sulphonation of detergent raw materials; the remainder is sold. Marchon's current expansion scheme, of which the new kiln is a part, contributes towards the constantly improving service the Company has to offer all detergent manufacturers. Service, quality and economy are Marchon's other names.

Marchon

MARCHON PRODUCTS LIMITED, WHITEHAVEN, ENGLAND. MEMBER OF THE ALBRIGHT & WILSON CHEMICAL GROUP

PEOPLE in the news

● **Mr. K. W. Streith** returned as managing director of Thomas Hedley and Co. Ltd. (the U.K. member of the Procter and Gamble group) on 1 June. In 1960 Mr. Streith was granted leave of absence to take up a special assignment, now completed, in connection with the company's export business. During this period, he remained a director of Hedley's, but made his headquarters in Geneva. **Mr. C. M. Fullgraf,** who was managing director of Hedley during Mr. Streith's absence, has become an associate director of the Procter and Gamble overseas division.

● Appointments at Sussex University, Brighton, for the academic year 1962-63 include the following as chemistry lecturers: **Dr. C. N. Banwell, Dr. E. O. Bishop, Dr. R. A. Jackson,** and **Dr. J. D. Smith. Mr. A. Pidcock** has been appointed an assistant lecturer in the chemistry department.

● Three new appointments have been made by Badger N.V., The Hague, the major Continental subsidiary of the Badger Co. Inc., U.S. **Mr. Robert M. Stewart,** contracts manager, who has been appointed deputy general manager, will continue to emphasise the company's sales activities throughout Europe, Africa and the Middle East, as well as assisting in overall engineering administration and coordination. His experience includes five years in European engineering and construction company management, and 13 years in process design and operational supervision of oil and chemical plants in Europe and the U.S. **Mr. W. Nicholas Kruse,** who has been appointed contracts manager, will coordinate sales and process design activities in Europe. **Mr. Raymond G. Graeter,** who has been given a permanent appointment as executive sales engineer, will lay particular stress on sales activities in the Netherlands, Germany, Scandinavia, and Yugoslavia.

● **Dr. Erich Baer** of Toronto University has been awarded the Chemical Institute of Canada Medal for 1962. Dr. Baer has been associated with the university for 25 years and much of his research has been in the fields of glycerol derivatives.

● **Mr. C. C. Skou,** who has set up practice as an independent consultant with an office at 34 Marton Road, Middlesbrough (tel.: Middlesbrough 43662), is a Fellow of the Royal Institute of Chemistry. He will advise on the manufacture of cements and other building and heat-insulating materials; heavy chemicals, ceramics and refractories; mineral mining; factory design and organisation, including process control; and human relations.

● **Mr. William Fraser,** who has resigned as managing director of the Kuwait Oil Co. Ltd., has been appointed a managing director of the British Petroleum Co. Ltd. He has been succeeded at Kuwait Oil by **Mr. D. E. C. Steel,** previously B.P.'s regional co-ordinator for the Western Hemisphere.

● The Council of British Manufacturers of Petroleum Equipment has announced that **Mr. G. Hancock,** general manager and director of David Brown Industries, foundries division, has been elected vice-chairman.

● Uddeholm Ltd. have appointed **Mr. Hugh Murchie** as their area representative in Scotland.

● At the annual general meeting of the British Rubber and Resin Adhesive Manufacturers' Association held on 30 May, **Mr. N. G. Bassett Smith** (Dunlop Rubber Co. Ltd.) was elected chairman for 1962-63. **Dr. H. Simon** (Evode Ltd.) was elected vice-chairman.

J. A. Berriman, new managing director of Shell Refining Co. Ltd. (left), and B. Wardle, managing director of the newly-formed Industrial Adhesives Ltd. (see 'Chemical Age', 2 June, pages 903 and 896 respectively)

● Now visiting I.C.I.'s Wilton Works is **Mr. Reuben Erlijman,** a chemical engineer from Duperial, Argentina. When he returns after a six months' stay, he will be concerned with the start-up of Duperial's new polythene plant at San Lorenzo. Two of his colleagues are spending some time at I.C.I.'s Plastics Division at Welwyn Garden City.

● **Lord Fleck** will give the opening address at the conference on national inspection to be organised by the Institution of Engineering Inspection at New College, Oxford, from 25 to 27 September.

● **Mr. H. J. West** has been appointed marketing director of British Oil and Cake Mills Ltd.

● At the 15th annual general meeting of the Fertiliser Society, **Mr. J. D. Battye** was elected president and **Dr. J. H. Hudson** vice-president. **Mr. H. R. Conan, Mr. H. van der Molen** and **Dr. C. C. Tanner** were elected to fill vacancies on council.

● **Mr. W. R. D. Macdonald** has been appointed deputy managing director of Yorkshire Imperial Metals Ltd.

● **Mr. L. A. Coombs,** managing director of William R. Warner and Co. Ltd., pharmaceutical manufacturers, of Eastleigh, Hants, has been appointed to the board of Warner-Lambert (Pakistan) Ltd.

● **Mr. W. Starrenburg,** director of co-ordination—chemicals, will be appointed to the boards of the Shell Petroleum Co. and Bataafse Petroleum Maatschappij NV from 1 July. He will also become an assistant managing director of NV Koninklijke Nederlandsche Petroleum Maatschappij (Royal Dutch Petroleum Co.). **Mr. E. Chester Peet,** chief financial officer of the Royal Dutch/Shell group of companies and a member of the boards of Shell Petroleum and Bataafse Petroleum Maatschappij NV, retires on 30 June after 43 years' service. He will be succeeded by **Mr. G. B. Huiskamp,** group finance co-ordinater, who will be appointed to the boards of the two companies with effect from 1 July.

● The United Kingdom Atomic Energy Authority have appointed **Dr. N. L. Franklin** as nuclear fuel director, production group, Risley. Formerly technical director, he will be responsible for the group's commercial activities and for technical aspects of its work on civil magnox fuel elements.

Seen at Laporte Chemicals Ltd. Warrington works during the visit of the board of Elektrochemische Werke Munchen (C.A., 2 June, p. 910), M. Keck and Paul O. Schlick (E.W.M. m.d.). On the right are Geoffrey Hickson, Laporte Chemicals m.d., and G. F. Sommerville, director

Commercial News

- Courtaulds negotiate sale of Snia holding
- Laporte group profits only slightly cut
- Kuhlmann pay more on higher profits
- Schering sales up; leave cosmetics field

Amber Chemical

Amber Chemical Industries report profits in 1961 of £23,192 (£17,825). The company is to pay two years' arrears of dividend on its Preference shares to 31 December 1961. The directors expect to pay the full 1962 dividend in December. There is no Ordinary dividend for 1961 (nil).

F. W. Berk

F. W. Berk and Co. Ltd. have reached agreement for the acquisition by their subsidiary, St. Albans Sand and Gravel Co., of the capital of T. W. Howard and Son Ltd. Howard are engaged in the winning, processing and selling of sand and gravel, and in contract haulage and plant hire.

William Boulton

Trading profit of William Boulton Ltd. for 1961 before taxation was a record £115,528, an increase of £21,927. Net profit was £58,353. During the year the company acquired premises at Longport, originally occupied by Jesshope Ltd., together with a considerable amount of plant, machinery, stock and work in progress, which contributed materially to the increased profit. The chairman, Mr. E. M. Breeze, reports a lessening of profit margins, but is confident that this can be offset by greater efficiency and increased turnover.

Courtaulds

Negotiations between Courtaulds Investments and Mediobanca about the possible sale of Courtaulds' near £20 million holding in Snia Viscosa are expected to be concluded within the next two weeks. Mediobanca, who are Snia Viscosa's bankers, have not disclosed the principals for whom they are acting but they are thought to be a consortium of Italian banks.

Laporte Industries

Manufacturing and trading suplus of Laporte Industries Ltd. for the year ended 31 March was £4,456,948 (£4,529,943). Depreciation took £1,648,640 (£1,213,698) and group net income was £1,538,053 (£1,837,124). Parent company's net income totalled £1,282,926 (£1,392,480). A final dividend of 7½% makes 10½% (same). The higher 1962 dividend, on increased capital, was forecast when the one-for-five rights issue was made in September 1961.

Austrian Glanzstoff

The Glanzstoff concern of St. Pölten, Austria, a member of the A.K.U.-Vereinigte Glanzstoff-Fabriken chemical fibres group, announce a 1961 trading loss of Sch.3 million. This loss is Sch.1 million less than that recorded for 1960.

Goodyear

Sales of Goodyear Tyre and Rubber for the first quarter of 1962 rose to $370,794,554, over 7% up compared with the same quarter of 1961. Net income increased from $15,404,059 to $15,841,020.

A capital expenditure programme of $100 million, the highest in the company's history, is being planned for 1962. This will involve certain new plants as well as expanding the existing plants and the modernisation of facilities for cost reduction purposes.

Keller et Leleux

Profits of Société des Etablissments Keller et Leleux for 1961 were NF2,960,000 (NF2,600,000 in 1960). A total of NF2,400,000 was allocated to the sinking fund and the dividend is being omitted. A scrip issue on both 'A' and 'B' shares has been proposed.

Kuhlmann

The French chemical concern Ets. Kuhlmann report a 1961 net profit of NF.17,650,000 (NF.17,450,000), after depreciation of NF.47,980,000 (NF.40,670,000). Net dividend is to be raised from 10% to 10½%.

Lumiere

The capital of Lumière is to be doubled to NF27 million by issuing new shares of NF25 (nominal) to NF60. The board has been authorised to increase the capital eventually to NF54 million by incorporating part of the reserves and increasing the nominal value of the shares from NF25 to NF50.

Naugatuck-Rumianca

The U.S.-Italian owned chemical concern Naugatuck-Rumianca, who produce rubber chemicals at Borgaro Torinese, earned too little in 1961 due to price competition to be able to pay a dividend. Turnover for the year was valued at 1,140 million lire.

Phosphates de Constantine

Net profits of Phosphates de Constantine for the year 1961 totalled NF1,870,257. In view of the Algerian situation, no dividend will be paid this year, and balance carried forward is NF3,121,402.

S.I.F.A.

Net profit for 1961 of Soc. Industrielle pour la Fabrication des Antibiotiques, a subsidiary of Nobel-Bozel of the Dynamite group, was NF8,632,736. A dividend of NF10/share (same) is proposed.

S.P.C.S.

Net profit of Produits Chimiques et de Synthèse, now controlled by Saint-Gobain and Péchiney, in 1961 was NF2,664,373 (NF3,874,776). In spite of heavy competition in France and in export markets, turnover increased to NF113,813,000 (NF110,060,000). The profits will be carried forward to balance previous losses. Following the acquisition of Soc. Indor in January, capital will be raised to NF14,991,750.

Schering

Turnover of Schering AG, including that of all their fully-owned domestic and foreign affiliates, increased 17% in 1961 to DM247.2 million (DM210.8 million) excluding the figure for the low-pressure coal hydrogenation plant (DM35.5 million) closed down earlier this year. Originally a petrol-from-oil plant, this has been used to produce hydrocarbons for use in the manufacture of detergents.

Also in the process of streamlining, the company has surrendered its interests in cosmetics. In future it will concentrate on pharmaceuticals, pesticides, plastics and industrial chemicals.

Rumianca

Rumianca S.p.A., Turin, are to pay a 1961 dividend of 10% (same) after net profit of 804 million lire (820 million). Sales rose over 1961 by some 5% to about 9,900 million lire. Capital has now been increased 5% from the former 10,000 million lire to 15,000 million lire.

Ugine-Caffaro

The new company set up by Ugine of France and Caffaro Soc. of Italy—Elletrochimie Ugine-Caffaro—has its head office at 1 Via Vasto, Milan.

Union Carbide

Union Carbide Canada, Limited, have set up a new subsidiary, Union Carbide Exploration Ltd., who will broaden the company's interests in mineral raw materials.

INCREASE OF CAPITAL

CATYLATORS LTD., manufacturers of chemical apparatus, etc., Weydown Road, Haslemere, Surrey. Increased by £2,500 beyond the registered capital of £10,000.

NEW COMPANIES

CAPPER CHEMIDUS LTD. Cap. £10,000. Contractors for installations of all types and all pipe work and plant from plastics, etc. Directors: W. P. Capper, J. P. R. Smith, P. D. Allan and F. Brearley. Reg. office: Forward Works, Woolston, Warrington.

CHEMICAL AND ELECTRONIC COMPONENTS LTD, Cap. £100. Engineering in all its branches, etc. Directors: K. Moore, A. A. Ortiz, G. D. Smith and

H. O. Williams. Reg. office: 19 Oldfields Trading Estate, Sutton, Surrey.

DORKING MINERALS CO. LTD. Cap.: £100. Buyers and sellers of minerals, metals, ores, organic and inorganic substances, etc. Directors: Alfred H. Massey and Mrs. Lilian M. Massey. Reg. office: Squires Farm, Logmore, Dorking, Surrey.

GENTLE PRODUCTS LTD. Cap. £1,000. Chemical manufacturers and dealers, etc. Directors: Stanley West and Sidney Swart. Reg. office: 23 The Borough, Hinckley, Leics.

MORLEEDE HOLDINGS LTD. Cap. £100. To acquire the whole of the issued capital of Robert Morton and Co. Ltd., Fairleede Engineering Ltd. and Acrob Chemical Processors Ltd. Directors: J. P. Robinson, A. C. Rodger, B. E. Brown, W. N. Tonkinson, P. Balean and B. E. Rhodes. Reg. office: 102 Friar Gate, Derby.

SHORKO HOLDINGS LTD. Capital £1,000. To acquire and hold shares, debentures or securities of any kind of any company engaged in the manufacture and marketing of chemicals, plastics or products derived from plastics, etc. Subscribers are: A. R. Harvey and J. F. K. Hinde, both of St. Helen's Court, Great St. Helens, London E.C.3.

ZEROLIT LTD. Cap. £100. Manufacturers of and dealers in chemicals, etc. Subscribers: R. Clarke, E. I. Akeroyd and T. V. Arden. Reg. office: 272-276 Gunnersbury Avenue, London W.4.

I.C.I. to amend profit-sharing scheme, bonus level may be cut

SUBSTANTIAL changes are to be made this year in I.C.I.'s profit-sharing scheme, Mr. S. P. Chambers, the company's chairman, told members of the I.C.I. central council at their meeting at Scarborough recently.

When the last changes had been made in 1958, he said, it had been explained that the new basis of bonus payments might have to be adjusted if certain anomalies became more prominent. That stage had now been reached, Mr. Chambers continued, the main point at issue being that the amount to be distributed as profit-sharing bonus was 22% of what was paid out in interest on loan stocks and dividends on preference and ordinary shares, some part of the amount being derived from operations in subsidiary and associated companies whose employees did not participate in the profit-sharing scheme.

Enlarging on Mr. Chambers' remarks, Mr. C. M. Wright, personnel director, said that while I.C.I.'s experience of profit sharing went back only eight years, there were several old-established companies which had been operating profit-sharing schemes successfully for 50 years or more and all of them had had to change the formula from time to time. It was unlikely, he added, that they could, in I.C.I., succeed in producing a formula which would take account of all the unforeseen circumstances and therefore they must be prepared for further changes in future.

The present review of the scheme was not yet complete, Mr. Wright said, but it would be wrong if he did not convey to them that if changes of the nature he had indicated were made, they would result in some reduction in the present level of profit-sharing bonus. In the circumstances, the board thought it would be wrong to make any announcement at the present time about the two resolutions under reference.

City and Guilds of London Institute

A paragraph in CHEMICAL AGE, 17 March on the appointment of Major-General C. Lloyd as director-general of The City and Guilds of London Institute incorrectly described the Institute as "a constituent college of Imperial College." It is an independent body founded in 1878 and deriving its present authority from a Royal Charter granted in 1900.

TRADE NOTES

Change of address

As from 11 June, the head office of British Oxygen Chemicals Ltd., will be transferred from St. James's to Hammersmith. The new address is: Hammersmith House, Hammersmith, London W.6. (Riverside 2020). The London sales office will remain at 24 Grafton Street, London W.1.

Merrill Chemicals Ltd., formerly Rapax Ltd., have moved to Oak Street, Heeley, Sheffield 8.

R. H. Cole and Associated Companies have completed the removal of their head office to a new building at 26-32 Caxton Street, Westminster, London S.W.1 (Sullivan 7060). This new address will also be the registered offices and sales departments for R. H. Cole and Co. Ltd.; R. H. Cole (Overseas) Ltd., R. H. Cole Plastics Ltd.; Lustrac Plastics Ltd., and Dr. Beck and Co. (England) Ltd.

Glycerine price cut

Glycerine Ltd., 8 Tudor Street, London E.C.4, have from 4 June reduced their home trade refined glycerine prices by £10.

Fluorocarbon f.e.p. sleeving

Believed to be the first full range of fluorocarbon f.e.p. sleeving manufactured in Britain, Polypenco Ltd., Gate House, Welwyn Garden City, Herts, announce their new fully fluorinated 'spaghetti' sleeving. It has most of the electrical properties of p.t.f.e., the only significant difference being that f.e.p. may be used for continuous service up to 200°C while p.t.f.e. will withstand 260°C.

Non-ionic surfactant

A technical data sheet on Polychol non-ionic surfactant is available from Croda Ltd., Cowick Hall, Snaith, Goole, York. The company now offer a new range of non-ionic surface active agents in which the hydrocarbon portion of the molecule is due to mixed sterols (cholesterol), trimethyl sterols (lanosterol), and high molecular weight aliphatic alcohols, as distinct from presently available products based purely on aliphatic alcohols.

Changes in Carlona polypropylene

With effect from 4 June, Shell Chemical Co. Ltd. are revising and extending their range of Carlona P polypropylenes. In the extrusion range slight reductions are being made in the flow levels of DE and FE, and in the injection moulding range HM 61 is being replaced by a lower flow grade GM. The KM and PM grades are unchanged.

The full range will thus have five flow levels, each of which will be available in at least two out of the following stabilisation levels, 61 for general purpose use, 81 for prolonged use at high temperatures and 21 for food and similar uses. At the same time, Shell Chemical have adopted the new I.S.O. method for polypropylene melt index measurements, 2.16 kg. load at 230°C. and this, rather than 2.16 kg. at 250°C, will be used in future. It has the effect of reducing the nominal melt index value by approximately one-third.

Ciago Latices and Rubbers

A new booklet entitled 'Ciago latex and rubber. Types, properties and applications' is now available from Durham Raw Materials Ltd., 1-4 Great Tower Street, London E.C.3, U.K. agents of N.V. Chemische Industrie A.K.U.-Goodrich, of Holland, manufacturers of the Ciago range. The booklet gives a complete list of Ciago acrylonitrile-butadiene latices, styrene-butadiene latices, and self-reinforcing rubbers.

Quickfit price cut

Substantial price reductions are announced by Quickfit and Quartz Ltd., Heart of Stone, Staffs, for their high vacuum stopcocks.

New ultra-thin Mylar film

What is claimed to be the thinnest unsupported plastics dielectric film ever produced commercially has now been added to the line of industrial films distributed in Europe by Du Pont de Nemours International S.A., 81 Route de l'Aire, Geneva, Switzerland. A 15-gauge Mylar polyester film with a thickness of .00015 in. (0.0038 mm.) and a nominal yield of 133,000 sq. in./lb. (199 sq.m./kg.), the new film extends the thickness range of Mylar films available in Europe from 0.0038 mm. to 0.356 mm.

Change of name

Fireproof Tanks Ltd. announce that they will in future be known as F.P.T. Industries Ltd.

DIARY DATES

THURSDAY 14 JUNE

R.S.—London: Burlington Hs., Piccadilly, W.1., 4.30 p.m. 'The structure of liquids' by J. D. Bernal.

R.I.—London: 21 Albermarle St., W.1., 10 a.m. to 1 p.m. and 2.30 p.m. to 6 p.m. (also 15 June). Royal Institution open days.

Market reports

Price cuts help boost fertiliser demand

LONDON New demand for industrial chemicals on home account has continued at a reasonably steady level with a good movement against contracts. Quotations generally are well held and the undertone is steady but lower bases prices have been announced for the lead compounds. Dry white lead is 40s/ton cheaper at £107 15s per ton, while red lead and litharge are 45s/ton lower at £94 15s and £96 15s/ton respectively. The new prices became effective on 31 May.

Activity in fertiliser materials has been helped by the reduced prices now in operation. Business in coal-tar products has been moderate, though a fair demand has been reported for refined tar and creosote oil.

SCOTLAND Business has again been brisk and steady trading conditions can be reported from the general chemicals market. Quantity levels have been well maintained and the flow against contract demands also steady. Demands too have been varied with those against the heavy chemicals predominant. The export market is still showing activity with a good volume of varied enquiries. There has been little change in agricultural chemicals, with seasonable requirements and forward bookings quite active.

Work begins on new Q. and Q. factory

WORK has now begun on the erection of the new Quickfit and Quartz factory following preparation of the 90-acre site, formerly farmland at Walton, near Stone, Staffs (CHEMICAL AGE, 30 December 1961, p. 1030). General building contractors are Turriff Construction (Warwick) Ltd. Preparation of the site, which has included levelling, drainage, sewage, and laying of roads, has been carried out by Percy Bilton Ltd., of Stone.

The factory roof will be of an arched design, made up of pre-stressed reinforced concrete plates to be erected by Modern Engineering (Bristol) Ltd.

It is hoped that the new factory will be completed by the end of June 1963. In addition to the new production plant, there will be an office block, canteen and centralised services department, comprising boiler house, oxygen plant, sub-station and factory and vehicle maintenance sections. Total floor area of the first stage will be 148,000 sq. ft.

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 5s including postage; annual subscription £12 10s.

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.

AMENDED SPECIFICATION

On sale 4 July

Steriod compounds. Merck & Co. Inc. **895 830**

ACCEPTANCES

Open to public inspection 11 July

Polymerisation process. Fenland Investments Ltd. **900 973**

Preparation of lactones. Pfizer Ltd. **900 977**

Steroids and processes for the manufacture thereof. Scherico Ltd. **901 092**

Process for the production of an antibiotic. *Schweizerische Ferment AG.* **900 640**

Dienoic acids and derivatives thereof. International Polaroid Corporation. **900 586**

Process for separating carbon monoxide and olefins from gaseous mixtures. Farbwerke Hoechst AG. [Addition to 884 368.] **900 851**

Polyvinyl compounds. Shawinigan Resins Corporation. **900 571**

Preparation of thiolacrylic esters. Rohm & Haas Co. **900 573**

Copolymer emulsions. Archer-Daniels-Midland Co. **900 795**

Disazodyestuffs insoluble in water and process for their manufacture. Farbwerke Hoechst AG. [Addition to 897 738.] **900 854**

Biologically active polymers. Du Pont de Nemours & Co., E. I. **901 039**

Process for the manufacture of *acetaldehyde* and acetic acid. Farbwerke Hoechst AG. **900 829**

Metal salts of dithiocarbamic acids as catalysts in the production of monomeric esters and polyesters. Chemstrand Corporation. **901 094**

Polymerisation of vinyl ethers. Montecatini. **900 615**

Production of deserpidic acid lactone. Laboratories Francais de Chimiotherapie. [Addition to 868 481.] **900 616**

Polymeric materials. United Kingdom Atomic *Energy Authority.* **901 037**

Polymerisation of ethylene. Canadian Industries Ltd. **901 040**

Derivatives of 1-amino-propane. Merck AG. **900 797**

Dye-receptive graft copolymers, method for preparing same and shaped articles fabricated therefrom. Dow Chemical Co. **901 042**

Metallisable monoazo dyes and metal complexes thereof and a process for their preparation. Compagnie Francaise des Matieres Colorantes. **901 043**

Compounds of the estratriene series and their production. Takeda Pharmaceutical Industries Ltd. **901 104**

Method of producing highly purified ethyl alcohol and an apparatus for carrying out such method. *Berwerkgesellschaft Hibernia AG.* **900 627**

Catalytic oxidation of alcohols. Celanese Corporation of America. **900 831**

Process for the production of N-isopropyl-N¹-phenyl-*p*-phenylene diamine. Farbenfabriken Bayer AG. **900 617**

Quinazolines. Monsanto Chemicals Ltd. **900 779**

Production of alpha-picoline and gamma-picoline. Distillers Co. Ltd. **900 799**

Process for the production of a therapeutically useful sulphonamide. Ciba SA. **901 103**

Process for the separation of hydrocarbons. Imperial Chemical Industries Ltd. **900 619**

Method for the manufacture and uses, lignin condensates. Avebene and Viez, H. M. **901 106**

Production of fluid compositions containing silica. Monsanto Chemicals Ltd. **900 800**

Therapeutic composition and method of preparing same. Pfizer Corporation. [Addition to 742 157.] **901 107**

Anaesthetic solutions. Geigy, J. R., AG. **901 108**

Process for the preparation of lactams. Toyo Rayon Kabushiki Kaisha. **900 801**

Water-soluble dyestuffs containing methylol groups and dyeings obtainable with these dyestuffs. Badische Anilin- & Soda-Fabrik AG. [Addition to 842 802.] **900 950**

Neomycin treated cellulosic textile materials. American Cyanamid Co. [Addition to 788 968.] **900 748**

Process and apparatus for cracking hydrocarbons. Kellogg Co., M. W. **900 553**

Production of melamine resin laminates. American *Cyanamid Co.* **900 879**

Fungicides having 1,2-dithiole nucleus. Hercules Powder Co. **900 805**

Preparation of silicon tetrachloride. Unilever Ltd. **900 935**

Polymer-dyestuff reaction products. Ciba Ltd. **900 752**

Particles or granules of hydrophilic synthetic resins. Dow Chemical Co. **900 807**

Compounds containing silicon and phosphorus. Unilever Ltd. **901 055**

Manufacture of polyurethanes. Imperial Chemical Industries Ltd. **901 056**

Dyestuffs containing ternary sulphonium or quaternary ammonium radicals. Bayer AG. **900 649**

Thiophosphoric acid ester amides. Farbenfabriken Bayer AG. **900 590**

Methane pyrolysis. Esso Research & Engineering Co. **900 844**

Polycyclic guanidines and process for their manufacture. Ciba Ltd. **900 754**

Production of 2-acylphenothiazines. American Home Products Corporation. **900 755**

Stabilisation of organic compositions subjected to oxidative deterioration with metal deactivators. Goodyear Tire & Rubber Co. **900 756**

Water-soluble dyestuffs containing sulphonic acid and methylol groups and the production of the same. Badische Anilin-& Soda-Fabrik AG. **900 764**

Polyurea copolymer and a process of production thereof. Toyo Koatsu Industries Inc. **900 787**

Polyurea polymer and a method preparing the same. Toyo Koatsu Industries Inc. **900 788**

Pesticidal mixture. Hoechst AG. **901 058**

Production of 1,4-diaminoanthraquinone-2,3-dinitrile. Badische Anilin-& Soda-Fabrik AG. **901 059**

Imidazole derivatives. Rhone-Poulenc. [Addition to 836 854.] **901 060**

Mono- and di-thiophosphoric esters, and processes for their manufacture and compositions containing them. Sandoz Ltd. **900 557**

Process for the manufacture of quinacridone pigments in a finely divided form. Ciba Ltd. **900 757**

Process for the production of sheet formation from polyisocyanates. Farbenfabriken Bayer AG. **901 078**

Production of tetracycline antibiotics. American Cyanamid Co. **900 762**

Alkoxypolychlorobenzoic acids and their use in *herbicidal compositions. Hooker Chemical Corporation.* **900 561**

Esters of phosphorus thioacids. Bayer AG. **900 789**

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Antibacterial agents. Beecham Research Laboratories Ltd. **900 666**

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Production of diacyl peroxides. Canadian Industries Ltd. [Divided out of 901 040.] **901 041**

Process for the preparation of $\Delta^{1,4}$-3-keto-19-hydroxysteriods and esters. Takeda Pharmaceutical Industries Ltd. [Divided out of 901 104.] **901 105**

Steroids. Scherico Ltd. [Divided out of 901 092.] **901 093**

Colour standards developed for spectrometer-integrator combinations

MANY spectrometers used in routine colour measurements are equipped with tristimulus integrators which automatically compute the tristimulus values of a particular colour sample. The U.S. National Bureau of Standards have developed sets of colour standards to check the performance of spectrophotometer-tristimulus integrator combinations. Each set contains five two-inch square filters made of selenium orange-red, signal yellow, sextant green, cobalt blue, and selective neutral glass.

The tristimulus value of a colour—that is the amounts of primary red, green and blue light which, when added together, produce a particular colour—are readily calculated from the spectral transmission or reflectance curves automatically recorded with the spectrophotometer. These calculations, however, are extremely tedious and time-consuming, so a computer attachment is often employed.

No working standards have been made available for verifying the accuracy of colour for colour specifications or colour standardisation measurements.

A detailed report issued by the National Bureau of Standards with the standards contain instructions for their use and also colorometric data which enable corrections to be made for equipment maladjustments, and for other sources of error.

Instrument apprenticeships

The Cambridge Instrument Co. Ltd., 13 Grosvenor Place, London S.W.1, have published a brochure for the benefit of young men contemplating a career in the scientific instrument industry. It gives a brief summary of the role of instruments in the world today, describes and illustrates some of the instruments made by the company and provides information on types of apprenticeships.

Prime Minister becomes Fellow of Royal Society

Mr. Harold Macmillan, Prime Minister, was on 31 May elected a Fellow of the Royal Society under the statute which provides for the election of persons who have either rendered conspicuous service to science or are such that their election would be of signal benefit to the society.

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