

Chemical Age

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PETROCHEMICALS and POLYMERS

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THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

mighty particular

It is not as far fetched as one might think to discuss Cacti and Engineering Design in the same breath. One fundamental difference of course is that Nature looks after the Cacti whereas the engineer must look after himself. But both must be mighty particular if they are to succeed—the one as it grows the other how it grows.

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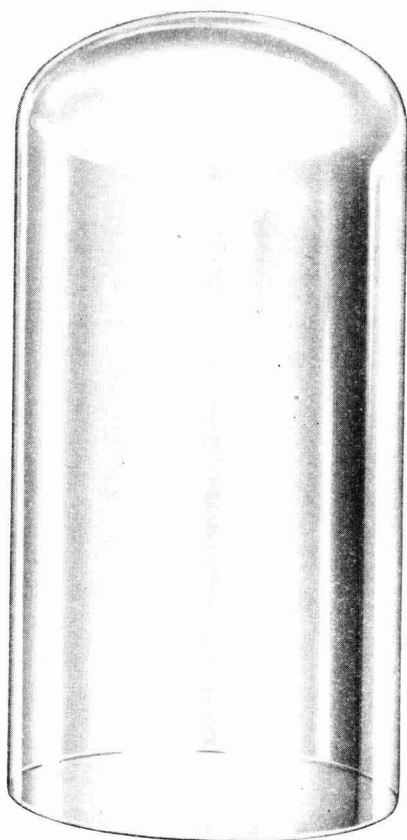
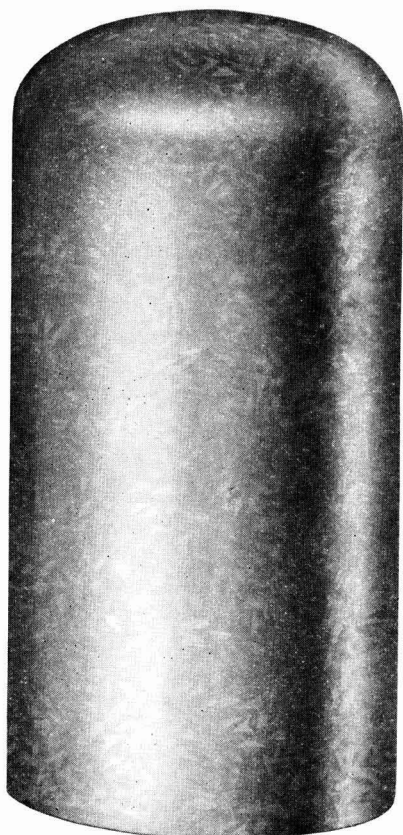
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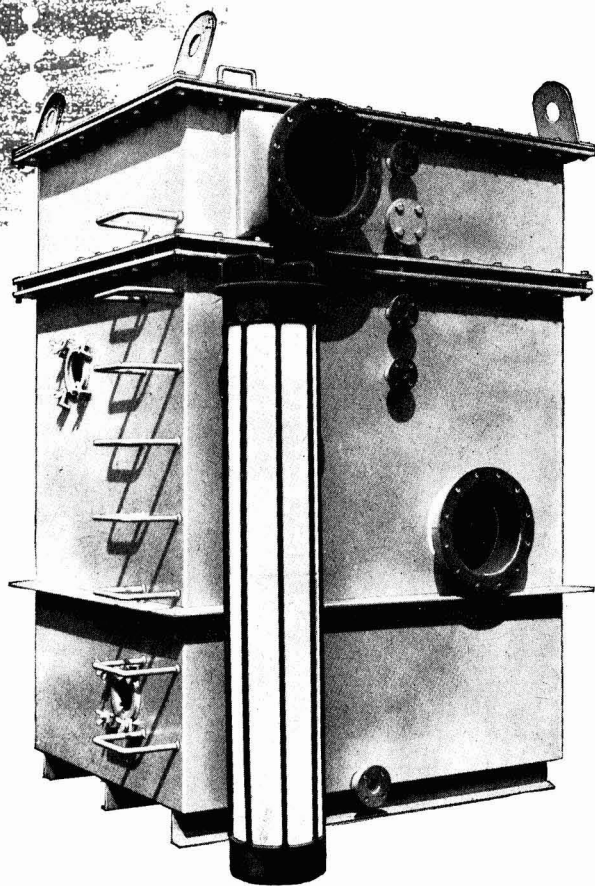
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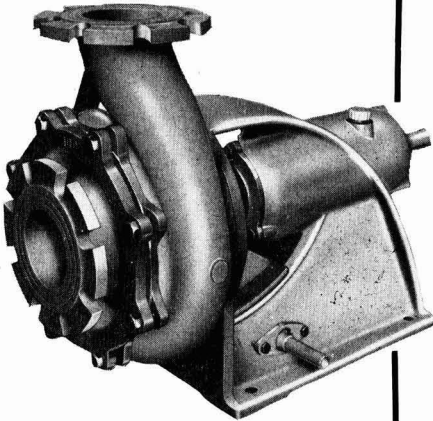
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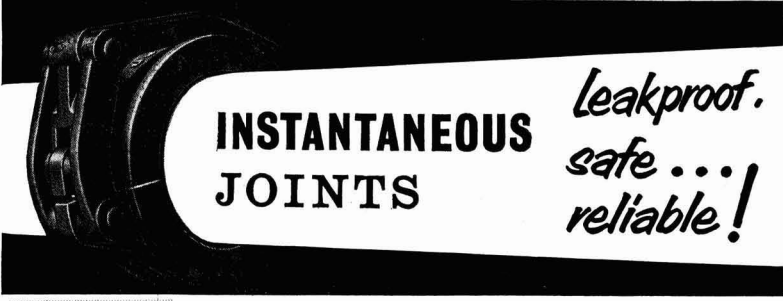
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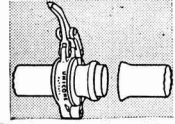


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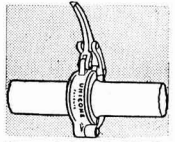
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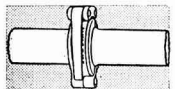
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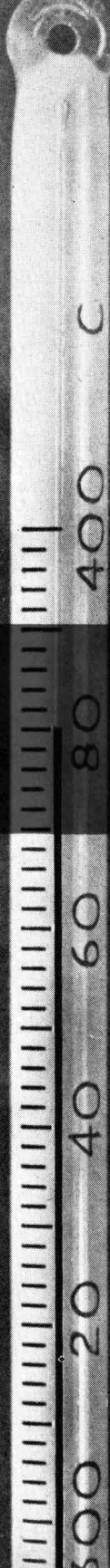
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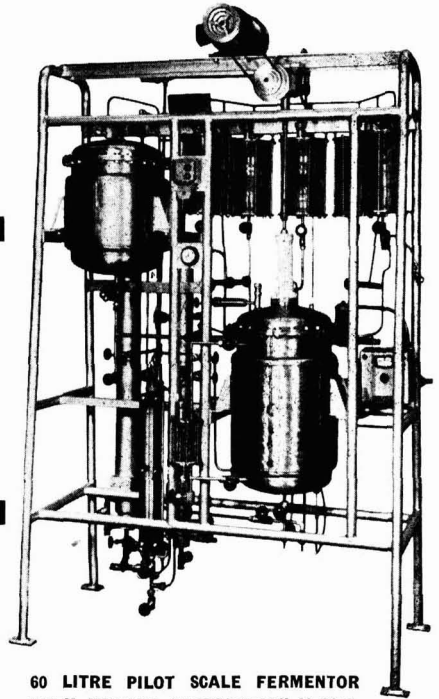
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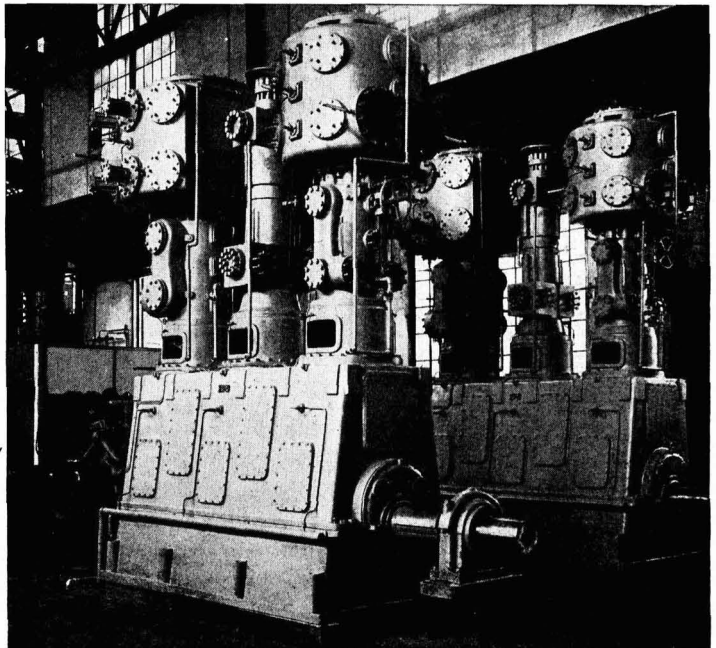
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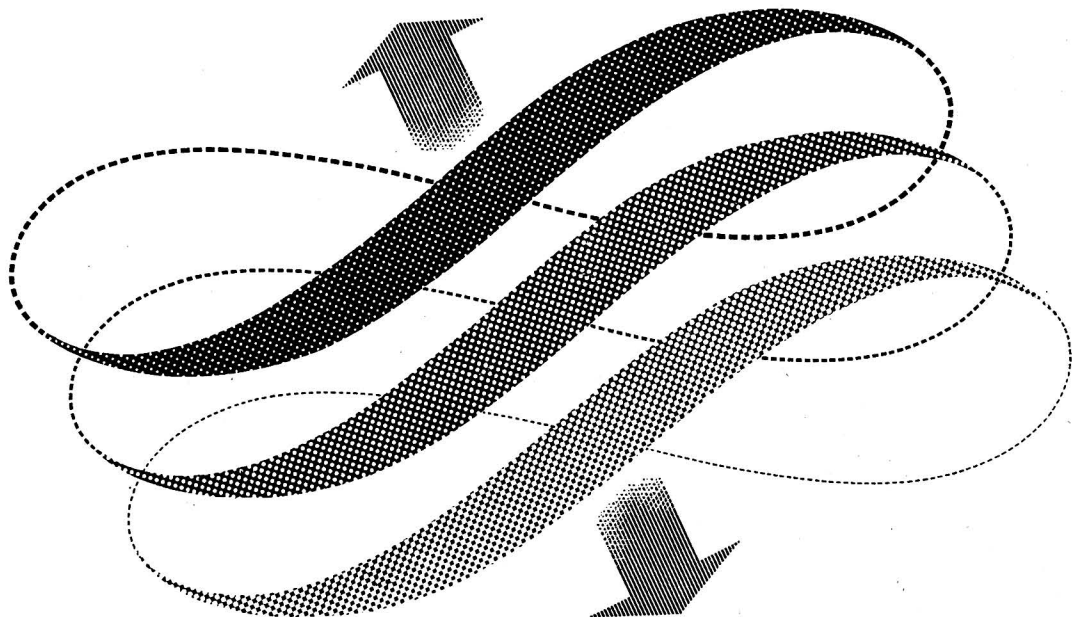
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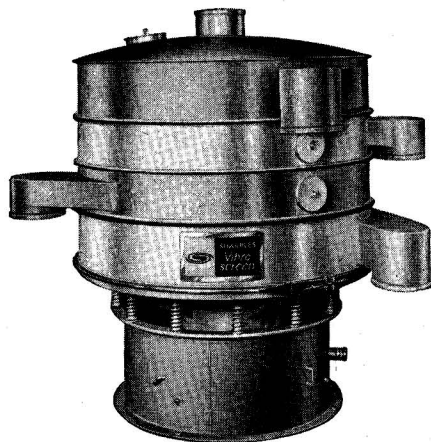
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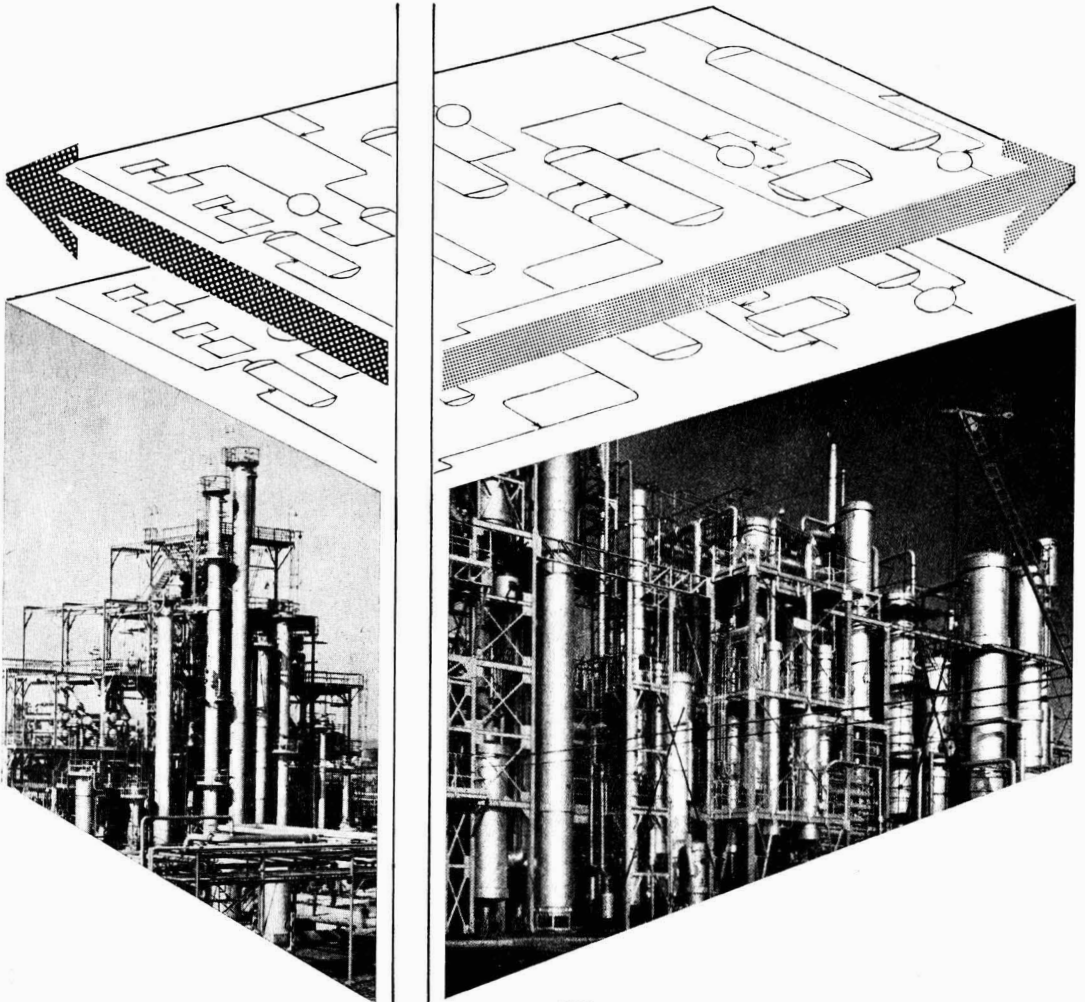
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VOL. 87

No. 2220

JANUARY 27 1962Telephone: **FL**Eet Street 3212 (26 lines)Telegrams: **Benformula** - London E.C.4

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[Central 3954-5]**IN THIS ISSUE**

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**BOUVERIE HOUSE • 154 FLEET STREET • LONDON • EC4****MERGER BATTLE**

IT will be some weeks before the result of I.C.I.'s bid for Courtaulds is known, but at the time of writing the former seem to be in the stronger position. I.C.I.'s case for a complete integration of U.K. fibre interests appears logical and conclusive. Were it not for the entirely different philosophies of the two companies on commercial and industrial problems, a joint operation would have been feasible and would have avoided the prospect of a distasteful take-over battle.

Courtaulds maintain that it is essential that the producer of synthetic fibres should be free to buy his polymer in the open market. More firmly rooted in chemicals, I.C.I. maintain that production of both polymer and fibre is all part of the same highly complex and scientific operation of manufacture. They have a strong point. Production of polyester fibre at Wilton involves large-scale chemical production as well as installations for spinning. The same will be true of polypropylene fibre when the Ulstron plant is on stream; already the complementary polypropylene resin plant is in production and a second unit is under construction.

In the case of I.C.I., most of their polymer plants are integrated right back to the basic raw material—olefins. Soon they will go even further back into the cracking of oil to produce the naphtha required for their olefin operations. Polymer plants are used to produce material not only for fibres, but also for the production of plastics materials, another point in favour of integration. I.C.I.'s chairman, Mr. S. P. Chambers, had a valid point, too, when last week he referred to the close inter-relation of polymer and fibre production when dealing with problems of research and technical service.

The modern chemical industry throughout the world has progressed far along the road to complete integration, a trend that is accelerating today. In the U.S. and on the Continent, there are examples of oil companies moving into chemicals and plastics and of chemicals producers moving further back into their basic materials. The aim in all cases is the same—optimum economics. The bigger a plant has to be to reach its optimum size, and this is growing larger each year, the more pressing is the need for integration.

There are many examples of this trend in Europe. The best in the U.K. is the recent acquisition by Distillers of the British Xylonite Group. Through their link with British Petroleum, D.C.L. have assured their source of basic material—oil. With the same link, they produce the petrochemicals vital for their chemical and plastics interests. Now they have completed the picture, right through to the field of fabrication.

To purchase raw materials for fibres and plastics in overseas markets and not from polymer plants built at great cost in this country would be ruinous to Britain's chemical economy and certainly harmful to the nation's interests. Of course, there are occasions—and always will be—when there would be some price advantage in buying elsewhere.

Recently, this has been true of acrylonitrile, raw material for Courtaulds' acrylic fibre. I.C.I.'s conventional-route plant was shut down last year because it was out-priced by imports from the U.S. based on the more

(Continued on page 164)

COURTAULDS FORECAST BIG INCREASES IN GROUP PROFITS

SUBSTANTIAL increases in group profits are forecast by Courtaulds Ltd. in the statement they issued on Wednesday this week in support of their rejection of I.C.I.'s take-over bid. It is stated that the directors' advice to reject the I.C.I. terms was based on information regarding past and future earnings of I.C.I. disclosed to them in confidence and which has yet to be published.

Group profits are estimated as follows:

	£ million
1960-61 (actual)	18.7
1961-62 (final three months estimated)	17.5
1962-63 (estimated)	23.0
1964-65 (estimated)	28.5

This big rise in Courtaulds profits is expected from "vigorous and effective action" taken to reverse the decline in profits from viscose yarns and fibres; continued expansion in profits from British Celanese and Courtelles; recovery, already apparent, from market recession in the first part of 1961.

Pre-tax profits from fibre and associated interests in 1962-63 are expected to be some 40-50% up on the £9.7 million earned in 1960-61.

The pre-tax profit forecast of £23 million for 1962-63 compares with an earlier "routine forecast" of £18.5 million that was disclosed to I.C.I. directors on 12 December. The higher forecast is attributed to the take-over of British Enka last November and arrangements to take over Lustrail viscose yarn production, which make it possible to speed reorganisation of the U.K. viscose industry.

Fibres, etc. interests. Courtaulds' interest in net assets is valued at £122 million. Profits from viscose and related activities in the year to 31 March 1962 are estimated at £5.1 million (£12 million in 1955-56). Radical reorganisation of the industry has eliminated idle capacity and duplication of overheads; products have been improved and lower raw material prices established. Pulp activities have been very successful. Profits from viscose, etc., should exceed £8 million in 1962-63.

British Celanese (acetate yarns and fibres, related chemicals, etc.). Profits reached their low point of £680,000 in 1957-58, the year of acquisition. British Celanese acquired the Acetate Division of Courtaulds at the end of that year and in the year to 31 March last, profits totalled £3,788,000; they should total £4.5 million this year rising substantially in succeeding years.

Courtelle (and other synthetic fibres). Courtelle had had a remarkable success since commercial production started in 1959. Courtaulds believe their unique process to be the lowest-cost process in the world both for capital and running costs. Profits for the years to 31 March 1961 and 1962 have been at the rate of about £700,000/year. It is said to be un-

precedented that a new fibre should make profits at such an early stage. Promotion and development expenses will continue to limit the rise in profits in the year to 31 March 1963, but with expanding production at home and overseas, the rise in profits should be rapid thereafter.

Other investments. Group profits from fibres and investments other than viscose totalled £5.3 million in 1955-56, rising to an estimated £12.4 million this year, £14.5 million in 1962-63 and £19.4 million for the year 1964-65. Of the 1960-61 total group profit (before tax and preference dividends) of £18.7 million, £5.6 million came from viscose activities, £3.8 million from British Celanese, £700,000 from Courtelle and £8.9 million from other investments.

Courtaulds comment on future prospects of principal investments as follows:

British Cellophane. Profits rose from £2.42 million in 1955 to a record £3.53 million in the year to 31 March last. Estimate for the current year is £2.9 million, rising to over £3 million in 1962-63. Further expansion of sales and profits are forecast for future years.

Pinchin Johnson and Cellon. Major reorganisation of paint interests is well advanced. Profits in 1961-62 have been running at £1 million the level of the previous year and should rise to £1.5 million for 1962-63.

Gossard. Profits in the year of acquisition (1959) were £181,000, rising to £245,000 in 1960 and to just over £400,000 in 1961.

Engineering contracts. Contracts for

complete factories are worth £23 million; further contracts are being negotiated. Profits from this source in 1960-61 totalled £1.85 million. An average profit of at least £1 million/year is forecast.

British Nylon Spinners. Dividends received rose from £12 million five years ago to £2.4 million last year. Some decline in profits in coming years is expected because of lower selling margins.

Snia Viscosa. This company has a history of continuous expansion and further major growth is planned.

Reply of I.C.I.'s chairman to this statement is given on p. 165. A report of earlier statements appears on p. 167.

Merger battle

(Continued from page 163)

economic acreolein process. That these imports could undercut the U.K. material, despite a 33½% tariff, was due mainly to vast U.S. overcapacity.

In the long run the interests of lower prices will best be served through an integrated operation. Monopoly aspects will be taken care of by Britain's entry into the Common Market, for duty-free competition with Europe's major fibre producers would ensure that no British company, no matter how large, would be able to get away with artificially inflated prices.

There are good grounds for accepting I.C.I.'s plea that a merger would bring economies in research, production and marketing costs. An integrated British fibre industry would certainly be a force to be reckoned with in world markets.

Fisons' export trade increases by 40%

AN increase of 40% in the last six months compared with the same time of the previous year has been announced by Fisons Overseas Ltd. Actual figures are not given. The success of the new export drive follows a major reorganisation of Fisons overseas activities in April of last year (CHEMICAL AGE, 22 April 1961). At that time Fisons Overseas Ltd. was formed out of Fisons Chemicals (Exports) Ltd. to control all overseas activities of Chemical Division companies.

In his annual report for the year ended 30 June 1961, the chairman, Sir Clavering Fison, said that it is the company's intention to increase export sales wherever possible and to seek investment opportunities for either chemicals or fertilisers throughout the world. To this end a new fertiliser manufacturing company was formed in April, 1961 (see CHEMICAL AGE, 8 April, p. 576) in association with Union Chimique Belge to produce high analysis agricultural compound fertilisers for the Belgian domestic

market and for neighbouring Common Market countries.

In order to achieve the mounting volume of orders (they increased from 5,000 to 8,000), there has been a 60% increase in staff, mainly in direct overseas sales representation and technical advisory work.

The product percentage increase in sales over the corresponding period of 1960 is as follows: pharmaceuticals 39%, agricultural and veterinary chemicals 33%, and industrial chemicals 40%. The biggest pharmaceutical seller is Inferon and the leading agricultural chemicals have been Rogor and Imposil. Industrial chemicals for the plastics, rubber and pharmaceutical industries have their biggest markets in Europe and North America.

Fisons Overseas envisage a very substantial growth in exports during 1962. This view is supported by the fact that orders outstanding in January are 65% up on the same time last year.

Project News

BLAW KNOX TO BUILD HOWARDS' SOLID PLASTICISER PLANT

A MAJOR contract for the supply of a complete plant to produce the solid plasticiser dicyclohexylphthalate has been awarded to **Blaw Knox Chemical Engineering Co. Ltd.**, 20 Eastbourne Terrace, London W.2, by **Howards of Ilford Ltd.**, one of the Laporte Industries Group.

Work has started on the project, which is scheduled for completion before the end of this year.

Main use of dicyclohexylphthalate, marketed under the trade name Howflex CP, is in transparent wrapping film of regenerated cellulose. The plasticiser is added at the stage when the film is coated on each side by nitrocellulose lacquer and imparts good heat sealing properties.

Howards have been making dicyclohexylphthalate for many years and selling it in many of the world's markets. The new plant is designed partly to increase production and partly to relieve the old plant, which will be used for the manufacture of other Howards' plasticisers. Howflex CP is the only solid plasticiser produced by the company.

Howards are due in production early this year with a 1,000 tons a year plant to raise capacity for cyclohexanol and methylcyclohexanol phthalate ester plasticisers; they recently came on stream with their second phthalic anhydride plant to produce 3,000 tons/year.

I.C.I. Billingham close coke-making units

● COKE-MAKING plant of **I.C.I.'s Billingham Division** at Billingham-on-Tees which was opened 33 years ago has been closed. The division will use coke from the nearby N.C.B. until its new hydrogen-synthesis process based on oil is completed towards the end of this year.

Venesta start new expanded polystyrene unit

● THE **Venesta Group** have started up, on schedule, their expanded polystyrene factory at Erith, Kent, one of the largest and most modern in Europe. The main production line is a quarter of a mile long.

Venesta's decision to enter this field was revealed last year when it was said then that the initial operation would absorb about £350,000 for machinery and working capital, and that a more substantial investment would probably be required as the market in the U.K. was developed.

Initially the factory will concentrate on the production of high grade expanded polystyrene, U.K. consumption of which is around 2,000 tons/year, as compared with 20,000 tons in Western

Germany. Venesta's initial aim is to produce about 1,000 tons/year.

To help boost U.K. consumption, Mr. Peter Clark, who headed the Commercial Plastics' team that made Fablon a household word, has been appointed marketing manager. A strong sales team includes Mr. Andrew Long, experienced in expanded plastics with Shell Chemical and Resil Processes; with technical experts Mr. Alan Plant (English Electric), Mr. David Hansford (Thermoplastics Ltd.) and Mr. K. McSweeney (Expanded Plastics Ltd.).

Rumanian zinc lead smelter contract for U.K.

● CONTRACT for a zinc lead smelting plant incorporating the Imperial Smelting process complete with sinter plant has been awarded to the **Power-Gas Corporation Ltd.** (of the Davy-Ashmore Group) and **Huntington Heberlein and Co. Ltd.** (of the Simon Engineering Group) by Masinimport, Rumania. The contract covers the supply of essential process machinery and equipment to a value approaching £2 million, but the total cost of the installation, all of which is to be designed and engineered by the British contractors, including the large proportion to be manufactured in Rumania, will be of the order of £5 million.

Following their work on the first full scale unit at Swansea, this is the fifth Imperial Smelting furnace project with which Power-Gas have been associated.

U.K. phosphoric acid plants have capacity of 15,000 tons

● IN the 16 December issue of **CHEMICAL AGE**, it was stated (page 959) that the capacity of each of the two phosphoric acid plants under construction by **W. J. Fraser and Co. Ltd.** was 1,500 tons of P₂O₅ in the form of 30% phosphoric acid. The capacities are in fact both 15,000 tons. The plants are being built for Richardsons Fertilisers Ltd. (not Richardsons Chemical Manure Co. Ltd.) and Scottish Agricultural Industries Ltd.

I.C.I. stake in £10m. S. African munitions contract

● THREE ammunition plants, valued at some £10 million, are to be built in the Republic of South Africa by African Explosives and Chemical Industries, following agreement with the Government. A.E.C.I. are owned jointly by I.C.I. (S.A.), South African subsidiary of Imperial Chemical Industries Ltd., and De Beers Industrial Corporation, a branch of the Anglo-American Corporation.

Two of the new plants will be in the

Transvaal—at Somerset West, Cape Province, where A.E.C.I. produce paint, plastics and explosives, and at Modderfontein, site of their large commercial explosives and plastics works.

A third works near Johannesburg will be operating shortly. The agreement covers arms and ammunitions.

New interest in Eskdale potash deposits

● NEW interest in the possible development of the vast deposits of potash in Eskdale, near Whitby, Yorks, is being shown by a subsidiary company of **Armour and Co.** The field was originally investigated by both I.C.I. and Fisons between 1950 and 1955, but the project was abandoned. An application to the North Riding No. 6 area Planning Committee for the sinking of an exploratory bore hole was approved.

New site for Australian TiO₂ project

● A NEW site has now been chosen for the **Laporte Industries Ltd.** titanium factory which is to be built at Bunbury, Western Australia. Originally to be erected on the eastern slope of the Collie River, the plant will now be located on the northern boundary of property about a quarter of a mile from Australind Road, Bunbury.

First details of the project were given in C.A., 17 December 1960.

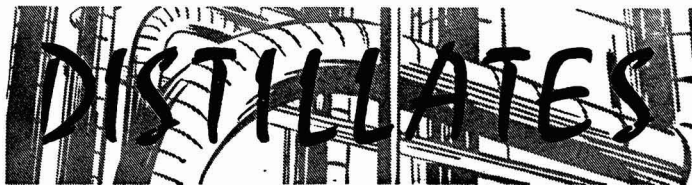
COMMENTING on the statement made by Courtaulds on Wednesday (see p. 164), Mr. S. P. Chambers declared that it was much better to compare what was now said with what was said by the chairman of Courtaulds in July 1961 and in November 1961 when, apart from gloomy prognostications that led to the reduced dividend, the impossibility of making reliable forecasts was stressed.

Mr. Chambers added that the revelation that information regarding past and future earnings was exchanged in confidence with I.C.I. was an indication of the advanced stage reached in the negotiations for a full merger. The figures given by Courtaulds last month bore no relation either to the nature of the statement made the previous month when the dividend was cut or to the "estimates" now given.

Lightnin Mixers complete factory extensions

Extensions at the Poynton, Cheshire, factory of **Lightnin Mixers Ltd.**, providing additional floor space of nearly 9,000 sq. ft., have now been completed. The area includes an extension to the existing assembly shop, storage space and an addition to the drawing offices on the first floor.

The company, founded only in the autumn of 1960, reports that orders for its fluid mixers are still coming in at a record level.



★ THE battle is on. Already Mr. S. P. Chambers has taunted Courtaulds with his references to I.C.I.'s more profitable earnings from fibres, with there being room for improvement at the top, and with the claim that I.C.I. are better equipped than Courtaulds to discover and develop newer synthetic fibres.

This last point has riled 35 senior members of Courtaulds' research staff at Coventry who would like to know when this situation arose. They state that since the war I.C.I. have discovered and developed one new fibre, Ardil—"a costly and spectacular failure. They could have made Orlon, Du Pont's acrylic fibre, but turned it down". Courtaulds' researchers say that their only fibre in commercial production, Terylene, accounts for a mere 7½% of the man-made fibres total. It was an invention of Calico Printers and its equivalent, Dacron, was developed much more rapidly in the U.S. than by I.C.I. in the U.K., despite I.C.I.'s foreknowledge of the fibre potentialities.

In the same period Courtaulds have discovered and developed Tricel, Courlette, Fibrolane and Courlene and have developed rayon tyre cords and staple to such a degree that improved products can be regarded as new fibres.

Clearly before the battle is won or lost much more will have been said to embitter feelings. Win, lose or draw, Mr. Chambers' public relations team will have a big job on its hands. It is as well that it has earned the reputation of being the finest in British industry.

★ ONE of the by-products that I expect from this era of profitless prosperity is a big increase in patent suits. With a squeeze on profits and tougher competition, chemical producers will look to all ways of tightening their economies. Since research and development are such costly charges, I do not expect companies to continue turning the blind eye to patent piracy.

Of course it is often difficult, sometimes almost impossible to nail the deliberate pirate. Many of the chemical industry's big developments have been worked up simultaneously by two separate companies working quite independently of one another. The reactive dyestuffs of I.C.I. and CIBA are good examples of two research teams reaching the same goal simultaneously. But it is galling for a company that has spent vast sums on development to see a competitor without comparable overheads come and skim the cream off the market.

This explains the current rash of law suits. Du Pont having secured a generous out of court settlement with Phillips over polyolefins have now brought charges

against Von Kohorn. In the latter case, charges are based on alleged enticement of staff, who are stated to have given away Du Pont know-how to their new employers. Du Pont, who have ploughed many millions of dollars into the development of acetal resin, are expected to file charges for alleged patent infringement in the U.S. In the synthetic fibre field, I.C.I. have suffered from enticement of highly skilled staff, but have never taken the matter to court.

★ DRUGS, like polymers, are another chemical industry field in which research and development are costly items. As with polymers there have been a number of recent court cases; this rush to litigation will, I predict, increase during the year.

Dr. Robert S. Aries who as reported recently in this journal, has been sued by a number of companies, notably Merck and Hoffmann-La Roche, is not alone in his troubles. Dr. Aries has been charged both with alleged patent violation and with the purchase of company secrets. In Canada, Mr. J. Gilbert of the Gilbert Surgical Supply Co. Ltd., Toronto, faces nine charges of alleged patent infringement by U.S. pharmaceutical companies.

Like Aries, Gilbert is fighting back and is suing the Canadian Pharmaceutical Manufacturers' Association and its general manager for libel. Gilbert's business has been built up on the sale of low-priced pharmaceuticals in Canada. He claims that the valid drug patent has yet to be written; he imports nearly all his raw materials at low prices from Italy and Denmark.

In 1957 Pfizer withdrew claims on tetracycline and Gilbert ceased to make oxytetracycline. Among cases to be heard are those brought by Poulenc Ltd. (chlorpromazine); Schering Corporation (chlortripolon); F. W. Horner Ltd. (tolbutamide); S. G. D. Searle (propantheline bromide); CIBA (tripelennamine); Hoechst and Upjohn (tolbutamide); American Cyanamid (tetracycline and acetazolamide); Hoffmann-La Roche (sulphisoxazole). It will be interesting to see what view the courts take of Gilbert's belief that drug patents are far too broad to be valid.

★ LAST week I referred to Sir Isaac Newton and the famous apple; if Newton had been a modern Russian, the Law of Gravity might never have been discovered. For Soviet chemists are reported to have developed a method of preventing ripe fruit dropping off the tree and rotting on the ground.

Apparently a special solution is sprinkled on the trees to produce a certain effect on growth so that apples, pears and other fruit stay put on the branches. According to a bulletin from UNESCO, the solution is being used in orchards in many fruit-growing areas of the U.S.S.R.

Another 'fruitful' discovery, in Australia, has given insecticide chemists a new lead in their fight against the fruit fly. Industrial chemist A. Willison accidentally spilt some solution on his shoes and observed, later at home, that fruit flies swarmed into the house to settle on his feet. He tested over 30 chemicals to discover which had proved so attractive to the flies, then took his discovery to the New South Wales Department of Agriculture. The chemical, with insecticide added, is being tested in various fruit-growing areas of N.S.W.

★ ONE of the important steps to be taken by the Common Cold Research Unit at Salisbury during the coming year will be to try the effect of Interferon on colds in human beings. Interferon was developed at the National Institute for Medical research and close co-operation is being maintained between the Institute and Burroughs Wellcome and Glaxo Laboratories who are working on the production of Interferon.

It is not yet possible to say whether a compound vaccine could be made or whether it would be completely uneconomical. It is possible that Interferon administered at the onset of a cold would have the required effect.

In any event it seems that the common cold will continue to inflict thousands of my readers during 1962.

★ THOSE breast-pocket radio receivers used so much in hospitals to keep in constant contact with doctors are now finding a use in the chemical industry. Key personnel at the Newport works of Monsanto Chemicals are now keeping in touch by means of this neat radio calling device, normally carried in the breast pocket.

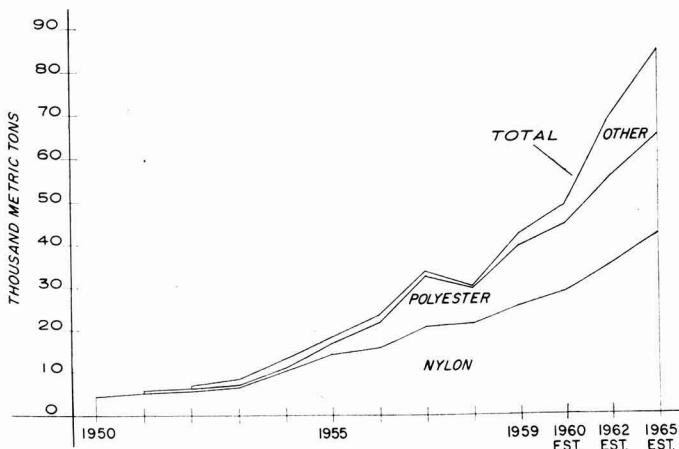
A 'bleep-bleep' sound warns the carrier to telephone the watchmen who then pass on the message. Monsanto introduced the system to overcome the problem of getting hold of key personnel quickly when their whereabouts may be uncertain or when they are some distance from the nearest phone.

Each set has a number and when that number is selected on a central keyboard the signal sounds from that set. Monsanto look to a considerable saving in working time, particularly where downtime is concerned in the case of plant breakdowns.

Alembic

I.C.I. BID FOR COURTAULDS

Vertical integration is key to failure of merger discussions



Aim of I.C.I.'s bid is the U.K. man-made fibre industry. Shown above is British production in non-cellulosic man-made fibres

BASIC differences in their views on man-made fibres production led to the break-down of discussions between I.C.I. and Courtaulds and prompted I.C.I. to renew their bid to gain complete control both of Courtaulds and the British man-made fibres industry.

Vertical integration is the key to the break-down of the talks. I.C.I. believe that a competitive man-made fibres industry is only possible through both vertical and horizontal integration; Courtaulds say that the producer should be free to buy his raw materials on the world market at the cheapest possible prices, but agree on the need for a stronger industry.

Courtaulds are convinced that the industry, however organised, can only be competitive if fibre producers are free to buy materials in the best market and the textile industry is not limited in its choice of fibres. Their experience has shown that this policy is "both sound from the producers' point of view, and consistent (through suitable contractual arrangements) with the interests of efficient raw material suppliers, even when they have to make large capital investments."

I.C.I.'s approach is entirely different. In addition to the advantages of horizontal integration, which would see research work on one fibre benefit other fibres, they feel strongly that there should also be vertical integration between production of the polymer and spinning of the fibre "because technical problems flow from one to the other."

I.C.I. believe that the Courtaulds view that the fibre producer should avoid manufacture of the polymer, may be valid in the case of the older cellulose substances such as rayon, but that it is wholly unrealistic in relation to the new fibres which are spun from complex chemical substances. In I.C.I.'s experience, the most efficient form of organisation for synthetic fibres and the one which produces the cheapest chemical materials and ultimately the cheapest fibre is "one in which chemical production and spinning operations are in one ownership." The company quotes practice in the U.S. and on the Continent, which is generally in line with this view.

These conflicting philosophies would lead to an inherent difficulty in operating a joint company, whatever the relative shareholding might be. I.C.I. also believe that with the utmost goodwill on both sides, the results of a joint operation

would compare unfavourably with complete integration both from stockholders' point of view and that of the national interest.

At his Press conference on 18 January, Mr. S. P. Chambers, chairman of I.C.I., took Courtaulds to task "with some diffidence" over the statement made by that company to the effect that I.C.I. wanted a tied market. His representatives in their discussions had at no time said that they wanted that, "although it is fair to say that the Courtaulds representatives were trying to get them to say that".

I.C.I. frequently adopted the policy of buying from outside sources and Mr. Chambers quoted as examples crude oil, naphtha and the ethylene which Esso will supply to the new Severnside ethylene oxide plant.

Earlier at the conference, Mr. Chambers had spoken of the paramount importance of vertical integration in fibres, the production of which was highly scientific and a very different matter from buying wood pulp. I.C.I. regarded the production of polymer and spinning as all being part of the same highly technical process, each having a bearing on the other. He instanced problems that might arise at the dyeing stage and said it might be necessary to go right back to the polymer or the dye-stuff to make alterations.

Integration vital

In addition to such problems of technical service, the properties of the polymer had to be varied to suit differing ultimate uses. It was therefore essential that the research department should have all the relevant market information. Integration was vital if Britain was to have a sound scientifically-based fibre industry and a sound textile industry.

Courtaulds directors had said they wanted to buy polymer in bulk in the cheapest market. To make polymer could well mean an investment of up to £45 million. It was, however, impossible to go out and buy 20,000 tons of nylon polymer. It could be done sometimes and I.C.I. had in fact done it on occasions when their plants had run short of capacity, when polymer was bought in the U.S. But the prices compared with the cost of producing at I.C.I. plants had been astronomical.

Occasionally it was possible to get some dumped material. But it was more likely that when the material was most needed, demand would be high and nine times out of 10 very high prices would have to be paid. In such an important industry the U.K. could not be left in the position of having to rely on overseas sources.

Mr. Chambers instanced acrylonitrile, which until the I.C.I. plant shut down last year, was being made by the uneconomic hydrogen cyanide route. In the meantime, I.C.I. have gained temporary exemption from import duty and are buying U.S. material to supply Courtaulds and other customers until a more modern plant utilising a more economic route is built. The actual pro-

cess is now under discussion in the U.S. Cost of the plant itself would only amount to between £2 million and £3 million.

To be able to shut down a plant and buy elsewhere was, declared Mr. Chambers, all part of I.C.I.'s flexible approach. That they could do that was due to the size of the company. I.C.I. would not build a new acrylonitrile unit until it could be shown that it would produce the product at a cheaper price than it could be bought. I.C.I.'s aim was to get the best process and the cheapest

Courtaulds proposals for joint ownership of fibre production

THE first set of proposals made by Courtaulds for strengthening the British man-made fibres industry had been rejected by I.C.I. because they entailed the setting up of a joint study group that would report to the two boards by the end of June 1962. This it was felt would be too much of a time-lag. This group it was proposed would report on five possible lines of action including a complete merger of both companies. It was also proposed that a similar group would report on the patent interests of the two companies.

One of the reasons for I.C.I.'s rejection was that these suggestions had already been investigated and considered by the two companies over a number of years without any progress having been made. Also in the course of discussions during the autumn of 1961, I.C.I. directors had been led to believe that the Courtaulds board was seeking a solution of the problems by a complete merger.

Following the rejection of these proposals and while I.C.I. directors were meeting on 8 January, Courtaulds made two further specific proposals which it was felt might provide a solution within a week or 10 days, although the actual financial details would take longer to work out. I.C.I. agreed to meet Courtaulds again to see if these proposals were feasible. The two proposals were:

1. Formation of a joint company to deal with all melt-spun fibres. I.C.I. having the majority interest and taking over Courtaulds' share in British Nylon Spinners Ltd.
2. Formation of a joint company to deal with all fibres, Courtaulds having the majority interest.

Main reason for the rejection by I.C.I. of these proposals was the difference in basic approach to the industrial and commercial problems of the man-made fibre industry. The I.C.I. statement, issued late on 17 January, long after CHEMICAL AGE normally goes to Press and referred to briefly in our issue last week, also detailed other factors, including investments in and profits from fibres on the part of the two companies, their joint ownership of British Nylon Spinners Ltd., etc.

I.C.I.'s investments in man-made fibres, including both polymer produc-

products. Du Pont had shown, and I.C.I. had shown that in nylon, the cheapest product was easily nylon 66—the product made by I.C.I.

Mr. Chambers added that the demand that there must be competitive supplies of raw material for spinning purposes was a new argument that Courtaulds had thought up in the previous few days and one that was not mentioned in negotiations. In any event it did not agree with Courtaulds' own policy of having large overseas wood pulp facilities for the production of rayon.

tion and spinning totals about £100 million and already approaches the total Courtaulds investments in fibres, including the old-established and less rapidly growing viscose acetate and rayon. It is much in excess of Courtaulds investment in the new and faster growing synthetic fibres. I.C.I.'s total profits both from polymers and fibres are, believe the company, already greater than Courtaulds' profits from all fibre sources at home and overseas, including rayon.

With their nylon polymer production, their half share of B.N.S. and their basic polymer production, plus Terylene spinning, as well as polypropylene fibre, I.C.I.'s interests in the newer fibres, already far outweigh those of Courtaulds. In addition, I.C.I. state they are better equipped than Courtaulds to discover and develop newer fibres by virtue of the scale of their research and development effort and basic chemical knowledge of polymers used for plastics as well as fibres.

In this respect, Courtaulds' research workers at Coventry have issued a statement that is highly critical of I.C.I.'s development of fibres (see 'Distillates').

Courtaulds claim that on a volume basis they produced 420 million lb., or nearly 75% of the 570 million lb. of man-made fibres produced in the U.K. in 1961. Of the remaining 25%, at least half is said to be nylon, in which Courtaulds have an equal interest with I.C.I. The nylon interest of Courtaulds is confined to spinning, polymer production is 100% owned by I.C.I.

I.C.I. reject Courtaulds' distinction between melt-spun and other fibres. It cannot, they say, provide a technically sound dividing line for the purpose of setting up a joint company, since the objective—largely dependent for its success on chemical research—is to produce new and better fibres independently of whether they are wet-spun, solution-spun or melt-spun.

Thus, having regard to the company's superior profit position in fibres and its prospects in future development and expansion, I.C.I. say they could not agree to the pooling of all their fibre interests in a company in which Courtaulds had a major holding. Nor could they agree to the setting up of a joint

company limited to melt-spun fibres.

I.C.I. then reiterated the views they gave on 18 December that the prime objective of the bid is integration of the U.K. man-made fibres industry on a basis comparable to that in the U.S. and the Continent. As a consequence, duplication of effort would be avoided and savings effected in current operations, both manufacturing and marketing. There would also be better utilisation of available research and development facilities and of capital resources. In addition there would be economies and improved efficiencies in other fields of common interest, such as packaging film, paints and chemicals.

I.C.I. profits show upward trend, says chairman

CCOURTAULDS' rejection of I.C.I.'s improved terms was announced just before the start of the Press conference at Imperial Chemical House, on the grounds that it would seriously undervalue the earning capacity of Courtaulds relative to that of I.C.I. (For Courtaulds latest statement see p. 164; the I.C.I. reply is on p. 165.)

When they rejected the original bid, Courtaulds then stated that prospects had greatly improved. It was those improved prospects that led I.C.I. to raise their bid, despite earlier statements that the initial offer was "final".

The new offer, which will be made in about three weeks direct to Courtaulds' shareholders, will give acceptors four I.C.I. £1 ordinary for every five Courtaulds £1 ordinary shares, compared with the three-for-four basis originally proposed. Courtaulds preference shareholders are also offered more. The offer will be conditional upon 90% acceptance, "or such lower figure as might be thought acceptable at the time."

The new offer is worth another £12 million, raising the value of the bid to £192 million. When I.C.I. made their original offer, the value of Courtaulds' shares was £120 million. Mr. Chambers declared last week that that represented a substantial gain to Courtaulds' stockholders; on capital gains the increase was put at 50% and on income, at one-tenth.

When the I.C.I. offer is posted it will be accompanied by an up-to-date estimate of profits for 1961. Present information is that "the turn of I.C.I.'s profits is now upwards." It was quite clear that the narrowing of margins of profit had reached a point where they were beginning to see a little more daylight and Mr. Chambers thought that the final figures would prove to be "very heartening". People would not be disappointed when they saw the full results.

Actual sales volume in 1961 was at a record level, but by value was running

(Continued on next page)

Pace quickens in Britain's biggest take-over battle

September, 1961

I.C.I. open merger discussions with Courtaulds

15 December

Terms of I.C.I.'s three-for-four offer passed to Courtaulds

17 December

Hoaxer 'phones newspapers calling Press conference at Mr. S. P. Chambers' Finchley home

18 December

'Daily Mail' publishes Mr. Chambers' denial of I.C.I. bid
I.C.I. issue statement on 'leak' and call Press conference, where full details are released

Courtaulds say statement is "premature", call in financial advisers

22 December

Sir John Hanbury Williams, Courtaulds chairman, returns to U.K. from South Africa

28 December

Joint probe of original 'leak', enquiries to be headed by Burt, formerly of M.I.5.

3 January, 1962

Courtaulds propose joint study group to probe five proposals to strengthen man-made fibres, including full merger; group to report by end-June. Proposals unacceptable

5 January

Courtaulds say they cannot recommend acceptance of I.C.I.'s terms; statement refers to proposal made on 3 January
I.C.I. raise terms of offer

8 January

More proposals from Courtaulds; suggest joint melt-spun fibre venture with I.C.I. as major holders, or joint company to deal with all fibres, Courtaulds to have majority interest.

I.C.I. call off Press conference in view of new proposals

17 January

Courtaulds reveal that proposals proved unacceptable to both companies. Longer I.C.I. statement gives details of proposals and reasons for rejection by I.C.I.

I.C.I. disclose terms of improved bid (four-for-five)

18 January

S. P. Chambers presides at I.C.I. Press conference
Board of Trade President asks to see both chairmen

23 January

Questions in Parliament—B.o.T. President promises early statement

24 January

Courtaulds issue 12-page statement, hold Press conference

at about the same level as in 1960 due to lower prices.

Some price cuts had been forced on I.C.I. by competition, but other prices had been purposely cut to the bone as part of company policy in readiness for Britain's possible Common Market entry. Some export prices were hardening and exports were running at a very high level. The prospects for 1962 were better than for 1961 and clearly there would be an improvement.

New plants under construction in 1961 represented a total investment of £80 million. They would be coming into production in the future and bringing in more profits. This represented an extra incentive to Courtaulds' stockbrokers.

Mr. Chambers calculated that if two people had each invested £1,000, one in I.C.I. and one in Courtaulds at a time when I.C.I. shares were first on sale (1 January, 1927, when the I.C.I. share was valued at 21s 6d and Courtaulds at 96s 3d), the I.C.I. investor would now be five times better off from the capitalisation point of view and 3½ times from the income point of view.

Referring to speculation as to why the Press conference called for 8 January had been cancelled on the same day, Mr. Chambers declared that this was not due to any change of course on the part of the board. Courtaulds had submitted new proposals for discussion and I.C.I. had simply shown the courtesy of acceding to the request for time to talk them over.

"The I.C.I. board have been 100% in favour of this proposal, wholeheartedly in favour of it and at all times quite unanimous," he added.

Answering questions, Mr. Chambers said he had known for some two weeks that the new terms would not be acceptable to Courtaulds' board. He added: "There is no question whatever that there can be any further negotiations on price. There is no question in any circumstances of I.C.I. making any alteration in the bid and no question of I.C.I. withdrawing from the matter."

He did not know if Courtaulds opposed the principle of a take-over bid or the terms offered, or both. He said he clearly could not say now what the fate of the Courtaulds' board would be if the bid succeeded.

Questioned as to the efficiency of Courtaulds, Mr. Chambers said there were many things in the company that were very efficient, but if it joined I.C.I. things could be much more efficient. He had no idea how efficient or inefficient detailed management was within Courtaulds, but he would think they were very efficient. On matters of policy, he thought there was room for improvement.

Mr. Chambers said he was not worried about monopoly implications—a view that was shared by Sir Alan Wilson, Courtaulds' chairman-elect, in a TV interview last week. Mr. Chambers said that I.C.I. proposed to make a British business more efficient and more profitable. It would therefore extend employment and make the group more competitive in the U.S. and on the Continent. On that he was prepared to face any politician in any

party. He said that no pressure had been brought to bear on him about the advisability of continuing with the merger plans.

Mr. Chambers would not reply to a questioner who thought that Courtaulds had made a mistake in announcing a lower interim dividend at a time when merger discussions were in progress. Nor would he be drawn when asked what

I.C.I. would do if Courtaulds took action to make their shares more valuable than the bid.

There was no question of I.C.I.'s bid being made in an attempt to thwart E.I. du Pont de Nemours of the U.S.

If the bid goes through, I.C.I. will carry on with their plans to raise capital in Switzerland in respect of their overseas activities.

B.o.T. President expected to announce political action

AS CHEMICAL AGE went to Press it seemed that some kind of Government action was likely over I.C.I.'s bid for Courtaulds Ltd. Mr. F. J. Erroll, President, Board of Trade, said in the House of Commons on Tuesday that he would make a statement either on Thursday this week or as soon as possible next week. Our Parliamentary correspondent does not think that this means a public enquiry or reference of the bid to the Monopolies Commission. It is felt, however, that an all-party fact-finding committee might be set up.

Last week, both Mr. S. P. Chambers, I.C.I. chairman, and Sir John Hanbury Williams, Courtaulds' chairman, called on Mr. F. J. Erroll, President, Board of Trade, at Mr. Erroll's request. Following these talks a Board of Trade spokesman stated that there was no question of the B.o.T. intervening in I.C.I.'s bid for Courtaulds. An earlier statement had said that the visits were to apprise Mr. Erroll of the facts.

Mr. Erroll, asked by Mr. Douglas Jay to set up a public enquiry, said the question was too complex to make a statement at once. Sir Cyril Osborne, referring to acrylonitrile, said that Courtaulds could now buy this at 50% below the price charged by I.C.I. He wanted Mr. Erroll to look at the bid from this angle, since control of raw material was an important factor in export prices.

Mr. Erroll would not be drawn when Mr. Hugh Gaitskell (Leader of the Opposition) asked if the coming statement implied a change of heart on the part of the Government which had previously rejected a public enquiry.

Mr. Jay was repeating a plea that he made in the House of Commons after the proposed merger had been made public (CHEMICAL AGE, 30 December, p. 1021). On that occasion, Mr. Erroll rejected the plea for a public enquiry and stated that he had no authority to refer the proposals to the Monopolies Commission.

Opposition to the take over has also come from the Chemicals Workers' Union, whose national executive council meeting last week-end called on the Government to take emergency measures to halt the bid and "prevent the chemical industries from becoming the happy hunting ground of gamblers and speculators".

Writing in *The Times* on 23 January, Mr. E. W. Goodale, president of the Silk and Rayon Users' Association, said that the interests of man-made fibre users would best be served by their having a choice of supplier. As a result they shared the philosophy of Courtaulds rather than that of I.C.I. They still hoped that some form of merger could be worked out, giving the most economic research and production as well as a reasonable choice for the user and consumer.

Both *The Times* and *The Financial Times* have expressed doubts about the effect of the merger on the public interest, the latter being more outspoken. *The Times* on 20 January in a first leader declared that the Government should be in no doubt about when and how they should act. "Their main concern should be to examine the role of I.C.I. in any new grouping that may eventually emerge."

It was felt that public anxiety about the size of the operation alone should be enough to convince the Government that several questions would need answering. *The Times*, however, does not call for any specific action; after referring to the visits made by the chairmen of the two companies to the Board of Trade, the leader stated: "There is probably little else that the Government can do, apart from making their views known".

The following are extracts from leading newspapers:

The Times (City Editor): "With I.C.I. in danger of losing a vital customer for chemicals should Courtaulds escape its net, it is equally clear that I.C.I. must at all cost secure success. The I.C.I. board would therefore have been wiser tactically to have made a much more generous bid from the start and certainly now that the new information, as Mr. Chambers admitted yesterday, has come to light about the immediate outlook for Courtaulds." (19 January.)

The Financial Times (first leader): "The Government cannot much longer avoid taking a view about the concentration of industry. . . . The Government must begin quickly to formulate a policy. It cannot stand stand on the sidelines indefinitely." (18 January.)

The Observer (City page): "This battle and its outcome will be good for the
(Continued on page 173)

I. Chem.E. N.W. Branch symposium

Novel designs featured in special heat exchange units

DISCUSSION waxed 'hot and cold' at a symposium on special heat exchange equipment, held by the North-Western Branch of the Institution of Chemical Engineers in Manchester recently. Ideas presented in nine papers—mainly by members of heat exchanger manufacturing firms—ranged from air-cooled exchangers to pebble bed regenerators for odour destruction, etc. 'Special' nature of the equipment discussed was obvious from the fact that conventional shell and tube exchangers were in the minority, giving place to designs in which metal sheet or strip is tortured into various special shapes—symbolic perhaps of the struggle for higher heat transfer performance.

Lamella heat exchanger

Illustrating the newer trend is the Ramen heat exchanger—a recent development now being introduced to the U.K. from Sweden—which was described in a paper by **A. P. Hosking** (A. Johnson and Co. (London) Ltd.), presented by W. Fletcher and G. Ymse. The Ramen unit consists essentially of a lamella battery in a shell and gives an overall heat transfer value about double that of a conventional shell and tube apparatus, while its pressure drop is low, it is robust and withstands high pressures. It is made from cold rolled strip steel which is profiled to a lamella shape then cut to a lamella length up to 6 m. Two sheets are laid one on the other and seam welded electrically where they touch. The lamella are made in such different sizes that their width corresponds to the length of a chord of the circular shell. The ends of a lamella bundle are welded together, thus separating two fluids in a manner similar to a tube plate. The length and diameter of the heat exchanger, and the spaces inside and between the lamella are selected to obtain high velocities in any two fluids; the normal spaces vary from 3 to 8 mm. The design pressure is usually 10 kg./sq. cm. and the lamellas have a plate thickness of 1.5 mm., for higher pressures sheets 2 mm. thick are used.

A contribution was made on a new regenerative heat exchanger concept which had previously been described in the Press by **Dr. D. S. Wilson**. This exchanger consists of a number of broad, thin, endless bands of a flexible material, e.g. steel or nylon, which are moved slowly round by rollers. The bands are packed parallel to one another with their edges in line, in which form sealing is easily effected. Before passing between the sealing rollers into the heat transfer ducts, the bands are so spaced by separators that the fluid is in contact with and heats the bands, first in cross flow, then,

by change in direction, in countercurrent flow. The reverse series of operations is given to the hot bands when they pass out of the heat transfer duct and, by a similar process, they give up their heat in another, cooler heat transfer duct then they return to the hot duct. A variation of this process is given by strips in the form of rotating, flexible discs which pass from a duct containing a fluid at a high temperature to one at a low temperature.

Froth contactors

A. Poll and **Dr. W. Smith** (D.S.I.R., Warren Spring Laboratory) presented the froth contact heat exchanger and reported preliminary experiments on a pilot plant apparatus in which tubes containing a hot fluid were cooled by a froth made of a mixture of air and water. The overall heat transfer coefficients were similar to those for water-cooled exchangers.

Refinements in the design of Votator heat exchangers were reviewed by **A. P. Hosking** (A. Johnson and Co. (London) Ltd.). This exchanger is of a jacketed tube design and the heat transfer medium flows through the jacket. The ends of the tube are closed by heads which contain connections for the product and which carry bearings for a shaft mounted within the tube. This mutator shaft is fitted with floating scraper blades and its outside diameter is within 75-80% of the inside diameter of the heat transfer tube. A positive displacement feed pump gives a definite pressure in the Votator and a pressure-regulating valve or back pressure valve is placed on the outlet pipe. The apparatus is constructed of mild or stainless steels, or of nickel or chromium-plated metal. Small units are horizontal and large ones are vertical. Turbulence in the scraped film produces good heat transfer rates.

The Contro-Film Processor was described by **J. T. Ryley** and **G. Etheridge** (W. J. Fraser and Co. Ltd.). Vapour is evolved from a volatile liquid or solvent which flows along a heat transfer surface towards the outlet. The boiling film is agitated by rotating blades which wipe the film and the thickness of the film can be adjusted by an axial movement of the rotor. The temperature of the film may rise to 700°F and the film thickness may be $\frac{1}{4}$ in. The heat transfer coefficient of a horizontal unit is high; it is independent of loading and temperature difference. The apparatus is designed for throughputs of 20-100 lb./hr. with surfaces from 1 to 70 sq. ft. It will evaporate heat sensitive materials, will concentrate latices and free them from their monomers, breaks up foams formed during evaporation and will process materials that are undergoing highly exothermal reactions.

Air cooled heat exchangers was the subject of a paper by **Mr. G. Winters** (Heat Exchange Division, Wellington Tube Works Ltd.) who stated that these exchangers were really air-cooled coolers. They are made to throw away heat, therefore an economic design was imperative. An air-cooled exchanger costs two or three times as much as a water-cooled one but it has the advantage that air is available in unlimited quantities at a reasonable temperature, that air is non-corrosive and that the exchanger is nearly always situated near to the process unit it serves therefore the pump and pipework associated with water-cooling towers is not needed. The air used as coolant may sometimes be used for ventilation.

The decision on the use of air or water for cooling depends largely on the source of available water which, in general, is a water-cooling tower. A similar temperature of the product can be achieved with air as with water as coolant. The control of the temperature of the product is costly and its necessity on plants cooled by air is no greater than on those cooled by water.

Air cooling is applied to all operations in oil refineries, it is very suitable for closed circuits of clean water but is unsuitable for cooling viscous liquids with poor heat transfer properties.

Extended surfaces

F. Howarth (Extended Surface Tube Co. Ltd.) presented a paper on extended surfaces, which transfer heat between two fluids, one having a better heat conductance than the other; an attempt is made to balance the surface area times conductance for the outside and inside surfaces of the tube by extending one surface with fins. The fins may be annular, helical or longitudinal, mechanically bonded, soldered, brazed, welded or integral with the tube.

Mechanically bonded fins, with the exception of the grooved tube, are limited to natural convection operation below 200°F; they are cheap but the bond is a source of weakness. Soldered and brazed tubes have a better bond and they operate at high fin temperatures. The welded fin tubes are used for many applications, a high frequency welding technique for fins on steel tubes is favoured for tubes used in petroleum and chemical plants. Integral fins reinforce tubes that are used at extreme pressures. Cold-rolled fin tubes are very reliable, they fail on the finning machine, not in service. The low fin tube can replace plain tube in shell and tube heat exchangers without any modification and with advantage in severe fouling conditions.

B. R. Lamb (A.P.V. Ltd.) discussed the Rosenblad spiral heat exchanger, which consists of a compact spiral of steel tube $\frac{3}{16}$ -1 in. dia. so that fluids can be passed through the spiral countercurrently. The flow pattern gives high heat transmission and turbulence occurs at low Reynolds numbers; the velocity through the channels is constant from inlet to outlet and the surfaces do not easily foul or scale. The covers are removable to give easy access to heating

surfaces. The apparatus is rather difficult to repair, is not easily cleaned mechanically and is unsuitable for heat exchange between liquids and permanent gases. It can be made of any metal that can be cold-formed and welded.

A paper on graphite block heat exchangers was presented by **D. G. Blackburn, C. H. V. Sawyer and J. Marriott** (Powell Duffryn Carbon Products Ltd.). The heat exchanger described is a graphite block perforated by rows of parallel holes for conveying two fluids; it is designed for a normal working pressure of 100 p.s.i. or, for special applications, 250 p.s.i. Headers for the supply and discharge of the fluids are made of carbon or of lined cast iron or lined steel. Baffles in the headers produce a multi-pass exchanger where the velocity of each fluid can be adjusted to an economic value. When gases are cooled, rectangular slots, $\frac{1}{8}$ by $\frac{3}{8}$ in., replace the usual $\frac{3}{8}$ in. diameter holes.

Graphite heat exchangers are made as cubes, rectangles and as cylinders encased in a steel shell with gland fittings at each end, the cylinders being designed as condensers or evaporators. The heat transfer properties of these exchangers are good but they have a maximum temperature limit of 180°C which is the decomposition temperature of the impregnating resin. Lower maximum temperature limits are necessary in contact with some corrosive reagents or some solvents.

The pebble bed regenerator described by **A. F. Stobart** (Stewarts and Lloyds Ltd.) had its origin as an odour destructor in waste gas. There are two 17 ft. dia., 20 ft. high steel shells lined with $4\frac{1}{2}$ in. of refractory brick and $4\frac{1}{2}$ in. of refractory brick and $4\frac{1}{2}$ in. of common brick. Each shell contains 10 ft. of pebbles $1\frac{1}{2}$ -6 in. dia., total weight of pebbles being about 90 tons. The pebble beds are joined at the top by a passage 5 ft. dia., the passage containing a burner for natural gas as a supply of heat. The gases enter one bed at the bottom through a reversing valve, pass up the bed, along the passage, down the other bed and out through the reversing valve. The operation starts with a small waste gas flow until the top of each bed reaches 1100°F when the waste gas is turned on fully, the natural gas burner maintains the temperature in the central passage at 1,150-1,200°F and the exit temperature rises 50-200°F in about 40 minutes. The gas flow is reversed and the cycle repeated. Natural gas consumption is 1.23 cu. ft. per 1,000 cu. ft. of waste gas; this gives 1,050 B.Th.U., an overall efficiency of about 95%.

Production of nitric oxide from air, using natural gas as fuel, was designed for 1.9% nitric oxide in the exit gases. This cheap nitric oxide did not make a cheap nitric acid because it was difficult to absorb the nitrogen oxides efficiently at so low a concentration.

Bad weather mars S.A.I. fertiliser sales

ADVERSE weather in 1960-61 affected the trade of Scottish Agricultural Industries Ltd., associates of I.C.I., following a spectacular increase in the use of fertilisers in the previous year. This is stated by Mr. R. A. Banks, S.A.I. chairman, in his annual review.

Fertiliser sales in Scotland did not come up to expectations. In England and Wales, S.A.I. interests were largely confined to basic slag, but bad weather in the autumn and winter, when the bulk of basic slag is spread, led to a substantial cut in sales.

There was some rise in the overall cost of raw materials, together with the start of an upward movement in clean freight rates after some years of exceptionally low levels.

However, the company believed that consumption of fertilisers in Scotland would continue to increase for some time so that the setback of 1960-61 was likely to be purely temporary. But Mr. Banks warned that profitability of the business might not advance in step with the increase in volume. (In the year to 30 September 1961, group pre-tax profit was £1,311,000, a 12.5% reduction on record level of £1,499,000 of the previous year.)

Tough Plastics in Dutch C.M. venture

In view of the development of the Common Market, Tough Plastics Ltd. are to take up close co-operation with the Oldenzaal, Holland, concern of NV Twentse Kunststoffenindustrie Plastics. Tough Plastics, who like the Dutch company produce plastics tanks and piping, will purchase a holding in Plastics, who will change their name to NV Nederlands-Britse Kunststoffenindustrie Plastics.

The Dutch concern will concentrate its sales on the Benelux group of countries and Federal Germany and will make use of Tough Plastics patent rights. It is planned to expand operational facilities, possibly outside the town of Oldenzaal. Majority shareholders in Plastics are NV Spinnerij Tubantia v/h B.W. en H. ter Kuile, Enschede, Holland.

New training school in Wales will boost supply of skilled glassblowers

THE first school for trainee glassblowers in Wales is centred at the new production unit of H. J. Elliott Ltd., Treforest Industrial Estate, Pontypridd, which was opened by Lord Brecon, Minister of State for Welsh Affairs, on 17 January.

The firm has found that only about 60% of those who take up glassblowing have any aptitude for it, the rest give it up. It is hoped that the new school will increase the numbers of skilled glassblowers to enable production to be doubled by 1964. One of the firm's best glassblowers has been seconded as full-time instructor.

According to Mr. Stanley H. Elliott, who was awarded an M.B.E. in the New Year Honours, one of the main reasons for establishing the school is the belief that Britain will enter the Common Market. Elliotts already export some 40% of their production.

H. J. Elliott, under their brand name E-Mil, are the largest producers of graduated laboratory glassware in the U.K. Because of their expansion programme, the training of glassblowers within the organisation is thought to be the best means of obtaining continuity of craftsmen for this essential industry.

Lord Brecon toured the thermometer manufacturing section in the new works, and inspected the main factory which

handles production of volumetric and graduated glassware. There, he saw various stages of the manufacturing processes where skilled glassblowers practise their lampblown techniques alongside the most modern mechanised equipment used in the large scale production of burettes, pipettes, measuring flasks, cylinders and all allied accurate measuring instruments in glass.

Opening the new factory, Lord Brecon stated that much of the company's success in export markets was due to the drive and energy of Mr. Stanley Elliott.



Watching a trainee glass blower are (l. to r.) S. H. Elliott, H. J. Elliott and Lord Brecon

A.E.A. switch from beryllium to stainless for fuel canning will close I.C.I. Witton plant

BERYLLIUM—one of the group of metals manufactured by I.C.I. under the picturesque description of 'tomorrow's metals'—looks like becoming the metal for 'the day after tomorrow', at least as far as its main application in the U.K.'s nuclear reactors is concerned. Decision of the U.K. Atomic Energy Authority to drop beryllium as a short-term prospect for the canning of fuel elements in their advanced gas-cooled reactor, which is to start up at Windscale later this year, means the closing down of production at the Witton (Birmingham) beryllium plant of I.C.I. Metals Division about the end of June.

Specially designed plant

The Witton beryllium plant, started up in 1959, is believed to have cost something like £1.5 million to build. It was specially designed to supply the U.K.A.E.A.'s needs and this it has done satisfactorily, but the A.E.A. will not be taking any more deliveries after the completion of those already scheduled. Reason is that there are still snags in using the metal—e.g. brittle failure on rapid cooling from high temperatures—which research has not so far succeeded in removing, so the U.K.A.E.A. have cut back their programme and are putting beryllium development on a longer-term basis. Development work for immediate future will be concentrated on stainless steel, with which "satisfactory progress" for cladding is reported, indicating the likelihood of higher fuel temperatures, thinner fuel cans and longer burn-ups. In weighing up the respective merits of the two metals the Authority have taken into consideration that the use of beryllium would entail less enrichment of the uranium, but on the other hand the cost of a beryllium can is much greater than that of one in stainless steel. (Beryllium currently costs £20-£25/lb. in the crude state, £160 for the wrought product.)

There is nothing new in the A.E.A.'s wariness towards beryllium—in its annual report last year the Authority recorded a decision to delay the introduction of a large number of beryllium-canned fuel elements into the Windscale reactor and to make the initial charge mostly of stainless steel-clad elements, the loading of beryllium-clad elements into the hotter parts of the reactor to follow gradually as material of better corrosion resistance was obtained. Previous tests had shown that, under the higher temperature conditions in the A.G.R., more corrosion of beryllium could take place than could be tolerated in a reactor of this type.

As well as the I.C.I. plant, the A.E.A.'s 'go-slow' on beryllium affects the Coventry plant of the Whitworth Gloster

Aircraft Co. (part of the Hawker-Siddeley Aviation Group), which began machining components for the A.E.A. in 1960. Chesterfield Tube Co. Ltd.—one of the Tube Investments Group—have also been carrying out advanced development work on beryllium tubing and other fabrications, with the atomic energy industry as the main target. The Milford Haven beryllium refinery of Consolidated Beryllium—who acquired the plant from the A.E.A. in 1960—concentrates on beryllium-copper alloys and does a certain amount of work on beryllia ceramics.

I.C.I. emphasise that they are still very much interested in the long-term prospects for beryllium and the decision to close the Witton plant is based on the consideration that, by the time the practical difficulties with beryllium for fuel elements have been overcome, plant of a different sort may well be required.

The I.C.I. plant was the first in Europe to be designed for processing large quantities of beryllium from raw material to wrought product, involving techniques quite apart from those used in the production of the well-established beryllium-copper alloys. Since the plant was started in 1959, major improvements have been

incorporated and the experience and know-how gained will no doubt prove useful at some future date. Although the metal is potentially interesting to the aircraft industry because of its combination of low density and high elastic modulus, wrought beryllium applications in the U.K. have so far been limited to atomic reactors. However, even at its present high price, the use of beryllium might be justified in specialised engineering applications and, as with titanium, a combination of production improvements and increased demand could eventually bring the price down.

U.S. applications

In the U.S., the beryllium industry was recently given a fresh impetus by the advent of new techniques for concentrating the ore, now embodied in the new plant of Beryllium Resources Inc., near Delta, Utah (see CHEMICAL AGE, 8 July 1961, p. 59), using domestic ores instead of importing them from South America and Africa as hitherto. The market for U.S. beryllium amounted to about 160,000 lb. in 1960 and it has been estimated that it could attain 300,000 lb./year by 1965 and considerably more than this if ductility and other problems are solved.

U.S. development of further application for the metal continue apace, current applications including rocketry and aircraft as well as atomic power plants; interest in beryllium for this last-mentioned application has been revived by the increased development of 'packaged' reactors and high-temperature gas-cooled reactors.

I.C.I. bid – what the papers say (from page 170)

It will warn others who are not employing their assets profitably, it will create a company large enough to meet American and Continental competition and imaginative enough to contemplate revivifying Britain's moribund textile industry. . . . Courtaulds should consider themselves lucky that there was a fairy godmother—Mr. Paul Chambers—on hand." (21 January.)

The Guardian (Financial editor): "Courtaulds enter the battle with strong assets but a weak earnings record in recent years. It is the failure to put the assets to profitable use which undermines the Courtaulds' case, even though it makes good industrial sense. Some hidden strategic reserves will have to be revealed if Courtaulds' shareholders are to be dissuaded from accepting the bid." (18 January.)

"One question to which the City can think of no answer is why the Courtaulds' board last November cut the interim dividend at a time when it was already deep in merger talks with I.C.I. At a quiet moment this might have been no more than ordinary prudence. In the middle of merge discussions it was almost suicidal." (19 January.)

The Economist: ". . . and after the 7 or 8 weeks are over, the combatants will not just shake hands and make it up.

In an agreed merger the managers of I.C.I. and Courtaulds could have worked together to sort out the problems; a merger won in battle may have to be built up from bitterness. (20 January.)

The Sunday Times (City section): "Had I.C.I. owned Courtaulds in the early 1960's, Courtelles, which is now the fastest growing man-made fibre in world markets, would not have been developed at that time. . . . In man-made fibres it is the new fibres that count; one must be suspicious of I.C.I.'s need to protect its vast investment in the middle-aged wartime fibres of nylon and Terylene against competition from the fibres developed in the 1950's, or being developed in the 1960's. (21 January.)"

Du Pont buy rights to U.K. Airvel process

Rights to the British Airvel process for putting bulk and elasticity into spun yarns of synthetic fibres so that they resemble wool have been acquired by E. I. du Pont de Nemours. Orlon acrylic knitting yarns produced by this process should be on sale next month. The method is claimed to be a "major breakthrough" in textiles and plans are in hand to license spinners in other parts of the world.

Packaging and exports—theme of third A.B.C.M. conference

PACKAGING costs—the challenge of European trade to the British chemical industry will be the title of the third conference of the packaging committee, Association of British Chemical Manufacturers, which will be held at the Hotel Majestic, Harrogate, from 26 to 29 March. Mr. G. H. Edwards, chairman of the A.B.C.M. packaging committee, will preside.

Theme of the conference will centre on the importance of packaging in the export trade. Packaging represents a heavy charge on many sections of the chemical industry and any constructive steps that can be taken to reduce costs and improve efficiency of packaging must of necessity be dependent on improved standards of handling.

The proposed entry of Britain into the Common Market emphasises the necessity for the packaging industry to put themselves in as strong a competitive position as possible. This, and other

factors, including the help which can be given by the various systems of transport, will be discussed by various speakers and discussion groups at the Conference.

Mr. L. H. Williams, commercial member of the British Transport Commission will be the principal guest at the conference dinner on 28 March.

U.K. streptomycin is subject to import bar

STREPTOMYCIN sulphate produced into the U.K. is the subject of a dumping duty imposed by Australia. A dumping duty has also been levied on penicillins G and V manufactured in the U.S. These duties have been levied from 18 January following complaints made by two Australian producers of antibiotics.

The duty has been imposed at a rate of 12.5% on mixtures and preparations of the two drugs and at variable rates on bulk primary materials.

Cambridge professor to advise on wages dispute

PROFESSOR H. S. Kirkcaldy, professor of industrial relations at the University of Cambridge has been appointed independent chairman of a meeting which was to be held on Thursday, after **CHEMICAL AGE** went to press, of the Chemical and Allied Industries Joint Industrial Council. The professor will not act as an arbitrator but has been asked to give guidance rather than judgement. About 60,000 workers including those of the fertiliser and plastics industries are affected.

The management of I.C.I. are also holding a meeting on Thursday with representatives of 12,000 skilled workers to discuss wage claims. They are already considering proposals made by representatives of 50,000 unskilled workers.

I.C.I. cut prices of polypropylene

HOME market prices of Propathene polypropylene resin have been cut by the I.C.I. Plastics Division by 4d/lb to 2s 8d/lb for 10-ton lots of general purpose granules. The new prices came into effect on 8 January.

Aim of this reduction is to extend the market for Propathene and to encourage moulders in the development of new uses, particularly in the field of consumer durables and domestic appliances.

The division's first Propathene plant came on stream late in 1961 with capacity of 11,000 tons/year. At the same time, **CHEMICAL AGE** was able to reveal the decision to build an extension doubling capacity to 22,000 tons/year.

I.C.I.'s Fibres Division has a 5 million lb./year plant for Ulstron polypropylene filament yarn at Wilton which came on stream in the autumn of 1961. Both the resin and fibre plants were built under licence from Montecatini.

Berk set up new heavy chemicals dept.

AN amalgamated sales department—the heavy chemical department—has been set up by F. W. Berk and Co. Ltd. It will take over the sales now handled by the company's heavy chemicals sales and wood and other chemicals departments. Mr. L. A. Plummer has been appointed manager with Mr. G. F. N. Marriott and Mr. J. R. Deuchar as joint sales managers.

The new department is located at Berk House, Baker Street, London W.1. Because of the need for close liaison with production and transport departments, the sale of acids—sulphuric, hydrochloric, nitric and hydrofluoric—and aluminium and ferrous chloride will continue to be handled from Stratford, London E.15, under the charge of Mr. R. C. Newton, but responsible to the heavy chemical department.

The new department will continue to be supported by the technical and laboratory facilities at Stratford. Technical representation to cover both the heavy chemical and wood chemical sides is being extended.

Obituary

F. A. Greene—pioneer of I.Chem.E.

Mr. Frank Arnold Greene, one of the founder members of the Institution of Chemical Engineers and past-president and hon. treasurer since 1929, died recently at the age of 84. A consulting engineer with a special interest in paper manufacture, explosives, gas and chemicals, he generally preferred to work as an individual, but during the second world war he co-operated in the design and erection of some of the largest explosives filling factories ever built in the U.K.

Born at Newport, Mon., he was educated at the old Merchant Taylors' School and at King's College, University of London, where he achieved the highest distinctions in engineering and also gained awards in chemistry and physics. His versatility and competence are demonstrated by his membership of the Institutions of Civil, Mechanical and Electrical Engineers while he was also a Fellow of the Chemical Society.

CAB added to plastics range of M. and B.

CELLULOSE acetate butyrate has been added to the range of M. and B. Plastics. It is claimed that this is the first time the material has been available in the U.K. in a stock range of thicknesses and forms.

This thermoplastic is resistant to water and chemicals, and is also a good electrical insulator, making it suitable for domestic and industrial components. It is claimed to be an outstanding material for vacuum forming.

In a tribute, a more recent past-president of the I.Chem.E., Sir Hugh Beaver, calls him "a colleague in whom one rejoiced; chemical engineers throughout this country will for many years reap what he has sown."

Dr. Jas. Hunter, chairman of the North-Western Branch of the Institution of Chemical Engineers, died recently. Born in 1909 at Darlington, he had a brilliant scholastic career, gaining a scholarship to the University of St. Andrew. He joined the (then) I.C.I. Alkali Division in 1934 and was engaged in research at Northwich. He joined the Institution of Chemical Engineers in 1936 and became a full member in 1941.

Dr. Hugo Bäuerle, director of Pharmaceutical Producers, West Berlin, Schering AG, has died unexpectedly at the age of 49.

Higher quotas for U.K.-Hungary trade

A NEW Anglo-Hungarian trade agreement envisages a £700,000 increase in each direction during 1962. The figure for U.K. exports has been raised to £6.5 million; main items are chemicals, basic materials, machinery and instruments.

The figure for Hungarian exports has been raised to £5.6 million; products will include chemicals and pharmaceuticals. Hungary also expects to export to the U.K. some £1 million worth of goods not subject to quota, including aluminium.

Overseas News

NEW DATES FIXED FOR CANADIAN TARIFF HEARINGS ON CHEMICALS

UNDER the Canadian Tariff Board hearing on chemicals, a date for hearings on fertilisers has been fixed at 28 May, 1962. These hearings will cover guano and other natural fertilisers, nitrogenous, phosphatic and potassic mineral or chemical fertilisers and other fertilisers.

10 September, 1962, is the date for representations on (a) outstanding portions of certain existing tariff items partially covered at previous hearings; (b) sal ammoniac skimmings; and (c) representations not previously made.

Under (a), products to be considered will include ammonium sulphate, antimony salts; arsenious oxide; boracic acid and borax; bromine; carbon disulphide; calcium cyanide; potassium cyanide; sodium cyanide; cyanogen bromide; hydrofluosilicic acid; crude iodine; arsenic sulphide; sulphur and brimstone; tannic acid; acetic acid; etc.

On 24 September, the Tariff Board will receive representations concerning 'end-use' items, including isopropyl alcohol, cresylic acid, xanthates, magnesium carbonate and magnesium oxide for specific purposes; and coke oven light oils for benzene and related aromatics. Fuller details are given in the *Board of Trade Journal*, 19 January, p. 115.

Krebs to handle Safi phosphoric acid project

The phosphoric acid project for the Moroccan Safi project, recently withdrawn from Dorr-Oliver (see C.A., 13 January, p. 76), has now been awarded to Krebs of Paris. It was alleged that Dorr-Oliver had schemed to gain the whole project, but the company refuted the charges pointing out that the bid to act as main contractors for the complete project had been made in conjunction with Commentry-Oissel. Dorr-Oliver are remaining in charge of construction engineering for the phosphate rock plant that will supply Safi.

Big jump expected in diene rubber usage

U.S. industry's consumption of polybutadiene and polyisoprene rubbers is expected to expand to about 100,000 tons this year, compared with only 22,000 tons in 1961, according to Mr. E. J. Thomas, president of Goodyear Tire and Rubber. Total U.S. rubber consumption in 1962 should exceed the record level of 1,628,000 tons in 1959, and top the 1961 level by more than 125,000 tons.

Consumption of diene rubbers outside the U.S. was expected to total between 30,000 and 40,000 tons, compared with 5,000 tons in 1961. Rubber consumption outside the U.S. would probably be a

record, exceeding 2.5 million tons, making the world total more than 4,125,000 tons.

French loan for Japanese refinery

A £3.5 million loan by Compagnie Française des Pétroles will help finance a £9.75 million oil refinery which Daikyo Oil plan at Yokkaichi, Central Japan. Due for completion early next year, the refinery will have a crude throughput of 50,000 bbl./day. At present Daikyo import more than 2.2 million bbl. of crude oil a year from France.

Amoco Fina additives plant in Belgium

Amoco Fina, jointly owned by Amoco Chemicals, Chicago, and Petrofina S.A., Brussels, have come on stream at Antwerp with their new oil additives plant. The plant was built primarily to serve the Common Market and is now producing oil detergents and inhibitors that are interchangeable with Amoco's U.S. production.

New silicon plant for Belgian firm, polycrystalline germanium capacity increased

ERECTOR of the new silicon plant of the Olen Chemical Products Division of Soc. Generale Metallurgique de Hoboken has now been completed and equipment is being installed. The division's capacity for polycrystalline germanium and doped single crystals has been increased.

Hoboken have developed a process for the production of ultra-pure tellurium using chemical and zone refining purification techniques; commercial quantities are now being produced. Processes have also been developed for the preparation of high-purity antimony and arsenic for use in semi-conductors. Also under investigation with a view to the production of ultra-pure metals are gallium, indium, cobalt, tin, lead and gold.

Research has continued on improving the quality of the oxide and metal uranium for fuel element manufacture;

Hoechst-Celanese firm to make acetal resin

It has now been confirmed that Ticona Polymerwerke, the new joint Farbwerke Hoechst-Celanese of America subsidiary, will produce Celcon acetal resin. As revealed in *CHEMICAL AGE* last week, the new plant, with 30 million lb./year capacity, will be sited at Frankfurt. Until the unit is on stream next year, Hoechst will import Celcon from the U.S.

Commercial production of acetal resin was pioneered by Du Pont, who have now announced their first licensing arrangement to Showa Neoprene of Japan (*CHEMICAL AGE*, 6 January, p. 10). Du Pont also have an acetal resin processing plant at Dordrecht.

Joint Montecatini-U.S. venture for boron

An agreement for the production and distribution in Italy of boron derivatives has been signed between Montecatini and Minerals and Chemicals-Phillip Brothers of the U.S. Italian production of boron from the Larderello natural steam geysers is not sufficient to cope with domestic demand. Currently, imports come mainly from Turkey and California.

Clark Oil to use U.O.P. phenol process

Universal Oil Products' newly-developed Unisin process for the production of cumene-phenol is to be utilised by Clark Oil and Refining Co., Milwaukee, in their first petrochemical project. Cumene feedstock will be supplied by a U.O.P. catalytic condensation unit. Cumene is oxidised to give phenol and acetone.

This new process will also be used to produce 30 million lb./year of phenol by Texas City Refining at a new plant due on stream by the end of this year.

the company has realised the manufacture of uranium enriched in U235. A start is to be made immediately on the erection of "an important plant" at Hoboken for the production of tantalum and niobium in several forms.

Monsanto bid for French polystyrene producer

Monsanto Chemical Co., St. Louis, who own a half share in Soc. Monsanto Boussois, France's biggest producers of polystyrene, have started negotiations to acquire the other half interest from their partners, Glaces de Boussois, Paris. Monsanto already have a half interest (with Soc. Edison) in Sicedison, Italian polystyrene producers, and through their 100% subsidiary, Monsanto Chemicals Ltd., are one of the two U.K. producers of this polymer.

Overseas news

More Indian licences granted to boost fertiliser production

THE Government of India has approved the third stage of expansion of Fertilisers and Chemicals, Travancore, Ltd. The expansion will involve an additional expenditure of about Rs 85 million and the company is to raise its authorised capital from Rs 50 million to Rs 75 million.

The expansion envisages an increase in capacity from 30,000 tons to 70,000 tons/year in terms of fixed nitrogen. The additional ammonia produced will be converted partly into ammonium phosphate, partly into ammonium sulphate and the rest into ammonium chloride. Ammonium phosphate production will be increased by 300 tons a day and ammonium chloride by 50 tons a day.

Meanwhile, the Government of India has issued a licence for setting up a fertiliser plant in the private sector at Tuticorin, Madras State. The works is being set up by Kothari and Sons in collaboration with a U.S. firm. To start with, it will have a capacity of 33,000 tons, which will be doubled later.

The Government of India has also decided to issue a licence to a consortium formed by Shaw Wallace and Co. and Rallis India Ltd. to start a fertiliser factory at Mangalore, also in Madras State. The licence is subject to the terms of collaboration with the Dutch States Mines being satisfactory. D.S.M. will have a 48% interest in the new joint company. The plant will cost Rs 280 million and will produce 100,000 tons annually in terms of nitrogen.

The Indian Government is reported to be negotiating with East Germany for technical collaboration in a phosphorus project to be undertaken in the public sector. Another phosphate project, also in the public sector will have as collaborators the Tennessee Valley Authority. Both these plants will be located in South India.

Monsanto know-how for Israeli plant

Monsanto Chemical Co. have recently signed an agreement with an Israeli concern under which Monsanto will supervise the erection of a dichloroethylene plant near Acre and supply know how.

Consortium plans new Austrian refinery

A consortium comprising British Petroleum, Esso, Mobil Oil, Royal Dutch/Shell and the Austrian State oil concern, Ö.M.V., is planning the construction of a new refinery at Linz. Basis of the plans is an estimate that if the Trieste-Vienna crude oil pipeline project is approved, Austria would need an extra 1,500,000 to 2 million tonnes/

year of oil. E.N.I. are promoters of this pipeline which would have an initial capacity of 3 million tonnes, but which could be doubled.

Ö.M.V. have recently brought on stream their new 1,800,000 tonnes/year refinery at Schwechat, where capacity is to be raised to 3,600,000 tonnes.

France cuts duty rates on nitrogen fertilisers

A quota of 10,000 tonnes has been established by France for imports of nitrogenous fertilisers. These may be admitted free of duty when imported from the Common Market and at reduced rates when imported from other countries granted most-favoured-nation treatment.

The fertilisers (percentage reduction of duty in brackets) are: ammonium chloride (3.4%); sodium nitrate (3.4%); calcium nitrate (2.9%); calcium cyanamide (2.9%); urea (3.9%); mineral or chemical nitrogenous fertilisers, single, other than natural sodium nitrate or ammonium nitrate (2.4%); and ammonium nitrate (2.4%).

Bigger budget for Soviet chemical industry

A TOTAL of 1,300 million New Roubles (3% of all economic investments) is to be spent in the current year on the Soviet chemical industry. This is one-sixth more than the chemical investments made in the U.S.S.R. last year. Current estimates put 1962 Russian production of particularly important chemical products as 12% more synthetic fibres than last year, 26% more plastics, 21% more synthetic rubber, 12% more synthetic fertilisers and 28% more synthetic ammonia.

Deliveries of chemical plant are reported still to be poor, and production could not be taken up last year at chemical works at Tula, Perm, Kyubyshev, Omsk and in the Ukraine due to erection difficulties. Production of chemical base products is also stated to be insufficient for the current expansion plans. (See also CHEMICAL AGE, 18 November 1961, p. 811).

New Canadian plant for benzene derivatives

Chemicals Refineries Corporation has been set up in Canada to manufacture paradichlorobenzene and orthodichlorobenzene. Canada currently imports more than 5 million lb./year of paradichlorobenzene and the new plant, to be located at Napierville, Que., some 30 miles south-east of Montreal, will be Canada's first. Production of the two chemicals

Freeport subsidiary to develop foreign ventures

A new subsidiary, Freeport International, Inc., is to develop new industrial ventures overseas, has been set up by the Freeport Sulphur Co.

Main emphasis will be on ventures which will expand the consumption of elemental sulphur, but consideration also will be given to any investment which meets Freeport's objectives of diversification and growth, says Mr. Robert C. Hills, president. Overseas activities will be headed by Mr. Peter Black, president. Mr. Black is also vice-president of Freeport Sulphur Co.

U.S. aid will establish Israeli glass-fibre plant

The Government of Israel has signed recently an agreement with U.S. interests for the establishment of a \$6½ million glass-fibre plant south of Beersheba. A new process will be employed using sand mined in the Negeb as the principal raw material.

E.N.I. place contracts for German pipeline

E.N.I. have placed contracts for the German section of their pipeline which by end-1963 will carry crude oil from Genoa to the E.N.I. refinery in Bavaria. Construction will be handled by Snam Progetti, an E.N.I. subsidiary, in conjunction with Mannesmann and Phoenix-Rheinrohr, the two German firms accounting for about two-thirds of the £6 million order.

for the Canadian market and for export is scheduled for the end of February.

The new enterprise was announced by the Record Chemical Co., Montreal, who state that a new process, supplying about 20% more orthodichlorobenzene and providing for economical production of paradichlorobenzene, will be used.

Caustic soda plant for North Korea

Building is reported to have begun at Hamhung, North Korea, of a plant to produce some 50,000 tonnes of caustic soda per year. The Hamhung plant's output will go to the synthetic fibre plants recently opened at Soengchin and Sinvidehu.

Caustic soda, DDT plants for Nicaragua

In accordance with the Central American Treaty on Industrial Integration, Nicaragua has been authorised to establish a chemical plant to supply the four member countries of the Economic Integration Treaty (Guatemala, El Salvador, Honduras and Nicaragua). The plant is expected to have an annual capacity of 8,300 tons of caustic soda, 3,000 tons of DDT, and 2,700 tons of chlorinated camphene.

● **Mr. Charles James Stopford** has been awarded the Knighthood of the Order of the Belgian Crown in recognition of the major part he played in developing Europe's titanium oxide industry. Since his retirement as president of the National Lead Industry of America in 1950 he has lived at Crystal River, Florida. A Merseysider, who began his career as a chemist at Widnes, he joined I.C.I. in the 1920's and later became managing director of British Titan Products Co. Ltd. He helped to develop not only the British titanium oxide industry, but also that of the U.S. and Belgium.

● **Dr. J. Burns**, deputy chairman of the North Thames Gas Board, has been appointed chairman of the Northern Gas Board in succession to **Mr. E. Crowther** who retires on 31 October. Dr. Burns became an executive member of the North Thames Gas Board in 1959 and deputy chairman at the end of that year.

● **Dr. Frank Groves**, project superintendent of the technical services department, Ruabon, of Monsanto Chemicals Ltd., has been appointed plant manager of Monsanto's associated company, Forth Chemicals Ltd., Grange-mouth.

● **Dr. A. B. Sabin**, who developed the oral polio vaccine in the U.S., has been made an hon. fellow of the Royal Society of Health and will address a meeting of the Society at Church House, London, on 1 February.

● **Mr. G. H. Thornley**, a director of Castrol Ltd., has been appointed to the newly created post of chief technologist to the group. His previous position as group technical manager will be filled by **Mr. J. Romney**. **Mr. L. A. G. Cooper** will become assistant group technical manager. Other new appointments are those of **Mr. N. E. F. Hitchcock** as group laboratory manager and **Mr. G. T. Tuckerman** as assistant manager, technical information department.

● **Mr. Norman Edmenson**, managing director of Gulf Oil (Great Britain) Ltd., 2 Portman Street, London, W.1, has been elected chairman. **Mr. Carl F. Belkofer** has been appointed managing director in his place. Mr. Edmenson has been associated with Gulf for over 30 years and had been sales director of Silvertown Lubricants Ltd., predecessor of Gulf Oil (Great Britain).

● **Mr. Herbert Burrell**, consultant engineer with the Darlington Chemical and Insulating Co. has retired after 33 years with the company.

● **Sir William Garrett** has been appointed chairman of International Rectifier Co. (Great Britain) Ltd. of Oxted, Surrey. The company, formed in May 1959 is owned jointly by Metal Industries Ltd., of which Sir William is a director, and International Rectifier Corporation of Los Angeles. Sir William succeeds **The Earl of Halsbury** who, in view of his increasing public responsi-

PEOPLE in the news

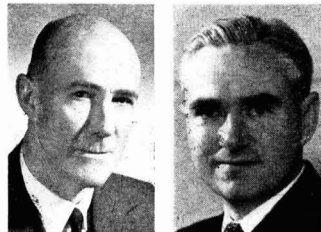
bilities—he was recently appointed chairman of the departmental committee of enquiry into the cost of decimalising the currency—has asked to be relieved of his subsidiary and associated company directorships in the Metal Industries Group. Sir William is a former director of Monsanto Chemicals Ltd.

● **Mr. Derek Williams** has been appointed chief chemist in charge of laboratories serving all divisions of the Phoenix Rubber Co. Ltd., Slough, Bucks. He was until recently senior compounding chemist with Joseph Lucas Ltd.

● **Mr. Rophie E. Bland** has been elected vice-president for sales and service and a member of the board of Houdry Process Corporation.

● **Mr. L. R. Dowsett**, a director of the Geigy Company Ltd., Manchester, and a director of Gyl Chemicals Ltd., will be in Australia from 5 March to 1 April to meet the companies' Australian associates, Geigy (Australasia) Pty. Ltd. He will visit a number of the larger customer firms in the plastics, rubber and chemical industries, many of whom

are associated with British principals, with the object of increasing Geigy exports to Australia of pigmentary colours, industrial chemicals and plasticisers. Rapid expansion of the Australian plastics industry will, it is felt, provide an increasing demand for these products. On 13 March he will be reading a paper on recent British developments in the use of plasticisers to the Plastics Institute of New South Wales. Mr. Dowsett is also to visit the U.S.



Cecil F. Bush (left), who as stated last week has resigned from the board of W. J. Bush and Co. Ltd. Right is L. R. Dowsett, of Geigy

New insecticide from Shell

A new addition to the insecticide family which comprises aldrin, dieldrin and endrin, has been developed and marketed by Shell companies. Called Telodrin, Shell claim that the insecticide is the most efficient and versatile yet discovered. There are few insect pests against which it is not highly effective.

Although subsequently developed by Shell companies, the original discovery of the compound was made in the laboratories of Ruhrchemie A.G., from whom exclusive rights for its manufacture were obtained.

The plant for the manufacture of Telodrin is located, together with other insecticide plants, at Pernis.

Market Reports

PLASTICISER, SOLVENT PRICES MAY BE CUT

LONDON Home trade remains active in nearly all sections of the industrial chemicals market and the price position is little changed. There has been a fair amount of export enquiry in circulation and, with the supply position easy for the most part, buyers are seeking keen rates. Business in fertiliser materials is satisfactory for the period, while the coal tar products have been in moderate call with prices maintained.

MANCHESTER Prices have been held fairly well and the general undertone remains steady, although reductions in additional products in the plasticiser and solvents group would not be surprising. Domestic consumers are maintaining a reasonably good demand for the potash and soda chemicals, as well as the ammonia, magnesium and barium

compounds, borax and boracic acid, with a fair movement reported on textile bleaching and finishing materials. Both home and export enquiry have been fair and overseas shipments of dyestuffs and other leading lines have been satisfactory.

SCOTLAND Although home market buying was fairly steady for the basic range of heavy chemicals, activity in other directions was rather quiet and it is hoped that next week will bring some improvement. It may be that some sections of industry are not yet fully in the production programmes. Demand has mostly been against current needs and with stress on the delivery position. For the most part, prices have been steady and those affected have been largely due to carriage increases. The export market is fairly active with a good volume of enquiries.

Commercial News

B.T.R. Industries

Group trading profit of B.T.R. Industries Ltd. for the year ended 30 September totalled £879,828 (£1,416,378). A final dividend of 8% is declared, making 13% on increased capital (15%). Net balance is £168,979 (£468,671). The substantial cut in profits is attributed to losses by the Microcell Group, but the directors believe that in the main these losses were exceptional to the year. Traditional business of the company saw a sales rise of 16% and an even bigger rise in pre-tax profits. Competition is increasing, but given no serious deterioration in general trading conditions, the overall results for the current year should show a marked improvement.

Fisons Basic Slag

Corby Basic Slag Ltd., a wholly-owned subsidiary of the Fisons Group, has been retitled Fisons Basic Slag Ltd. to identify their activities more closely with Fisons Fertilizers Ltd., the parent company, who are the sole U.K. selling agents for Bilston basic slag. Basic slag is the only U.K. indigenous phosphatic fertiliser which also contains lime and trace elements.

Ilford

Group profit of Ilford Ltd., in whom I.C.I. have a substantial holding, for the year ended 31 October totalled £1,304,345 (£1,539,722). After tax of £561,143 (£642,908), net profit was £743,034 (£896,076). Final dividend is 12½% (same), making 17½% (same).

Manbre and Garton

Group net profit of Manbré and Garton Ltd. for the year ended 30 September was £847,432 (£831,623). A final dividend of 12½% is declared, making 20% on capital increased by a one-for-two scrip issue (same equivalent total). The company has acquired the business of L. Lambert and Co. Ltd., caramel producers, Uxbridge, Middlesex.

C. Tennant

C. Tennant Sons and Co. Ltd., London, who recently acquired a controlling interest in two Canadian chemical merchant houses—Charles Albert Smith Ltd., and William J. Michaud Ltd. (now known as Tennant and Michaud Ltd.)—have merged the two companies under the name of Tennant Smith Ltd., with offices in Toronto, Montreal and Vancouver. There is no change in management or policies and no connection between Charles Tennant and Co. (Canada) Ltd., and either Tennant Smith Ltd., or C. Tennant Sons and Co. Ltd. Turnover last year of the two companies exceeded \$9.5 million.

A.K.U.

Net profits for 1961 of Algemene Kunststijde Unie (A.K.U.), Arnhem,

- Fisons rename Corby Basic Slag
- C. Tennant merge Canadian companies
- E.N.I. integrate in synthetic fibres
- Record sales reported by E. I. du Pont

totalled Fl.32.5 million (£3.25 million), or more than 17% below the 1960 figure of Fl.39.3 million. Sales totalled Fl.347.8 million (Fl.344.6 million), but costs rose by some 6% to Fl.315.4 million. Tax accounted for Fl.15.3 million (Fl.22.2 million).

Business of A.K.U.'s subsidiary American Enka is stated to have been very good and that of Vereinigte Glanzstoff-Fabriken AG, West Germany, and the Austrian and Italian subsidiaries, Erste Oesterreichische Glanzstoff-Fabrik and Italo Olandese Enka, were satisfactory. In the current, financial year A.K.U. expect business to be at last year's level, though a further increase in labour costs amounting to some Fl.10 million is estimated.

Bayer

Farbenfabriken Bayer AG have applied to have their shares listed at the Brussels and Antwerp stock exchange. For some time Bayer are reported to have been considering the setting up of plant near Antwerp.

Colorantes

Cie Française des Matières Colorantes, subsidiary of Ets. Kuhlmann, have raised their capital from Fr.60 million to Fr.72,287,700. The company has further contracted a long term investment loan with the French Credit National of Fr.20 million to order to finance developments and investments. In 1961, the company launched some 170 new dyes, including the following new series: Lycramine dyes (for acrylic fibres), Neurochrome dyes (for nylon and wool) and Intracetylene dyes (for cellulose acetate).

Dow Chemical

Net earnings of the Dow Chemical Co., Midland, Mich., in the quarter ended 30 November were equal to 48 cents (53 cents) a share. The six months earnings were worth \$1.09 (\$1.18).

E.N.I.

Acquisition of a controlling interest in Lane Rossi, Vicenza, one of Italy's largest textile groups, will give E.N.I., the State oil concern, an outlet for the synthetic fibres that they will produce at Gela in Sicily, and Ferrandina in Lucania. Lane Rossi, whose sales last year were worth more than £15 million, have interests in clothing firms and retail shops. The new textile interest will be handled along with the group's petrochemical interests, which are managed by A.N.I.C.

E.N.I. will thus be fully integrated in textiles, having their own clothing units,

fibre spinning, polymer production, oil refineries and natural gas deposits.

Du Pont

As expected, sales of E. I. du Pont de Nemours, Wilmington, Del., were a record in 1961. Preliminary results give a sales total of \$2,191 million (\$2,143 million). Earnings totalled \$8.88/share (\$8.10), the earnings figure includes \$5.72 from operating activities (\$5.57) and \$3.16 in dividends from General Motors (\$2.53). Du Pont state that the higher earnings reflect increased sales and continuing efforts to cut costs. The benefits were partly offset by a reduction in selling prices.

Glanzstoff

Vereinigte Glanzstoff-Fabriken AG, synthetic fibre producers, Wuppertal, announce for the past financial year a turnover of some DM652 million, an increase of some 18 per cent. Turnover of Glanzstoff plus five associated companies totalled some DM990 (884) million over the year. Although higher production costs mean that the 1961 profit will not have risen by the same degree as turnover, results as good as those for 1960 are expected.

Rhone-Poulenc

Following the recent reorganisation of Rhône-Poulenc S.A. (see 'Commercial News' last week), the industrial and commercial activities of the group are now handled by Soc. Nouvelle des Usines Chimiques Rhône-Poulenc, with capital of Fr. 400 million. Industrial activities are now in three sections: Chemicals—Soc. Nouvelle des Usines Chimiques R.-P., Specia and Prolabo; man-made fibres—Rhodiacta, Rhovyl, Crylor and C.T.A.; films—La Cellophane and Cie Industrielle des Plastiques Semi-Ouvrés.

After this reorganisation, it is anticipated that 1962 will see a marked expansion for the group. That Rhône-Poulenc shares are in big demand can be seen from the fact that shares issued in the last capital increase were subscribed for by 147,000 holders.

NEW COMPANY

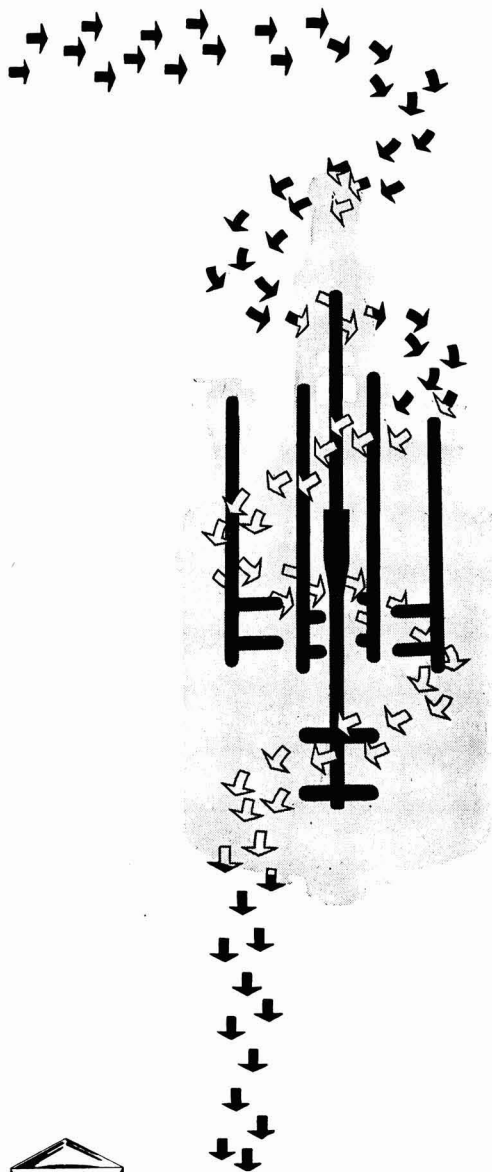
BOEHRINGER INGELHEIM LTD. Cap. £5,000. Manufacturers of and dealers in chemicals, drugs, medicines, disinfectants, etc. Subscribers: P. A. Gold and W. S. Rogers, 5 New Court, London W.C.2.

INCREASE OF CAPITAL

INDUSTRIE CHIMICHE ITALIANE DEL PETROLIO (I.C.I.P.), Via Manzoni 40, Milan, who operate a 1,170,000 tonnes/year refinery at Mantua, are increasing their capital from 7,000 million to 8,000 million lire.



Metal alkoxides and acetylacetonates



Derivatives of catalytically active metals which are soluble in organic media are becoming increasingly important to the organic chemist in his search for high reaction yields under easily attained conditions. Metal alkoxides and acetylacetonates, for example the derivatives of Al, Co, Cu, Fe, Ni, Ti and Zr, for use as catalysts, co-catalysts, and curing agents can be supplied for your evaluation.

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Bookshelf

New dictionary has strong bias to 'pure' chemistry

A NEW DICTIONARY OF CHEMISTRY, 3RD EDITION. By *L. M. Miall*. Longmans, Green, London, 1962. Pp. xii + 593, 84s.

To judge by his preface, the editor of this dictionary would be the first to agree that a work of this sort is essentially an exercise in the art of compromise and that perfection is unattainable as it is undefinable. Some criteria can, however, be suggested. A dictionary should be up to date, accurate and preserve a good balance between the various branches of the subjects treated. The revision of the second edition of this work has been undertaken by 16 chemists well known in their several fields. They have revised the old material so well that it is difficult to detect that this is not a new book. Each reader must make his own judgement as to accuracy but a number of spot checks did not reveal any mistakes. The entries for organic and inorganic chemistry appear better than those for physical probably because the latter are far more difficult to select and cast in dictionary form. One can sympathise with the decision (?) to omit 'Entropy'. Too much space is devoted to potted biographies, which are too often of the 'Who's Who' type. The dictionary could be improved if production figures were given for major chemicals, even figures for the U.S.A. alone would be worthwhile. Indeed the editor has hardly given chemical industry its due. I.C.I. receives no entry. Despite these criticisms, this is a good dictionary with a strong 'pure' bias. It should prove particularly useful to those who have no personal collection of chemical books, but have some chemical education.

► Chemical Kinetics

CHEMICAL KINETICS. By *B. Stevens*. Chapman and Hall, London, 1961. Pp. x + 107, 12s 6d.

The author describes this book as designed for the degree student who is reading chemistry as a secondary subject, but hopes it will prove useful for the first-year honours student also. He presents a formal course which gives the student little insight into the reasons why so many chemists work in the field. About one-third of the text is devoted to the algebra of the subject which is chiefly important for the prospective investigator. For the general student more should be made of the theory of unimolecular reactions. Lindemann's treatment is given in detail (no mention of Christiansen 1921) but no example are discussed. Atom and Free Radical reactions are given a six-page chapter largely devoted to chain processes. The Hinshelwood treatment of inhibition by

nitric oxide is described without any mention of the serious doubts as to its validity. Incidentally, one may hope that this will be the last text book that will suggest that azomethane decomposes simply to nitrogen and ethane.

The book is intended as the first of six of similar type (three others to be written by Stevens) that will discuss aspects of physical chemistry for the general student. To judge by the present volume they will not be widely sought after. There may well be need for descriptive texts for the general student, the provision of such a work has not been attempted here! The material is much the same as that in several of the standard texts, indeed one well-known book devotes 150 larger pages to the topics discussed here. Few students will wish to buy a book which although sound and helpful has no outstanding characteristics.

► Crystallisation

CRYSTALLIZATION: THEORY AND PRACTICE. By *A. Van Hook*. Rheinhold and Chapman and Hall, London, 1961. Pp. ix + 325, 100s.

The scope of the volume is indicated by the chapter titles and their allocation of pages: Historical (44), Basic principles (47), Modern theories (63), Data on nucleation and growth (38), Crystallisation in the laboratory and plant (46), Practice of crystallization (79).

A considerable amount of literature abstraction has gone to the writing of this book; a great deal of material is referred to in the text and in the extensive reference lists. It thus provides a useful abstract of the current facts and theories.

Unfortunately, it gives the impression of having been composed by the 'scissors and paste' procedure. Critical selection and assessment are not obvious, and clear presentation is not the author's strong point.

The account of modern theories and current practice (with particular reference to sugar, common salt, crystallisation of molten alkali halides, and the production of quartz and diamonds) form appreciably more profitable reading.

► Glass fibre

GLASS REINFORCED PLASTICS. Edited by *Phillip Morgan*. Iliffe Books Ltd., London, 1961. Pp. 340, 50s.

A third edition of this book in seven years is thought necessary on the grounds that the application of glass reinforced plastics has undergone "refinement of detail and extension of usage". As in the previous editions, there is no attempt made to treat the subject as a whole, so

that the book consists in the main of self-contained chapters. New chapters have been added on: dough moulding compounds; glass reinforced sheeting; and pressure vessels and filament winding. The first seven chapters are devoted to various raw materials such as glasses; allyl, silicone, melamine and furane resins, but with particular emphasis on polyester resins. Production methods of moulding sheet, rod, and tube are described in the next five chapters. The last eight chapters deal with the specialised applications of glass reinforced plastics to, the electrical field, automobiles, boats, chemical engineering, aircraft, etc. The chapter on miscellaneous applications of glass reinforced plastics covers some 23 topics and is particularly useful as a source of reference. The book is well produced and contains many good diagrams and photographs which clearly illustrate the tremendous scope of these materials.

► Vacuum techniques

VACUUM PRODUCING EQUIPMENT. Engineering Equipment Users Association. Constable and Co. Ltd., London, 1961. Pp. 100, 18s.

The E.E.U.A., consisting of nine member companies, has produced this handbook to serve as a guide to the selection and use of vacuum producing equipment for industrial purposes. It deals almost entirely with equipment which will produce pressure of not less than 1 mm. Hg. The book is arranged in seven sections: Available equipment; Description and performance of the equipment; Sizing of vacuum producing equipment; Selection of vacuum producing equipment; Pipes and fittings; Instruments and control; Vacuum testing. For its size, this book contains a lot of information, and at such a reasonable price industrial users of vacuum equipment will find it well worth having.

► Thermodynamics

THERMOSTATICS AND THERMODYNAMICS. By *Myron Tribus*. D. Van Nostrand Co., New York and London, 1961. Pp. xxxii + 649, 82s 6d.

This is a very unusual text—presumably intended for engineering students with a good knowledge of mathematics. Starting with a simple lever, by page 14 the energy associated with a magnetic field is being calculated in vector notation. The second to fifth chapters bear the titles: Methods of statistical inference; The formalism of statistical mechanics; The perfect monoatomic gas; The general concept of temperature.

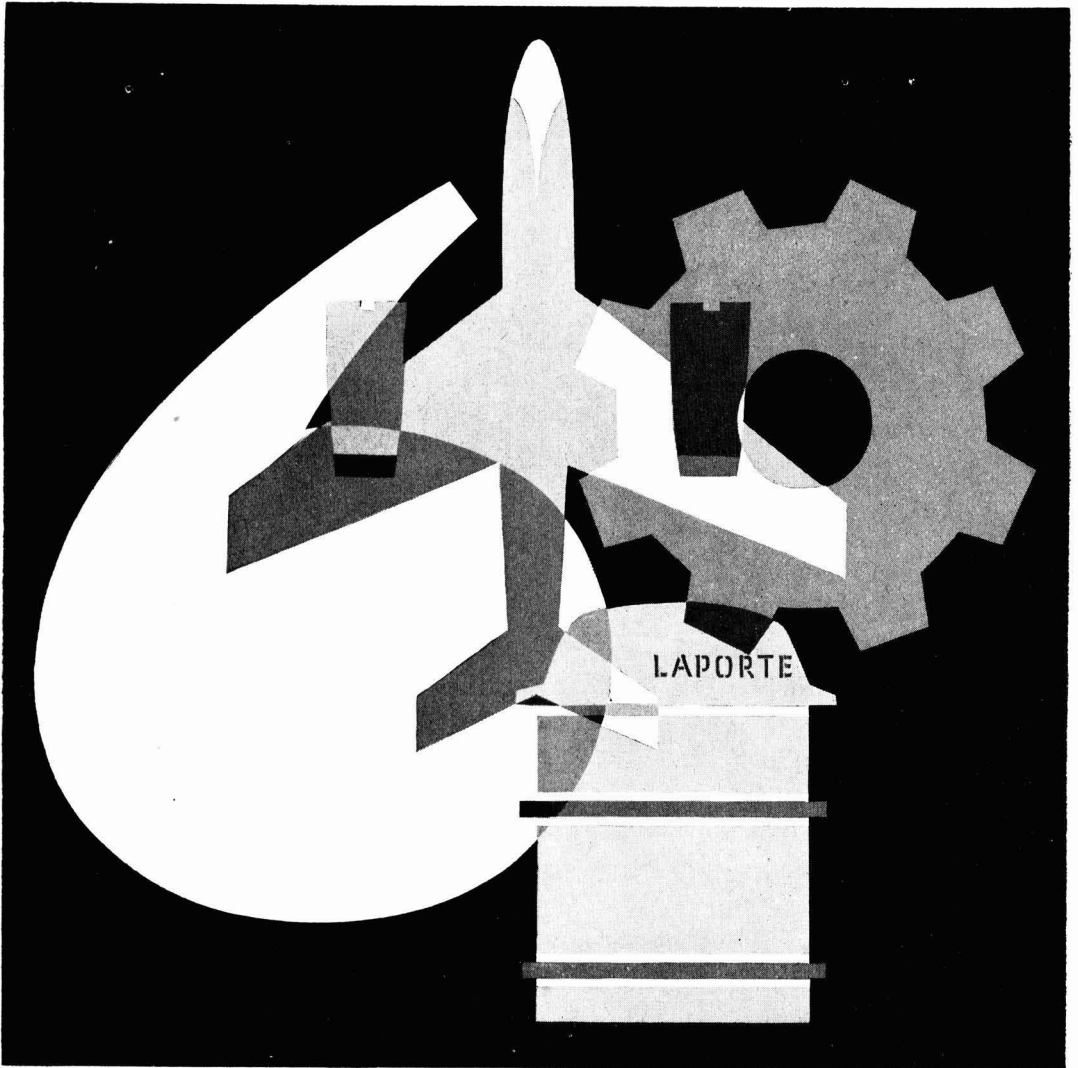
Having been treated to Lagrangian methods, sophisticated quantisation and statistical mechanical problems the reader comes, on p. 505, to the statement: 'The symbol Δ is often used in mathematics to mean "difference in"; and five pages later, via the van't Hoff box with pistons, the equilibrium constant for a gas reaction is deduced.

The book is a remarkable hotch-potch. It will be quite astonishing if, despite the claims on the dust-jacket, it finds any use in the systematic exposition of thermodynamics.



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TRADE NOTES

Cold paint-bonding

Success in the development of a truly cold paint-bonding phosphating process which operates at ambient temperature is reported by the Walterisation Co. Ltd., Purley Way, Croydon, Surrey, who have issued a pamphlet describing the process. Advantages claimed include simplification of plant with lower initial cost, lower operating costs, no steam or fume extraction.

Sulpholane

A new highly polar compound, sulpholane, is available in development quantities for the first time in the U.K. from Whiffen and Sons Ltd. Loughborough. Sulpholane modifies the acidity functions of solutions with shift towards the extremes of the range; acids become more acidic, bases more basic.

The compound can be used as a selective or specialised solvent. It is also being used as the stationary phase in gas liquid chromatography. A good solvent for polyacrylonitrile, it does not react with alkyl halides and is recommended for solvent uses in place of the more volatile dimethyl-formamide.

Pigment proofing

I.C.I. Dyestuffs Division have added to their fast pigment range, Monastral Fast Green GTPS paste, a phthalocyanine green in the form of an aqueous

paste of high pigment content but low content of dispersing agent, which make it specially suitable for use in pigment proofing. In this process, the fabric (usually a canvas) is coloured and water-proofed simultaneously. Besides its designed use for pigment proofing, the new material is of interest for the colouring of milled soaps and distempers, and in wallpaper manufacture.

Aluminium prices cut

To help boost consumption, British Aluminium Ltd. have cut the prices of their rolled aluminium products. Some sheet in 1-ton lots has been reduced by 1½d/lb. or more than £14/ton. In larger quantities, the cuts amount to nearly 2d/lb. One result of the cuts is to widen the differential between standard and non-standard products. Alcan Industries Ltd. have also cut their prices.

New telephone number

Telephone number of the head office of Laporte Industries Ltd., Hanover House, 14 Hanover Square, London W1, has been changed to MAYfair 6003.

Liquid sugar

A new publication on liquid sugar and liquid sweetener mixtures is available from Department R.V., Brown and Polson Ltd., Wellington House, 125-130 Strand, London W.C.2. The brochure is intended to answer the questions of com-

panies considering the use of liquid sweeteners, and details of the Brown and Polson Flo-sweet products are given.

Change of address

Burnett and Rolfe Ltd., Rochester, Kent, announce that the new address of their Manchester office is 515 Royal Exchange, Manchester 2. Telephone number remains Blackfriars 9084.

Durez resin

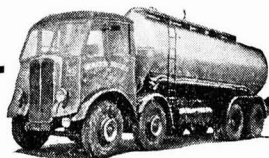
Samples of and physical data on a new addition to the Durez range of resins, No. 19900—a lump thermoplastic oil-soluble resin—are available from Omni (G.B.) Ltd., 35 Dover Street, W.1.

Synthetic resin price cuts

Revised price schedules for a number of the synthetic resins manufactured by Kunstharzfabrick Synthese N.V., of Katwijk-aan-Zee, Holland, are announced by the U.K. distributors, F. W. Berk and Co. Ltd., Berk House, 8 Baker Street, London W.1.

The general purpose polyester resins Setarol 3000, 3001 and 3027 are now available at 1s 10d/lb. for 1 ton lots. Setarol 3039, a chemical-resistant polyester, is at 2s/lb. in ton lots. Reductions of between 4d and 6d/lb. have been made in the price of the various Setarol polyester grades recommended for gel coats, for translucent sheetings.

Lower prices have also been fixed for some alkyd resins, such as Setal 84 (non-yellowing stoving type, based on synthetic fatty acids), and Setal 4001 (75% soya oil, 20% isophthalic acid).



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Full details of advertisement rates will be found at the top of page 186.

NEW PATENTS

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

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

ACCEPTANCES

Open to public inspection 28 February

- Separation of ions. National Research Development Corp. **890 503**
 Process for the production of sucrose esters. Howards of Ilford Ltd. **890 206**
 Pyrimidines. Imperial Chemical Industries Ltd. **890 076**
 Process for the manufacture of acrylic and methacrylic acid esters. British Celanese Ltd. **890 214**
 Manufacture of shaped articles such as filaments from aromatic polysulphonamides. Imperial Chemical Industries Ltd. **890 077**
 Process for polymerising propylene to linear high molecular weight polymers. Montecatini. [Addition to 810 023.] **890 078**
 Extraction of a polysaccharide substance from crude fucoidin. Ciba Ltd. **890 207**
 Organo-tin compounds and process for their manufacture. Farbwerke Hoechst AG. **890 283**
 Process for the manufacture of ion-exchange condensation resins in pearl form. Farbenfabrik Wolfen Veb. **890 080**
 Preparation of steroid compounds. Merck & Co. Inc. **890 511**
 Production of organo-aluminium halide compositions. Imperial Chemical Industries Ltd. **890 221**
 Polymers of alpha-olefins and other vinyl hydrocarbons. Montecatini. **890 224**
 Acylation of hydroxy compounds with vinyl esters. Staley Manufacturing Co., A. E. **890 083**
 Preparations of chlorinated and other non-polar volatile solvents. Gourmet & Co. Ltd. **890 084**
 Dyestuffs of the phthalocyanine series. Farbenfabriken Bayer AG. **890 120**
 Water-soluble dyestuffs containing heterocyclic rings, their manufacture and use. Ciba Ltd. **890 121**
 Production of ethylene copolymers and catalysts therefore. Phillips Petroleum Co. **890 516**
 Polycarbonamides. Du Pont de Nemours & Co., E. I. **890 437**
 Method of preparing carboxylic acids, etc. from hydroxyperoxides. Montecatini. **890 141**
 1:3:4-Oxiazole compounds and process for their manufacture. Ciba Ltd. **890 461**
 Manufacture of foamed polyurethanes. Imperial Chemical Industries Ltd. **890 280**
 Process for the production of isohydrazones. Farbenfabriken Bayer AG. **890 334**
 Preparation of tetrachloroethene. Hooker Chemical Corp. **890 227**
 Disperse dyestuffs of the anthraquinone series. Sandoz Ltd. **890 464**
 Process for the preparation of copolymers. Ethylene Plastique S.A. **890 145**
 Synthetic unsaturated polyester resins. British Celanese Ltd. **890 383**
 Process and apparatus for treatment of hydrocarbons. Soc. Belge de l'Azote et des Produits Chimiques du Marly. **890 311**
 Process for making the surfaces of fluorocarbon polymers cementable. Du Pont de Nemours & Co., E. I. **890 466**
 Polypropylene grease. Esso Research & Engineering Co. **890 386**
 Terephthalic acid. Badische Anilin- & Soda-Fabrik AG. **890 387**
 Polymer of propylene composition. Du Pont de Nemours & Co., E. I. **890 468**
 Organo-phosphorus acaricidal and ovicidal agents. Farbenfabriken Bayer AG. **890 320**
 Preparation of alcohols. Continental Oil Co. **890 307**
 Resinous composition. American Cyanamid Co. **890 261**
 Method of marking perfluoro-carbon resin surfaces. Du Pont de Nemours & Co., E. I. **890 430**
 Process for degassing and rectifying a liquid rich in ethylene and ethane. Soc. l'Air Liquide, Soc. Anon pour l'Etude et l'Exploitation des Procédés Georges Claude. **890 486**
 Process for obtaining anhydrous hydrazine. Farbenfabriken Bayer AG. **890 240**
 Process for the manufacture of magnesium hydroxide. Israel, State of. **890 257**
 Preparation of a sugar ester. Drew & Co. Inc., E. F. **890 136**
 Process for preparing cyclohexanone and cyclohexanol. Stamicarbon N.V. **890 137**
 Chloramphenicol ester. Lepetit S.p.A. **890 313**
 Bisydrazinium salts, their production and pharmaceutical compositions containing them. Grace & Co., W. R. **890 471**
 Process for the polymerisation of conjugated dienes and catalysts therefor. Shell Internationale Research Maatschappij N.V. **890 139**
 Conjugated diene polymerisation process and catalyst therefor. Shell Internationale Research Maatschappij N.V. **890 140**
 Steroid compounds, and processes for their preparation. Laboratoires Français de Chimiothérapie. **890 472**
 Anthraquinone vat dyestuffs and process for their manufacture. Ciba Ltd. **890 172, 890 175**
 Steroids and the manufacture thereof. Upjohn Co. **890 474**
 Cyanuryl chloride. Soc. d'Electro-Chimie, d'Electrometallurgie et des Acieries Electriques d'Ugine. **890 093**
 Androstanol and androstenol derivatives. Searle & Co., G. D. **890 396**
 Production of tetracyclines. American Cyanamid Co. **890 148**
 Steroids and the manufacture thereof. Upjohn Co. **890 315**
 Agricultural chemical compositions. United States Rubber Co. **890 191**
 Substituted benzophenone and polyolefin compositions. American Cyanamid Co. **890 476**
 Process for preparing cyclohexanone. Stamicarbon N.V. **890 095**
 Thiophosphonic and thiophosphinic acids esters. Farbenfabriken Bayer AG. **890 424**
 Condensation products which are fast to light, and their production. Badische Anilin- & Soda-Fabrik AG. **890 150**
 Biguanides and process for their manufacture. Ciba Ltd. **890 477**
 Process for dispersing ammonium bromide in resins. Dow Chemical Co. **890 426**
 Thermo-stabilised dihydroxy diaryl alkanes and cyclo-alkanes. Farbenfabriken Bayer AG. **890 432**
 Substituted amino-sulphonic acids. Du Pont de Nemours & Co., E. I. **890 194**
 Process for the manufacture of carbon tetrachloride. Farbenwerke Hoechst AG. **890 196**
 Polyamides. Monsanto Canada Ltd. **890 479**
 Production of magnetic iron oxide especially suitable for the production of magnetogram carriers. Badische Anilin- & Soda-Fabrik AG. **890 198**
 Process for the production of water-soluble polymers. Badische Anilin- & Soda-Fabrik AG. **890 267**
 Production of cyanogen halides. Du Pont de Nemours & Co., E. I. **890 268**
 Process for purifying chlorine. Farbenfabriken Bayer AG. [Addition to 828 644.] **890 354**

D.S.I.R. Welsh office moves

Branch office of the D.S.I.R. in Wales has moved from Galfaba to new accommodation at 69 Park Place, Cardiff. Here it will be close to both the University of Wales and the College of Advanced Technology, as well as being more easily accessible to industrialists visiting Cardiff.

DIARY DATES

TUESDAY 30 JANUARY

S.C.I.—London: 14, Belgrave Sq., S.W.1. 6 p.m. 'Some thoughts on discharge of effluents to tidal waters,' by Dr. P. N. J. Chipperfield.

WEDNESDAY 31 JANUARY

B.N.E.S.—London: Institution of Civil Engineers, 17, Great George St., S.W.1, at 5.30 p.m. 'Plutonium fuel for nuclear power' by L. Grainger and A. B. McIntosh.

I.I.T.—Cardiff: Welsh College of Advanced Technology, Cathays Park, 6.45 p.m. 'Computors and their application' by E. Stuart.

THURSDAY 1 FEBRUARY

C.S.—Bristol: Department of Chemistry, The University, 6.30 p.m. 'The organisation of research and development' by Dr. F. Roffey.

C.S.—Hull: Chemistry Department, The University, 7.30 p.m. 'Recent advances in the mass spectrometry of organic compounds' by Dr. J. H. Beynon.

C.S.—London: The Large Chemistry Lecture Theatre, Imperial College of Science and Technology, South Kensington, S.W.7, 7.30 p.m. 'Hybrids and related organo-complexes of transition metals' by Dr. J. Chatt.

S.C.I.—Belfast 7: Chemistry Lecture Theatre, Stranmillis Road, 7.45 p.m. Film Show.

S.C.I.—Manchester: Large lecture Hall, Manchester Literary and Philosophical Society, 36, George St., 6.30 p.m. 'Some recent developments in dyestuffs chemistry' by Dr. E. N. Abrahart.

S.C.I.—Nottingham: Gas Showrooms, Parliament St., 7.30 p.m. 'The future of chemicals from coal' by Dr. R. R. Gordon.

FRIDAY 2 FEBRUARY

C.S.—Cambridge: University Chemical Laboratory, Lensfield Rd., 8.30 p.m. 'A few chemical problems connected with cancer chemotherapy' by Prof. F. Bergel.

C.S.—Cardiff: Department of Chemistry, The University, Cathays Park, 5 p.m. 'Chemistry of proteins' by Dr. F. Sanger.

C.S.—Exeter: Washington Singer Laboratories, Prince of Wales Rd., 5.15 p.m. 'Some recent advances in the chemistry of aromatic fluorine compounds' by Prof. M. Stacey.

C.S.—Newcastle upon Tyne: Chemistry Department, Kings College, 5.30 p.m. 'The catalytic oxidation of naphthalene' by Dr. H. L. Riley.

C.S.—Southampton: The Chemistry Department, The University, 5 p.m. 'Carbonyls, computers and crystallography' by Dr. O. S. Mills.

Plas. Inst.—Manchester 3: Textile Institute, 10, Blackfriars Street, 6.45 p.m. 'Foamed rubber and plastics' by I. D. Maxton.

S.C.I.—Birmingham: College of Advanced Technology, Gosta Green, 6.30 p.m. 'Synthetic alcohol production' by A. C. Carle and W. M. Stewart.

S.C.I.—Glasgow: Room 24, Royal College of Science and Technology, George Street, 7.15 p.m. 'Adsorption in everyday life' by Dr. Charles H. Giles.

S.C.I.—Manchester 1: Manchester Literary and Philosophical Society, 36, George St., 6.30 p.m. 'Transportation of corrosive chemicals' by R. M. C. Logan, S. Nash and L. Stubbs.

C.T.R.A. review of coal tar technology

VOLUME 13, part 1 (January to June 1961) of 'Review of coal tar technology' has been issued by the Coal Tar Research Association. Price to non-members is £1.

The volume includes sections on coal tar and coal tar products, and general chemistry and chemical technique. The chapter on utilisation of coal tar products describes patents which have been granted in the plastics and resins fields. Union Carbide have been granted three covering polymers derived from the condensation of phenols with unsaturated acetals. More patents claiming the production of polycarbonates have also been granted.

Patents issued to Union Carbide describe the preparation of dicyclopentadiene dioxide resins and, according to a Dow Chemical Co. patent, certain copolymers of maleic anhydride and aromatic hydrocarbons, when treated with alkali, form alkali metal salts, which are useful as soil conditioners.

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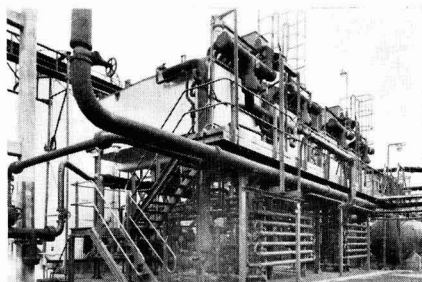
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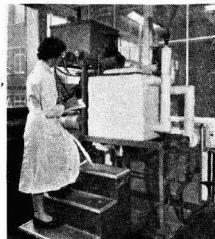
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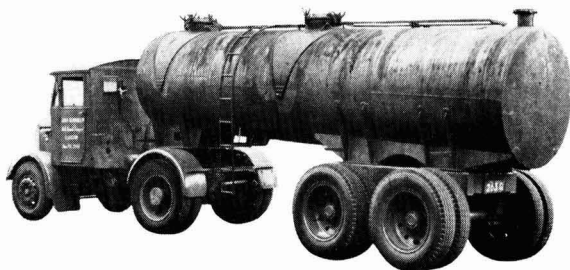


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