Chemical Age

incorporating

PETROCHEMICALS and POLYMERS

VOL. 85 No. 2181 29 APRIL 1961

INDEX TO ADVERTISERS

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

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APRIL 29 1961

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IN THIS ISSUE

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PETROCHEMICALS GROWTH

THE change in CHEMICAL AGE'S title to incorporate the words 'Petrochemicals and Polymers' is timely for it coincides not only with the announcement of the development of two new petrochemical sites, in Wales, at Baglan Bay and Milford Haven, it was also effected in the week that the Royal Institute of Chemistry put the spotlight on petrochemicals at a special symposium held during its annual conference at Southampton.

As Mr. E. LeQ. Herbert said when he opened the symposium, the U.K. chemical industry is making more rapid strides than any other British industry; in the chemical industry it is petrochemicals that are making the fastest progress. Over the past 10 years the average growth rate for all U.K. manufacturing industries has been just over 3%; for the motor industry the figure is 6%; for chemicals, 7%; for plastics, 15%; and for petrochemicals 37%.

U.K. production of organic chemicals from petroleum has risen from 45,000 tons in 1949 to 750,000 tons in 1960 and should reach 1,400,000 tons by the end of next year. Petroleum feedstock has increased from 160,000 tons in 1950 to 1,850,000 tons in 1959, 2,350,000 tons last year and is expected to reach 4,300,000 tons in 1962. By 1962 investments in petrochemicals will have risen five-fold since 1953.

It is clear that Baglan Bay is to be developed by British Hydrocarbon Chemicals Ltd. along the lines of their Grangemouth site with the emphasis initially on olefins. If the Grangemouth pattern is to be duplicated then future announcements can be expected on plants for polythene, methanol and phenol production. Further west in South Wales, the low-cost, high-yield factors of Esso's Milford Haven refinery have already attracted their first chemical customer. Here Fisons will set up a nitrogen complex —and it is perhaps significant that they plan to enter the industrial nitrogen field—while in combination with Esso they will build a joint 150,000 tons/year ammonia plant.

When the new sites are fully developed there will be nine major centres. I.C.I.'s Wilton-Billingham complex has no adjacent refinery, but it will have its own 1 million tons/year oil distillation unit by 1962. The same company's £100 million Severnside complex also has no refinery, but the fertiliser plant of the associated Richardson's Chemical Manure Co. in Northern Ireland will be sited near the new B.P. refinery. In addition B.P. refineries supply feedstock to the Grangemouth complex, which includes Forth Chemicals, Grange Chemicals and Union Carbide, as well as B.H.C., to Baglan Bay, where B.H.C. and Forth Chemicals have new projects and at the Isle of Grain where B.P.-California are building an aromatics plant.

Shell have their biggest plants at Carrington, drawing feedstock from Stanlow, where there is a major xylenes unit. In the south, Shell Haven refinery supplies feedstock for ammonia and associated plants, ammonia being piped to the nearby Fisons plant. In addition to Milford Haven, Esso have their Fawley refinery, from which ethylene and butadiene are supplied to the adjacent plants of Monsanto, Union Carbide and International Synthetic Rubber. In Derbyshire, British Celanese, of the Courtauld's group, have their own petrochemical site at Spondon.

(*Continued on page 688*)

MONTECATINI'S NEW SYNTHETIC RUBBERS AT MILAN FAIR

One of the rooms of Montecatini's pavilion at the Milan Fair. This room was devoted to the three new types of synthetic rubber developed by the company

THE three new synthetic rubbers that Montecatini have exhibited for the first time at the International Samples Fair at Milan (see CHEMICAL AGE last week, p. 652), are the result of long and complex research.

All three products—Elaprim, the acrylonitrile and butadiene copolymer; Dutral, an ethylene/propylene copolymer; and Astyr, 1,4-*cis*polybutadiene—extend the use of synthetic products in the field for which they are designed.

The applications of Elaprim are numerous. Its high resistance to oils and aromatic hydrocarbons gives it extensive uses in the petroleum, chemical, car and textile industries and in fields where rubber must preserve its resilience and original shape after prolonged contact with oils and solvents. It can be processed with the machinery used to make natural rubber articles.

Dutral is a saturated product and therefore chemically inert. Its resultant inactivity, even in the presence of oxidising agents gives it the resistance to ageing claimed for it. Thus, Dutral is described as an 'antiozone' and 'antiacid' rubber. Its elasticity approaches that of natural rubber and is superior to that of other types of synthetic rubber. Another interesting feature of the compound is its low specific gravity which makes it more suitable for certain types of application and cheaper since less weight of rubber is needed for an article of a given size.

The production of tyres for heavy vehicles is expected to be the most important application of Astyr. After being vulcanised, the compound displays more elasticity than its natural counterpart and hence the internal friction is developed with less heat. Its resistance to abrasion is said to be superior to that shown by other types of synthetic rubber or even by natural rubber.

Astyr can be processed by the machinery normally used for tyre manufacture and, as it can be used in any kind of tyre, it expands the potentialities of synthetic rubber in this field—an important factor in view of a possible shortage of natural rubber.

H.O.C. May Have First Plant at Rotterdam

THE Heavy Organic Chemicals Division of I.C.I. hope to have one of the first plants on the 300-acre site which the company has acquired at Rotterdam (see CHEMICAL AGE, 4 March, p. 356), according to the division's chairman, Mr. S. W. Saunders, who was speaking at the Olefine and Oil Works Council's half-yearly meeting. It was expected that the division would be responsible for running and managing its plant at Rotterdam but the company's European Council would look after the sales and commercial sides.

Speaking of the need to increase plant efficiency and output and reduce costs, Dr. Saunders said that much time and discussion had been given to the problem in the last three years and the results were very good. H.O.C. Division's crackers were doing well but the ethylene from them would have to be cheaper. Work was going on to devise a cheaper process for the production of ethylene, especially as the demand was increasing. The division is also looking into new ways of making phenol cheaper.

Dr. Saunders also referred to a planned *p*-xylene plant to meet the demand for it in Terylene manufacture and said that a start would soon be made on a fourth carbonylation unit.

Another speaker at the Council was Mr. E. P. Street. He said that in the last 10 years I.C.I. exports had doubled but in the same period, H.O.C. Division's exports had multiplied by 20. Featuring most prominently in these figures was carbonylation alcohols which accounted for half the value of the exports. Antioxidants accounted for a further fifth.

Capital Spending on Chemicals at Lowest Rate Since 1956

FIXED capital spending by the chemical and allied industries in 1960 totalled £159.4 million, or 18% of the total figure for all U.K. manufacturing industries. It was the lowest chemicals rate since 1956, figures for preceding years being: 1959, £172.6 million; 1958, £196.9 million; 1957, £187,6 million; and 1956, £155 million.

Spending on chemical plant in each quarter was as follows (in £ million):

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
1956	32.4	36.1	37.9	48.6
1957	42.6	48.2	44.4	52.4
1958	48.7	48.4	46.3	53.5
1959	50.2	43.5	34.3	44.6
1960	37.9	37.8	39.0	44.7

In the last half of 1960, spending exceeded the comparable figure for 1959 and it is likely that 1961 will see a return to the high levels of 1958. Mr. S. P. Chambers, I.C.I. chairman, has already indicated in his annual report that spending by his company will now return to 1958 levels (see CHEMICAL AGE, 22 April, p. 653).

A.C.C.'s £1.5 m. Bid for Farmers' Co.

FOLLOWING merger discussions with the board of the Farmers' Co. Ltd., producers of chemical fertilisers and animal feedstuffs, Associated Chemical Companies are now making a bid, valued at more than £1.5 million, for the 550,000 ordinary £1 shares of the Farmers' Co. Terms are two and four-fifths 5s shares of A.C.C. (quoted at 19s. 6d) for each £1 Farmers. This would require the creation of 1,540,000 new ordinary 5s units of A.C.C., whose ordinary capital is at present £2,154,254. Net tangible assets of Farmers are put at £833,000. Their board, who hold 140,700 shares, recommend the offer. A.C.C. expect to maintain the 16% dividend on the larger capital.

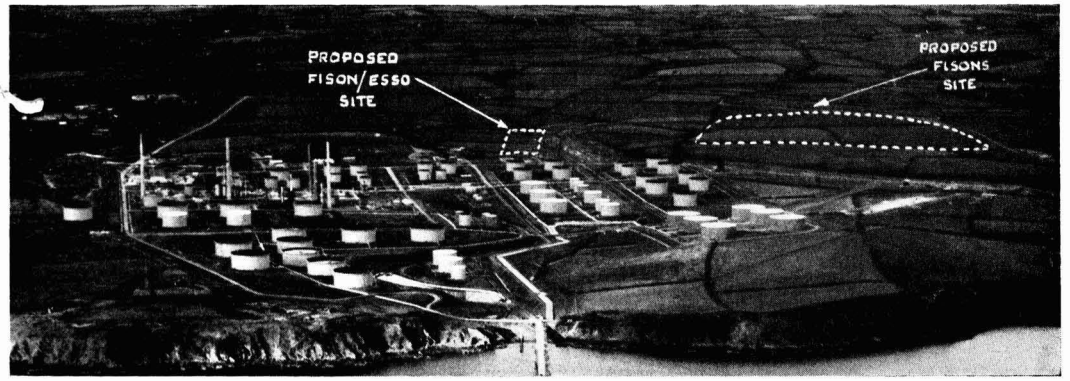
Berk Entertain Metallic Corrosion Delegates

Delegates from the first metallic corrosion congress (see CHEMICAL AGE, 22 April, p. 668) visited the coating division of F. W. Berk and Co. Ltd. They were shown one of the largest shot-blasting chambers in Europe, advanced fluidisation and spray techniques for plastic coatings, equipment for the application of Epikote linings and examples from the Berk range of equipment and instrumentation.

Growth in Petrochemicals

(Continued from page 687)

Many more big new projects can be expected in the coming months. As Mr. L. Holliday of Shell Chemical said at the R.I.C. symposium, the British plastics industry is in a palaeolithic stage—the biggest developments are yet to come. Monomers not now in production are likely to dominate the scene in the next decade or two.



Aerial view of Milford Haven refinery showing the proposed sites for the Fisons/Esso ammonia plant and Fisons wholly-owned nitrogen factory

Project News

£16 M. Ammonia and Nitrogen Plant for Milford Haven

FISONS' biggest-ever project will be a £12 million nitrogen complex to be built on a 40-acre site near the Milford Haven refinery of Esso Petroleum Co. Ltd. Ammonia will be piped from another new plant to be built by a joint company that will be formed by Esso and Fisons on a 50-50 basis. Work on the erection of the 150,000 tons/year ammonia plant, to be built on a five-acre site immediately next to the refinery, will be started shortly. The ammonia plant will cost an estimated £4 million. Both projects should be on stream by the spring of 1964.

Fisons are not yet ready to disclose the nature of the nitrogen products to be made, nor the names of contractors for any of the plants.

The ammonia plant will be constructed in accordance with a mutually agreed specification and programme, with Esso acting as managing agent. Esso will also be responsible for operating this plant on behalf of the joint company. This plant will employ about 50 people, while the nitrogen plant will employ some 200.

The nitrogen plant will produce intermediate and final products for the fertiliser and chemical industries, both at home and overseas.

In addition to the Milford Haven developments, Fisons Fertilizers, in conjunction with their associates, West Norfolk Fertilisers, King's Lynn, are raising capacity of their nitrogen plant at Flixborough, Lincs, to more than double the present output. This should come on stream during 1964. Fisons' share of these projects is estimated at about £12 million, most of which will be met from the company's existing and accruing resources.

U.K. production of nitrogen in 1959-60 totalled 530,000 tons N., with consumption at 550,000 tons N. For 1960-61 U.K. production is expected to rise to 620,000 tons N., with consumption estimated at 580,000 tons N. U.K. ammonia capacity is an estimated 600,000 tons/year, which will by 1964 rise to between 850,000 and 900,000 t.p.a. I.C.I.'s current capacity is estimated at 325,000 t.p.a.

At present Fisons contract to buy some 60,000 tons of ammonia from the Shell Chemical 75,000 tons/year plant at Shellhaven; I.C.I. will start construction this year of their 100,000 tons/year ammonia plant, plus associated plants for urea and fertilisers. Last year I.C.I. Billingham Division completed an ammonia-from-oil project with 60,000 tons/year capacity at Billingham, and during the next two years will bring into production a new process for making at a lower cost hydrogen required for ammonia, fertiliser and other division products. The new process will use light oil as a raw material in place of coke.

Low-cost Feedstock

Fisons' link with Esso for ammonia production will give them a low-cost feedstock because the refinery is one of the world's most highly automated.

Mr. H. C. Tett, Esso's chairman, commenting on the joint project, said that when Esso moved into Milford Haven they undertook to try and interest other related industries in the available raw materials. They are much encouraged by the new project, which has been negotiated within a few months of the start of their own refinery production.

Sir Clavering Fison said that one of the factors which influenced their choice of site was the need to provide employment in the area. While most of their production will go into fertilisers, Sir Clavering said that Fisons would also take a big interest in the growing market for industrial nitrogen.

I.C.I. Go Ahead with Further Modernisation of Perspex Plant

● A FURTHER stage in the modernisation of the Darwen Perspex factories of **I.C.I. Plastics Division** is to be put in hand at a cost of £200,000. Under this project the Britannia Mill will be modernised, enabling output of patterned and block Perspex to be raised. A new stores building will also be provided and the whole programme will take about a year to complete.

The patterned material made at Britannia Mill is mainly used in lighting fittings for which there is a growing demand, particularly in the export market; about 80% of production is shipped overseas. Block Perspex is used for decorative purposes and for model making.

It was stated in May last year that Orchard factory, Darwen, where flat Perspex sheet is made, would be modernised and that the adjacent Parkinsons Mill would be acquired to assist in this.

Present combined output of Perspex plants at Billingham, Wilton and Darwen is 17,000 tons/year. A 3,000 tons/year expansion is due for completion at Wilton by 1962.

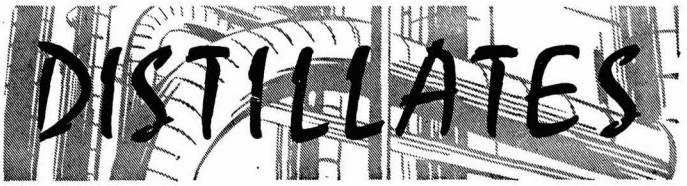
Power Station Steam for British Celanese

● STEAM used for the generation of electricity at 'Spondon H' power station is to be pased on to the Spondon chemical works of **British Celanese Ltd.** This is the first power station in the U.K. to pipe steam to an industrial plant and the station's activities will be geared to B.C.L.'s demand for steam. A maximum demand of 600,000 lb./hr. can be met.

Diesel Generator Unit for Indian Synthetic Rubber Plant

● ORDER for a 750-kW diesel-alternator set for a synthetic rubber and chemical factory that is being built at Bareilly, India, has been received by **W. H. Allen Sons and Co. Ltd.,** Bedford. The order comes from the **Lummus Co.,** who are handling the complete installation. The diesel generating unit consists of a 12-cylinder (vee - form) pressure - charged Allen type VBS12C engine, running at

(*Continued on page 697*)



★ Loss to R.I.C. members of the opportunity of what promised to be an interesting conference lecture on 'The workshop and busy depths of nature'—through the untimely illness of Sir Harold Hartley—was compensated for by a another stimulating talk by Mr. E. LeQ. Herbert, R.I.C. president, who stepped in at short notice. At Belfast last year, Mr. Herbert endeared himself to members with a thought-provoking lecture on 'The chemist and community'—following a similar philosophical strain at Southampton he spoke about 'Catalysts for progress' and how the products of the modern chemical industry themselves help catalyse improvements in standards of living and human well-being throughout the world.

Like his Belfast lecture, Mr. Herbert used modern visual aids to add interest to his talk. With well-edited colour film he showed the successful world-wide fight against diseases such as trachoma, leprosy and yaws, and against ravages of the locust. Not every lecturer can of course command such publicity resources as are available in Mr. Herbert's company, but the time is long past when audiences can be treated to amateurish slides—many scarcely legible even to those sitting in the front row.

Authors should realise their obligations to their audiences and provide slides that can be clearly read even at the back of a hall; there are few industrial organisations today, however small that cannot produce a well-lettered slide. In any event, in a well-organised conference—credit for which must go to the R.I.C. H.Q. staff and to Mr. D. H. Bell and Mr. T. F. McCombie, chairman and hon. secretary of the Mid-Southern Counties Section—Mr. Herbert showed how, even with little time for preparation, a lecture should be presented.

★ While the R.I.C. president was called on to carry out a 'saving operation' and present the Conference Lecture at short notice, Dr. A. J. Howard, Ulster's Government Chemist, and I were asked to effect a 'saving operation' of a very different nature and at much shorter notice. After lunch at an inn, well known to Southampton graduates, we heard a truculent local in the 'public' shouting abuse at the barmaid. In the absence of the landlord, she appealed for the protection of the only two occupants of the 'saloon'—Dr. Howard and myself.

We assured her that we would not leave until the offensive customer had gone and at our suggestion she 'phoned the police. By this time the abusive inebrient was threatening to knife the hapless barmaid. Before he could resort to violence, he peered into the 'saloon' and caught a glimpse of Dr. Howard, who like myself, was wearing a conference badge. Probably thinking we represented some form of law and order, he left in haste.

With the arrival a few moments later of the police, we departed too. Having previously helped extricate a lady R.I.C. member's car from the mud, we felt that we had done our fair share to aid the fairer sex. For two participants, the R.I.C. conference returned to normal. My visit to Southampton ended ignominiously by my car being towed the last 18 miles, following the seizing-up of a big-end. I was not alone in my misfortune, for the Shell film unit, which ably presented the film sequences shown during the president's lecture, experienced a 'blow-out' on the way back to London.

★ "A portrait of a pretty girl holding the product you want to sell" is an old and familiar U.S. definition of advertising. Now this basic idea has been carried into the hitherto austere field of company accounts.

Half-a-dozen glamour pusses, four of them in glorious technicolour, adorn the pages of Snia Viscosa's report and accounts for 1960. To avoid disappointment for any reader who might be tempted to send for the report, I must add that amid a mass of fascinating figures, the vital statistics of the G.P.'s are not mentioned.

★ The chemical engineering manpower situation in U.K. industry seems less desperate now than it did a few years ago, but there is still an unsatisfied demand for chemical engineers in the chemical industry. So much is noted in the annual report of the Institution of Chemical Engineers, which records that, with 500 newly qualified chemical engineers in 1959 the U.K. had the third largest output in the world after the U.S.S.R. and the U.S. In 1956 it was estimated that the output of chemical engineers in the U.K. in 1959 would be 727 as compared with the actual figure of 498. It may be estimates for 1962 (875) and 1965 (1,052) are also too high, but they do give some idea of the country's future capacity for training chemical engineers.

Chemical plant firms are better off in chemical engineering manpower than the chemical industry, for the B.C.P.M.A. annual report for 1960 states that for the most part members have not been experiencing any real shortage of chemical engineers, although several firms reported difficulty in obtaining men in the 30-50 age group.

Sir William Garrett, A.B.C.M., chairman, told the Institution of Work Managers recently that the shortage of chemical engineers was most of our most damaging weakness, made worse because chemicals were expanding twice as fast as our industries as a whole.

★ Talk in oil and petrochemical circles recently has often come round to benzene-from-petroleum and who will be the first in the field with a large-scale plant. While B.P.-California have announced the first U.K. petro-aromatics plant, it will not by present-day standards be a large one.

In view of the fact that benzene consumption is estimated to rise to between 350,000 and 400,000 tons/year by 1965-66, I expect to hear of one or two plants in the 50,000 to 100,000 tons/year-range before long. Shell, who can use Venezuelan crude are thought of as likely contenders; Esso and Mobil, who have no petrochemical plants in the U.K., are also in the field. These three companies all have aromatics plants under construction on the Continent. I.C.I. with their large Severnside site—and only two projects so far announced for it—must also be in the running.

In the near future, readers can expect to hear an announcement concerning the first U.K. manufacture of polycarbonates.

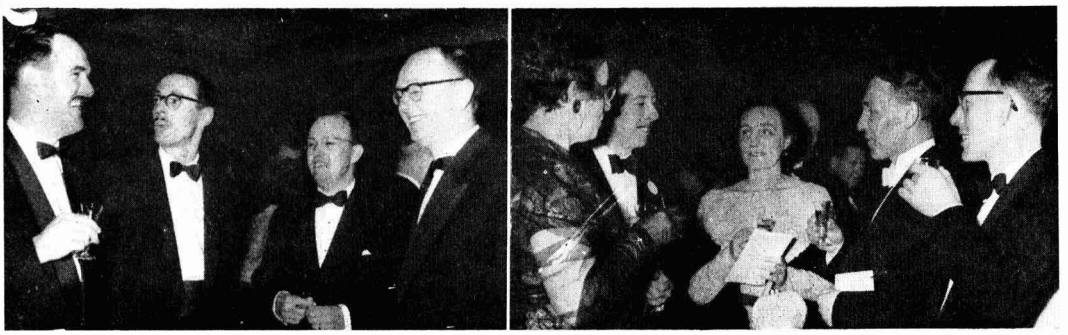
★ With the aim of finding new outlets for cereal grains and other starch-rich crops, the Arthur D. Little Research Institute of Inveresk, has been doing much work on the preparation of polymers from glucose and its derivatives. Researchers have come up with promising route to polyamides via interfacial polycondensation. Optically active polymethacrylate has been prepared containing glucose derivatives.

Promising work has also been done on modifying the chemical structure of wood to overcome the disadvantages of timber and open up new markets. Work designed to explore the properties of ethylene sulphide has been started in the belief the interesting new uses will be found. Industrial development has been hampered, it is felt, by the lack of an economical process.

I was interested to learn from the annual report that half of the Institute's sponsors are British and Continental and the rest American. Some 65% of its income comes from industry, the remainder from governmental and related industries. A.D.L. are unique in that all its work is orientated basic research, with all projects lasting three years or more.

Alembic

R.I.C. CONFERENCE AT SOUTHAMPTON



At the R.I.C. annual dinner: l. to r., P. R. Roberts (D.C.L. Chemical Division, Hull), M. J. Glover (Government Chemist's Department), Dr. A. D. Jenkins (Gillette Industries Ltd.), Dr. R. J. Magee (Queen's University, Belfast), Mrs. Lambie, D. A. Lambie (Radiochemical Centre, Amersham), Mrs. Hale, R. W. Hale (Boots Pure Drug Co. Ltd.) and K. Harrison (Flintkote Ltd.)

Chemicals from Petroleum are Theme of Conference Symposium

MORE than 250 members attended the annual conference at Southampton University from 20 to 22 April of the Royal Institute of Chemistry. Highlight of the conference, which was successfully organised by the headquarters staff in co-operation with the Mid-Southern Counties Section, was a symposium on 'Chemicals from petroleum'.

Conference lecture, which was to have been given by Sir Harold Hartley, C.B.E., F.R.S., an hon. fellow on the subject of 'The workshop and busy depths of nature' was because of Sir Harold's indisposition given at short notice by Mr. E. LeQ. Herbert, R.I.C. president, who completed his term of office at the meeting. Mr. Herbert, who is succeeded as president, by Sir William Slater, K.B.E., F.R.S., who is a former secretary of the Agricultural Research Council, spoke on 'Catalysts for progress', illustrating his lecture with film and linking it with the symposium theme of petrochemicals.

Members and their ladies were welcomed at a civic reception in the Guildhall on Thursday, 20 April. The Institute's annual dinner was held at the Guildhall the following evening, followed by receptions and dances on 22 April, held by British Drug Houses Ltd. at the Polygon Hotel and jointly by Southampton University and the Institute at the University.

Works visits arranged included those to the Southampton Gasworks, where members saw a modernised works capable of converting refinery gas into high-quality town gas by cyclic catalytic processes; John Wyeth and Brother Ltd., Havant, manufacturers of ethical pharmaceuticals; Mullard Ltd.'s new semiconductor works; the International Synthetic Rubber Co. Ltd., Hythe; Esso Petroleum's Fawley Refinery; and the Atomic Energy Establishment, Winfrith.

Papers were given as follows: 1st session, with Mr. Herbert as chairman—'New polymers from petroleum', by Prof. H. F. Mark and Prof. N. Gaylord, Polymer Research Institute, New York; 'Monomers from petroleum', by Mr. L. Holliday, research and development manager, Plastics and Rubber Division, Shell Chemical Co. Ltd.; and 'New methods of polymerisation', by Mr. K. C. Bryant, research manager, Monsanto Chemicals Ltd. 2nd session, with Mr. D. H. Bell, chairman, Mid-Southern Counties Section, as chairman—'Fibres from polypropylene', by Mr. A. B. Thompson, I.C.I. Fibres Division; and 'The manufacture of heavy organic chemicals from petroleum in the U.K.', by Mr. Harold Hodge, Chemicals Department, Esso Petroleum Co. Ltd.

Mr. Hodge, who gave his paper at a meeting held recently in New Orleans by the American Institute of Chemical Engineers, spoke in place of Mr. F. P. Bannister, butyl supervisor, Esso Petroleum, who was unable to present his paper on 'The manufacture of isobutylene polymers'. Mr. Hodge's paper was extensively reported in CHEMICAL AGE, 4 and 11 March.

The 1962 annual conference will be held in London during April.

Modern Petrochemicals—the Catalysts for Progress, says R.I.C. President

LINKING his paper on 'Catalysts for progress' with the general theme of the conference symposium on petrochemicals, Mr. E. LeQ. Herbert, president, paid tribute to that rapidly expanding section of the chemical industry. To the chemist, the present was the age of catalysis; at the end of every chemical reaction exploited commercially was some industrial product—many of them chemicals from petroleum and products often derived from a catalytic reaction—which were themselves harbingers and hasteners of change within the wide sphere of human activity. With wise guidance they were 'catalysts for progress'.

Chemicals played a most important part in the world-wide fight against disease and to illustrate this Mr. Herbert showed colour film of how modern drugs are helping to combat trachoma, leprosy and yaws.

No matter how good modern soap and synthetic detergents were, scarcity of water was a limiting factor in hygiene. This was where the newly developed use of a monolayer of cetyl alcohol or octadecanol on the surface of water—about 5 lb. per acre per year—could reduce evaporation to 65%. Cloud seeding with silver iodide or solid carbon dioxide was another potent weapon and had in fact filled Lake Corella Dam in Australia.

The supply of food in adequate quantities was another vital factor in the well-being of the world's population—an estimated 2,000 million. But there were just as many insects to every square mile of land—enough to cause half of all human deaths and in one year to deny use of bread, grain and rise to feed 150 million people. A medium-sized swarm of locusts had to consume 2,000 tons of food a day to maintain itself and the fight against this plague was illustrated by colour film which showed dieldrin in light mineral oil being sprayed from a plane.

Mr. Herbert also spoke of the part played by fertilisers, plastics, man-made fibres, etc., in raising standards of living throughout the world.

He concluded by saying that security was once thought of as being static—it rested on things not happening. The pace of things and new products of industry had in the last 30 years brought old industries to ruin or at least to hard-

Mr. and Mrs. E. LeQ. Herbert receive R. J. Cole (Paint Research Station)

ship and to the reverse of security. "We are coming to a concept of 'dynamic security'—the equilibrium generated by perpetual change, something like what the chemist calls 'dynamic equilibrium'," declared Mr. Herbert. This meant that every industry had to be alive and moving, energetic and able to live with what changes came, ready to discard what was no longer productive and to accept what was better.

The strength of modern industry was built on changing demands and circumstances and its security was a function of its response to those changes. 'Dynamic security' depended on ceaseless action and reaction and endless change. Those catalytic forces were general and world-wide, benefiting humanity in general throughout the world.

Plastics Still in 'Stone Age' with Biggest Uses Yet to Develop

WHEN certain developments ahead come about, particularly in the application of plastics as a material of construction in the building industry, the present use of plastics will appear trivial. This was the view expressed by Mr. L. Holliday (research and development manager, Plastics and Rubber Division, Shell Chemical Co. Ltd.), when he gave the second paper in the R.I.C. symposium on 20 April. In a paper entitled 'Monomers from petroleum', he said that those engaged in plastics tended to think of themselves as rather sophisticated technically—in fact they were about as sophisticated as man in the Stone Age. The plastics industry was at the same stage as palaeolithic man when he developed the first type of flint arrowhead.

Really large-scale production of monomers has taken place since about 1940; the particularly high growth rate for ethylene is due to the fact that apart from polymerisation, it is also used for the production of ethanol, ethylene oxide, ethyl chloride, etc. Parallel with the vast increase in production, prices of most of these monomers have fallen in a striking way. The following data, shown in U.K. units, are based on U.S. data:

	1940	1950	1960
		£ per ton	
Butadiene	548	94	113
Styrene	426	135	104
Vinyl chloride	—	147	88
Vinyl acetate	—	203	140
Acrylonitrile	517	440	216

Prices have fallen greatly as output has risen. This leads to the conclusion that many potential monomers, at present rather rare chemicals, will in about 20 years time be in common use for the production of polymers.

One of the most fruitful lines in current monomer research consisted of exploring to the full the possibilities of simple one-step reactions, such as ammoxidation or oxychlorination. Oxidation reactions are particularly important and nowadays alcohols, phenols and carboxylic acids are produced by oxidising paraffins and aromatics under controlled conditions.

Ethylene is one of the most important monomers as can be seen by the consumption of polythene—600,000 tons/year in the U.S. and about 130,000 tons/year in the U.K. Made almost exclusively by the pyrolysis of ethane and higher mol. wt. hydrocarbons, ethylene is not a significant by-product of refinery operations, such as reforming and cat cracking, which are directed towards petroleum manufacture. Typical yields from these processes are given below, the table showing that ethylene is a relatively minor product. Propylene and butylenes are, however, major products:

	Thermal Reformer Operating at 1,500 t/d		Catalytic Cracker Operating at 5,000 t/d	
	% wt.	tons/day	% wt.	tons/day
H_2 ...	—	—	0.15	7.5
CH_4 ...	2.05	30.5	1.20	60.0
C_2H_4 ...	0.45	6.8	0.40	20.0
C_2H_6 ...	4.05	60.7	1.15	57.5
C_3H_6 ...	2.35	35.2	2.25	122.5
C_3H_8 ...	4.25	63.7	1.90	95.0
C_4H_8 ...	2.85	42.7	3.40	170.0
C_4H_{10} ...	3.75	56.3	4.20	210.0

These figures show that special processes must be used where ethylene is required as a primary or major product. These processes, which also use thermal cracking, are characterised by very high temperatures, short residence times and a relatively low molecular weight feedstock. In general, the higher the mol. wt. of feedstock, the less selective is the process for ethylene production:

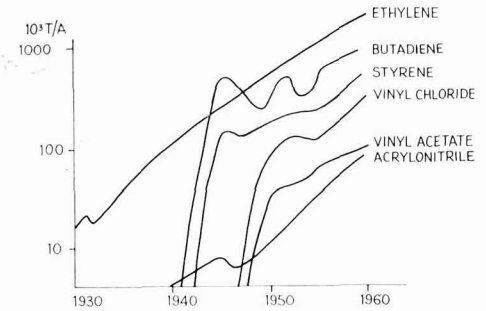
	Ethane Cracking 48% Conversion once through	Propane Cracking 85% Conversion once through	Gasoline Cracking once through
	% wt.	% wt.	% wt.
H_2	3.3	1.0	0.6
CH_4	4.0	20.4	11.1
C_2H_4	38.8	25.1	15.7
C_2H_6	52.0	10.2	6.6
C_3H_6	0.9	15.8	14.4
C_3H_8	0.5	15.0	1.7
C_4H_8 } < 0.5		2.7	C_4H_8 2.3
C_4H_{10} }			C_4H_8 11.3
			C_4H_{10} 0.2

If the requirement is only for ethylene, it will be seen that ethane is obviously an excellent feedstock, although ethane is only available on a large scale where there are natural gas resources. Where other olefins are needed, gasoline is a better starting point.

Recent advances in cracking process for ethylene have concentrated on higher temperatures, lower residence times, cheaper and heavier feedstocks. B.A.S.F. have a fluid coke cracking process, starting with crude oil. The reactor contains the fluid bed and the coke particles receive the coke formed in the reaction. Part of the coke is burned to provide the heat of reaction. To control reaction time, Monsanto have developed a molten lead reactor in the U.S. on a semi-commercial scale. The gas to be cracked is bubbled through molten lead; olefin production can be controlled more exactly using a very short residence time, since further reaction of the olefins is prevented.

In the production of acetylene from petroleum sources, very high temperatures, between 1,200 and 1,500°C and very short residence times, have to be used so that cracking reactions are

Dr. K. C. Warne (I.C.I. Heavy Organic Chemicals Division), Mrs. Warne, R. W. Rae (British Hydrocarbon Chemicals Ltd.) and Mrs. Rae



This graph shows growth in the U.S. for some monomers

favourable to the thermodynamics of acetylene formation. The heat of cracking is endothermic and very high. In the more modern processes, the high heat requirements are met by mixing in with the feedstock a quantity of pure oxygen and leading the mixture into a burner made of ceramic materials. Combustion gases are quenched immediately with water to lessen decomposition of the acetylene. After removal of water vapour and carbon, a typical crude gas composition would be only 8½% vol. acetylene, 57% vol. hydrogen and 25% vol. carbon monoxide. This mixture calls for an elaborate purification train and the most recent publication on the Montecatini process predicts a manufacturing cost for acetylene of £40-£50/ton—if true, this will make acetylene a much more widely used raw material.

Mr. Holliday expected further developments in the field of chlorine-containing monomers as the result of research into chlorination reactions of hydrocarbons at high temperatures. In one process, in which ethane is chlorinated at 500°C, vinyl and vinylidene chlorides are produced. Such processes would become more attractive if the by-product hydrogen could be used again as a source of HCl. At present it is usually an embarrassment and the Deacon process for oxidising hydrogen chloride to chlorine is not very attractive.

Reason for the great interest in the recently announced Standard Oil of Ohio process for acylonitrile was that it did not require hydrogen cyanide, a rather expensive intermediate. Sohio feedstocks are ammonia, propylene and air—the process is one of ammoxidation. Hydrogen cyanide itself is made from methane, ammonia and oxygen. Distillers have shown that *m*- and *p*-xylenes will undergo the same reaction in the presence of a suitable catalyst to produce the corresponding dinitrile.

The second largest class of monomers are those containing oxygen. No success has yet been achieved in the search for a process to oxidise propylene direct to propylene oxide. On the other hand propylene can be oxidised to acrolein and isobutene to methacrolein. The acrolein route is one of the two petrochemical routes to the production of glycerol, an important monomer. These throw up other monomers—acrolein, allyl chloride, allyl alcohol and epichlorhydrin. The availability of cheap acrolein opens up the possibility of more economical routes to other important monomers, such as the acrylates.

R.I.C. Hon. Fellows Receive Scrolls

SCROLLS of hon.-fellowship were presented at the R.I.C. dinner to Sir John Russell, F.R.S., a past-president of the British Association and director for many years of Rothamsted Experimental Station and of the Imperial Bureau of Soil Science, and to Sir Eric Ashby, Master of Clore College, Cambridge, and a former vice-chancellor of Queen's University, Belfast. Making the presentations at the Guildhall, Southampton on 21 April, Mr. E. Le Q. Herbert, retiring president, said that hon. fellowship was the highest award the R.I.C. could make, the first recipient having been the Duke of Edinburgh.

Mr. Herbert proposed the toast of 'The County Borough of Southampton', to which Councillor W. Greenaway, Mayor of Southampton, replied. He also replied to the toast of 'The Institute', proposed by Sir Eric Ashby.

Sir Eric declared that it was a very good thing that the R.I.C. had been founded—when Sir John Russell was 15 years old—to take over from the universities the task of giving cohesion to the profession of chemistry. That cohesion now formed a most important national and international bond. The R.I.C. had also made a vital contribution to education and it was encouraging that the Institute put such a stress on practical work.

Toast of 'The Guests' was proposed by Sir William Slater, K.B.E., F.R.S., and was responded to by Dr. D. G. James, vice-chancellor, Southampton University. Sir William particularly welcomed Sir Alexander Todd, F.R.S. president, Chemical Society, Mr. G. F. Williams, president, Association of British Chemical Manufacturers, and Mr. L. T. Le G. Burley, both directors of the British Drug Houses Ltd., and Sir John Russell, whom he said was an apothecary's apprentice who came to be one of the world's greatest agricultural chemists.

Sir William Slater is New R.I.C. President

SIR WILLIAM SLATER, G.C.V.O., K.B.E., F.R.S., a member of the R.I.C. council from 1953 to 1956 and formerly secretary of the Agricultural Research Council, was elected president in succession to Mr. E. LeQ. Herbert, managing director of Shell Refining Co. Ltd. Other officers elected were:

Vice-presidents: Mr. George Dring, technical consultant and former research director of Bakelite Ltd., who is vice-president, Plastics Institute; Dr. F. A. Robinson, director of research, Allen and Hanburys Ltd., treasurer and past chairman, Biochemical Society; Mr. E. J. Vaughan, C.B.E., director of materials research, Royal Naval Scientific Service.

Hon. treasurer: Dr. Harold Burton, Professor of Chemistry, Queen Elizabeth College, London University, who is vice-chairman of the Chemical Council, and R.I.C. hon. treasurer since 1953.

General Council members: Dr. F. Hartley, scientific services director, British Drug Houses Ltd., hon. treasurer, Chemical Council; Dr. E. C. Wood, analytical and consulting chemist, hon. editor, Association of Public Analysts; Dr. E. D. Hughes, F.R.S., Professor of Chemistry, University College, London, and former hon. secretary, Chemical Society; Dr. R. M. Barrer, F.R.S., Professor of Physical Chemistry, Imperial College; Dr. R. H. Purcell, C.B., chief scientific adviser, Home Office; Dr. D. G. O'Sullivan, director, D.S.I.R. research unit, Courtauld Institute of Biochemistry, Middlesex Hospital; Mr. G. H. Bottomley, vice-principal and head, Chemistry Department, Widnes College of Further Education.

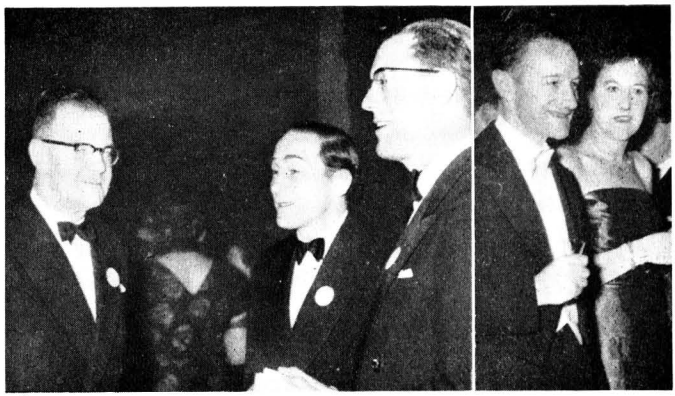
O.E.E.C. Issues New Drug Regulations Report

'TECHNICAL and administrative regulations on pharmaceutical products in O.E.E.C. countries' is the title of a report issued in English and French by the O.E.E.C. Chemical Products Committee working in co-operation with the *ad hoc* Working Party on Pharmaceutical Products.

The report contains details of pharmaceutical import licences, limitations and regulations concerning pharmaceuticals from the public health and hygiene angle, controls in the field of pharmaceutical advertising, as well as details of price controls, registration of specialities and patents, sickness insurance and so on in the following countries: Belgium, Denmark, Germany, France, Ireland, Italy, Holland, Norway, Austria, Portugal, Spain, the U.K., Sweden and Switzerland.

Desulfurol for Boiler Use at London Airport

Combustion Chemicals Ltd. have received a 12-months contract from the Ministry of Aviation for the supply of Desulfurol for the treatment of the heavy residual fuel oil used on the La Mont H.P.H.W. boilers at London Airport.



G. Holland, left (A. Boake Roberts and Co. Ltd.), with R. G. Mason (a director of Boake Roberts) and T. M. D. Ball (D.C.L. Chemical Division). On the right is Mr. A. J. Turnbull (Nestlé Co. Ltd.) with Mrs. Turnbull

Soviet Metallic Polymers for Use in Rockets

THE use of condensation processes in recent years in the U.S.S.R. to prepare polymers containing metallic, or at any rate, non-carbon atoms in their main chain, mainly to make high-temperature products for use in rocketry was described by Mr. K. C. Bryant (research manager, Monsanto Chemicals Ltd.), in his paper at the R.I.C. conference. In his paper, entitled 'New polymers from petroleum', Mr. Bryant divided polymerisation reactions into condensation reactions—where bifunctional molecules react with or without the elimination of by-products such as water; addition reactions—where cyclic saturated molecules open their ring and add to one another; and vinyl polymerisations—where unsaturated molecules add to one another, one of their double bonds disappearing, a category which presumably included formaldehyde.

In principle, the Soviet method was used to prepare organometallic compounds which could be partly hydrolysed to yield dihydroxy compounds. These then condense to give high molecular weight compounds, with, for example, aluminium in the backbone. Trivalent elements, such as aluminium and tetravalent, such as titanium and zirconium, can be used and, by employing a mixture of alkoxides, two or more metals can be introduced into the main chain. It is not clear how or whether the structure can be controlled. PON polymers can be prepared in the same way.

Another interesting technique of carrying out condensation reactions—interfacial condensation—is a Du Pont discovery. Polycondensations are frequently based on slow reversible organic reactions, e.g. between a diamine and dicarboxylic acid, needing a high temperature and reduced pressure to remove the low molecular weight by-products, such as water, and alcohol. Many polyamides and polyesters have been prepared in this way, but they have been limited to intermediates and polymers stable under the severe conditions usually required.

Mr. Bryant then outlined the work of Wittbecker and Morgan, who found that the Schotten-Bauman reaction of an acid chloride with an active hydrogen could be made the basis of a simple interfacial polycondensation process. At present, this is mainly an excellent tool for exploring new structures and compositions, but it is not clear whether it can supplant the old-established industrial techniques. It is particularly applicable to polyterephthalamides from short chain, primary, aliphatic diamines, as well as to polyamides based on 4-4' sulphonyldibenzoic acid.

A rather spectacular example from the field of metal-containing polymers is the first reported preparation of a truly high molecular weight soluble beryllium-containing polymer by Klueiber and Lewis from a monomeric co-ordination compound, also polycarbonates by transesterification of diphenyl carbonate with bisphenol A.

Mr. Bryant continued by outlining vinyl polymerisations, particularly stereospecific polymers. The Firestone Rubber Co. developed their Coral rubber with lithium to give a product almost identical with natural rubber, except that it contains a little more 3-4, at the expense of *cis* 1-4. A very similar material, Ameripol, has been developed by Goodrich-Gulf by a Ziegler-type catalyst of a specific titanium/aluminium ratio. It is stated that at Ti/Al-2 the product is all trans 1-4 isoprene, but that between 0.5 to 1 and 1.5 to 1 the product is *cis* 1-4.

While interest has centred on *cis* 1:4 polyisoprene, Russian workers have reported that, using chromium oxide catalysts, exclusively trans 1:4 polymers were obtained from butadiene and isoprene.

When Dye Problems are Solved Polypropylene Will Find Wide Textile Usage

THREEFOLD expansion of polypropylene capacity at the Wilton Works of I.C.I. Plastics Division, from the current level of 11,000 tons/year to at least 33,000 tons/year, is envisaged in the next few years. This was stated by Mr. A. B. Thompson (I.C.I. Fibres Division) in his paper entitled 'Fibres from polypropylene' presented at the second session of the R.I.C. symposium on 'Chemicals from petroleum'. (Expansion to 22,000 tons/year has already been sanctioned by I.C.I. and a contract awarded to Constructors John Brown Ltd., who built the original units—see CHEMICAL AGE, 11 March, page 401.

Mr. Thompson said that in the U.S. alone production capacity rose from about 10,000 tons/year in 1958 to about 60,000 tons in 1960 and is expected to reach 250,000 tons shared between at least eight major producers by the end of 1962. Polypropylene has a higher softening point, a higher rigidity, which is less sharply reduced by rising temperature, and has a lower density than polythene—these properties, combined with the low cost of manufacture from readily available propylene supplies, first made the newer material of major interest as a moulding plastics.

Polypropylene is also suitable for the production of melt-extruded film, monofilament and fibre and these applications are being developed. I.C.I. Fibres Division has plans for production at Wilton Works, where it has pilot plants.

Polypropylene fibres are of low density, high strength and high durability. These properties, combined with the fact that they are expected to be priced between the more expensive polyamides and finer wools on the one hand and rayons, cottons and bast fibres on the other, leads I.C.I. to believe that polypropylene will find wide applications in fibre markets.

Although many modifications and treatments are now known which render the fibre dyeable, no producer has yet announced the commercial production of a dyeable fibre—it seems that none of the various modifications is yet cheap enough, or has given adequate technical effects for commercial exploitation. All coloured polypropylene fibres currently being sold are pigmented before extrusion.

Much work remains to be done in evaluating the virtues of polypropylene fibre, but the few recovery measurements so far made indicate that it is likely to find uses in pile and loosely constructed fabrics. Another of its virtues is useful here, for despite high strength and durability, it is remarkably resistant to pilling—in fact if polypropylene were mixed with wool, Mr. Thompson would expect to find that any pilled material would be woollen—not polypropylene.

When dyeing problems are overcome, I.C.I. expect that polypropylene will find considerable markets in the general textile fabric field, as well as in high strength industrial products.

B.C.P.M.A. See Overseas Contracts as Recognition of U.K. Contracting Competence

LAST year, members of the British Chemical Plant Manufacturers' Association obtained an "outstanding number" of overseas contracts, states the association's annual report. Encouraging features seen in this are the increasing recognition of the contracting competence of U.K. firms, the provision in many cases of know-how and the work it brought to B.C.P.M.A. members who acted as sub-contractors.

A significant part in exports was also played by members making unit items of equipment and specialised process plant. A survey carried out last year by B.C.P.M.A. revealed that while price and delivery were considered by some to be obstacles to greater overseas trade, members were mostly troubled by credit terms and the facilities offered by the Export Credits Guarantee Department. Tied loans were also thought a handicap by some.

The executive committee hopes that member-firms will take advantage of opportunities in the European Free Trade Association. Sweden is cited as having a chemical plant industry with an annual output of around £2.5 million a year; in 1959 that country imported chemical plant from West Germany to the value of £2.5 million, compared with only £250,000 from the U.K.

Exports of chemical and allied plant in 1960 were valued at £20.98 million, compared with £19.99 million in 1959 and £14.70 million in 1958. Imports in 1960 were valued at £1.54 million (£1.44 million in 1959 and £1.55 million in 1958).

Tariff Reduction

The association expects that the chemical plant industry would lose rather than gain by any tariff reduction, but it has not raised any objection to the idea of tariff cuts, it being hoped these might help in bridging the gap between the Common Market and the rest of West Europe. It is expected that under G.A.T.T. negotiations, the C.M. tariff will ultimately be 10% for most items of chemical plant; the corresponding U.K. rate would be 14%.

The report refers to a mission to Yugoslavia, sponsored by the Federation of British Industries, which indicated increased opportunities for trade with that country, whose five-year plan, 1961-65, provides for considerable rises in output of chemicals, particularly sulphuric acid and fertilisers.

Joint research projects with the Association of British Chemical Manufacturers have continued on distillation, liquid/solid separation and drying. Members of both associations have indicated that they feel that research is also needed in: Mixing, particularly of solids and non-Newtonian materials; heat transfer, especially from two-phase systems; size reduction and separation, and gas cleaning. A.B.C.M. has recommended that the Engineering Equipment Users' Association should prepare a code of practice covering the design, performance and selection of gas cleaning equipment.

B.C.P.M.A. Officers

AT the annual meeting of the British Chemical Plant Manufacturers Association, held in London on 20 April, Mr. Norman C. Fraser, deputy chairman of W. J. Fraser and Co. Ltd., retiring chairman, was re-elected. A ballot to fill 10 vacancies on the council resulted in the election of the following:— C. Colley (managing director, Metal Propellers Ltd.); P. D. Doulton (joint managing director, Matthew Hall and Co. Ltd.); E. S. Franklin (managing director, Torrance and Sons Ltd.); Dr. R. Lessing, C.B.E. (managing director, Hydronyl Ltd.); A. E. Matthews (technical director, John Thompson (Dudley) Ltd.); R. Middleton (director, George Royston and Son Ltd.); R. C. Odams (director, Constructors John Brown Ltd.); B. N. Reavell (chairman, Kestner Evaporator and Engineering Co. Ltd.); R. W. Rutherford (managing director, Power-Gas Corporation Ltd.); and P. W. Seligman (deputy chairman and managing director, The A.P.V. Co. Ltd.).

The following officers were elected by the Council:— Vice-chairmen: P. D. Doulton (Matthew Hall); R. W. Rutherford (Power-Gas); P. W. Seligman (A.P.V.); hon. treasurer: H. W. Fender (vice-chairman and managing director, Prodorite Ltd.).

I.Chem.E. Survey Shows Penetration of Chemical Engineers into Industry

IN his presidential address at the annual general meeting of the Institution of Chemical Engineers, held in London on Tuesday, Mr. W. K. Hutchison, C.B.E., referred to a survey, carried out in 1960, of the employment of chemical engineers in the U.K. The results of this survey, to be published soon, confirm the findings of previous surveys and again indicate the extent to which chemical engineers are penetrating the whole range of process industries, including such diversified activities as metals, textiles, food, drink and tobacco, and paper. The broad grouping of chemical and allied trades continues to occupy the leading position that would be expected, employing 34.6% of the total, and chemical plant manufacture remains the highest single class of employment with 17.7% of the total. The fuel and power industries are becoming increasingly large employers of chemical engineers, and if atomic energy and coke ovens and by-products are grouped with gas, electricity, and coal, the total represents 23% of all chemical engineers employed.

The survey also indicates a continuing trend towards administration and management (31.3% in 1960 compared with 30% in 1957) and towards development and research (25.9 against 22.7% in 1957). The other leading activities are design and construction at 19.2% and plant operation and production at 10.8%, both somewhat down on the corresponding proportion for 1957.

A final conclusion that can be drawn from the Institution's surveys is that the greatest remaining potential for the employment of chemical engineers over the whole range of process industries is in the field of production, and, in particular, plant operation, where techniques of management are of special significance.

On the future pattern of chemical engineering, Mr. Hutchison pointed out that the fact that unit operations have been retained for 30 years as a basis for teaching and research in chemical engineering demonstrates the soundness of this reasoning and it is no reflection on its validity that anxiety is now being expressed as to the wisdom of so much concentration on one aspect only. He went on to show that the chemical engineer of the future will have to understand the underlying principles of control and must be able to use all the tools that modern computer techniques have placed at his disposal for process control and for the optimisation of design.

C. E. Spearing Becomes New I.Chem.E. President

AT the 39th annual meeting of the Institution of Chemical Engineers on 25 April, Mr. W. K. Hutchison, C.B.E., deputy chairman of the Gas Council, was succeeded as president by Mr. C. E. Spearing (director, Kellogg International Corporation).

Other members of the Council are: *vice-presidents:* Mr. C. M. Auty (re-elected), Dr. G. P. Kane, Mr. K. B. Ross (re-elected), Mr. E. S. Sellers; *joint hon. secretaries:* Mr. F. E. Warner (re-elected) and Mr. R. C. Odams (re-elected); *hon. treasurer:* Mr. F. A. Greene (re-elected); ordinary members of Council (a) members: Mr. S. W. Adey, Prof. P. V. Danckwerts, Mr. L. Holliday, Mr. K. W. Palmer, Dr. B. Raistrick, Mr. R. V. Rutherford, Dr. J. A. Storrow, Mr. C. S. Windebank and Mr. E. Woollatt; (b) associate members: Mr. W. G. Daroux, Mr. R. Parkins and Mr. P. A. Rottenburg; (c) co-opted members: Mr. K. M. Curwen, Mr. K. W. Findlay, Mr. T. W. B. Flavel, Mr. G. U. Hopton, Dr. J. S. Hunter and Mr. A. S. White.

B.A.S.F. Increase Sales, Production, Expand Capacity for Phthalic, Caprolactam, Plastics

A YEAR of increased sales and production is reported by Badische Anilin- und Soda-Fabrik, according to the annual report issued on 21 April.

In some fields, the company has been unable to satisfy demand because of limited capacity. For instance, difficulties in obtaining enough phthalic acid for their Palatinol range of softening agents was experienced, but the situation is expected to be eased in 1961 when the new phthalic acid plant comes into production. Large new plants are also currently under construction for caprolactam and dimethylterephthalate. These are in addition to the extension carried out last year. The maleic anhydride, formaldehyde, monomethylamine and dimethylamine plants are also currently undergoing extensions.

Plastics have shown an increased production in the face of sharper competition and falling prices. Sales of vinyl chloride polymer rose due to capacity increase, and the Lupolen polythene unit at Rheinische Olefinwerke GmbH subsidiary was in full use in spite of 1960 capacity expansion and further expansion which is underway. Polyester plastics were expanded considerably, the Palatal range being supplemented by new types.

Subsidiaries' Projects

Other subsidiaries and part subsidiaries of B.A.S.F. are in the process of increasing production capacity. Chemische Fabrik Holten GmbH (West Germany) opened a new ethylene oxide plant in mid-1960; Dow Badische Chemical Co. (U.S.) will soon have a butanol plant on stream and a unit for caprolactam is under construction; the capacity of the polystyrene plant of Dispersions Plastiques SA (France) is currently being increased to meet the good demand for foamable polystyrene; and Hindustan Organic Chemicals Ltd. (India) are to build an organic intermediates plant with processes and other aid from B.A.S.F., Hoechst and Udhe.

B.A.S.F., who are to pay DM126 million or £11.5 million (DM101 million or £9.2 million) as 18 (16)% dividend on the DM700 million share capital for the past year, recorded for 1960 a total turnover of DM2,588 milion or £235.3 million (DM2,268 million or £206.2 million). This total includes the turnover of the parent company itself, turnover for sales to non-B.A.S.F. group members by West German companies owned wholly by B.A.S.F. and the turnover of such West German companies in which B.A.S.F. has a holding and whose products are marketed by B.A.S.F.

Net profit for 1960 for the B.A.S.F. concern was DM126,032,762 excluding a small sum carried over from the previous year. This total compares with DM99,398,000 for 1959 a rise of 26%.

Over the last year, B.A.S.F. exported 37% of their products, an export level almost exactly that reported in 1959. A total of DM20 million was granted by the company in 1960 for payment to the under-developed countries, as part of the national scheme, though payment of this was not made until the start of the current year, so that the sum is not included in the 1960 accounts.

Foreseen for the B.A.S.F. shareholders' meeting to be held on 18 May is a capital increase from DM700 million to DM800 million. The seven-to-one rights issue under which this will be made was reported in CHEMICAL AGE, 15 April.

Royal Dutch/Shell Chemical Sales are 10% of Group Total

SALES of chemicals by the Royal Dutch/Shell Group in 1960 were valued at £196 million, or 10% of total group sales and income after tax deductions. This was stated by Lord Godber, retiring chairman, in his annual report. Group net income totalled £177,485,000 (£175,535,000); sales of crude oil and oil products rose in volume by some 7% while chemical sales also showed a considerable advance.

Competition in the oil industry was even more intense than in 1959, leading to lower average prices; chemical prices also came under pressure. The sum remaining from sales and other operating income, after meeting all consumer taxes was £49 million higher at £1,958 million.

Royal Dutch/Shell have now invested nearly £200 million in its world-wide business of producing chemicals from petroleum and petroleum gases. Lord Godber said that persistence in heavy investment in fixed assets and working capital, as well as considerable research spending, was needed over an extended period during which know-how and experience were being accumulated and markets expanded. In this development phase the profits from plants in full production must bear a heavy load of initial operating expenditure in respect of new processes.

This was why the profits of the group chemical business had so far been relatively modest in relation to the total investment. Although the petrochemical industry was faced with many problems, Royal Dutch/Shell are confident that their expanding chemical operations will make an important contribution to total group earnings.

In the period 1956-60 the group has invested £113 million in chemical plants, compared with £454 million on production, £346 million on refineries and £61 million on pipelines and terminals. In that period chemical investment represented about 7% of all capital and exploration expenditure. Chemical plant investments were made as follows: 1960, £27 million; 1959, £26 million; 1958, £22 million; 1957, £20 million; 1956, £18 million.

Snia Viscosa's Polyester Fibre Output Up by 68% in 1960

NET profit of Snia Viscosa, Milan, for 1960 was Lire 4,342,713,188, a steep rise on the 1959 figure of Lire 2,960,437,428. Output last year of artificial and synthetic fibres totalled 200,500 tonnes or 8.1% more than in 1959. Output of viscosa rayon totalled 60,800 tonnes (67,600 tonnes), an increase of 11.1% .

Production of other fibres was as follows:

Fiocco Viscosa, 84,700 tonnes (85,800 tonnes), down by 1.3%; acetate and cuprammonium fibres, 13,900 tonnes (13,200 tonnes), up 5.3%; merinova, 3,100 tonnes (2,800 tonnes), up 10.8%; polyamide fibres, 25,400 tonnes (19,400 tonnes); up 31%; polyvinyl fibres, 1,700 tonnes (1,500 tonnes), up 13.3%; polyester fibres, 3,200 tonnes (1,900 tonnes), up 68.4%.

Production of acrylic fibres was started last year, reaching a total of 800 tonnes.

Snia Viscosa's own production of fibres last year totalled 109,500 tonnes or about 2% more than in 1959. Output of rayon showed an increase of 12.4% while that of other cellulosic fibres increased by 13.3%. This does not apply to fiocco, output of which was down 9.6%. Production of Merinova went up by 13.2% and that of synthetic fibres by 44.6%.

S.A.I.C.I., an affiliate of Snia Viscosa, reported the following outputs: 'noble cellulose', up by 16.5%; soda lye, up by 46.4%; liquid chlorine, up by 48.9%; sodium hypochlorite, up by 17.1%.

Plans are well advanced for a p.v.c. plant which will use these materials. Snia Viscosa are currently building a plant for the polymerisation of caprolactam and have recently completed a plant for the production of carbon disulphide from methane.

Will

Dr. Richard Thomas, former manager of Unilever Research Department, Port Sunlight, who died on 25 November, left £12,393 net.

AROMATIC HYDROCARBONS HEAD TOWARDS HIGHER QUALITY

Benzole Producers 'Open Days'

BENZENE, used for the production of detergents, nylon, styrene, phenol and many other chemicals, is the most important aromatic hydrocarbon, and it is towards this material that technical development in the benzole industry must be mainly directed, said Mr. G. Claxton, chief chemist, Benzole Producers Ltd., in a paper presented at a meeting in London on 24 April in connection with Benzole Producers 'open day' activities. Mr. Claxton gave figures for production of aromatic hydrocarbons in various countries, some examples being as follows:

PRODUCTION OF AROMATIC HYDROCARBONS

(Millions of imp. gall.)

	1957	1958	1959
U.S.			
Benzene from coal ...	157.5	105.0	141.0
Benzene from petroleum	93.5	122.0	134.0
Toluene from coal ...	35.8	27.5	35.8
Toluene from petroleum	129.0	148.0	149.0
Total aromatics ...	548.0	605.0	—
Gt. Britain			
Crude benzole ...	122.4	119.9	112.3
Belgium			
Crude benzole ...	15.8	—	—
Refined benzole ...	—	16.9	17.4
France			
Refined benzole from coal	33.3	40.6	36.0
W. Germany			
Crude benzole ...	138.5	140.8	124.0
Poland			
Refined benzole ...	—	11.2	14.7
U.S.S.R.			
Estimated refined benzole	142.0	148.0	—

The Benzol-Verband, in Germany, are producing benzene with a crystallising point of 5.3°C and at total sulphur content of 10 p.p.m. The influence of petroleum-produced benzene is more apparent in the U.S., where at least two large producers are selling coke-oven benzene with a crystallising point of 5.4°C or better and about 2 p.p.m. of total sulphur.

Hydrofining of Benzole

Mr. Claxton's paper, entitled 'The internation aspects of benzole recovery', traced the development of international standards for benzole and allied products and described the various quality tests now available. He then went on to deal with some of the more outstanding technical developments in the benzole industry, such as hydrorefining. Two Lurgi hydrorefining plants, which are capable of operating on coke-oven gas, are now operating in the U.K.; other hydrorefining plants now being offered were those of Koppers (both in Germany and in the U.S.), Carl Still, Esso Development, Universal Oil Products, and Newton Chambers in conjunction with the Coal Tar Research Association. These various designs differ in engineering detail but are almost identical in principle.

Of the Udex process, used for freeing the refined material from paraffins and naphthenes, Mr. Claxton said this process, which depends on the preferential solubility of aromatic hydrocarbons in aqueous diethylene glycol, involves high capital costs, but used in conjunction with hydrorefining is producing aromatic fractions competitive in quality with those produced from petroleum.

Mr. Claxton believed there were great possibilities for freeze refining, or the separation of aromatic and non-aromatic hydrocarbons by freezing during the preparation of pure benzene—a development, resulting from a joint investigation by Benzole Producers Ltd., The Coal Tar Research Association and Newton Chambers Ltd., which has now reached the pilot plant stage. It was surprising that in Germany, where hydrorefining was developed earlier than in the U.K., no commercial development of similar freeze-refining processes seemed to have taken place. The Koppers Co., U.S., had issued a number of patents for freeze refining for processes based on the use of cooled drums on which crystals collect. None of these patents, however, seemed to have achieved commercial success, mainly, it was believed, because of the clumsiness of the method and the low throughputs.

Leading the discussion following Mr. Claxton's paper, Mr. F. A. Jackman, president of the National Benzole and Allied Products Association, and chairman of International Standards Organisation Technical Conference on Aromatic Hydrocarbons, referred to the potential threat to the U.K. benzole refining industry from petroleum-derived products; within the next few years we may well see petroleum-based plants being put up in the U.K. One of the prerequisites for the survival of the industry was that it should be able to meet this competition on quality grounds.

Mr. Claxton's paper was preceded by one by Mr. W. Eland, coke oven manager, Richard Thomas and Baldwins Ltd., Ebbw Vale, in which he described some experiments carried out on another coke-oven plant of which he had previously been in charge. The experiments involved an adjustment to carbonising conditions to yield a high quality benzene at low coke production.

Laboratories Visited

The meeting, held under the chairmanship of Mr. A. K. Steel, chairman of the Benzole Research Committee, followed the first of two 'open days' at the Watford laboratories of Benzole Producers Ltd., visitors to which included a large number of distinguished personalities from the benzole, coal tar, chemical and coke oven industries. Activities demonstrated at the laboratories included research, quality control, technical liaison, a technical information service, technical committee work, and the publications service to members.

Following the technical meeting, there was an informal dinner at the Connaught Rooms, London, at which Mr. H. H. Bates, chairman of the company, presided.

Guests included Mr. C. E. Evans, O.B.E., general manager, British Hydrocarbon Chemicals Ltd., and Dr. R. J. Morley, Director General of Carbonisation, National Coal Board.

Project News

(Continued from page 689)

750 r.p.m., and driving a 750-kW Allen alternator suitable for operation on a 3,300-volt, 3-phase, 50-cycle supply, at 0.8 power factor. The set is to be supplied complete with radiator, air compressors and a control panel for alternator and exciter and will incorporate auto-starting equipment for the diesel engine; with the exception of the panel all equipment will be mounted on a skid-type baseplate. Two 3,000-kW steam turbo-alternator sets are also to be installed in this factory and the diesel set will initially supply power for the starting up of the turbo-alternators, from then on serving for standby duty.

Gas-oil Blending Plant Well Advanced

● WORK on a new plant for the blending of gas-oil for **J. C. Oxley's Dyes and Chemicals Ltd.**, Dewsbury, is well advanced and completion is expected by mid-May. The contract is being handled by **Blaw Knox Chemical Engineering Co. Ltd.**, 20 Eastbourne Terrace, London W.2, who are responsible for all aspects of the project. Oxley's are a subsidiary of Williams (Hounslow) Ltd.

Bibby to Switch Oilseed Plant to Hexane

● A NEW oilseed processing plant is being constructed by **J. Bibby and Sons Ltd.**, Liverpool, and should be on stream by mid-1962. Two-thirds of the oilseeds handled by the company are processed by the solvent extraction method and it has been decided to make an extensive alteration to the plant so that hexane, a more efficient solvent, can be used in place of trichlorethylene, which is used at present.

Anglo-Bulgarian Agreement Includes Chemical Quota

Negotiations have been held in London this month with representatives of the Bulgarian Government for trade quotas for the year beginning 1 April. New quota lists have been agreed, providing for U.K. exports to Bulgaria totalling £4.16 million, including most types of machinery and equipment and chemicals.

A.D.L. Develop Glucose Routes to Nylon, Polymethylmethacrylate

THE number of projects in hand by the four-year old Arthur D. Little Research Institute at Inveresk near Edinburgh doubled during the year and its staff and facilities increased with the addition of two special purpose laboratories and new specialised equipment. Significant progress was made in 1960 in all fields of current activity—biochemistry, organic chemistry, physical chemistry and metallurgy.

Much of the Institute's work so far has centred on the chemistry of plant materials—wood, cereals, sucrose and glucose. A Biochemistry Section was set up in 1960, equipped to undertake the study of biochemical problems where such new techniques as starch gel and high voltage electrophoresis and paper and column chromatography with automatic densitometry are already having their impact.

The Organic Chemistry Section has continued work on the polymerisation of glucose and its derivatives to form new high molecular weight compounds. Already polyamides, with viscosities comparable to those of nylon with possible application as fibres, have been prepared using the new technique of interfacial polycondensation. The technique is based on the Schotten-Baumann reaction of an acid chloride with compound containing an active hydrogen atom—NH_2. A polymethacrylate has also been prepared containing glucose residues.

Study on the chemical modification of wood is now going into its second three-year period. A low temperature method for the acetylation of wood has been worked out and promising results obtained by impregnating wood with monomers, later polymerised *in situ*. Another new project last year concerns the chemistry of ethylene sulphide with a view to finding new industrial outlets for this chemical.

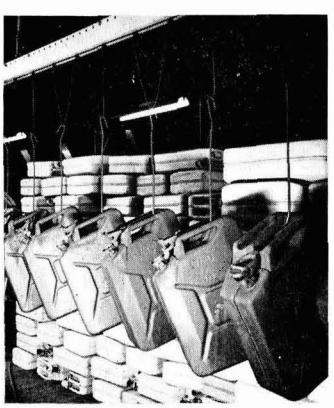
Ex-Government Jerricans Reconditioned

OCCASIONALLY, large quantities of surplus jerricans are disposed of by the Ministry of Supply, and Recontainers Ltd. of Verwood, Dorset, have just made what is believed to be the largest single purchase of jerricans since the war, from the British Government. The transaction involves nearly 1 million cans, mainly of post-1952 manufacture, and Recontainers say that this huge quantity, plus existing stocks, enables them to maintain continuity of supplies for at least three or four years.

Originally designed and produced by the Germans in the second world war, the jerrican is now also used on an increasing scale by industrial undertakings for the storage and transport of petrol, oils, fats, insecticides, chemicals and drinking water.

Many commercial concerns find the jerrican—with its shape designed for rigid stacking, its quick action, airtight filler cap, and its rugged construction—a low priced container which retains its value long after the contents have been used.

Recontainers claim to be the largest reconditioners and stockists of jerricans in the U.K. Besides supplying the needs of the home market, they have over the years built up a world-wide export connection for jerricans, with over 100 countries.



Reconditioned Jerricans on the Recontainers production line

Rotterdam Officials See Wilton Works

A party from Holland, including the Burgomaster of Rozenburg and officials of Rotterdam port and electricity supply, last week made a flying visit to the I.C.I. Wilton Works to learn something of the developments they may expect when I.C.I. come on stream with the first plants at their new £100 million site near Rotterdam. They were accompanied by two members of I.C.I.'s European Council, Dr. S. B. Cormack and Mr. B. R. Goodfellow.

Chemical Stocks Up at End of 1960

Stocks held by the chemicals and allied industries at 31 December 1960 were £54 million up on the end 1959 figure of £431 million, which showed a rise of £21 million over December 1958. These statistics, compiled by the Board of Trade, are based on 1954 prices.

Man-made Fibres Output by Process

A BREAKDOWN into the main groups of U.K. production of man-made fibres has now been made by the Man-Made Fibres Producers' Committee for 1960, and such figures will in future be issued once a year. Not since the issue of the 'Case Book of the Man-made Fibres Industry', showing figures for 1955, has there been any official breakdown into cellulosic and synthetic fibres.

	Continuous Filament		Staple	
	(million lb.)			
	1955	1960	1955	1960
Viscose ...	141.7	141.5	?	256.5
Acetate ...	61.3	44.9	?	14.6
Synthetics ...	29.6	82.1	?	52.3
TOTAL ...	232.6	268.6	139.2	322.4

It will be seen that the tendency for viscose staple to expand is still very pronounced. Because of the progress made with fully synthetic filament yarns acetate filament yarn production is substantially smaller than it was in 1955 and an increase in triacetate demand has been offset by the decline in secondary acetate. Nylon and Terylene account for the substantial growth in synthetic fibre output since 1955; in 1960, additional capacity for nylon and Terylene, as well as acrylic fibres, helped to swell the total in a year of expansion.

Overseas Executives Visit Burroughs Wellcome

A PARTY of overseas visitors from Nigeria, Jamaica, Indonesia, Ghana, Trinidad, Iraq, Syria and the Lebanon, is to visit Burroughs Wellcome and Co. Ltd. on 5 May as part of a study of British Industry. The study is being carried out under the auspices of the Industrial Welfare Society.

They are undertaking an eight-week "group tutorial" designed to facilitate the exchange of experience between executives from different countries by giving them a first-hand insight into personnel, welfare and training schemes operating in the more progressive industrial and commercial concerns in U.K. They will also study education and social service systems.

In Parliament

Minister Upholds I.C.I. Switch to Oil for Hydrogen

Asked if he was satisfied that the National Coal Board went to the limit to retain I.C.I.'s purchase of 600,000 tons of coal a year for the production of hydrogen from coke, Mr. J. George, Parliamentary Secretary, Ministry of Power, said the change to oil affected coal as a raw material, not as a fuel. The Minister had no wish to dictate to a private company what its raw materials should be.

Dr. Cecil John Turrell Cronshaw, former deputy chairman of British Nylon Spinners Ltd., and late a director of I.C.I., who died on 5 January last, left £69,017 net (duty paid £27,283).

Overseas News

INCO CHAIRMAN REPORTS INCREASE IN U.S. DEMAND FOR NICKEL

THE new Thompson nickel project in Manitoba of the International Nickel Company of Canada Ltd. is expected to be producing at a rate of 75 million lb./year "in a matter of weeks", Mr. Henry S. Wingate, chairman of Inco, told the annual meeting in Toronto on 19 April. Mr. Wingate stressed the importance of the plant to the company's future prospects—it will be the second largest nickel plant in the world, Inco's Sudbury plant being larger. The Thompson plant was formally dedicated, officially marking the first nickel production, on 25 March.

By way of commentary on the versatility of nickel, Mr. Wingate pointed out that Inco had developed a nickel alloy for use in storing liquefied gases at temperatures as low as −320°F, while, at the other extreme, Inconel X nickel alloy was used for the skin of an experimental aircraft which reached a temperature of 700°F at the aircraft's record speed of 2,905 m.p.h.

Inco's financial prospects—see 'Commercial News', p. 705.

West German/Japan Tie-up for Sulphuric Acid Plant

Sumitomo Metal and Mining Co. are to build a sulphuric acid plant involving a technical tie-up with Gerd Petersen of West Germany. Application has been made for official approval.

The contract with Petersen includes both patent rights and technical know-how. The cost of the contract will be $130 per tonne of 60 Be acid when the plant is installed.

Du Pont Accuse Celanese of Patent Infringement

Du Pont have filed a suit against Celanese for an alleged infringement of patents which Du Pont hold in acetate resins. The suit, which will be heard at the Delaware district court, enjoins Celanese from making or selling its own acetal resin, Celcon.

Celanese deny that any infringement is taking place and intend to go ahead with their plans for the manufacture of Celcon in a multi-million-dollar facility at Bishop, Tex. (see CHEMICAL AGE, 4 March, p. 369). They say they have made a full study of the patent situation in connection with Celcon acetal copolymer resin and they believe that their material is new and chemically unique.

Belgium's Increased Chemical Exports

Belgian chemical industry exports in 1960 were higher quantitatively by 4.8% and in worth by 7% than those recorded for the previous year. Last year they totalled 2,893,100 tonnes, worth 16,400 million Belgian francs. Exports to fellow-members of the Common Market rose by BFr.636 million, or 13%, to BFr.5,612 million, those to other European countries taken together decreasing by 16%, from BFr.4,097 million to only BFr.3,435 million in 1960. Over the same period Belgian chemical exports to other countries, taken together, increased by almost 17% to BFr. 7,342 million.

Over 1960 the Belgian chemical industry invested BFr.3,500 m., of which BFr. 1,500 million went on plants opened during the year. The industry, the number of whose workers and staff rose by 3,000 to 57,100 over last year, had a 1960 turnover estimated at BFr.28,000 million. Of this latter estimated sum, approximately 2.5% was spent on research.

Japan-U.S. Agreement for Diisocyanates

Takeda Chemical Industries is to begin construction of a plant for the production of toluene diisocyanate. The company has received formal approval from the Japanese Government for the use of Allied Chemical know-how. The tie-up covers the fundamental design of waste acid stripping, purification of hydrogen and storage facilities for intermediates.

The plant is scheduled for completion in September and is to have a capacity of 100 tonnes a month. The process to be employed is the continuous nitration of toluene to dinitrotoluene. Subsequent and continuous hydrogenation yields toluene diamine.

Vienna Symposium on Uses of Tritium

A symposium is to be held in Vienna from 3 to 10 May on the subject of the detection and uses of tritium in the physical and biological sciences. The meeting is being organised by the International Atomic Energy Agency in co-operation with the International Council of Scientific Unions.

In recent years, tritium has been used increasingly as a research tool in chemistry, physics, biology, metereology and hydrology. The symposium at Vienna will provide an opportunity for a review of the applications of tritium and tritium compounds.

Cobalt 60 Plant for Germany

Two Cobalt 60 large-scale radiating units with a total capacity of 12,000 curies are reported to be planned for use in West Germany. One, of 7,000-curie capacity, has just arrived at the Institute for Mineral Oil Research in Hanover from the U.S., and the other, a U.K.-made unit incorporating a U.S. radioactive source, is due to arrive soon. The former unit was purchased with a sum of about DM250,000 put at the disposal of the Mineral Oil Research Institute by West German Ministry for Nuclear Power and Water and will be used for "the development of radioactive processes for mineral oil processing and petrochemical industry." It has the greatest curie-power of any radioactive source yet imported by West Germany. The second unit, of 5,000-curie strength, is to be imported by an as yet unnamed company in the German chemical industry for a comprehensive study of radioactive chemical reactions.

Milton Roy Develop Hydrogen Purifier

The U.S. company, Milton Roy Co., have introduced a hydrogen purifier which will produce ultra-pure hydrogen from impure sources. Standard models for small volumes (40 to 100 ml. per min.) weigh 10-15 lb. and units for larger capacities (5-50 cu. ft. per hr.) weigh about 60 lb.

Australian Firms Seek Protection on Citric Acid

As a result of representations by local industry, the Australian Tariff Board is to enquire into whether assistance should be accorded the production of citric acid, tartaric acid and cream of tartar. Currently British preferential rate on these is 1¼d/lb.; most favoured-nation: citric acid, 3⅝d/lb., and tartaric acid; cream of tartar, 4¼d/lb.; general tariff: citric acid, 3⅝d/lb. and tartaric acid and cream of tartar 4¼d/lb. (Rates are quoted in Australian currency).

Yawata to Produce Vinyl Chloride

The Japanese company, Yawata Chemical Co. is to build a plant for the production of vinyl chloride monomer with a capacity of one tonne a day. The monomer will be produced from ethylene fraction from coke oven gas. The pilot plant is expected to be completed by July; a commercial plant is also planned to run a parallel with the pilot plant.

Enjay to Extend Oxo Capacity

Enjay Chemical have announced that they are to extend their oxo chemical capacity at Baton Rouge, La., from 90 to 120 million lb. a year. The expansion should be completed early next year.

Enjay's move follows other announcements by Oxo Chemicals and Monsanto. The new plants will raise oxo capacity in the U.S. to about 610 million lb. a year.

U.S. oxo production in 1962 is estimated by *Chem. & Engng. News* as follows:

Company	*Annual capacity (millions of lb.)* 1961	1962
Amoco	12	12
Dow Badische	25	25
Humble Oil and Refining (Enjay)	90	120
Gulf Oil	48	48
Oxo Chemical	0	40
Monsanto	0	60
Texas Eastman	125	125
Union Carbide	180	180
	480	610

PEOPLE in the news

● **Mr. R. Malpas,** project group engineer in the engineering department of the I.C.I. Heavy Organic Chemicals Division, will become division engineering manager on 1 May in succession to **Mr. J. A. Fofthouse,** who will shortly become engineering and technical director of the Nobel Division.

● **Mr. G. G. Thompson** has been appointed a director of the Birmingham Chemical Co. Ltd., of Lichfield, a member of the Staveley group of companies. He is on the board of the parent company, Staveley Industries Ltd., and is managing director of the British Soda Co. Ltd., Sandbach, another member of the group.

● **Mr. T. Anness,** general manager of A. W. Brook Ltd.. Midland sales organisation of Laporte Industries Ltd., will retire at the end of August. He will be succeeded by **Mr. M. H. Akeroyd,** who will combine the position with his present one of Midland area sales manager. Mr. Anness, former commercial manager of Laporte Chemicals Ltd., joined that company, then known as B. Laporte Ltd., in 1920.

At the recent annual dinner of the S.C.I. Surface Activity Group: l. to r., Sir Eric Rideal, group chairman, Sir Alan Wilson, deputy-chairman, Courtaulds Ltd., and Lord Fleck, S.C.I. president (see C.A., 22 April, p. 660)

● The National Coal Board have appointed **Mr. Norman T. Simmons, F.R.I.C.,** divisional chief scientist for the South-Western Division. Mr. Simmons has been chief scientist in the No. 5 area of the division since 1947. He was previously chief chemist on the staff of Powell Duffryn Ltd.

● **Mr. W. M. Keightley,** deputy pharmaceutical production manager of the Boots Pure Drug Co.'s Beeston works, Nottingham, has retired after 43 years' service. He joined Boots in 1918 in the analytical department and transferred to the pharmaceutical factories in 1937. He was appointed deputy production manager at Beeston in 1957.

● **Mr. M. J. S. Clapham,** recently appointed overseas director of Imperial Chemical Industries Ltd., will continue for a further term as president of the Institute of Industrial Supervisors.

● **Mr. V. C. Bond, F.P.S.** has been appointed managing director of the newly formed Nicholas Laboratories Ltd. The company was formerly the ethical pharmaceutical division of the Aspro-Nicholas Group and has been formed as a result of reorganisation within the group.

● **Dr. J. S. Littler** (Oxford University) has been awarded a CIBA Fellowship for post-doctorial study in chemistry at the E.T.H. Zurich. **Dr. V. P. Arya,** at present working at Stockholm University on natural products chemistry, and **Dr. R. Grinter,** working at the E.T.H. Zurich on physical organic chemistry, have had their Fellowships reviewed for a further year.

● The Borough Polytechnic has announced the promotion of members of the staff. Among them are **Mr. D. R. J. Holdsworth,** lecturer in chemical engineering, who has been made a senior lecturer, and **Dr. J. A. Speed,** assistant lecturer (Grade B) in inorganic chemistry, now a lecturer.

● **Mr. Leonard Richardson,** assistant works manager (technical) since 1955 with Monsanto Chemicals Ltd., retired recently after 50 years in the chemical industry, 28 of them with Monsanto.

● **Sir Arthur Vere Harvey, M.P.,** has been appointed to the board of CIBA, Basle. This is the first time that an executive of the CIBA U.K. group has been made a director of the parent company. Sir Arthur joined CIBA in 1957 as chairman of its four British subsidiaries and recently was appointed managing director of the newly formed CIBA United Kingdom, the holding company for all the group's U.K. interests.

● **Sir Harold Roxbee Cox,** who is 58, is to be chairman of the Council for Scientific and Industrial Research for five years from 1 October. He will succeed **Sir Harry Jephcott** (chairman, Glaxo Laboratories Ltd.), who has been chairman of the council since its formation. Sir Harold Cox, who has been a member of the council since 1957, spent six years as Chief Scientist of the Ministry of Fuel and Power. He left Government service in 1954 for industry, and last January was appointed chairman of the Metal Box Co. Ltd. He is active in the field of higher technological education, and is chairman of the National Council for Technological Awards.

● **Professor D. M. Newitt, F.R.S.,** Pro-Rector and head, Department of Chemical Engineering and Chemical Technology, Imperial College, who retires on 30 September, has been appointed senior research fellow at the college. He will be succeeded by **Professor P. M. S. Blackett, F.R.S.,** Professor of Physics, as Pro Rector and by **Professor A. R. Ubbelohde. F.R.S.,** Professor of Thermodynamics, as head of the department. Professor Ubbelohde is also director of the Salters Institute for Industrial Chemistry.

Professor A. R. Ubbelohde

● **Mr. G. V. Taylor,** works manager at the Newport factory of Monsanto Chemicals Ltd., who joined the company in 1934, is retiring on 1 June. He will be succeeded by **Mr. A. C. W. Pemberton,** general superintendent of technical services at Monsanto's Fawley factory. Mr. Pemberton graduated in chemical engineering at University College, London, in 1950 and joined Monsanto at Newport in the same year.

DIARY DATES

MONDAY 1 MAY

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6 p.m. A.g.m. & 'Chemistry in the service of a new industry', by E. G. Peppiatt.

TUESDAY 2 MAY

Inst. Metal Finishing—Llandudno, Annual Conference.

Plast. Inst.—London: Wellcome Building, Euston Rd., N.W.1, 6.15 p.m. A.g.m. & 'Blow moulding of thermoplastics', by M. C. Dixon.

WEDNESDAY 3 MAY

S.A.C.—London: Meeting Room of the Chem. Soc., Burlington Hs., Piccadilly, W.1, 7 p.m. & 'The combustion of organic compounds by ignition in oxygen: the determination of carbon & hydrogen', by G. Ingram. 'The use of induction heating in carbon & hydrogen determinations', by Mrs. D. E. Butterworth. 'The determination of citronellol in admixture with geraniol: further studies of formylation reactions using gas-liquid chromatography', by D. Holness. 'The detection of "Additional Elements" in plastic materials by the oxygen flask combustion method', by J. Haslem, J. B. Hamilton & D. C. M. Squirrell.

FRIDAY 5 MAY

Inst. of the Rubber Industry—London: Lecture Theatre, Inst. of Elec. Eng., Savoy Place, W.C.2. one day conference.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. 10-ton quantities, 80% tech. in bulk, £77 per ton; in casks, £90 per ton; 80% pure in bulk, £83; in casks, £94; glacial, 98/100% in bulk, £93; in drums, £100.

Acetic Anhydride. Ton lots d/d, £128.

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

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £37 10s.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. MAP., £106 per ton; DAP, £100 10s, per ton, d/d.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s 8d d/d to 6s 2d; golden, 3s 11d d/d per lb. to 5s 4d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 4-ton lots or more, bag packing, £41 per ton.

Barium Chloride. 2-ton lots, £45.

Barium Sulphate [Dry Blanc Fixe]. Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian bags, c.p. Tech. anhydrous, £60 gran., £47 10s; crystal, £51; powder, £52; extra fine powder, £53; BP, gran, £56 10s; crystal, £60; powder, £61; extra fine powder, £62. £1 cheaper in 5-ply paper bags.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78 10s; crystal, £87 10s; powder, £85 extra fine powder, £87; BP gran., £91 10s; crystal, £99 10s; powder, £97; extra fine powder, £98. £1 cheaper in paper bags.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. In 1-ton lots, per lb., 2s 2½d.

Chromium Sulphate, Basic. Powder, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid—Granular. In kegs, 1-4 cwt. lots, per cwt., £10 1s; 5-19 cwt. lots, per cwt., £9 17s; 1-ton lots, per cwt., £9 16s; packed in paper bags, 1-4 cwt. lots, per cwt., £9 13s; 5-19 cwt. lots, per cwt., £9 9s; 1-ton lots, per cwt., £9 8s.

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

Copper Carbonate. Per lb., 3s 6d.

Copper Sulphate. £77 per ton less 2% f.o.b. Liverpool.

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

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt. less than chem. pure.

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

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £115; 35% wt., d/d, £138.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodine. Resublimed BP, under 1 cwt., per lb., 11s 6d; for 1-cwt. lots, per lb., 11s 3d.

Iodoform. Under 1 cwt., per lb., 24s 1d; for 1-cwt. lots, per lb., 23s 5d; crystals, 3s more.

Lactic Acid. Edible, d/d, 50% by wt., per lb., 16¾d; 80% by wt., 26½d; C.P., 50% by wt., per lb., 14½d; 80% by wt., 23d; dark tech., ex-works, 44% by wt., per lb. 9d. 1-ton lots, loaned containers.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Bases prices: 15-cwt. drum lots, Genuine dry red, £99 5s per ton; orange lead, £111 5s per ton; Ground in oil: red, £120 10s, orange, £132 10s.

Lead, White, Bases prices: in 5-cwt. drums, per ton for 2-ton lots, Dry English £114 15s; Ground in oil, £135 15s.

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

Litharge. In 5-cwt. drum lots, £101 5s per ton.

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

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £19 7s 6d per ton.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £13 10s, ex-works.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, in 28-lb. parcels, 20s; 5-cwt. lots, in 28-lb. parcels, 20s 6d; 1-cwt. lots, in 28-lb. parcels, 20s 9d.

Mercury Sulphide, Red. Per lb. for 5-cwt. lots in 28-lb. parcels, £1 10s 6d; 1-cwt. lots, in 28-lb. parcels, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 56 lb. paper bags, c.p., about £125-£130.

Phosphoric Acid. TPA 1,700 ton lots, c.p., £103; BP (s.g. 1,750) ½-ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

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

Potassium Dichromate. Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2½d.

Potassium Iodide. BP, under 1 cwt, per lb., 9s 0d., per lb. for 1-cwt. lots, 8s 9d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11¾d; 3-cwt. lots, per lb., 1s 11¼d; 5-cwt. lots, per lb., 1s 10¾d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. crums, c.p. station, in 5-ton lots, about £87 per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1¾d. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 11s 3d; 56 lb. and over, 11s 0d.

Sodium Lactate. Edible, 75%, per ton, £168, d/d free drums, 1-ton lots.

Sodium Metaphosphate. Flaked, paper sacks, £136.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches, 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. 60/62%, spot, d/d, in drums in 1-ton lots, solid, £38 2s 6d; broken, £39 2s 6d. Flakes, £40 12s 6d, crystals, £29 10s.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £11 10s—£12 10s per ton; 140° Tw., arsenic free, £9; 140° Tw., arsenious, £8.

Tartaric Acid—Powder and Granular. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £102 10s, green seal, £100 10s; red seal, £97 10s.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84;

5-10 tons, £82; 10 tons and up, £80; in 500-gal. tank wagons, £79. In bulk minimum 2,500 gal. £75 per ton.

Butyl Acetate BSS. 10-ton lots, £165.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £137 10s.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158 in 40-45 gal. drums, under 1 ton, £133; 1-5 tons, £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

***tert*-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £216; 45-gal. 1-4 drums, £222.

Diethyl Phthalate. In drums, 10 tons, per ton, £201; 45-gal. 1-4 drums, £207.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £194; 45-gal. 1-4 drums, £200.

Dioctyl Phthalate. In drums, 10 tons, d/d, per ton, £287; 45-gal. 1-4 drums, £293.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £137.

Ethyl Alcohol Fermentation grade (PBF 66 o.p.). Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500-10,000 p. gal. per p. gal., 4s 0¾d. D/d in 40/45-gal. drums, p.p.g. extra, 2d.
Absolute alcohol (74.5 o.p.), p.p.g. extra, 2d.

Methanol. Pure synthetic, d/d, £40.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

Methyl Ethyl Ketone. All d/d. in 40/45-gal. drums, under 1 ton, £143 10s; 1-5 tons, £138 10s; 5-10 tons, £136 10s; 10 tons and up, £143; in 400-gal. tank wagons, £134 10s.

Methyl *iso*Butyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl *iso*Butyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

***iso*Propyl Acetate.** 10 tons, d/d, 45-gal. drums £132.

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

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 6¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7d per lb.; ex-store, Manchester, London and Glasgow, 7¾d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 7¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8d per lb. Ex-store Manchester, London and Glasgow, 8¾d per lb ISAF: Ex-store Swansea, min. 3-ton lots in one delivery, 9¾d per lb., min. 1-ton lots and up to 3-tons in one delivery, 10d per lb. Ex-store Manchester, London and Glasgow, 10¾d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb. 1s 4½d to 1s 7d; dark, d/d, per lb., 1s 0½d to 1s 4d.

Lithopone. 30%, about £57 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

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

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, d/d bulk, per lb. 1s 3d; 40/50-gal. ret. drums extra, per lb., ½d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d. MANCHESTER: Per gal., 1s 3d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 7s 9d D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 5s 3d. heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 4s 1d. Drums extra; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 20s about.

Toluol. Pure, per gal., 5s 2d; 90's 2,000 gal. in bulk, per gal., 5s 0d.
MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 6d-5s 8d.

INTERMEDIATES AND DYES
(Prices Normal)

***m*-Cresol** 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.

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

***p*-Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

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

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

***p*-Nitraniline.** Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

Nitronaphthalene. Per lb., 2s 5½d.

***o*-Toluidine.** 8-10 cwt. drums (drums extra), per lb., 1s 11d.

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

Dimethylaniline. Drums extra, c.p., per lb. 3s 2d.

U.K. Producers of Cyclohexanone

In our reference to U.K. supplies of cyclohexanone now being adequate (CHEMICAL AGE, 25 March, p. 526) the names of one of the British producers—British Tar Products Ltd., 418A Glossop Road, Sheffield 10—was incorrectly given as British Tar Distillers. British Tar Products are, of course, makers of other allied products, such as cyclohexanol, methyl cyclohexanols, methyl cyclohexanone and esters of cyclohexanol, etc.

TRADE NOTES

Release Coating Composition

A release coating composition that is claimed to be durable and efficient in overcoming the problem of sticking of coated cellulose films to heat-sealing surfaces on automatic packaging machines has been developed by British Cellophane Ltd., 9 Henrietta Place, London W.1, in co-operation with the Thompson Engineering Co., 266 Beulah Hill, Upper Norwood, London S.E.29. The coating consists of a thermo-setting silicone resin combined with a fused layer of aluminium oxide, this layer being applied by a flame-spraying technique.

Producer Gas Plant

'Mechanical producer gas plant' is the title of a new illustrated brochure, MPG.461, from the Power-Gas Corporation Ltd., P.O. Box 21, Stockton-on-Tees. It includes sections on typical applications of producer gas, principal features of producer design, schemes for cold gas production, and examples showing the cost of gas production in typical installations.

Consolidated Zinc Group

From 23 May the London address of the Consolidated Zinc Corporation Ltd., and their subsidiaries, including Imperial Smelting Corporation Ltd., Aluminium Sulphate Ltd., Consolidated Beryllium Ltd., and Pure Chemicals Ltd., will be changed to 6 St. James's Square, London S.W.1 (Whitehall 5411).

Nicholas Laboratories

As a result of re-organisational changes within the Aspro-Nicholas Group, the former ethical pharmaceutical division has now been given company status under the name Nicholas Laboratories Ltd.

Feed Pellet Additive

Exploitation of a new source of inexpensive bentonite on the Mediterranean island of Ponza has led to a greatly increased use of the material in the production of feeding pellets. Ponza bentonite, described as a high quality gelling bentonite, is now being marketed in the United Kingdom under the name Berkonite, by F. W. Berk and Co. Ltd., 8 Baker Street, London W.1.

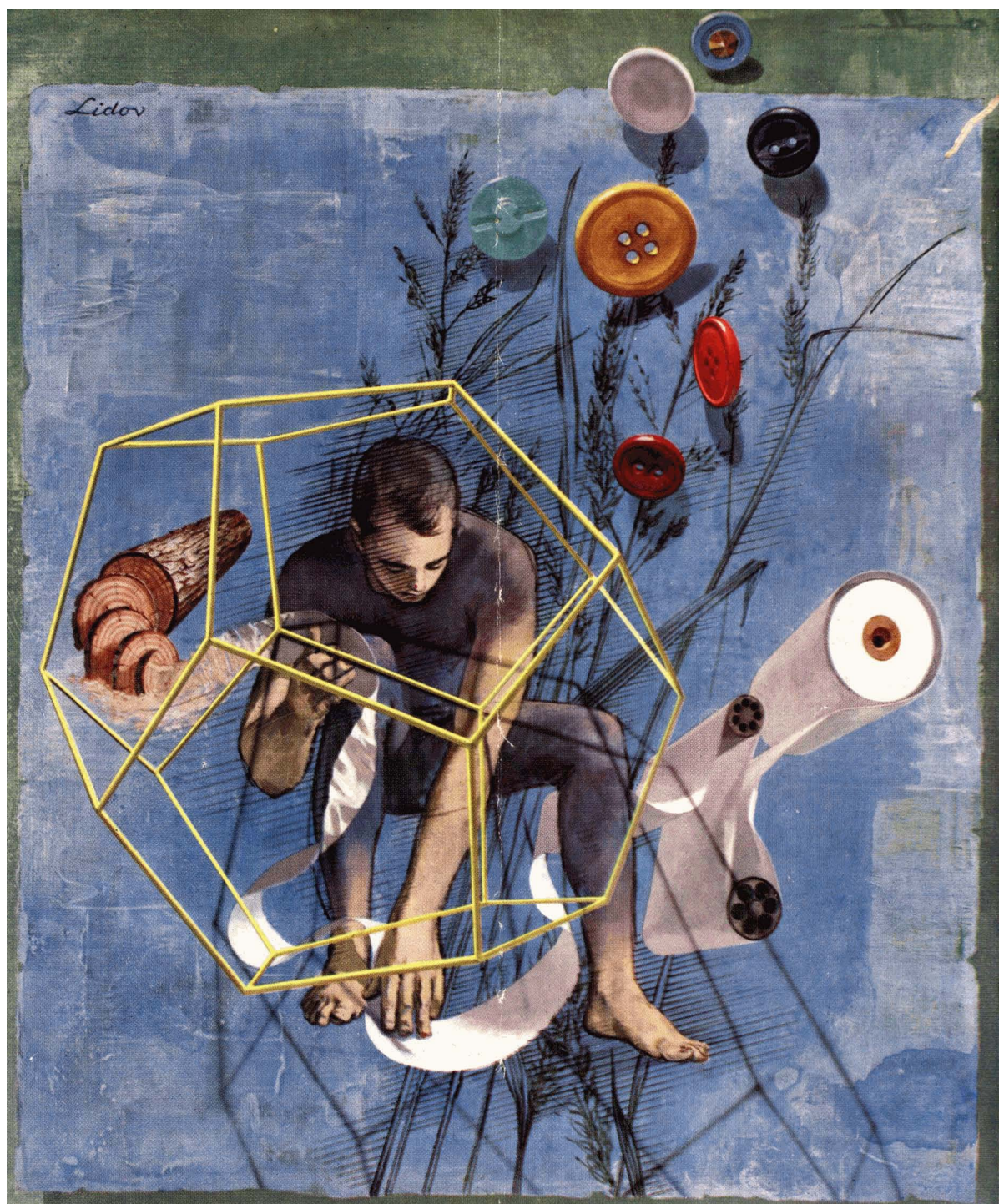
Sub-licence for Kanigen

Sub-licence for the operation of the Kanigen nickel plating process has been granted by Albright and Wilson (Mfg.) Ltd. to Fescol Ltd., who are planning to erect the necessary plant at their works at Brownhills, Staffs.

Stabiliser-plasticiser for P.V.C.

A new plasticiser-stabiliser for p.v.c. is among the compounds described in the winter 1961 edition of *Resin Review*, published by Rohm and Haas Co.

The new plasticiser-stabiliser, Monoplex S-74, is a monomeric expoxy ester, which has a low volatile loss and good water resistance. It has been specially developed for applications in the car industry where non-fogging of windscreens and low temperature flexibility is required.



Paper—for centuries man's best medium for communicating ideas—is moving into greener fields. Today, it packages the products we live with. It helps build the homes we live in. In disposable form, it even provides some of the clothing we wear. New paper-industry chemicals and processes, many of them pioneered by Dow, make it possible for paper to do more jobs for more people better than ever before.

DOW

Commercial News

Associated Chemical

Demand for most of the group's products was buoyant throughout 1960 although some indications of uncertainty became apparent during the latter months, reports the chairman of Associated Chemical Companies, Mr. J. C. Hutton-Wilson, in his statement to shareholders. Sales of industrial chemicals increased by about 10% and direct exports accounted for 21% of such sales. During the year, capital expenditure exceeded £1 million, of which about two-thirds was spent on the modernisation of the chromium chemical plants. The group continues to spend considerable amounts on research into new processes. Profits and dividend of the group were reported in CHEMICAL AGE, 15 April, p. 628.

Horace Cory and Co.

Net profit of Horace Cory and Co. Ltd. after all charges, including tax, was £25,190 (£23,692). U.K. tax took £25,107 (£21,588) and there is a credit for tax-over-provision in 1959 of £1,342 (£1,941). Dividend of 30% is declared on ordinary capital increased in June 1960 (25% plus bonus of 5%). Preference dividend is 9% (same).

Canadian Industries

The current slowdown in the Canadian chemical industry was due to the general downward trend of the Canadian economy, said Mr. Peter E. Allen, president of Canadian Industries Ltd., in the annual report. The report expected the market for chemical products to grow at a healthy rate and said there now seemed to be a wider recognition that new investment in chemical plants should be tied more closely to size and expected growth of this market. It also suggested that Government may be coming to recognise that increased employment on a lasting foundation can come only from encouragement of secondary industry.

Capital expenditures in 1960 by C.I.L. and subsidiaries at $8,050,000 were $1,050,000 higher than the 1959 figure.

Sales increases in domestic, as well as export, markets were reported for Terylene. Polythene exports were much greater, but domestic sales were less than in 1959. Sales of most chemicals, except for sulphuric and nitric acids, were also up.

Italian Edison

The Italian chemical producers Società Edison S.p.A. announce a recommended dividend for last year of 135 lire per 2,000-lire share (same) after net profit for 1960 of 14,260 million (13,680 million) lire. Depreciations last year totalled 5,000 million (4,750 million) lire. The company's chemical production at Porto Marghera and Mantua rose by 10% over the year. The Sicedison petrochemical subsidiary raised sales by 40% over 1959 levels.

As well as recommending the unchanged dividend—which recommendation was accepted—the Edison board was successful in suggesting a raising of company capital from 200,000 million to 240,000 million lire. Over the past four years Edison has invested 200,000 million lire in chemical projects.

Hibernia-Chemie

Scholven-Chemie AG, the West German chemical company owned wholly by the country's nationalised coal-mining company Bergwerksgesellschaft Hibernia AG, have bought up from the Friedrich Krupp concern, Essen, the carbon chemical producer concern Krupp-Kohlechemie GmbH, Wanne-Eickel. Its name has been changed from Krupp-Kohlechemie GmbH to Hibernia-Chemie GmbH. This company has taken over on a tenancy basis organic and inorganic chemicals production units of the main Hibernia company.

International Nickel

While earnings figures for the first quarter of 1961 were not yet available, indications were that net earnings of International Nickel Company of Canada Ltd. "should compare not unfavourably with the $18 m., or 62 cents per common share, reported for the last quarter of 1960", Mr. Henry S. Wingate, chairman, told shareholders in Toronto (see also p. 699).

Petrogas Processing

Petrogas Processing Ltd. have been formed by Jefferson Lake Petrochemicals of Canada and 27 oil and gas companies owning reserves in the Calgary gas field. The new company is building a $13 million gas treatment and sulphur plant with capacity to process 150 million cu. ft./day of natural gas and to produce 107 million cu. ft. of pipeline gas, 2,200 barrels/day of stabilised condensate and 863 tons/day of elemental sulphur.

Jefferson Lake Petrochemicals of Canada plan to issue $5,000,000 6⅞% secured debentures to finance proposed developments.

Completion of the gas treating and sulphur manufacturing plant is due in December. Jefferson Lake, who will be the operator, will also join in construction of a gas gathering system and treatment plant near Savanna Creek, about 135 miles south-west of Calgary, where they will build a $2 million sulphur plant.

Reichhold (Canada)

Reichhold Chemicals (Canada) Ltd., report 1960 net income of $38,594, or 10 cents/share ($187,862 or $1.14/share). Lack of naphthalene was chiefly responsible for the slump in earnings, which occurred despite record total sales of all products.

Reichhold, U.S.

Over the first quarter of the current year Reichhold Chemicals Inc., U.S., recorded a profit stated to be lower than than of $663,000, or 18 cents per share, for the corresponding period of 1960. This is despite the fact that March 1961, turnover was the highest in the company's history.

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 31 May

Purification of gases. Gas Council. **869 131**

Purification of fluorinated hydrocarbons. Haszeldine, R. N. **869 273**

Process for the purification of titanium tetrachloride. Laporte Titanium Ltd. **869 602**

Methods for preparation of halogenated organic compounds. Haszeldine, R. N. **869 364**

Protective coating on resilient cellular materials. Dunlop Rubber Co. Ltd. **869 623**

Composite structures and vinyl acetate copolymer adhesives for use therein. British Celanese Ltd. **869 071**

Resilient materials. Dunlop Rubber Co. Ltd. **869 606**

Process for the manufacture of modified cyclohexanone resins. Howards of Ilford Ltd. **869 467**

Stabilising ethylene oxide polymers. Union Carbide Corp. **869 111**

Alkylene oxide-copolymers. Union Carbide Corp. **869 112, 869 113**

Polymerisation of ethylene oxide in organic diluents. Union Carbide Corp. **869 114**

Polymerising alkylene oxide. Union Carbide Corp. **869 115, 869 116**

Manufacture of polyethylene. Eastman Kodak Co. **869 534**

Diphosphoimidazoles. Leo A.B. **869 625**

Removal of metallic catalyst residues from hydrocarbon polymers. Du Pont de Nemours & Co., E. I. **869 110**

Stabilising ethylene oxide polymers or copolymers. Union Carbide Corp. **869 117**

Ethylene oxide polymer compositions. Union Carbide Corp. **869 118**

Molecular weight control of olefin polymers. Ruhrchemie AG. **869 137**

Process for the preparation of 1:4-dibromobutane and 1:4-dibromobutane. Cellulose-Polmeres et Derives Cepede S.A., and Red-GmbH. **869 121**

Merocyanine dyes and undissociated cyanine dyes. Kodak Ltd. **869 521**

Manufacture of polyquaternary compounds. Farbenfabriken Bayer AG. **869 423**

Azodyestuffs derived from cyanuric halides and process for their manufacture and application. Ciba Ltd. **869 279**

Continuous purification of crude maleic anhydride. Yawata Iron & Steel Co. Ltd. **869 297**

Preparation of 2-diphenylacetyl 1,3-indandione. Upjohn Co. **869 280**

Process for the production of polymeric unsaturated ester or polyester resins. Farbenfabriken Bayer AG. **869 298**

Polymerisation of ethylene. Distillers Co. Ltd. **869 544**

Therapeutic potentiated barbiturate compositions. Smith, A. E. W. **869 369**

Separation of aromatic hydrocarbons. Esso Research & Engineering Co. **869 299**

Ferrous citrate complex. Croshnik, W., and Haffeke, W. H. **869 228**

Process for separating fluorethylenes from each other. Farbwerke Hoechst AG. **869 568**

Phenolic resin-coated moulding powders. Hooker Chemical Corp. **869 302**

Heterocyclic compounds and their use. Geigy AG, J. R. **869 181**

Interpolymers. Balm Paints Proprietary Ltd. **869 144**

Modified resins. Balm Paints Proprietary Ltd. **869 145**

Manufacture of polymers. Farbwerke Hoechst AG. **869 429, 869 430**

Basically substituted heterocyclic compounds and process for their manufacture. Ciba Ltd. **869 089**

Process for the polymerisation of olefins. Gelsenberg Benzin AG. [Addition to 822 611.] **869 370**

4-Nitrostyryl-2-sulphonic acid compounds. Geigy AG, J. R. **869 372**

Pharmaceutical compositions comprising benzylhydrazine derivatives. Imperial Chemical Industries Ltd. **869 575**

Corticosteroids and preparation thereof. Pfizer & Co. Inc., Chas. **869 090**

Process for the removal of hydrogen sulphide from gases. Gas Council. **869 127**

Dioxazine pigments and process for their manufacture. Ciba Ltd. **869 357**

Phenothiazine derivatives. Rhone-Poulenc. **869 473**

Dialkylamides of alpha-substituted fatty acids. Nippon Shinyaku Co. Ltd. **869 474**

Thioparabanic acids. Ciba Ltd. **869 360**

Vinylic phosphorus compounds. Metal & Thermit Corp. [Addition to 777 158.] **869 528**

Benxozine derivatives and processes for the preparation thereof. Thomae GmbH, K. [Addition to 896 729.] **869 093**

Compositions comprising polyvinyl esters. Farbwerke Hoechst AG. **869 094**

Process for the production of valuable gaseous hydrocarbons. Koppers GmbH, Heinrich. [Addition to 787 829.] **869 361**

Fertilisers based on urea-formaldehyde resins. Imperial Chemical Industries Ltd. **869 362**

Leuco-sulphuric acid esters of dyestuffs of the benzanthrone-pyrazolanthrone series and process for their manufacture. Farbwerke Hoechst AG. **869 475**

Polyether compositions. Imperial Chemical Industries Ltd. **869 096**

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Liquid pharmaceutical compositions comprising compounds of ion exchange resins and therapeutic substances. Clinical Products Ltd. **869 149**

Dihydroxydiarylmethanes. Monsanto Chemical Co. [Addition to 708 640.] **869 476**

Process for the production of boron alkyls and of highly active aluminium oxide. Studiengesellschaft Kohle. **869 550**

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Choline salicylate. Mundipharma AG. **869 553**

Recovery of halogen from reaction residues. Imperial Chemical Industries Ltd. **869 162**

Co-cured rubber and reinforced resin. Esso Research & Engineering Co. **869 163**

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Amylose derivatives and their production. Coöperatieve Verkoop- en Productievereenigning Van Aardappelmeel en Derwaten Auebe G.A. **869 192**

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Process for the preparation of cyclic di- and tri-carboxylic acids. Henkel & Cie GmbH. **869 505**

N-aryl-alkanamides, their preparation and use as herbicides. Food Machinery & Chemical Corp. **869 169**

Process for continuously carrying out the dry polymerisation of olefins or gases containing olefins. Gelsenberg Benzin AG. [Addition to 822 611.] **869 311**

Market Reports

GOOD MOVEMENT OF SODA, POTASH PRODUCTS

LONDON Apart from an increase in the price of red lead, white lead and litharge, there has been little change either as regards price or trading activity and new business arranged for nearby delivery has been on a satisfactory scale. Most of the routine soda products and potash compounds are moving in good quantities against contracts. Export trade inquiry continues to be maintained at about recent levels. The call for fertilisers has been sustained while nothing of fresh importance has been reported from the coal tar products market.

MANCHESTER Quotations in practically all sections of the chemicals and allied products market have maintained a steady front during the past week. A fair aggregate weight of new business has been reported on home consumption account, and replacement buying for overseas shipment has been well represented, especially in dyes and intermediate products, plastics, paints and pigments. On the home side there has been a continued steady movement of borax and boric acid, hydrogen peroxide and most of the potash, soda and barium compounds, with a fair amount of business passing in to bleaching materials, aluminium, sulphate, and the non-ferrous metal products.

SCOTLAND There has been a slightly better movement generally in chemicals for the home market and overall the week's trading has been reasonably brisk and did show an improvement on the previous one. The bulk of demands are still for immediate requirements, with emphasis on the delivery position. There has also been quite a number of enquiries. Conditions in regard to agricultural chemicals have also shown some improvement, with a good volume of demands for seasonal requirements. The export position is unaltered and here again enquiries are numerous.

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