Chemical Age

CONTAINERS AND TRANSPORT FOR CHEMICALS
(page 507)

VOL. 85 No. 2176

25 March 1961

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

INDEX TO ADVERTISERS

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

(Continued on page 478)

COAL + CHEMICALS
+ KNOW - HOW
= BITUMEN

TIMBER + CHEMICALS
+ KNOW - HOW
= PAPER

RAW JUTE + CHEMICALS
+ KNOW - HOW
= JUTE CLOTH

BITUMEN BONDED/PAPER LINED JUTE BAGS supplied by **LOW & BONAR LTD** are an amalgam of all the above plus skilled machining and branding. Jute cloth can also be papered on both sides, coated with P.V.C. and/or polythene.

Apply for particulars of
LOBOTITE Bias Sewn Tubular Hessian
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Low & Bonar Ltd.
63 KING STREET. DUNDEE. SCOTLAND.
TELEPHONE: 24111 P.B.X. TELEGRAMS: "LOBO DUNDEE".

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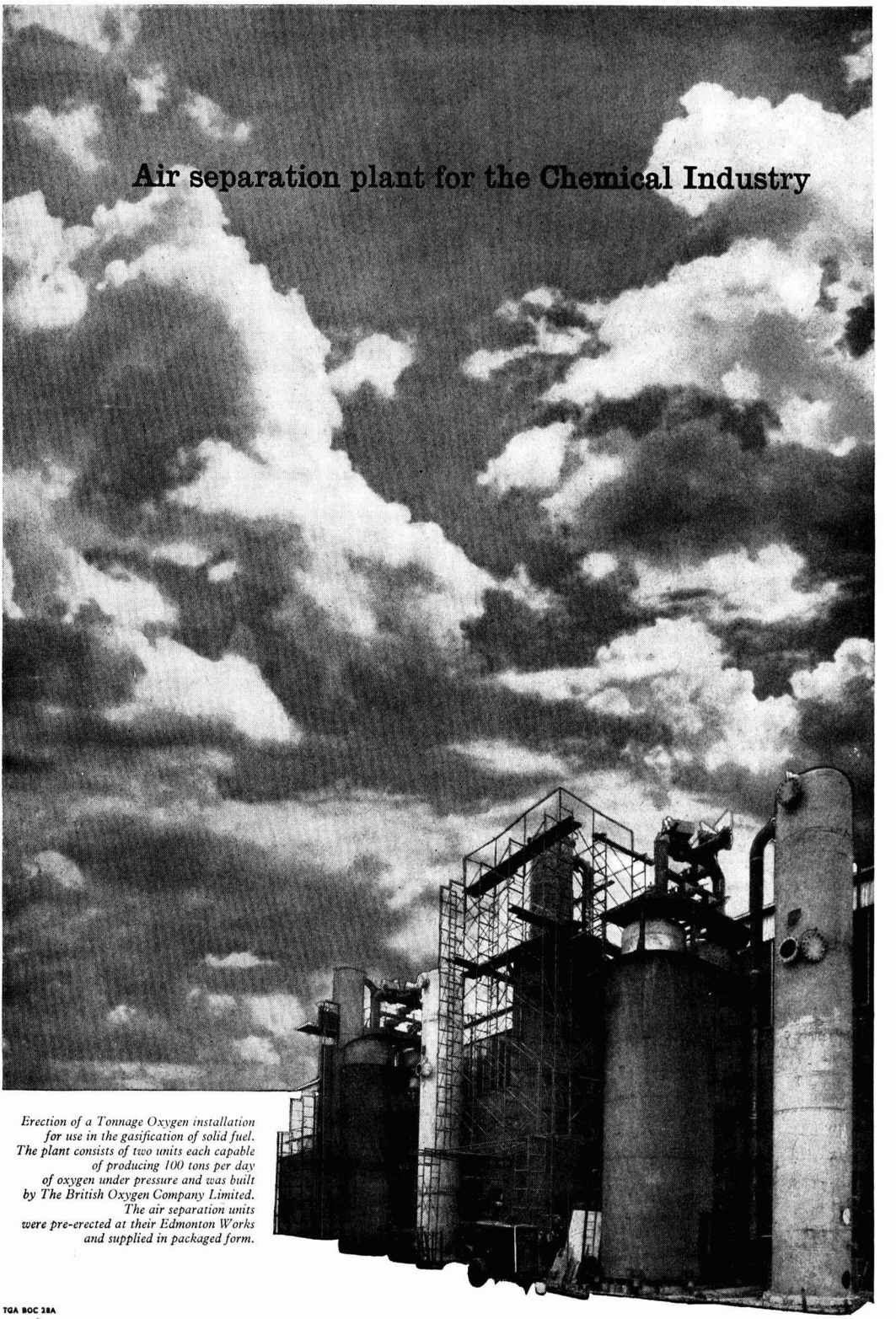


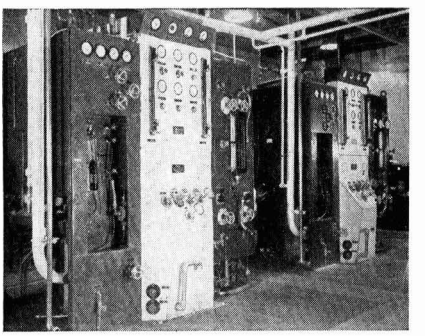
Erection of a Tonnage Oxygen installation for use in the gasification of solid fuel. The plant consists of two units each capable of producing 100 tons per day of oxygen under pressure and was built by The British Oxygen Company Limited. The air separation units were pre-erected at their Edmonton Works and supplied in packaged form.

TGA BOC 28A

Tonnage Oxygen and Nitrogen Plant

PLANTS FOR AIR AND GAS SEPARATION

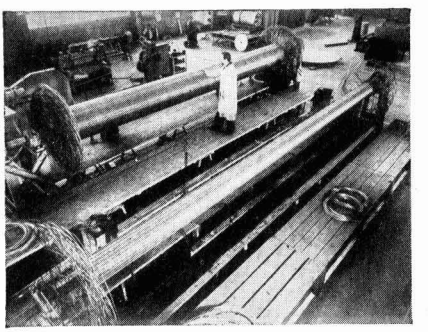
BOC has unrivalled experience in building a wide range of plants specifically designed to meet the diverse requirements of the Chemical, Steel and Gas industries. Continuous bulk demands for atmospheric gases are best met by plant installed close to the point of usage. The consumer can either own and operate such plant or take supplies by pipeline from a BOC installation.



Liquid Oxygen Plants at the Argon Purification Plant, UKAEA, Dounreay

PURIFICATION PLANTS

BOC are specialists in the design and construction of plants for the purification of nitrogen, argon, helium and the rare gases. Very high purity products can be obtained.



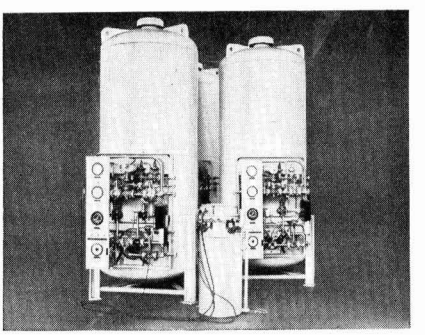
Cross Flow Heat Exchangers

ANCILLARY EQUIPMENT

All types of ancillary equipment, associated with air separation plants, are designed and manufactured by BOC. These include a wide range of liquid storage tanks, pumps, evaporators and compressors.

CRYOGENIC ENGINEERING

The specialist skill and knowledge accumulated over many years enables BOC to provide a comprehensive service to all users of atmospheric gases and in cryogenic engineering applications. The benefits of BOC's experience and tradition are free to customers, and experts are always available for discussion and advice—a complete service from pre-sales consultation through all stages of design and construction to after-sales advice and co-operation.



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BOC MAKE

Complete Air Separation Installations for Oxygen, Nitrogen and Rare Gases
Transportable Oxygen Plants · Gas Purification Systems
Liquid Oxygen Pumps and Vaporisers · Gas Compressors
Gas and Liquefied Gas Storage Systems · Gas Separation Plants

For air separation plant—first consult

The British Oxygen Company Ltd

HEAVY INDUSTRIAL DEPARTMENT Spencer House, St. James's Place, London, SW1. HYD 3051

'HYCAFLEX'

Flexible containers

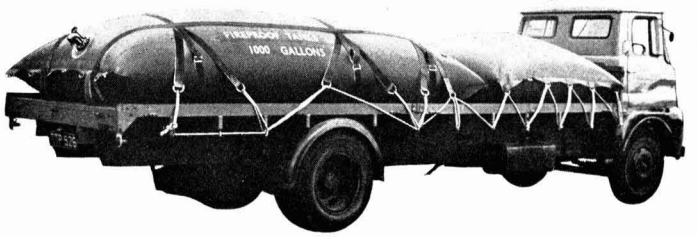
These dual-purpose containers are designed for either bulk liquid storage or on-the-spot conversion of standard vehicles to auxiliary tankers. 'Hycaflex' containers cut costs—by reducing capital outlay on tanker vehicles, and by allowing economical return journeys to be made with normal freight. They are easily folded or rolled for compact stowage and their heavily reinforced rubber construction gives maximum resistance to weather and abrasion on unmade sites.

A capacity load of normal freight (7 tons) could be accommodated by the vehicle shown below after discharging its consignment of 1,500 gallons.

Capacities from 250 to 2,000 gallons, i.e., to fit conventional road transport, are standard. Larger sizes are made to specific requirements.

'HYCAFLEX' DRUMS

. . . medium capacity flexible containers manufactured from an exceptionally tough rubber and fabric laminate, resistant to fuels, oils and medium strength acids, and giving protection against abnormally rough treatment. Dimensions are 28 in. x 24 in. dia., material thickness 0.16 in. or 0.32 in., capacity 45 gallons. Larger capacity drums are being developed.



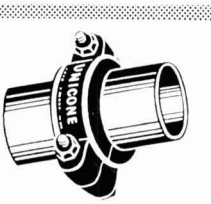
★ Our Technical Advisory Service welcomes your enquiries and we shall be pleased to test any fluid for compatibility with 'Hycaflex' containers.

FIREPROOF TANKS LTD

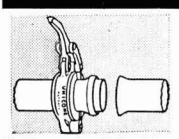
THE AIRPORT • PORTSMOUTH • HANTS • *Tel. 62391 - 2 - 3 - 4*

INSTANTANEOUS JOINTS

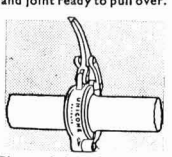
leakproof. safe . . . reliable!



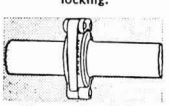
For permanent or semi-permanent pipelines 'UNICONE' bolted pipe joints are employed.



Rubber gasket in position and joint ready to pull over.



Pipe ends joined ready for locking.



The completed joint.

For temporary pipe lines 'Unicone' instantaneous joints are recommended. Comprising two parts only, they fasten with a "snap" ensuring a perfect seal in a matter of seconds.

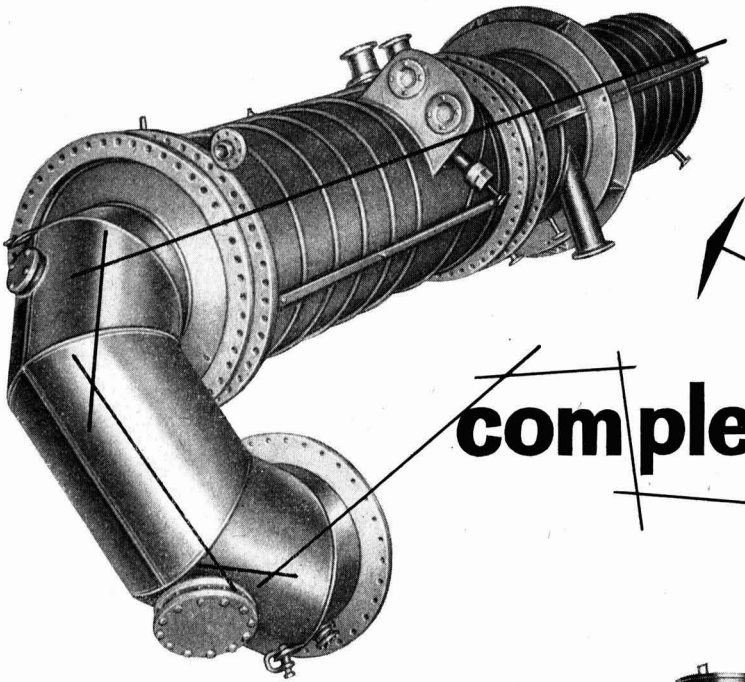
For permanent or semi-permanent pipe lines, 'Unicone' bolted type joints are usually employed and can be assembled far more quickly than any other flexible joint giving positive anchorage.

A perfect joint in a matter of seconds...

The 'Unicone' system of pipe-jointing, with its time and labour saving features, produces a pipe line which is flexible while remaining absolutely leak-proof.

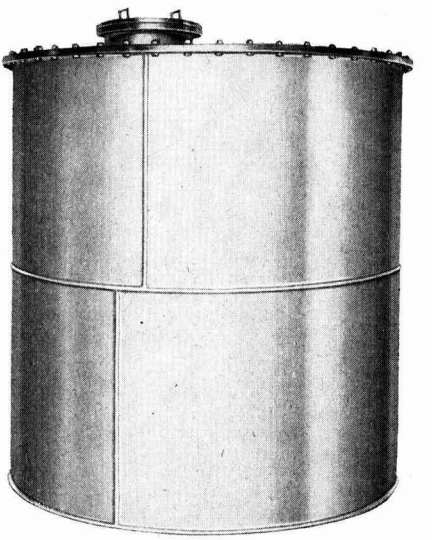
'UNICONE' REGD. Flexible Joints for Pipelines

THE UNICONE CO., LIMITED
RUTHERGLEN, GLASGOW, SCOTLAND



complexity

simplicity



...but each executed with the same precision vital to high grade chemical engineering plant and which can always be found in work carried out by Burnett and Rolfe Limited

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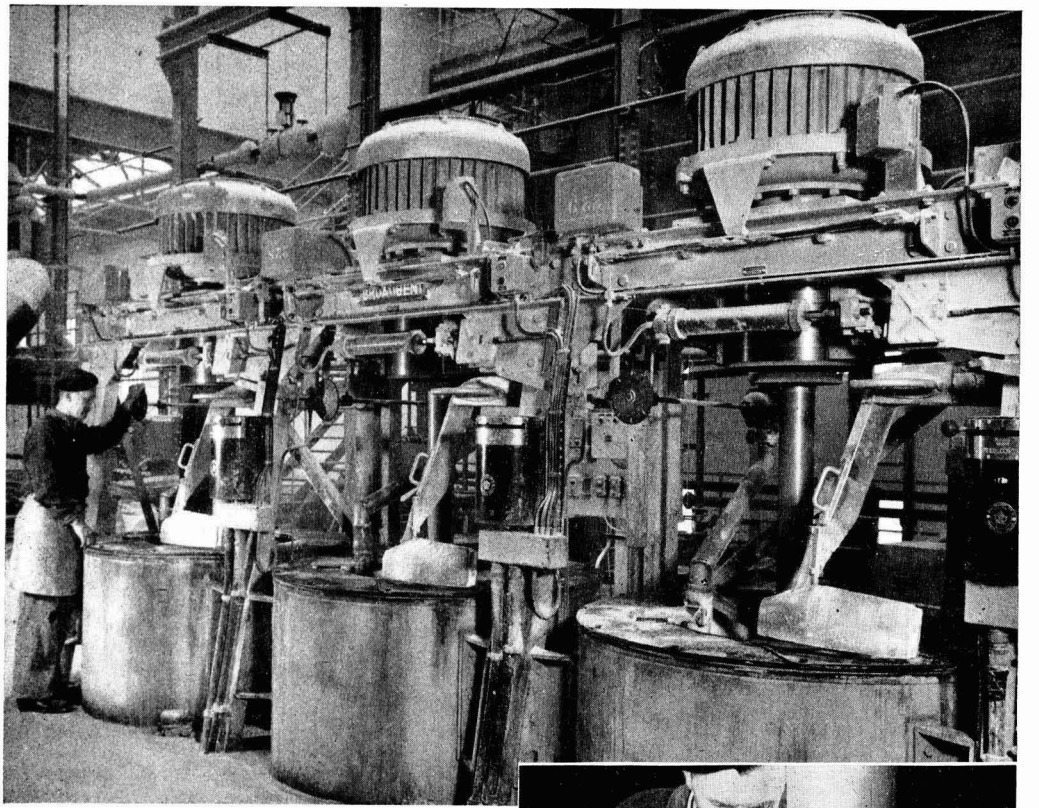

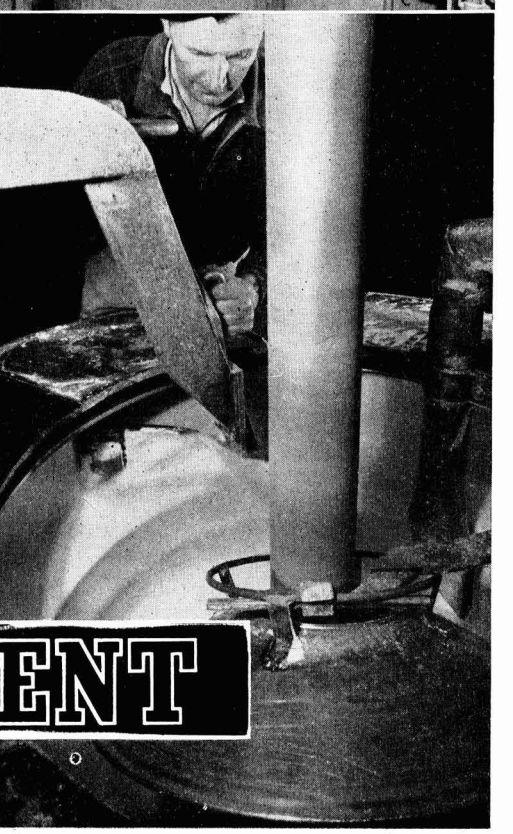

OVERDRIVEN PLOUGHING CENTRIFUGALS

Overdriven Type 27/28 Broadbent Centrifugals are successfully operating on a large number of chemical process applications, dealing with freely filtering products.

They combine the advantages of large capacity in proportion to diameter of basket with rapid labour saving bottom discharge.

Write for list 27/28

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THOMAS BROADBENT & SONS LTD.
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GLASS packing actively SELLS goods!

It has been well said that 'seeing is believing.' And nowhere is this more applicable than in the store when housewives are shopping. They like to *see* exactly what they're buying, just how much they're buying and, in the home, exactly when they need to buy more. Glass is trusted by housewives. That is why inexpensive, versatile glass is such a powerful sales aid.

Something new and interesting is always happening in the Glass Container Industry. If you have a packaging problem your Glass Manufacturer will be happy to discuss it with you.

See how good things are in

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PROVE IT WITH A PRACTICAL TEST ON YOUR OWN PRODUCTS

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DESIGN PREFERENCE TESTING Any new design can be tested on a consumer panel of 400 families.

CONTAINER IN USE TESTING The new container and its product can be tried out in actual use in the home.

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Further details of this service are contained in a booklet which you can get from your Glass Manufacturer or from the Federation.

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Telephone: FLEet Street 3212 (26 lines)
Telegrams: Benformula - Cent - London

Editor M. C. HYDE
Manager R. C. BENNETT
Director N. B. LIVINGSTONE WALLACE

Midland Office
Daimler House, Paradise Street, Birmingham. [*Midland* 0784-5]

Leeds Office
Permanent House, The Headrow, Leeds 1. [*Leeds* 22601]

Scottish Office
116 Hope Street, Glasgow C2. [*Central* 3954-5]

IN THIS ISSUE

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CHEMICAL AGE

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PROFIT SET-BACK IN U.S.

FACED with the prospect of a further year of lower net earnings despite increased sales, such as 1960 has been, U.S. chemical producers are taking drastic measures to ensure a widening of profit margins for the future. For, although a fair proportion of firms managed to increase their 1960 sales compared with 1959, only some 30% of them managed to increase their net income over the year. The fourth quarter of the year was particularly poor, examples being Celanese's drop in earnings from 77 cents/share in 1959 to 56 cents/share in the last 1960 quarter; Olin Mathieson's from 80 to 61 cents; Reichhold Chemicals from 36 to 21 cents; and Witco Chemical from 40 to 31 cents/share. The comparatively few companies making gains over the final 1960 quarter included Commercial Solvents, with their spectacular jump to 40 cents/share compared with 18 cents in the last 1959 quarter—largely achieved by disposing of unprofitable lines and expanding production of the more attractive products.

Dominant features of the American scene are overproduction and intense competition—it was noted in a U.S. Manufacturing Chemists' Association survey summarised in CHEMICAL AGE last week (p. 446) that 30% of companies with new chemical projects are outside the chemical industry proper. It is also evident that the most profitable lines are the newer and specialty products, while increased productivity and lower costs are the ideal in existing operations; hence the continuing strong emphasis on research and development. With this, as noted in our last week's report, there is an intensification of plant construction and extension, and an energetic pursuance of new markets, particularly overseas. The big concentration of U.S. export activities in European Common Market countries, previously commented on in this journal, receives further confirmation in the annual report of E.I. Du Pont de Nemours (see p. 505).

U.K. chemical producers, too, have experienced a squeeze on profit margins, but not to the same extent as in the U.S. While the U.K. industry is also experiencing stiffer competition and is finding the export market increasingly tough, especially in Europe, British companies are on the whole more cautious in spending on new production facilities than their American counterparts, production here tending to follow demand more closely than in the U.S. The increasing tendency for diversification in the U.K. chemical industry is another ameliorating factor, making the industry more resilient to changes in the pattern of consumption. The start that has been made by one or two of the larger companies in opening up new export outlets in the Iron Curtain countries, if followed up by fresh endeavours, should help to counteract the effects of the U.S. chemical companies' entrenchment in Europe.

Here, as in the U.S., there is a pressing need for the development of new products and new applications, and to reduce costs by increasing production efficiency. Sustained research and development is the obvious answer. It has been stated that the U.S. chemical industry now spends some $700 million a year on research and development projects; in the U.K., it has been estimated that chemical industry research and development investment in 1958 was some £22 million. Taking into account the fact that the U.S.

(*Continued on p. 502*)

SEED DRESSING CRITICISMS ARE NONSENSE — LORD FLECK

IN a speech on Monday, highly critical of what he called unjust criticism of agricultural chemicals, Lord Fleck, K.B.E., F.R.S., S.C.I., president, said that the use of seed dressings in the U.K. produced 350,000 tons of extra grain, valued at £11 million, which would otherwise be lost to the country. He was proposing the toast of the Pesticide Group, Society of Chemical Industry, at the annual dinner held at the Horseshoe Hotel, London.

Lord Fleck declared that pesticide manufacturers were suffering greatly from the injustice of ill-founded comments on the use of chlorinated hydrocarbons and other products. That criticism was just so much nonsense. Local and national newspapers, as well as societies that encouraged it were doing a great disservice to science and to agriculture.

The fact that a few more deaths of birds were taking place had to be put into its proper place. It was no use trying to work up public indignation because some birds had been killed unfortunately through consuming insecticides. It should be remembered that in Britain something like 3½ million cattle were slaughtered each year, plus some 12 million sheep and lambs, 15 million pigs and 220 million broilers, ducks and other birds. At meals—at least three times a day—people lent their moral support to the large-scale slaughtering of animals for their nourishment. There was, added Lord Fleck, an urgent need for common sense.

Mr. G. L. Baldit (Plant Production Ltd.), chairman of the group, replied to the toast, saying that in about a year from now, when the Ministry of Agriculture had completed their work, it was planned to hold a properly balanced scientific meeting to deal with the ill-informed criticisms of the industry and help put the use of agricultural chemicals into proper perspective.

Toast of "The Guests" was proposed by Dr. E. E. Turtle, M.B.E. (M.A.F.F. Infestation Control Division), group vice-chairman, and replied to by Professor G. J. M. van der Kerk (director, Organisch Chemisch Instituut, T.N.O., Holland).

The dinner was held in conjunction with a symposium on fungicides (see p. 505).

New Chemistry Fellows for Royal Society

NEW Fellows of the Royal Society, elected on 16 March, include the following:

Prof. James Baddiley, Professor of Organic Chemistry in the University of Durham. King's College, Newcastle upon Tyne. Distinguished for his researches in organic and biochemistry, particularly in the field of co-enzymes, nucleotides and bacterial cell-wall constituents.

Prof. J. Baddiley, left; C. F. Kearton, below left; Dr. H. London, below

Dr. Joseph Chatt, head of the inorganic chemistry department at the Akers Research Laboratories of I.C.I. at Welwyn, Herts, and group manager of the Heavy Organic Chemicals Division. Distinguished for work on the chemical and physical constitution of co-ordinated metallic compounds.

Mr. C. F. Kearton, O.B.E., managing director, Courtaulds Ltd., Coventry. Distinguished for work on chemical engineering characteristics of volatile uranium products and for technological development in the textile industry.

Dr. Heinz London, deputy chief scientific officer at the Atomic Energy Research Establishment, Harwell. Work on superconductivity, on liquid helium and on the separation of isotopes.

Dr. Leo Marion, M.B.E., senior director, National Research Council of Canada, and director, Division of Pure Chemistry, Ottawa. Distinguished for work in organic chemistry, particularly in the field of alkaloids.

Dr. J. A. Pople, superintendent, Basic Physics Division, National Physical Laboratory, Teddington. Noted for his work on the application of quantum mechanics to the explanation of the chemical and spectroscopic properties of molecules.

Ethylene Will Catch Up With Propylene in France

CURRENT trends in the development of petrochemicals in France is to be the title of a paper to be given by Mr. P. A. Laurent, Cie Française de Raffinage, at a meeting of the Heavy Organic Chemicals Group, Society of Chemical Industry, to be held at 14 Belgrave Square, London S.W.1, on Friday 7 April at 6 p.m.

In the first part of his paper, M. Laurent will outline the growth of usage of ethylene, propylene, butylenes, butadiene and aromatics between 1956 and 1960; stress will be placed on production capacities, overall consumption and end-uses. A tentative forecast of development will be made up to 1953, which will show that propylene, so far the main olefinic base material, will be matched by ethylene in the next two years. Butadiene and aromatics will also be of great importance by 1963.

Second part of the paper will give a summarised statistical comparison between petrochemical developments in France and the U.S. Certain aspects of competition between petrochemicals made in France and those imported from the U.S. will be dealt with in the third part.

No tickets are required and non-members will be welcome.

C.A. Sub. Rates to Rise for First Time in Five Years

ANNUAL subscription rates for 'Chemical Age', held at their present levels for more than five years despite numerous increases in production costs and other overheads, will be increased with effect from 1 April by 5s a year.

The new annual rates will be 57s 6d. for home subscribers and 65s for overseas subscribers. The single copy rate will be 1s 9d (by post 2s). It is regretted that it is no longer possible to absorb mounting costs.

Bayer to Build Facilities at Antwerp

Bayer Chemical Co. have announced that they are to build a factory at Antwerp. They are in the process of negotiating with the Belgium authorities for a site of 150 hectares.

U.S. PROFITS SET-BACK

(Continued from page 501)

industry is about five times the size of the U.K. industry, and assuming that these estimates are based on a comparable definition of 'chemical industry', it will be seen that the Americans are spending about twice as much, in proportion, as is being spent here. It should also be noted that the Americans are now putting increased emphasis on *original* research, including fundamental scientific investigations; this is bound to yield rewards in the long run.

Project News

Shell Granted Goodrich Licence for Polydiene Rubbers

A LICENCE for the manufacture and marketing of polydiene synthetic rubbers in the U.K. has been granted to Shell Chemical Co. by Goodrich-Gulf Chemicals Inc. Shell already hold licences for the use of Ziegler catalysts in the production of polybutadiene and polyisoprene.

In March of last year, Shell announced their intention to establish substantial capacity in the U.K. for the manufacture of polydiene rubbers (see CHEMICAL AGE, 2 April 1960, p. 563). The plant, which is at Carrington, is expected on stream in January of 1963 and will have a capacity as large as any polydiene plant in the world.

At the same time as the announcement of the Carrington plant was made, Shell Nederland N.V. revealed that a parallel plant was to be built in Holland with an estimated capacity of 25,000 tons a year of polyisoprene. Phillips Chemical are in the process of raising their polybutadiene capacity from 20,000 to 25,000 tons a year while a company formed jointly by Stauffer Chemical and American Synthetic Rubber are building a plant with a capacity of 30,000 tons a year which can be raised to 50,000 tons. This latter plant is based on the Phillips process and uses an alkylmetal catalyst.

The patents held by Ziegler cover the use and manufacture of catalysts which can be used for a number of polymerisation processes. The Goodrich-Gulf patents are simply for the production of polybutadiene and polyisoprene by a process which uses the Ziegler catalysts. Licences from both Ziegler and Goodrich-Gulf are therefore necessary for the plant at Carrington. Although Shell have only just disclosed the acquisition of the Goodrich-Gulf licence, it was known at the time of the announcement of their plans for the production of polydiene rubbers at Carrington that the licence would be obtained.

Under the terms of a consent decree issued by the U.S. court for the District of Columbia, Goodrich-Gulf must grant non-exclusive licences to other manufacturers to make *cis*-1,4-polyisoprene using a titanium-based Ziegler catalyst at a royalty of 2.5% of sales (see CHEMICAL AGE, 10 September 1960). This means that the company can charge $100,000 in cash for the granting of a licence and another $100,000 to $200,000 according to the size of the plant when construction begins.

Ugilor's D.C.L.-licensed Acrylo Plant Nears Completion

● THE first plant to produce acrylonitrile by reacting propylene and ammonia—the ammoxidation process—under licence from the **Distillers Company Ltd.**, is now almost completed. The producers, **Ugilor** of France, were named in CHEMICAL AGE, 9 April, 1960, p. 601. Their capacity will be between 3,000 and 4,000 tonnes/year. This one step process is described in Australian Patent 56,564/60, and uses oxides of molybdenum and cobalt as the conversion catalyst. Both Sohio and Du Pont have processes starting with propylene—the most important differences being in the catalyst—Sohio use bismuth phosphomolybdate, while Du Pont use silver on silica.

I.C.I. Severnside Water Treatment Contract

● A £13,000 contract has been awarded by **I.C.I.** to **William Boby and Co. Ltd.** for the supply of a dealkylisation-base exchange plant at their new petrochemicals site on Severnside.

Models of Marchon Fatty Alcohols Plants for Moscow Fair

● MODELS of parts of the two fatty alcohol plants that **Marchon Products Ltd.**, of the Albright and Wilson Group, are to supply to the U.S.S.R. in conjunction with the **Constructors John Brown Ltd.** are to be displayed at the British Trade Fair in Moscow. A recording machine will answer questions in Russian about the models. Mr. F. Schon, Marchon chairman, has made several visits to the Soviet Union and members of the staff have lectured about the production of detergents in Moscow and elsewhere in the U.S.S.R.

Chemico Sulphuric Acid Plant for Mexico

● CONTRACT to supply full process design and detailed engineering services relating to a 30 short tons/day sulphuric acid concentration plant of the submerged combustion type has been awarded to **Chemical Construction (G.B.) Ltd.** by Compania Mexicana de Explosivos S.A., Mexico, a wholly owned subsidiary of E.I. Du Pont de Nemours and Co.

Acheson Dispersed Pigments Complete Plant Extension

● A FURTHER stage in the expansion programme of **Acheson Dispersed Pigments Co.**, a division of Acheson Industries (Europe) Ltd., has been reached with completion of a 25,000 sq. ft. extension to the Dukinfield works. An additional building provides facilities for plant, laboratory and offices. Further details are not yet available, but following this development a number of new appointments and promotions have been made (see p. 518).

Phosphoric Acid is Subject of F.S. Talk

DEVELOPMENTS in phosporic acid manufacture were the subject of a lecture delivered to the Fertiliser Society by W. C. Weber and F. W. Edwards of Dorr-Oliver on 23 March.

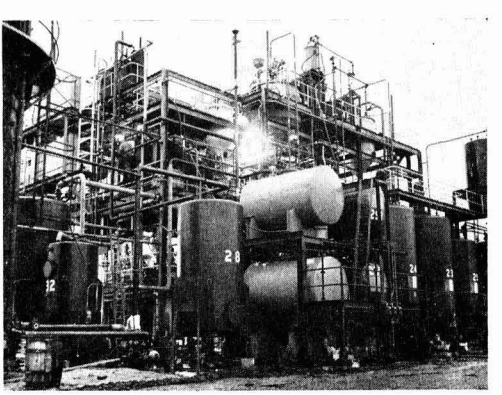
The paper was concerned only with the production of wet process phosphoric acid using sulphuric acid and detail of process, chemistry and basic technology were not included. The lecture consisted of a discussion of recent advances in the equipment and the arrangement of the component stations, with particular reference to the experience of Dorr-Oliver in this field. This included information not previously released.

Although the lecturers did not feel free to publish data on U.K. phosphoric acid production and they did not have sufficiently comprehensive information on European capacity, some approximate figures for the U.S. were given.

	Actual 1955	Estimated 1960*	Projected 1965†
Tons of P_2O_5/day	2,100	3,800	5,860
No. of plants	21	29	41

* Based on plants actually under construction.
† Based on plants proposed and likely to be built.

Fisons M.C.P.A. Plant at Harston



MCPA plant, Harston, of Fisons Pest Control, which will be the basis of a much larger plant to be built in the U.S.S.R. by Fisons and Constructors John Brown (see C.A., 18 March, p. 449 for details)

★ PAPER sacks are big business and I learn that some 550 million are produced in this country each year, worth about £15 million; jute sack production is put at 220 million. The chemical industry, including fertilisers, is the biggest customer for multi-wall paper sacks. I estimate that total spending on all packaging materials and supplies for chemicals lies between £40 million and £50 million a year.

The change from jute to paper sacks has probably been taken farther in the U.K. than in North America. The competitive standing of papers sacks, metal drums, fibre drums and carboys is discussed in a special survey on page 507. It is interesting to learn that the much-maligned carboy is more than holding its own; despite high tare weight it still has an extremely low package cost per lb. It will be a long time—if ever—before it is displaced.

★ BAG snatchers and tearaways beware! Potential victims have been given a potent weapon by the Hanlon Chemical Co., Kansas City. Named Escort, it is packed in a squeezable plastics container that can easily be held in the hand; it can be used to shoot out a lachrymatory dye.

The would-be attacker is marked with a bright dye that on a white skin forms a reddish mark. This is difficult to wash off and visible traces disappear in about two weeks. A fluorescence lingers and can be detected under u.v. light. The dye, which has Food and Drug Administration approval, has no lasting harmful effects.

★ THERE is a row brewing in Southern Rhodesia that has nothing to do with racial unrest or the Federation—it is over the £18 million oil refinery that American Independent Oil Co., New York, are planning to build there, and which the Federal Government has just given the go-ahead. Aminoil's main owners are Phillips Petroleum, Signal Oil and Gas, and Ashland Oil and Refinery.

Still to be concluded is a firm contract with the Federal Government that will enable Aminoil to start construction; meanwhile, a considerable section of the Rhodesian Parliament and Press have voiced objections to an arrangement which, it is alleged, would grant a monopoly, and would not only hit existing oil distributing companies in Rhodesia, but would also result in a loss of oil-carrying revenue to Rhodesian Railways of at least £300,000 a year.

The Rhodesian Minister of Commerce and Industry, Mr. Owen, has reaffirmed that the Government had asked the Shell and Vacuum companies whether they were interested in establishing a refinery. But it seems that these approaches have been denied by the companies themselves. According to Mr. Owen, the Rhodesian Government had undertaken not to negotiate on any other refinery project until the present option had expired, but two companies had said they were not prepared to make firm proposals and two others had indicated their interest.

★ MATCHES are so much an accepted part of our life that it does not seem possible that a time existed when this was not so; but it is only a century since the death knell of the tinder and flint was sounded. Although matches were invented in 1827 by an Englishman, John Walker, it was not until a Mr. Bryant and a Mr. May formed a partnership with a capital of £8,000 in 1852 and the granting of a patent to May in 1855 that their commercial production was in sight. It is to mark the centenary of their first factory in 1861 that Bryant and May have issued a booklet—'A fragment of English social history'—on making matches.

Match-making materials have varied little since the beginning. John Walker's original formula was potassium chlorate, antimony sulphide and gum arabic. Today's matches are made from potassium chlorate and phosphorus sesquisulphide and the head of a safety match consists of chlorate and sulphur which is rubbed against amorphous phosphorus on the side of the box.

The Queen and the Duke of Edinburgh were presented with specially bound copies of the booklet when they visited Bryant and May's Bow factory on 15 March.

★ THE 'chemistry sets' I toyed with in my early youth had more affinity with conjuring outfits than with scientific apparatus. It is all different now, especially in the U.S., where outfits containing such refinements as chromatographic materials and molecular models are finding a market amongst the more sophisticated juvenile chemists.

One U.S. journal reports that the top-selling kits, priced at around $10, include some 20 chemicals, heat-resistant labware, alcohol burners, molecular model-building sets, litmus paper, and a beam scale. More elaborate sets are available for teenage enthusiasts.

While chemistry sets in the U.K. are growing steadily more scientific, there does not seem to be any complete miniature chemical labs. marketed comparable with these U.S. kits. Seriously minded British youths have a preference for buying their laboratory materials 'loose' and making up their own sets. Indeed, it seems doubtful whether a chemistry set of a more advanced type could be devised that would satisfy a wide demand. Some idea of the problems can be seen in the fact that, at the Rutherford College of Technology, Newcastle upon Tyne, they found that none of the commercial sets met their requirements for issuing to students in the practical organic chemistry course. Each student had to have a set of apparatus sufficient to cover all the common operations—distillation, refluxing and so forth. L. H. W. Hallett, M.A., B.Sc., F.R.I.C., and D. A. Bayles, B.Sc., A.R.C.S., A.R.I.C., have described (*J.R.I.C.*) how the department enlisted the aid of a local glassblower to manufacture a set to their own design.

So, whether for the private use of schoolboy enthusiasts or for instructing the more mature student, there seem to be some gaps in the supply of chemistry 'sets' of which laboratory glassware manufacturers might well take note.

★ ALTHOUGH it hardly comes under the heading of chemical industry news, I was delighted to learn that Fisons Horticulture Ltd. have now launched their national garden centre service. With a £20,000 budget, Fisons some time ago decided to introduce this service for the millions of British gardeners.

Core of the project is the training of at least 4,000 retail shop assistants so they can answer specialised gardening problems. So far 2,000 have attended Fisons' courses at 40 centres and have received their diplomas. In each case, their shops will be entitled to display the distinctive symbol of the national garden centre service and to make use of the Fisons Garden Centre in Wigmore Street, or, for highly technical problems, the Levington Research Station.

Although this scheme is not part of an advertising campaign, Fisons cannot help but benefit from their initiative. I have often found a complete ignorance on fertiliser problems in retail shops, even in those that claim to be garden specialists, and if the new scheme helps overcome this, then all praise to Fisons.

Alembic

World Fungicides Account for Large Tonnages of Sulphur, Copper, Mercury and Organics

SOME 275,000 tons of sulphur, 56,000 tons of copper, 300 tons of mercury and 12,000 tons of organic compounds were used in 1958 for the preparation of fungicides for world agriculture, declared *Dr. F. C. H. Gayner* (Plant Protection Ltd.) in his paper 'Fungicide usage in world agriculture', presented at the fungicide symposium held in London on Monday and Tuesday this week by the S.C.I. Pesticides Group.

Dr. Gayner said that about 200 fungi could cause serious damage on crops of world importance, but a large proportion of fungicides were used on only eight fungi—powdery mildew of vines, vine downy mildew, late blight of potatoes, banana leaf spot, cocoa black pod, blister blight of tea, seed-borne diseases of cereals and blast of rice. He concluded by describing the need for new fungicides to control diseases that could not now be dealt with chemically, for use curatively, and for more efficient compounds with an improved cost/benefit ratio.

Glasshouse Crops

In 'Current usage and recent developments in the use of fungicides on glasshouse crops', *W. H. Read* (Glasshouse Crops Research Institute) spoke of new work in the direct application of methyl *iso*thiocyanate and of solid compounds for incorporation in the soil by tillage, whereupon they decompose liberating methyl *iso*cyanate as does metham-sodium. He said that recent work by Fisher suggested that polybutenes of defined viscosity might be of value in controlling cucumber mildew.

The development of trisubstituted organotin compounds was being discussed as a new possibility in protectant fungicides, stated *Professor G. J. M. van der Kerk* (Organisch Chemisch Instituut T.N.O., Holland). New types of compounds were available which combined high toxicity towards certain fungi with low phytotoxicity and low mammalian toxicity.

Progress had been made in three directions towards the development of systemic compounds. These were:

Compounds which were not fungitoxic and which did not lead to the formation of fungitoxic compounds in the plant, but which rendered plants more resistant towards fungal attack by interference with plant metabolism. Results obtained with certain types of 'unnatural' amino acids and with derivatives of thiourea were being discussed.

Development of procaine (diethylaminoethylester of *p*-aminobenzoic acid) and structurally related compounds as systemically active agents against powdery mildews.

Derivatives of the dialkyldithiocarbamic acids were said to be subject to several types of biochemical transformation, some of the transformation products showing much promise as systemic fungicides.

Other papers read at the symposium, which was attended by some 184 plant pathologists and chemists from the U.K. and overseas, were given as follows:

'Current usage and recent developments in fruit', by *A. H. M. Kirby* (East Malling Research Station); 'Physical conditions affecting *in vitro* fungistatic action on conidia of *Botrytis fabae* sardina', by *Dr. A. H. McIntosh* (Rothamsted Experimental Station); 'The mode of action of dithiocarbamates', by *Dr. M. J. Janssen* (T.N.O., Holland); 'Uptake of fungicides by fungal cells', by *Dr. E. Somers* (Long Ashton Research Station); 'Structure-activity correlationships of some anti-fungal compounds', by *Dr. D. Woodcock* (Long Ashton); 'Anti-fungal compounds in seedlings of *Vicia faba*', by *Professor R. L. Wain, F.R.S., Dr. D. M. Spencer* and *Dr. C. H. Fawcett* (Wye College); 'Dichloran—a new fungicide for the control of *Botrytis spp*', by *D. J. Higgons* (Boots Pure Drug Co. Ltd.); 'Nell-Pres Dodine n-dodecylguanidine acetate', by *Dr. W. F. Jepson* (Cyanamid International).

Du Pont Annual Report Reveals Bigger-than-ever Stake in Europe

EXPORTS of products manufactured by E.I. Du Pont de Nemours and Co. in the U.S. totalled $218 million in 1960—an increase of 28% over 1959—the company's annual report reveals. Of the company's total overseas business ($363 million) some 35% ($127 million) was in Europe, 28% in Canada, 24% in Latin America. Total overseas business showed an increase of 21% over the previous year's total of $300 million.

At the end of 1960 operating investment of Du Pont's foreign subsidiary and affiliated companies, including those not consolidated, was approximately $280 million, of which about $60 million was in Europe, $135 million in Canada, and $85 million in Latin America. At year end employees of these companies numbered about 13,000 including 180 who were transferred from the Du Pont Co.

As noted in 'Commercial News' (p. 522) net earnings of Du Pont declined 14% in 1960 despite the record sales. Commenting on the price-cost problem facing American industry, Mr. Crawford H. Greenewalt, president of Du Pont, noted that industrial wages and salaries with associated supplementary benefits have been increasing steadily for more than a decade. As a result, he said, manufacturing costs for Du Pont and for industry generally have advanced at a rate outpacing the effects of increased production and technological advances.

Du Pont's construction expenditures during 1960 were $214 million compared with $174 million in 1959 and are expected to approximate $205 million in 1961. Six plants were completed and began operations during 1960 in the U.S. Expenditures for research and development in 1960 were $96 million, of which 'pioneering research'—including most of the fundamental research together with applied research aimed at entirely new ventures—accounted for about $51 million.

At the end of the year the number of Du Pont employees, excluding 7,405 at Government-owned plants, was 87,935, compared with 86,265 at the end of 1959.

Coal Workers Fear Effects of Bigger Oil Usage by I.C.I. Billingham

I.C.I. annual demand for steam-raising coal at Billingham and Wilton plants will not be affected by any projected change in fuel plans, says a statement issued by the Durham Divisional Coal Board from Newcastle on Tuesday. The statement follows the voicing of fears by Mr. S. Watson, Durham area secretary of the National Union of Mineworkers, that I.C.I.'s plans to change over from oil to coal at Billingham and Wilton would result in a big cut in coal demand in the area and might affect as many as 5,000 miners.

According to the Durham Divisional Coal Board statement the demand from the I.C.I. plants for steam-raising coal was at present 1.25 million tons a year and this will not be affected. But the company's coke ovens are nearing the end of their useful life and will not be rebuilt and in consequence the 500,000 tons of coking coal taken annually by the company will not be required from about the beginning of next year.

For some time, said the board, this coking coal will be replaced by N.C.B. coke though the board adds, "It is true that ultimately this process will be replaced by one using oil."

I.C.I. themselves have not so far issued any statement either confirming the switch from coal to oil at the plants mentioned or commenting on the mineworkers' speculations.

In Parliament

Fertiliser Subsidy Is to Be Cut by £2·5 million

A REDUCTION in the fertiliser subsidy, complaints that the use of toxic chemicals on the land were causing the deaths of birds and animals, and research on the chemical control of bracken featured in a debate on the Annual Agricultural Review in the House last week.

Following an announcement by the Minister of Agriculture (Mr. Christopher Soames) that the fertiliser subsidy was to be reduced by about £2½ m., Sir P. Agnew asked whether this meant that horticulturists would have to bear the increased cost of buying fertiliser without being recouped anywhere else in the Review. Mr. Soames referred to the rising cost of the guarantee over recent years —last year it was £29 m., this year it was £32 m. and it had now been reduced by £2½ m., which would have an effect on the price paid for fertilisers by all users.

The Minister was asked whether he would consider making arrangements for the fertiliser subsidy to be paid direct to the manufacturer instead of to individual farmers, with a view to saving administrative costs. A spokesman for the Ministry replied that the present arrangement was considered best, as it would otherwise be difficult to ensure that the full benefit went to agriculture as required by statute.

Minister Acts on Committee's Drug Recommendations

The Standing Joint Committee on the Classifications of Proprietary Preparations has advised that, although there should continue to be no restriction on the prescribing of any drug which the doctor considers necessary for his patient, he need not usually go outside the drugs and preparations normally listed and that the doctor who does so may be called upon to justify his action if the cost of his prescribing is being formally investigated.

In announcing the acceptance of this recommendation, Mr. E. Powell, Minister of Health, said that he was aware that the pharmaceutical industry may be apprehensive of the effect of this advice on its future progress and development, but he was sure that any such apprehension was ill-founded.

1961 Should See Progress in Correct Use of Seed Dressings

Pressed to take further action to prevent the death of birds and mammals from seed dressings, the Minister of Agriculture said regional pest officers had instructions to try to collect any dead animals or birds that might have died from poisoning so that they could be examined, while the National Farmers' Union and the Association of Corn and Agricultural Merchants were sending circulars to their members about the dressing of seeds. He thought that this year would see considerable progress in education in the use of these seed dressings.

British-made Cyclohexanone Now in Adequate Supply

The temporary exemption from import duty for cyclohexanone is being revoked from 1 April, as stated in CHEMICAL AGE, 4 March, p. 368, because from that date U.K. production will be sufficient to meet home demand. This was stated in the House of Commons on Monday by Mr. F. J. Erroll, Minister of State, Board of Trade.

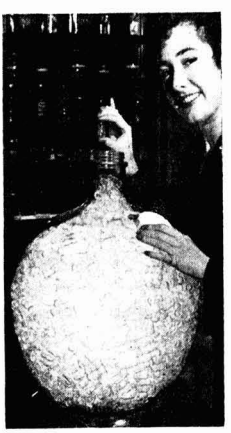
Mr. Erroll was referring to the new plant now being commissioned by Howards of Ilford Ltd., which has an annual capacity of 2,000 tons a year of Sextone (cyclohexanone) and Sextone B (methylcyclohexanone). The contractors for the plant are W. J. Fraser and Co. Ltd. Howards are the main suppliers, other producers being British Tar Distillers and Yorkshire Tar Distillers.

The revocation of the temporary exemption is effected by the Import Duties (Temporary Exemptions) No. 2 Order 1961. But for the Order the chemicals listed in the schedule would have been exempt from duty until 1 October. With the exception of cyclohexanone, the chemicals listed were now being made in adequate quantities in the U.K. and it did not seem right that British producers should be deprived of tariff protection until 1 October.

Effectiveness of Chemical Control of Bracken Not Proved

In answer to a question, a Ministry of Agriculture spokesman said the trials carried out by the Agricultural Research Council's Weed Research Organisation had not as yet "provided conclusive evidence of the degree of effectiveness of chemical control of bracken." It was not possible to say when or whether the evidence from these trials would justify grant-aid for users of this method.

'Largest British-made' Glass Container



This 10-gall. carboy, seen here filled with 3½ c.c. vials, is claimed to be the largest glass container to be made in the U.K. by fully automatic process. Carboys of this size are a routine production job for United Glass Ltd., Leicester House, Leicester Square, London W.1

Laboratory Apparatus Show

The Royal Institute of Chemistry, Manchester and District Section, is organising an exhibition of chemical laboratory apparatus and techniques, to be held at the Manchester College of Science and Technology, 2-8 p.m. on Thursday, 6 April, and 10 a.m. to 8 p.m. on Friday, 7 April. Admission is free.

Obituary

Mr. R. B. Kerr, M.B.E.(Mil.), deputy managing director of Foster Wheeler Ltd., who died on 22 February at the age of 56, started his industrial career as an overseer in a Barbados sugar factory in 1926, followed by an appointment to Trinidad Leaseholds Ltd. as assistant refinery operator and later as assistant to the general manager in Trinidad. His subsequent career led him to Foster Wheeler Ltd. whom he joined in October 1949 as engineer in the process plants division (contracts department). In 1954 he was promoted to chief contracts engineer of the process plants division and joined the board in February 1959, subsequently becoming deputy managing director in January 1960.

He was both an associate member of the Institute of Petroleum and a graduate of the Institution of Chemical Engineers.

U.K. Sales Base Sought for Swedish Wetting Agents

An agent to cover sales in the U.K. is sought by a Swedish manufacturer of wetting agents (including anionics, nonionics, emulsifiers and polyglycols) used in the textile, detergent, cosmetic and pharmaceutical industries.

Applic tions giving particulars of the applicant's background, business activity, sales organisation and cover, other agencies held, share capital or turnover, etc., should be addressed to the British-Swedish Chamber of Commerce in Sweden, Hovslagaratan 5B, Stockholm C, Sweden, quoting reference No. L-23/AEW/IL, to reach there not later than 1 May.

CONTAINERS AND TRANSPORT

Modern Developments in Packaging for the British Chemical Industry

ALTHOUGH bulk transport of liquid, solid and gaseous chemicals has expanded phenomenally in the postwar years to customers both in the U.K. and Europe, the industrial package remains as a subject meriting careful study by the management of chemical manufacturers.

The products of the chemical industry represent the largest single end use of metal drums, fibreboard drums, multiwall paper sacks and glass and plastics carboys; they also consume very substantial quantities of jute sacks, timber and fibreboard cases, plywood kegs and cases, tins, bottles and other small glass containers. Remembering that 25-30% by value of chemicals produced go to export markets, and that many of the remainder are used as raw materials by other exporting industries, it is clear that any better utilisation of packaging materials which can be brought about by close collaboration between package suppliers and chemical manufacturers can only be to the national advantage.

Principles to be Observed. The fundamental principles to be observed in chemical packaging can be summarised as:

(1) Knowledge of the physical and chemical properties of the product.
(2) Knowledge of the various packaging materials which will be compatible with the product, and from which a choice can be made.
(3) Regard for the safety of all persons and all goods likely to come into proximity to the product.
(4) An appreciation of the conditions under which and the quantities in which the product will be sold, transported and used.
(5) Realistic appraisal of all costs involved—package, package filling, package handling and storage, and freight.

Only when all of these factors have been carefully assessed can a choice of package be made.

Some of the Problems. The problems of packing the many thousands of chemicals which are produced today are innumerable, but there are a number of broader questions which must be of concern to the whole industry.

The weight of a package and the cubic space it occupies in relation to the contents, are both highly significant in the economics of chemical packaging whether the containers are empty or full.

The cost of transport of empty packages from the suppliers' works, plus warehousing and handling in and out of store and to the filling point, varies very substantially—empty 45 gall. drums occupy about 28 times the space and are 12 times the weight of paper sacks of equivalent capacity, while 10 gall. glass carboys in safety crates occupy three times the space and are 3½ times the weight of 10 gall. steel drums.

The freight payable on the filled containers can also vary very substantially whether the basis of charging is on the gross weight or on the overall volume in terms of cubic tons.

The comparative freight costs per net ton of corrosive liquid (S.G.1) in a range of commonly used containers are shown below, where the freight is charged at £10 per ton on (a) measurement, and (b) gross weight.

Comparative Freight Costs

Package	Calculated at 200s per ton on: Measurement	Gross weight
Cylindrical packages	£	£
10 gall. carboy ...	46.4	15.2
5 gall. carboy ...	36.6	16
45 gall. Pe-lined drum	14.2	10.9
10 gall. Pe-lined drum	17.3	11.45
5 gall. Pe-lined drum	18.75	11.6

From this it is clear that other than adequate strength, *shape* is the most important feature of an export package, and the chemical industry expects rectangular and cubical packages to become more popular in the future.

Metal Drums. The twin basic problems are to prevent degradation of the product by the package, and to inhibit attack on the drum by corrosive products.

Metallic coatings have long been used to prevent rust discoloration of the product. Heavy gauge returnable drums are normally galvanised by hot-dipping or flushing after manufacture, while light gauge drums are made from tinplate or galvanised sheet. The disadvantages are (a) that on the heavy gauge drums the life of the galvanised coating is short compared with the life of the drum; (b) the tendency of galvanised coatings to form 'white rust' which may be removed by the vibration and shocks incurred in transit; and (c) lack of continuity of the galvanised and tin coating on light gauge sheet.

Increasing use is being made of drums internally coated with two or more coats of lacquer, which nowadays is applied to and cured on the drum in the partly fabricated state after pretreatment of the metal by either grit blasting or chemical treatment. There have been great advances in the field of internal coatings with the phenolic modified epoxy lacquers, polyurethane resins, and vinyl based lacquers and the chemical industry is looking forward to lacquered steel drums which will give a safe storage life of up to two years for:

(1) Aqueous liquids, including detergents.
(2) Snow-white dispersions and/or emulsions.
(3) Water-white non-aqueous liquids, e.g. solvents.
(4) Acids, e.g. phosphoric acid.

On drums generally, the chemical industry is looking to improvements in constructions which will, in the future, permit the use of lighter gauges of metal —indeed this is a 'must' if the steel drum is to remain competitive.

Fibreboard Drums. Considerable use is made of metal-ended full-opening fibreboard drums as, when they incorporate barrier plies in their bodies, they are suitable for packing hydroscopic powdered or granular materials such as bulk drugs, dyestuffs and plastics moulding powders.

Despite the great strides forward

Trend Pointers in Chemical Packaging

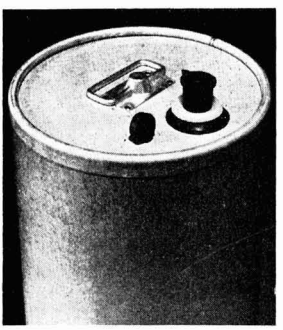
- **Lighter gauges of metal are a 'must' if the steel drum is to remain competitive**
- **Adequate external weather-proofing of fibreboard drums is vital for chemical exports**
- **Changeover to paper sacks has probably gone further in Britain than in U.S.**
- **The glass carboy gives extremely low package cost per lb of product, despite high tare weight and space needs**
- **To devise realistic and reasonable package performance tests is an urgent task**

which have taken place in recent years, however, it is felt that adequate weather-proofing of the external surface is a necessity if the drums are to be shipped successfully to general overseas markets where they might stand outside in heavy rainstorms.

Paper Sacks. Since the war the multi-wall paper sack has emerged not only as a package for chemical products in its own right, but as the most important industrial container for powdered or granular solids. In fact, due to the absence of a top-quality fibreboard drum in the immediate post-war years the changeover to paper sacks has probably gone further in Britain than in the U.S.

The principal problems concern the education of all persons concerned in the distribution chain—packer, warehouseman, loader, carrier, docker and customer—in the correct handling and storage techniques.

Carboys. The glass carboy is a very old type of package. Judged solely from the standpoint of product/package compatibility, glassware is the perfect packaging medium for a very wide range of difficult liquids. When used on a returnable basis in the home trade, and transported in full truck loads the carboy will continue to perform its function until it is broken by external means. Under these conditions the average life of the bottle is eight years, that of its metal hamper three years, while the straw or wood wool cushioning normally requires replacement after three trips. It will be seen, therefore, that an extremely low package cost per lb. of product is achieved, this despite the high tare weight and space requirements in storage and transport.



Bowater Polykask, with metal rims and polythene inner, is designed for the carriage of liquids including corrosive acids. The rubber spout, fitted with a rubber bung, is retractable to close flush with the rim. An indentation in the base corresponds with the position of the metal lifting handle on the top to facilitate stacking

An economic replacement for the returnable home trade carboy is therefore a considerable problem, and one on which much thought and experimentation has been given.

For export, however, due to the reasons already discussed, the glass carboy is being replaced to a considerable extent by the polythene-lined drum.

A Bowater 110 F.S. sack-filling machine in use with multiwall paper sacks at the chemical plant of Johns-Manville (U.K.) Ltd., Hessle, Yorks

Performance Tests. The popular misconception that most chemicals are dangerous and obnoxious, quite naturally leads the customer, the carrier, the shipowner, the dock worker and the man-in-the-street to the view that under no circumstances should there be any possibility of spillage of a hazardous chemical from a package. The cost of insuring against such a possibility by strengthening the package, so that it would withstand falling from a rapidly moving vehicle or from a ship's derrick, would be likely to be prohibitive and lead to complete loss of the market.

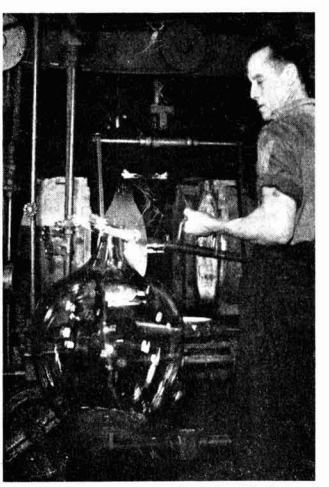
The marking, packing and transportation of hazardous products has received, and continues to have, detailed consideration by various national and international organisations. All have a common objective—safety—but the chemical exporter is likely to be faced with an increasing number of requirements which sometimes differ considerably from each other. Consequently to establish the transit hazards which chemical packages are exposed on given traffic routes, and to devise realistic but reasonable performance tests for given package types would appear an essential and urgent task to be undertaken jointly by the packaging, transportation and chemical industries.

Modern Techniques Help the Carboy Meet the Challenge of New Containers

THE glass carboy has served the chemical industry for generations, and current sales trends indicate that it will remain in service for a long time to come. It has clearly withstood the strong challenge made by other forms of container.

The reasons for this continuing hold on the market are not difficult to find. The low cost and natural resistance of glass to chemicals ensure a popularity that remains undiminished by the severest competition.

As the only fully automatic British maker of carboys and demijohns, United Glass have given close study to the problems of the industry. It was this that resulted in the design of straight-sided containers which have gone a long way towards easing transport costs.



A finished 10 gall. carboy is lifted from the machine and is ready for the annealing lehr

In recent years, the sales of glass containers have reflected the growing prosperity of the chemical industry. Since May 1947, a year which saw the end of traditional glass blowing methods and the introduction of mechanisation into the manufacture of carboys, demand has been matched by a steady increase in production.

The average life of a carboy circulated in the U.K. is said to be about 40 trips—an average based on the assumption of four journeys a year for 10 years. It is claimed by many, however, that the estimate is too low, and that an annual breakage of 10% is not borne out by the experience of larger companies. With a great many containers in continual circulation they put the average yearly toll of breakages at only 1 or 2%.

Over the years the progress of the glass industry has been steady rather than startling in its innovations. We are today enjoying the cumulative knowledge and experience of thousands of years. However, in its ingenuity and research the industry has forged ahead. Its main line of development has been in improvement of manufacturing processes, in its mastery of design techniques and in its solution of such traditional problems as the effective sealing of containers.

In this direction the chemical industry has seen some of the fruits of the work being carried out by their application to the carboy. There is now an alternative

to the old glass stopper, for example—the thermoplastic closure. The thermoplastic screw-on cap has a polythene lining which is specially vented to release pressure built up inside the container. This has proved a great boon and helped to remove a constant source of worry to those responsible for transporting chemicals in bulk.

In the same way, new production techniques have been applied to the manufacture of carboys. A great deal of study is being made of the balance between weight and strength, and as a result it has been possible to increase resistance to thermal shock without making the container either heavier or bulkier.

The strength of the glass is tested by filling the carboy quickly with water 50°C above atmospheric temperature. Bursting strength is determined by hydraulic pressure and the carboy is expected to withstand an internal pressure of 50-90 p.s.i.

The standards demanded by United Glass of all their products are high, and before any carboy is delivered to the packer it has to undergo severe tests. Thin spots are detected by tapping in much the same way as wheels are tested on railway carriages. It is a method that is both quick and effective.

Any residual strain left in the glass due to unsatisfactory annealing is traced by examination in polarised light.

It is this care in the process of manufacture on which the efficiency of the carboy ultimately rests. It is this that makes it so ideal for its important work.

50,000 T.P.A. of Molten Sulphur Go by Berk's Road Tankers

THE use of road tankers as a means of transporting various liquid commodities over large distances has grown to such an extent over the past 15 years that it is now commonplace. In fact motorists today can hardly drive along Britain's major roads without passing thousands of gallons of milk, petrol or beer en route.

It was, however, left to the chemical manufacturers F. W. Berk and Co. Ltd. to pioneer a road tanker service which would supply users of sulphur with their needs in molten form. This method of handling and transporting sulphur has exclusively been a Berk development.

Despite the significant post-war growth of Berk's interests, and the diversification of their manufacturing and merchanting ramifications, the handling of sulphur has continued to play an important role in a company whose experience in sulphur matters has been acquired over more than half a century and which is one of the U.K. representatives of the Sulphur Export Corporation of America.

Some 10 years ago Berk appreciated the possibilities arising out of the small but growing source of high purity sulphur which was becoming available from the oil refining industry in the U.K. It was apparent that as these refineries which the major oil companies were constructing round Britain's coasts came into full production, they would provide an entirely fresh source yielding many thousands of tons of sulphur each year. This prophecy has proved correct, and F. W. Berk and Co. presently handled the surplus sulphur output from these sources, almost all in molten form.

Initially, trials to investigate both the practicability and advantages of handling sulphur in the molten state from start to finish were conducted at Berk's own sulphuric acid plants at Stratford, London E.15. So successful were the results that the company commissioned a fleet of special road tanker vehicles with a capacity of transporting molten sulphur over distances in excess of 200 miles.

This fleet, which is on contract hire from Harold Wood and Sons Ltd., Heckmondwike, Yorks, has now been operating and delivering molten sulphur to many plants including sulphuric acid makers and others for a period of years and with complete success. Indeed, among Berk's customers are many who now receive their whole sulphur requirements in the molten form.

The tankers are used exclusively in the one traffic to avoid any possibility of load contamination and have a capacity of about 14 tons of molten sulphur. They are fully insulated and are fitted with a steam heating network which permits preheating in cold weather to ensure against high heat loss on loading.

The optimum temperature range for keeping sulphur molten lies between 250°F and 310°F. Above the higher figure the sulphur tends to become viscous and flowability is greatly impaired.

Berk tankers are loaded therefore with the molten sulphur at a temperature of not less than 300°F. This ensures that with a maximum heat loss on loading of 10°F the tanker sets out with its load at not less than 290°F.

Insulation of the vessel has proved to be so effective that heat loss during the run approximates to 1°F per hour and thus loading at 290°F allows a completely safe margin for the longest journey. In fact, the sulphur will remain molten for at least 24 hours.

Should some extraordinary occurrence prevent the tanker from reaching its destination within the optimum period, it is obvious that the sulphur would eventually solidify. However, by use of the steam heating network it can be returned to its molten state.

A steam jacket is fitted to the bottom outlet valve at the rear of the vessel which enables the sulphur that has solidified at this point during transit to be remelted on arrival. Each vehicle is fitted with a compressor enabling the load to be discharged on site either by gravity to storage pits below ground level or air-blown to elevated storage.

The tankers carry a 10 ft. flexible pressure hose flanged at each end to match the vehicle outlet valve flange, and this is used for connecting to the recipient's delivery line. The latter should be rigid, steam traced and lagged.

By receiving their sulphur supplies in the molten state, users obtain many advantages.

Space, buildings and capital are released by doing away with bulky solid stocks; by obviating mechanical handling, except for pumps, they reduce their handling and maintenance costs. The fact that heat requirements for maintaining sulphur in molten form are considerably less than for remelting the solidified product, provides another saving factor.

Apart from these economic considerations, users derive other benefits. These include freedom from sulphur dust which corrodes where it lands; elimination of contamination during transit and therefore filtration requirements; considerably reduced fire risk.

This impressive list of advantages, coupled with the efficient delivery service that F. W. Berk and Co. have established, has induced many plants to receive their supplies of sulphur in this molten state. The company now handles 500,000 tons of molten sulphur a year.

So today, in addition to passing his evening glass of beer on his way to work, the motorist may overtake 14 tons of extremely hot liquid sulphur travelling the highway.

One of the Berk fleet of road tankers for the transport of molten sulphur

Packaging for Chemicals

New Trends in Paper Sacks and Fibre Drums

THE earliest use of paper sacks occurred during the 1914-18 war. In between the wars it became the accepted package for 1 cwt. of cement and a number of similar products. However, it was not until after the 1939-45 war that technical developments in this industry enabled it to provide a suitable package for the vast range of products now packed. Today it is the accepted industrial package for dry powder, flake or granular material in weights between 28 lb. and 112 lb.

The growth of this industry to its present consumption of over 500 million sacks a year in the U.K. has been due mainly to three basic factors. Firstly, a sack can be altered in construction to suit a particular product. Secondly, it can provide protection in a number of respects at a minimum cost. Thirdly, it can be packed at high speeds with a low labour cost, and stored and transported efficiently.

Before expanding this, it is as well to describe the types of sack manufactured. The terms ' pasted sack ' and ' sewn sack ' refer to the method of end closure. The pasted sack is a tube formed by a number of plies of paper which are overlapped at the end of the tube and secured by adhesive. The sewn sack is a similar tube of paper which is stitched through the various plies at the end of the tube and is sometimes bound with crepe tape reinforcement.

Further sub-divisions of type, such as sewn open-mouth and pasted valve, are created by the different methods of filling the sack.

Valve Sacks

Valve sacks can only be filled on a machine which forces the material through the valve in the corner of the sack. The sack, apart from this corner valve, is completely sealed by the manufacture so that no closing operation is necessary after filling.

The open mouth sack as its name implies, has only one end completed by the manufacturer: the other end remains open so that the product can be packed either by hand or by an automatic machine. After this filling operation, the open end has to be closed, usually by stitching.

These types of sack can be made in a variety of different sizes. As it is usual in this country to pack either 1 cwt. or 56 lb., the correct size of sack will depend on the bulk density of the material. It is, therefore, necessary to be able to manufacture sacks in lengths varying in half inches between 24 in. and 60 in.

It is also possible to change the width of the paper sack although the number of individual widths is more limited. The range of sack circumferences in common use varies between 34 in. and 59 in. This flexibility enables nearly all bulk densities to be packed without waste of space and while still retaining a suitable package shape.

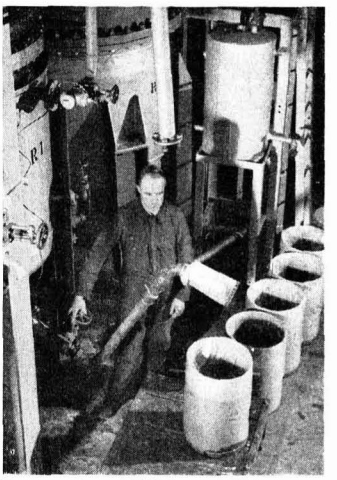
In this article, Mr. E. R. Duffin, assistant to the divisional manager of the fibre drum and multiwall sack divisions of Bowater Packaging Limited, describes the development of the use of paper sacks and fibre drums in the chemical industry, explains their advantages and limitations and looks briefly at their potential

Of even greater importance than the size flexibility is the ability of the paper sack to change its side wall composition to provide strength or barrier protection. Various strengths of sack may be required, even if the same product is being packed, for different destinations.

Although a full description of all the barrier materials used in sacks cannot adequately be covered here, the two most important are worth mentioning. Firstly, the kraft union ply, with its moisture, moisture vapour and acid resisting properties, has for years been the most popular barrier in sack manufacture. More recently, polythene-coated paper, providing an even better level of protection and better strength characteristics under extreme temperature conditions, has increased its share of the sack trade.

Some of the limitations of the paper sack should also be mentioned. The sack, being a flexible package, will not provide crush protection. It is not easy to package large lumps of material although successes have been achieved in packing coal in weights of up to 56 lb. It cannot easily package fluid products unless these products of this type are waxes and bitumens for which the inner ply of paper is treated so that it will strip freely from the contents after setting.

A recent development which is reducing the package cost is the use of an extendable kraft. This material has an even higher shock resistance than the traditional types of sack kraft and can either improve the strength of the sack or reduce its paper content, while providing the same strength. Although this development is in its pilot stage, trials so far conducted have been very satisfactory.



Bowater drums with loose plastics liners being filled with alkyd synthetic resin in the polymer emulsion plant of Scott Bader and Co. Ltd.

It has been said that the only package which can economically replace the paper sack is the bulk transport system, which is not really a package. Even here, the paper sack's future is not unduly clouded, as cost analyses of the packing, transport and storage costs in many trades have shown that bulk transport of materials will only be beneficial under special conditions.

The fibre drum, being a rigid package, can give the sort of protection that the flexible paper sack cannot provide. It does not rely on its contents to support any load placed on top of it and, therefore, crush protection is one of its important features.

The fibre drum industry was originally created to satisfy the demand for a drum which would withstand heavy handling and still be cheaper than an all-steel drum. It was initially confined to the smaller sizes for packed weights of up to 1 cwt. which did not require any barrier protection. The advent of the 1939-45 war not only created the need for a more refined fibre drum, but also provided a good deal of development work on protective packaging generally.

After the war the simple fibre drum developed in leaps and bounds, particularly in the chemical industry. It proved itself to be an extremely strong package which could be made to carry weights as large as 5 cwt., even for export shipment to the other side of the world.

From a simple price comparison between a fibre drum and a paper sack to carry 1 cwt. of dry material, it is evident that the drum is not a price competitor of the paper sack. The reasons for this are obvious. The rigid protection provided by the drum requires more materials to be used in its manufacture and its shape and construction require more manufacturing operations. Its large measure of success in industrial applications has not, therefore, been based on its cheapness but on its particular merits.

A Bowater multiwall paper sack is placed on the filling spout for a load of Bilston basic slag at one of Fisons' plants

Apart from the crush protection, it also has an extremely high level of strength in other directions which in practice have guaranteed reliable deliveries of valuable products to almost every every country in the world under extremely difficult transport conditions. Comparing it in another sense with the paper sack, where the contents would normally be used at one time, the fibre drum lends itself to being reclosed after partial usage and will still offer the same sort of protection after being broached.

It can also be filled extremely easily and sealed without the use of special equipment. The cylindrical shape of the drum provides very great column strength when drums are stacked vertically which permits storage to a considerable height without crushing the product. This round section also facilitates the moving of heavy weights by rolling the drum either on its side or on its base.

Another advantage of the fibre drum is its ability to recover from a blow on the side wall. Should a metal drum receive a blow heavy enough to dent its side, the dent will remain, causing a permanent deformation and perhaps stacking difficulties. After such a blow, a fibre drum will in most cases recover entirely without serious detriment to its stackability.

The barrier protection provided by the fibre drum can be of a slightly higher order than that provided by a paper sack because of its method of manufacture. Drums can be made with barrier linings covering the complete fibreboard construction which provide no chance of wicking or penetration of moisture vapour, or which prevent the contents attacking the interior of the drum.

Although the fibre drum market for dry products is still expanding, it is being used to an increasing extent for the packing of products which cannot be produced without a liquid content. In some cases the incorporation of a separate plastics lining inside the drum provides a satisfactory package for semi-liquids. Development work is proceeding to enable a fibre drum to carry an even larger range of products which are difficult to pack.

RESEARCH PROVIDES EXPANDING USES FOR METAL DRUMS

DEMAND for drums and other containers for the packaging of liquid and solid chemicals, paints, etc., has increased steadily in recent years and shows no sign of abatement. Thus, despite the increasing use being made of bulk transport by road and rail tanker, the drum manufacturers find themselves busier than ever, and obliged not only to expand production but also to develop new and modified types of containers to meet changing needs.

The larger modern drum manufacturing shops, producing drums in a range of different types and sizes, are automated to a very high degree; this has been beneficial to the user not only in ensuring him quick delivery of his orders, but also, through the achievement of fabricating economies, in keeping the prices of drums at a reasonable level. In fact, the prices of drums have remained agreeably low in relation to increased labour and materials costs.

How Drums Are Made. Typical of modern drum manufacturing operations generally is the Crayford, Kent, factory of Metal Containers Ltd., which, though smaller and less highly automated than the company's Ellesmere Port factory, comprises a well integrated production line in which the incoming sheet steel is transformed into finished containers in a surprisingly short time.

Steel, of varying thicknesses, is received in coil form, the steel sheet being uncoiled, flattened and cut to size on a single machine, another machine rolling the flat sheet into cylindrical form before spot welding of the side seam. Automatic electric welding of the seam follows, the cylinder then being flanged at the ends, ready for double seaming. The 'rolling hoops' are pressed out and the small reinforcing corrugations are made on a special machine.

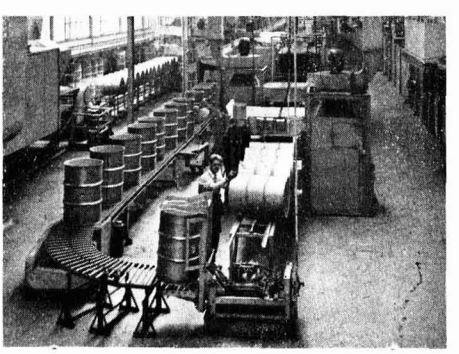
The ends of the drum, formed in a separate operation, and provided with the Trisure closure, are double-seamed to the body on a special horizontal seaming machine. The drum, after testing for leaks, is then painted and stoved. Internal lacquering, where called for, is also carried out at Crayford, again as part of an integrated production line.

Drums for Chemicals. A substantial proportion of drums produced in the U.K. is now being used for chemicals. This has led to a demand for corrosion-resistant linings for drums and Metal Containers have a special laboratory which examines samples of chemicals that create problems in packaging, and works on the development and testing of lacquers and other internal coatings.

This work has resulted in such developments as the Valethene drum, which is essentially a steel drum containing another of high-pressure polythene, with a removable lid so that the polythene inner drum can be removed for inspection or replacement. Outer containers are made in a range of alternative types and in gauges from 14-20 B.G.

Fibre drums are also being called for in increasing quantities, their light weight making them attractive for a wide range of powdered, granular and semi-liquid materials. A typical product is a kraft drum with a stove-lacquered steel base crimped to the body and the top aperture reinforced by a zinc-coated chimb ring. Closure of the stove-lacquered steel lid is effected by a precision-built closing ring with lever action locking device.

The provision of closures to meet different requirements is another aspect of drum manufacture which has called for considerable development work. The latest development of Metal Containers, in collaboration with Parsons Brothers Ltd., of Hull, is an adaptation of the Tournex tamper-proof closure for use on steel drums. The Tournex cap, which offers a full 2-in. filling orifice for 5 and 10 gall. containers, is fitted with a tamper-proof band which is held on to the cap by bridges of equal and unvarying construction. After the cap has been screwed on, the tamper-proof band is sealed under a bead formed in a specially profiled Tournex neck. It is then impossible to remove it without separating the two parts of the cap; thus any interference with the contents of the container is immediately noticeable.



Internally lacquered drums emerging from the production line at Metal Containers' Ellesmere Port factory

CONTAINERS AND TRANSPORT

C.A. Round-up of New Developments for the Chemical Industry

New Container Linings Developed by Acalor

A number of plastics and sprayed products are being developed by **Acalor (1948) Ltd.**, Kelvin Way, Crawley, Sussex. Called Acalastic, the products are: Acalastic reaction coatings, a range of specially formulated sprayed coatings for the lining of containers, tanks, or vessels of any size either in the works or *in situ*; Acalastic thermoplastic constructions, a range of fabricated and moulded containers in thermoplastic materials with particular emphasis on thin rubber-modified thermoplastic sheeting for lightweight, inert, non-corrosive containers; and Acalastic glass fibre laminates, a development of Acalastic PLS/VNL glass fibre vessels, with or without integrally bonded p.v.c. liner, suitable for temperatures up to and above boiling point. The products are available from quite small vessels up to road tanker size.

Blagden Drum Fitted with Mixing Head

To ensure thorough mixing of contents before decanting and for small batch mixing, **Victor Blagden and Co. Ltd.**, London and Manchester, have fitted their M-type container with a scientifically designed agitator. The driving torque projects through the lid and can be operated without removing the head or any other component parts.

The shaft is sealed against leakage in transit and wearing parts are hardened to ensure a long life. Filling apertures can be provided to suit special needs. The drum is available in 40 gall., 45 gall. and 50 gall. nominal capacities.

Fluorine Container in Monel Nickel

Recently produced by **W. P. Butterfield (Engineers) Ltd.**, Shipley, Yorks, is a highly specialised unit for the transport of fluorine. The unit consists of an inner vessel—the fluorine container—fabricated in 5/16 in. thick Monel nickel, surrounded by an intermediate vessel to contain nitrogen, made from 3/16 in. Monel. The outer vessel made from boiler quality mild steel $\frac{1}{8}$ in. thick, forms a vacuum jacket round the unit. The unit is controlled by fluorine and nitrogen pressure gauges, level gauges and vacuum gauges.

Butterfield's provide tankers for the transportation of many liquids including chemicals, such as liquid argon, fuel oils and phenol.

I.C.I. were the customers for a 2,950-gall. single compartment phenol tanker. This tanker was made of pure nickel and is fitted with its own electrical generator and heating blankets.

B.O.C. Modernise Liquid Oxygen Deliveries

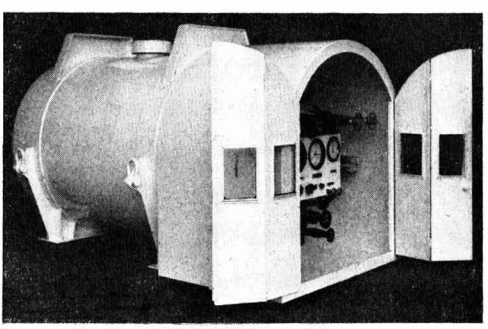
Liquid oxygen tankers, fitted with electrically operated pumps, for the delivery of liquid into evaporators at consumers' works at a pressure up to 300 p.s.i.g., are part of B.O.C.'s extensive programme for modernising, improving and extending liquid oxygen distributing and dispensing equipment.

New vacuum insulated evaporators have been designed and manufactured by the Engineering Division of the **British Oxygen Co. Ltd.**, and existing cold evaporators are being modified to take pressure filling. The system is to be extended to include liquid nitrogen and liquid argon.

With these new units and the modified cold evaporator, fresh supplies of liquid can be pumped in without interruption of the customer's demand. The pump filling operation is twice as fast as the conventional decanting method.

Additional advantages of these pressure filled systems are the saving of cost by completely automatic handling, increased efficiency of insulation making greater storage possible, the saving of costs for the building of special plant houses.

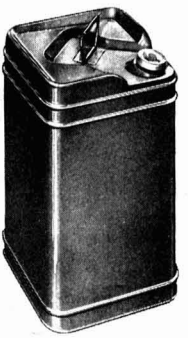
These vacuum insulated evaporators have now been in operation for over a year in the U.K. Thirty units have already been installed and installation is planned at an increasing rate during the next three years.



Butterfield fluorine transporter

Square-sided Metal Drum Solves Storage Problem

A new and successful development of **E. A. Brough and Co. Ltd.**, 4 Upper Parliament Street, Liverpool 8, is a square-sided drum suited for shipping purposes which takes up less room in bulk storage than the conventional round-sided container. This drum, available in the 5-gall. size, incorporates the



Square-sided metal drum

KCC head, thereby ensuring clean and accurate decanting with safety in stacking. These drums are also available with a rigid polythene liner for special purposes.

The drums manufactured by Brough can be of fixed head or open tip patterns in the size range 1 to 45 gall., in diameters extending from 5 in. to 22½ in. The majority of the containers are constructed from mild steel sheet, but the firm also offers tinplate drums in a more restricted variety.

To protect drums against corrosive chemicals the interiors can be treated with one of the high-temperature stoving lacquers in the epoxy or phenolic range.

Armoured Polythene Drums by Cascelloid

Available from **Cascelloid Ltd.**, Abbey Lane, Leicester, are armoured polythene drums, of which the outer container is of steel and the polythene liner is fitted with a pouring device and non-leak closure. These are available in 5-gall. and 10-gall. capacities.

Cascelloid can also supply 1-gall. and ½-gall. rectangular polythene boxes, manufactured from high-density Rigidex polyethylene. A heavy 10-gall. size can be supplied in a plywood case. These

are all in addition to 4-pt. and 7-pt. round polythene bottles which are supplied in a variety of weights and materials to suit the liquids they are to contain.

Cascelloid have given close study to containers for transporting liquids without damage or spilling, and have completed Government contracts to stringent specifications, so developing a strong, unbreakable and leakproof series for general use.

Rubber-lined Steel Containers

Among the wide range of containers produced by **Drums Ltd.**, Grosvenor Gardens House, Grosvenor Gardens, London S.W.1, are the DL pails, full-aperture containers for liquids made of black steel. They have welded side seams, double-seamed solutioned bottoms and special full cover lids with rubber liners. The cover can be supplied plain or with various neck fittings. These pails are available in 1-gall. to 12-gall. sizes.

Also available for the storage of liquids are large black steel drums, corrugated with two pressed-out rolled hoops. They are fitted with a 2 in. trisure screw bung in the side or head as required. For solids, a range of similar steel drums with wide apertures are available. Both these come in sizes up to 45 gall.

Pfaudler Glass-lined Road Tankers

Enamelled Metal Products Corporation (1933) Ltd., Artillery House, Artillery Row, London S.W.1, well known for their wide range of glassed-steel chemical plant, have also manufactured Pfaudler glass-lined road tankers for the transport of a variety of chemicals. Tanks with capacities ranging from 200 to 2,000 imp. gall. can be constructed. These tankers are suitable for use with most acids, while a special alkali-resisting glass has been developed for use with alkalis.

Collapsible Containers by Dunlop

The advantages of transporting chemicals in containers which can be rolled up into a minimum space for the return journey are obvious. **The Dunlop Rubber Co. Ltd.**, 10-12 King Street, London, S.W.1 have played a considerable part in the development of this type of container, which has recently been approved by British Road Services after extensive and severe testing.

The container is a light-weight, easily portable tank suitable for carrying liquids or gases by road, rail, sea and air and for use as static storage tanks. It is particularly suitable for use in rough terrain or for special duties where it is impossible to operate standard road tankers.

The container is a rubber-coated fabric bag, the fabric used being a high tensile nylon cloth of special weave. The rubbers include various synthetics that can withstand the action of petrol, oils, tropical exposures, etc.

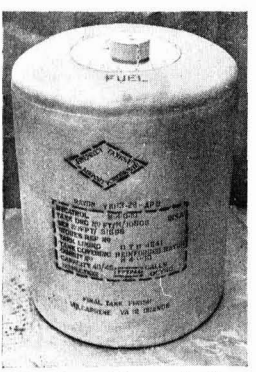
British Road Services have approved Dunlop collapsible containers and seen here is a 24 ft. semi-trailer with 2,000 gall. of liquid

The larger tanks are made of heavier constructions with two plies of fabric and with articulated metal end-clamps. For mobile services these tanks are now being made by Dunlop in a standard range of sizes, from 250 to 2,000 gall. normal capacity. Tanks, however, can be 'tailor-made' from 50 to 30,000 gall., although tanks over 2,500 gall. are not recommended for mobile service.

45-Gall. Flexible Rubber Drums

From their earlier range of self-sealing fuel tanks, **Fireproof Tanks Ltd.**, The Airport, Portsmouth, have developed a number of containers for industrial application, including flexible fuel tanks constructed of synthetic rubber compounded from a butadiene-acrylonitrile copolymer, reinforced with nylon or Terylene, flexible water containers and Hycaflex flexible containers with capacities ranging from 250 to 2,000 gall.

Latest in the company's range is the Hycalfex drum, a medium capacity container manufactured from rubber and fabric laminate. Incorporated in the drum is a lifting eye, top and bottom, a 3-in. bore filler, knurled filler cap and interior support for even distribution of internal pressure when lifting. All seams are vulcanised and the exterior surface is treated with a scuff-resistant lacquer. When not in use, Hycalflex drums can be folded, saving space.



Hycaflex rubber and fibre laminate drum

Capacity is 44 gall., diameter 24 in., height 27 in., material thickness 0.16 in. or 0.32 in. This container is described as being completely resistant to fuels, oils, medium strength acids, etc. A high-purity version, produced from a special butyl compound, is to be made for use with flowable solids and consumable liquids.

Farwig Range

Among the range of cans, drums and tins offered by **J. F. Farwig and Co. Ltd.**, 208/214 York Road, London S.W.11, are flat and taper topped drums ranging in capacity from 1/16 to 2 gall., and square cans of various sizes. Also available are R.D. type containers, the fullway opening lever container comprising a tightly fitting plug easily removed, with a tabbed capsule covering to ensure a perfect sealing.

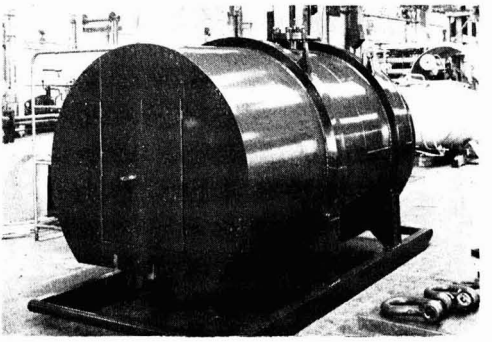
New Thin-walled Polythene Carboys

Thin-walled polythene carboys are a new range in the Skylon series of products produced by **Fibrenyle Ltd.**, Skylon House, Park Royal Road, London N.W.10. A special feature of these carboys are their even walls. They are made in 5-gall., 10-gall. and 15-gall. sizes, and wire cages are available for all three capacities.

Also included in the Skylon range is a 30-oz. rectangular polythene acid container with a non-spill chamfer and straight sides to allow for easy resting, and a mercury container with a taper seal polythene cap.

2½-ton Vessels for Liquid Argon Storage

Well known as manufacturers of Portolite flexible containers for the carrying of liquids, **Marston Excelsior Ltd.**, Wobaston Road, Fordhouses, Wolverhampton, an I.C.I. subsidiary, have also had much experience in the fabrication and fitting of bulk transport containers for road use. The 7-ton capacity double hoppers and ancillary equipment fitted to a fleet of 16 I.C.I. bulk salt delivery vehicles were manufactured and fitted by Marston; one of these vehicles has been in service for more than six years.



2½-ton vessel for the transport or temporary storage of liquid argon, fabricated by Marston Excelsior for I.C.I. Billingham Division

Aluminium was used for the hoppers, giving a high payload and ensuring product purity. Aluminium has also been used for bulk road containers for lime deliveries.

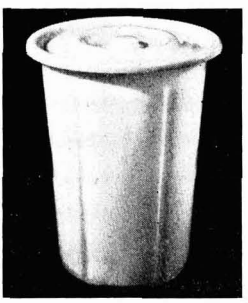
Recent work has included a number of 2½-ton vessels for transport or temporary storage of liquid argon. Fabricated for I.C.I. Billingham Division, these units consist of inner and outer vessels with a vacuum powder-filled interspace. Working pressure of the inner vessel is 115 p.s.i.g., working temperature of the inner vessel is 90°K; material used is aluminium NP.5/6.

Girling Drums

Supplied to the chemical industry by **S. Girling and Sons (Drums) Ltd.,** Leaway, Lea Bridge Road, Leyton, London E.10, are 40/45 gall. drums manufactured either in light steel, stainless steel or galvanised, and tin, lacquer or enamel lined. The drums are reconditioned throughout and air pressure tested.

Bex Containers

A series of containers for industry, made of rigid polythene, are produced by **Halex Ltd.,** Highams Park, London E.4. The Bex series includes stacking



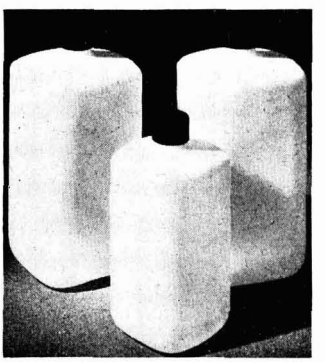
Bex 20 gall. industrial bin

trays of two sizes (19 in. by 14½ in. by 5½ in. and 23 in. by 14 in. by 5½ in.), several sizes of industrial bins ranging from 10 to 20 gall. capacities and industrial tanks of 7 to 80 gall. capacities.

Developments in Polytainers

Polytainer bottles, produced by Plastics Division of the **Metal Box Co. Ltd.,** 37 Baker Street, London W.1, are now available in 1 gall. and ½ gall. sizes. Made from Rigidex high-density polyethylene, they are suitable for a wide range of liquids; detergents, cleaners and certain polishes; oil in water emulsions, insecticides and disinfectants (except those based on phenol or cresol); many foodstuffs; most water-based products (including acids and alkalis); and hydrogen peroxide.

The new size Polytainers are of a modified shape to save storage space



New range of Polytainer bottles by Metal Box

and are practically unbreakable. Elaborate and costly outers are unnecessary, and arrangements have been made with Hydrate Corrugated Cases Ltd., Southall Trading Estate, Trumpers Way, Boston Road, London W.7, for the provision of individual board cartons.

Year-round Road Hire Service for Chemicals

An all the year round spot hire service for the chemical, paint, printing and plastics trades is provided by **Regent Transport Ltd.,** Ripple Grange, Ripple Road, Barking, Essex. Orders are accepted of all sizes from anywhere for collection, sometimes the same day and delivery the next.

The road tankers are compartmented 1,500, 2,000, 2,200, 3,600 and 4,000 gall. capacity vehicles. The bulk of the loads carried are coal tar solvents, thinners, gravure spirits, white spirits and alcohols, with terpenes, linseeds and wood oils in three of the 75 vehicles. The cargo tank is lined with Prodorglass supplied by Prodorite Ltd., to prevent contamination by rust. It has been found that stainless steel is the best material for the tanks since aluminium is attacked by caustic soda.

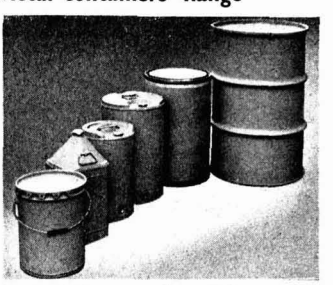
Multiwall Paper Sacks by Palfrey and Otford

Multiwall paper sacks are being used increasingly for the transport of chemicals. Among the varieties available are Palfsacks, manufactured by **William Palfrey Ltd.,** Palfrey House, 24 City Road, London, E.C.1, in a wide range of sizes and in multiple plies from 2- to 6-ply. The standard type is made with all plies of natural kraft.

The introduction of the polythene-coated ply, however, provides a protective lining against the action of some chemicals and prevents the passage of liquids. More recently introduced has been the silicone treated ply designed to allow the bagging of hot materials and a surface that will not adhere to tacky materials when the covering is stripped off.

Also producing and supplying various types of multiwall paper sacks for the chemical industry are the **Otford Paper Sack Co. Ltd.,** Otford Road, Sevenoaks, Kent. These paper sacks are made to different specifications to withstand the corrosive effects of the various chemicals contained.

Metal Containers' Range



Some of the range of metal drums made by Metal Containers Ltd. (see p. 511)

Pickfords to Enter Liquefied Gas Field

With a service provided by Pickfords, 59-67 Theobalds Road, London W.C.1, liquids can be moved in either rigid or articulated tankers with carrying capacities ranging from 5 to 14 tons. The tanks are made of mild steel, aluminium, stainless steel or are lined with a liner appropriate to the chemical to be carried. The majority of the tanks are lagged or insulated to maintain the temperature of molten liquids. The vehicles are equipped with either mechanical pumps or compressors for discharging the loads.

Tanks made from high grade aluminium alloy and ranging in capacity from 7 to 14 tons, are used for the transport of powders, which are being carried in

increasing quantities. A mechanically operated blower assisted by tipping is used to fluidise the powder and discharge to the required height.

Liquefied gases are another field the company will shortly be entering.

Operations are based on three main depots—London, Liverpool and Manchester—with sub-depots at a number of other points. In addition to conveyance between points in the U.K., through services are also run to Northern Ireland and to all countries on the Continent. Movements can be arranged either on a load basis with the company's liveried vehicles or the vehicles can be supplied under contract to the customer painted, if required, in his livery and if necessary manned by his own driver.

Combi-container

As well as manufacturing several types of steel drums (bung type, full aperture and heavy roller-hoop), **Steel Drums Ltd.**, 119 Burdon Lane, Sutton, Surrey, are agents for the Combi-container illustrated that is produced by their principals, Mauser K.G., Koln, Germany.

German-made Combi-container

Rheem Lysaght Drums

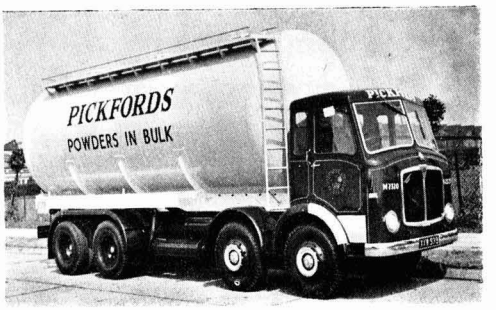
Current production on existing plant for lacquer-lined drums by **Rheem Lysaght Ltd.**, St. Vincent's Works, Bristol, 2, is 2,000 per week. A scheme is under way which will include a new oven and associated equipment, allowing a production potential of 5,000 per week.

At the present time Lysaght are supplying approximately 120 customers whose range of products cover every field from oil to chemicals in liquid, powder and semi-solid form. Drums are supplied in the unlined or lacquered state in three principal sizes—45, 40 and 25 gall.

Bowater Polythene-lined Containers

A series of polythene containers for liquids and semi-liquids are made by **Bowater Packaging Ltd.**, Fibre Drum Division, Bowater House, Knightsbridge, London S.W.1. The Bowater range combines polythene with fibre and fibre/steel outers.

Pickfords state that powders are increasingly being carried by road tankers



Polykasks and Polycrates are designed for corrosive liquids, acids, fertilisers, insecticides, distilled water, etc. They are manufactured in capacities ranging from 5 to 12 gall. The Polykask consists of a tough polythene bottle fitted into a fibre drum, while the Polycrate is a carboy in a wire crate.

Also produced are the Duocask, a standard Bowater fibre/steel drum fitted with an open-top semi-rigid polythene inner container, and free standing storage containers.

Handling of Dry Waste and Sludge

Produced under licence in the U.K. by **Powell Duffryn Engineering Co. Ltd.**, Cardiff, two of the three Dempster systems of handling materials have application in the handling or transport of chemical materials or waste.

The Dempster Dumpster equipment is designed to facilitate the accumulation and disposal and transhipment of a wide variety of materials by means of standard containers of various types designed to hold dry waste, sludges, powders, liquids, etc. The containers are serviced by specially equipped vehicles, being uplifted, taken to the point of discharge and returned in a continuous rota. The Dempster Dumpster type LFW can be mounted on any standard truck chassis. All lifting and dumping functions are controlled from the truck cab. There are seven models with capacities ranging from 6,000 to 38,000 lb. in containers of 1 to 15 cu. yd. capacity.

The Dempster Dinosaur, another system for handling materials, employs large or small detachable containers ranging from 40 to 60 cu. yd. capacity. The container is drawn up hydraulically on to the chassis of the collection vehicle and locked into position. The container can be tipped to empty or set down for unloading or reloading on the ground, on a raised wharf, flat rail wagon or lorry, or left standing free on its built-in legs.

Rail Tank Wagons for Continental Service

One of the most experienced companies in the fabrication of rail tank vehicles for the chemical industry, **Charles Roberts and Co. Ltd.**, Horbury Junction, Wakefield, have a group company, Tank Rentals Ltd., formed specially to hire tanks to customers. This fleet is increasing steadily, as is the diversity of products carried. The most spectacular development has been the introduction of special vehicles capable of running in this country and, over the train ferry, on to the Continent. This traffic is handled by I.C.I. Heavy Organic Chemicals Division (see C.A. last week for details of a special tank wagon train for iso-octanol).

The expansion of Tank Rentals has been aided by the fact that many companies, deeply involved with production and sales problems, prefer to use the services of a specialist company for transport matters; this avoids tying capital up in the purchase of rail tank cars. It is also the company's policy to help British Railways to offer a comprehensive service to freight customers.

The company has built rail tank cars for many differing chemical services, varying from comparatively simple

Dempster Dumpster LFW. 253-C hoisting unit mounted on an Austin 7-ton short wheelbase chassis with a 3 cu. yd. open top tilt-type container on casters about to be lifted

Bogie tank wagon by Roberts for conveying liquid chlorine. Underframe is riveted and fitted with plate type bogies. Equipped with handbrake only, there is provision for a vacuum brake to be added. Buffers are hydraulic and there is standard drawgear with rubber springs and screw couplings

vessels constructed in mild steel to those fitted with heavy Class 1 type vessels for the conveyance of liquefied gases, as well as several with stainless steel barrels. Among recent work is a tank wagon for conveyance of anhydrous ammonia (for Fisons) fitted with both vacuum brake and hand brake; a wagon for caustic liquor (Joseph Crosfield), also with vacuum and hand brake; and a further caustic liquor wagon (for I.C.I. Alkali Division) with tank shell plates 7/16 in. thick and end plates of ½ in. thickness.

A steam-heated and insulated single-compartment road tanker for bituminous liquids was recently completed for Yorkshire Tar Distillers. With an electronic level probe to prevent overfilling, it has a 3,290 gall. capacity; it is discharged under pressure and filled by vacuum.

Tufplas Container Used for Sodium Chlorite

A road transport container fabricated in Tufplas, a chemically-bonded combination of unplasticised p.v.c. and polyester resin and reinforced with glass-fibre, is manufactured by **Tough Plastics Ltd.**, Byfleet Road, Addlestone, Surrey. Patents are pending for the material.

This type of container is now in use in Germany for transporting highly concentrated sodium chlorite. It is believed that it will be developed substantially for use in the U.K.

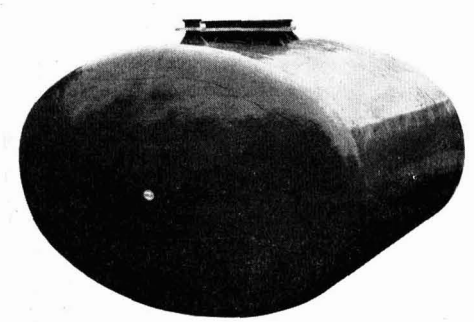
The unplasticised p.v.c. sheet used in this particular fabrication was supplied by I.C.I. and is their industrial-grade Darvic material. The polyester resin used for reinforcement came from Beck, Koller Ltd. and the reinforced glass is E glass supplied by Fibreglass Ltd.

The capacity of the tank is 1,100 galls. and its weight empty some 4 cwt.

New Lightweight Fibre Drums from Venesta

A new series of metal-ended Vendrums has been introduced since the turn of the year by **Venesta Plywood Ltd.**, West Street, Erith, Kent. With the various types of liner now available, Venesta Plywood expect their new Vendrums to meet the packaging needs of a wide range of chemical products. The series includes two basic types of fibre body wall construction for different degrees of moisture protection for dry products, and three integral liner constructions for liquids and semi-liquids.

Common to all constructions is a new method of attaching the steel base of the drum to the spirally-wound fibre body wall. The rim of the base is seamed into the fibre wall and forms a strong and, Venesta Plywood claim, an entirely durable join without rivetting or stitching. With no unwanted perforations in the body wall the highest possible degree of moisture protection is guaranteed; there are no metallic projections on the inside of the drum to corrode or snag loose internal liners if these are used.



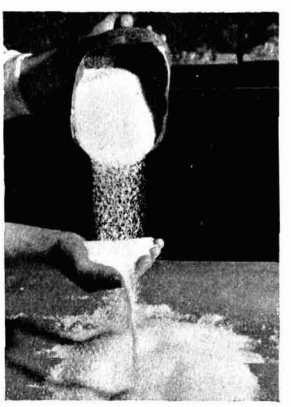
Road transport container fabricated in Tufplas

The two basic body constructions for the new 'dry goods' Vendrums provide a progressive scale of moisture resistance. 'Standard' is a body tube wound from layers of chipboard and kraft, fully glued between each laminate, and with an outer surface of either natural kraft or an attractive green. For a greater degree of protection, the windings can incorporate aluminium foil.

First of the new liquid-carrying Vendrums to be introduced by Venesta Plywood is a 5 gall. container. It can incorporate a 'tailor-made' liner made of rubber latex, p.v.c. or polythene film. In each case the liner is finished with an injection-moulded plastics neck secured to the steel lid—off-centre for secure stacking—by a threaded collar.

Price's Now Have Bulk Quantities of Free-flowing Stearic Acid

FREE-FLOWING stearine beads are now available from Price's (Bromborough) Ltd., Bromborough Pool, Bebington, Wirral, Ches, in all Pristerene qualities as well as the Stearex grades. Free-running, these stearine beads can



Price's stearic acid in bead form

be moved pneumatically, measured volumetrically and have far less tendency to dust or cake than other forms.

Price's state that plant efficiencies can be clearly improved by the fact that Pristerene beads can be pumped without the adverse effect of heat from storage hoppers straight into mixing vessels.

Some three years ago the company anticipated a need for stearic acid in a form that could be handled by fluidisation techniques. After overcoming the difficulties of 'beading' a wax-like substance, Prices's began to produce stearine beads in 1958. Launched exclusively for the rubber industry by Columbian International (Great Britain) Ltd. under the Stearex brand, these beads proved so successful that supplies had to be limited until more and larger capacity could be built.

Copies of a new bulletin on the bulk handling of stearine beads and advice on their use are obtainable from Price's.

Overseas News

GOODRICH-GULF START CONSTRUCTION ON NEW POLYBUTADIENE PLANT

GOODRICH-Gulf Chemicals, equally owned by Gulf Oil and B. F. Goodrich Co., are to begin construction immediately on a multi-million dollar plant for the commercial production of Ameripol CB, *cis*-polybutadiene rubber. Initial output will be 10,000 short tons/year and the plant is due on stream by the end of this year.

Results to date indicate that Ameripol CB is the only known polybutadiene rubber which can be used as a 100% replacement for natural rubber in heavy duty tyre treads.

Goodrich-Gulf have offered to license the manufacture of stereo-specific rubbers under their patents, together with sub-licences for pertinent catalysts held by Zeigler. The licencing programme has met with worldwide interest. Goodrich-Gulf have granted licences to two synthetic rubber manufacturers, including Shell (see p. 503) and negotiations are continuing with a number of others in the U.S. and other countries.

Polymethylacrylate Expansion in Holland?

Following the recent announcement of Imperial Chemical Industries Ltd. regarding their Rotterdam petrochemical project (C.A., 4 March, p. 356) the Dutch concern N.V. Chemische Industrie Polyplastic, producers of polymethylacrylate, are now reported to be planning a considerable extension of their capacity.

Polyplastic, who since 1959 have belonged to the Molijn en Co. concern of Holland, market their existing product under the name of Polypex. The majority of the Dutch market is at present in the hands of such non-Dutch concerns as I.C.I., Röhm and Haas, and Ressart.

Sulphuric Acid for Chilian Copper Production

The Empresa Nacional de Minería (ENAMI) are to install a new sulphuric acid plant at El Salado, near the port of Chañaral, at an estimated cost of U.S.$150,000 and 60,000 escudos. The plant will have a production capacity of 20 tons/day of 98% acid which ENAMI intend to use in their copper concentrates plant at Osvaldo Martinez nearby.

U.S.-German Fatty Acids Plant for W. Germany

Fatty alcohols are to be produced under patents of Prof. Ziegler, of Mülheim/Ruhr, at a plant to be set up jointly in West Germany by the Deutsche Erdöl-AG oil company, Hamburg, and Continental Oil Co., Houston, U.S. The plant, to come into operation with an annual capacity of 50,000 tonnes in mid-1963, will be situated at Brunsbüttelkoog, on the North Sea coast of Schleswig-Holstein. To be supplied with raw materials from the Deutsche Erdöl refinery at nearby Heide, the plant will involve investment of initially DM60 million to DM70 million.

The operating company, which is starting construction of the plant immediately, is Condea Petrochemie mbH. Its products will be used as raw materials for washing media and as softening agents in the plastics industry.

New Montecatini Pyrites Processing Plant

A plant for the processing of pyrites is to be built by Montecatini near Follonica. Construction will begin in April and is scheduled for completion by June 1962. The annual capacity of the plant is to be initially 170,000 tonnes of iron and 350,000 tonnes of concentrated sulphuric acid.

Part of the sulphuric acid output of the plant will be absorbed by various Montecatini plant operating in Italy and the rest will be sold to other companies.

The heat generated by the furnaces used for roasting the pyrites will be used for the production of steam and will drive a 9,000 kW electric power station. Some 60 million kWh which this station will produce yearly will be consumed by various mines operated by Montecatini in the region.

First's Open European Office in Brussels

Robert S. First, Inc., chemical consultants, 60 East 42nd Street, New York 17, have now opened their European headquarters at the Centre International Rogier, 2016, Passage International, Brussels. Mr. Albert S. Hester, manager of European operation, who was formerly based in London, will now make his permanent headquarters in Brussels.

Robert S. First specialise in expansion and diversification studies, joint ventures and acquisitions, foreign technical liaison, and marketing and economic research for chemical, plastics and allied industries.

New Plant Adds to Italy's Carbon Black Capacity

Columbian Continental Europa—a concern set up jointly by Columbian Carbon Co. of New York and Contintental Carbon Co. of Houston, have inaugurated a 27,300 tonnes/year carbon black plant at San Martino di Trecate (Province of Novara).

Three types of lamp-black will be produced; ISAF, HAF and FEF, the first two being used to harden pneumatic tyres, while the third endows them with additional resilience.

The new scheme has absorbed an investment of about $6 million. Part of the plant's output will be exported. The Italian rubber industry has for some time been faced with a shortage of lamp black, consumption of which has been increasing at a faster rate than in other European countries. In 1960, Italy consumed some 37,300 tonnes of lamp black compared with Germany's 74,500 tonnes, the U.K.'s 71,800 tonnes, 10,000 tonnes in the Netherlands and 7,300 in Belgium and Luxembourg. (For data on carbon black in Europe, see C.A., 7 January.)

Japanese Firms Plan TDI

A number of Japanese chemical producers plan to produce toluene diisocyanates. Plans of Nippon Polyurethane and Takeda Chemical have been approved by the Foreign Investment Council; the first company will use the Farbenfabriken Bayer process, while Takeda plan to buy know-how from Allied Chemical, U.S. Mitsui Chemical Industry's plans, which involve using Du Pont techniques, will be approved when the company's distribution plans are made known. Priority of approval is being granted to those producers whose plans are approved by TDI users.

In addition to the three companies who propose to use foreign know-how, Nippon Soda, Kanto Denka and Mitsubishi Chemical also plan TDI facilities but based on domestically developed processes.

Socabu May Raise Butyl Rubber Capacity

The French synthetic rubber producers Société du Caoutchouc Butyl (Socabu) are reported to be studying the possibility of increasing their production capacity. Socabu, set up by major concerns including Esso Standard and Compagnie Française des Pétroles, last year produced 17,500 tonnes of butyl rubber at their plant near Le Havre, of which over 43% was exported. The plant is said to be in a position to produce for sale 4,000 tonnes of isobutylene; as France's only producer for sale of this intermediary product, Socabu are stated to be seeking new customers.

Rexall Drug Obtain Loan for Petrochemical Project

The U.S. concern Rexall Drug and Chemical Corporation have completed negotiations with an insurance company consortium for the floating of a $35 million loan. The loan is secured by the issue of bonds due to expire in 1982. The money raised is to be used for the setting-up at Odessa, Texas, of a petrochemical plant in co-operation with the El Paso Natural Gas Products Co.

Sincat to Build New Catalytic Polymerisation Plant

Societa Sincat are to add a thermal cracking and a catalytic polymerisation unit to the plants they already operate at Priolo, Sicily. These additional plants will process crude oil from Ragusa and produce fertilisers, plastics materials and some by-products.

PEOPLE in the news

● Following completion of their extensions at Bridge Street, Dukinfield, Ches, Acheson Dispersed Pigments Co., a division of Acheson Industries (Europe) Ltd., have made the first of a number of new appointments and promotions. **Mr. B. R. Corry, A.R.I.C.,** works chemist, has been promoted production superintendent, and will be responsible for all plant production operations. **Mr. K. Harwood,** production supervisor, becomes scheduling co-ordinator, sales department, and **Mr. Frank S. Cadd** has joined the company as project engineer and will mainly be concerned with process engineering, design and construction. He was previously with Project Construction Ltd., an affiliate of Simon-Carves Ltd.

● **Mr. H. H. Woolveridge, B.Sc.,** director of the Distillers Co. Ltd., has been elected president of the British Plastics Federation in succession to **Mr. C. H. Glassey.** Joining Distillers in 1925 on the chemical side, Mr. Woolveridge played an active part in the formation of the company's Plastics Group, of which he is now chairman. In addition to being a director of the companies comprising this group, he is also on the boards of three companies in the D.C.L. Chemical Group. As stated last week he has now joined the board of British Xylonite, recently acquired by Distillers. **Mr. David Radford** (Ekco Plastics) and **Mr. F. Walls** (I.C.I.), remain chairman and vice-chairman of the federation respectively.

● **Mr. William Reid** will retire from executive duties at the Distillers Company Ltd. on 31 March. He will be succeeded as chairman of the management committee by **Mr. T. F. A. Board, C.B.E. Mr. H. H. Woolveridge, B.Sc.,** has been appointed as a member of the management committee. **Mr. E. G. Gross,** a D.C.L. director, has been appointed as resident director in charge of all the company's interests in Australia.

T. F. A. Board, left; H. H. Woolveridge, below left; and E. G. Gross, below

● **Mr. Ambrose Congreve,** chairman of Humphreys and Glasgow Ltd., London, is on a three-week tour of South and Central American cities. Accompanied by **Mr. D. C. Lennon,** an associate director, he began his 20,000-mile tour in New York. The tour includes Rio de Janeiro, Sao Paulo, Buenos Aires, Santiago, Lima, and Mexico City. The visit follows Mr. Congreve's meeting with Sr. Alvaro Alsogaray, Argentinian Minister of Economic Affairs, when he visited London recently.

Bertram White (left) who becomes chairman on 1 April of A. Boake Roberts (Holding) Ltd. and A. Boake Roberts and Co. Ltd. Right is D. C. M. Salt, newly appointed director of Monsanto Chemicals Ltd. Both appointments were referred to in 'People in the News' last week

● **Mr. L. J. Garnham,** formerly with Carless, Capel and Leonard Ltd., has joined C. Tennant Sons and Co. Ltd., where he will be responsible for the sales and development of the Coal Tars Division.

● **Mr. W. Price** has resigned from the board of William Blythe and Co. Ltd., Holland Bank Works, Church, near Accrington, Lancs.

● **Mr. Frank Savaage, M.A., B.Sc., A.R.I.C.,** has been appointed chairman of the Anchor Chemical Co. Ltd., Clayton, Manchester 11. Mr. Savaage, who is 54, graduated with honours in chemistry and subsequently carried out research under Prof. von Wartenberg at the Technische Hochschule, Danzig. On his return to England in 1929, he was engaged as a research chemist at the Billingham Works of I.C.I. He remained with the company for 15 years in the heavy chemicals field, being engaged successively in research, plant management, administration and sales. He entered the rubber industry in 1945 when he joined Anchor Chemical Co. as assistant managing director. He was appointed managing director in 1958.

F. Savaage **N. A. C. Friend**

● **Dr. Norman A. C. Friend, Ph.D., D.I.C., F.R.I.C.,** who has been appointed European technical manager of the Canadian Chemical Ltd., Montreal, is based at 49 Old Bond Street, London W.1. He was formerly in the chemical sales department of British Celanese Ltd., and more latterly served in the London office of Amcel, an affiliate of Celanese Corporation of America in a senior technical capacity. A qualified patent agent, Dr. Friend joined the chemical sales department of British Celanese in 1945, becoming its manager in 1951; in 1957 he was also appointed personal assistant to the managing director (technical). Recently he was made a Fellow of the Royal Institute of Chemistry.

● **Dr. R. Beeching, B.Sc., Ph.D., A.R.C.S., D.I.C., F.Inst.P., C.I.Mech.E.,** technical director of Imperial Chemical Industries Ltd., will from 1 June become chairman of the new British Railways Board. Aged 48, he joined I.C.I. in 1948, after wartime service with the Ministry of Supply Armament Design Section. Dr. Beeching became a member of the Terylene council, later renamed Fibres Division. As a vice-president of I.C.I. (Canada) Ltd. in 1953 he started the Canadian Terylene organisation, returning to the U.K. in 1955 to be chairman of I.C.I. Metals Division. He joined the company's main board in 1957 and is now also a director of British Nylon Spinners Ltd. and of Imperial Chemical Industries of Australia and New Zealand. Dr. Beeching, who hopes to return to I.C.I. after a period of five years, will receive a salary of £24,000 a year.

● **Mr. J. W. Martin,** director and sales manager of Whessoe Ltd., Darlington, Co. Durham, is to retire on 31 March.

● **Dr. A. R. Battersby, M.Sc., Ph.D.,** lecturer in chemistry at Bristol University, has been awarded the Chemical Society's Corday-Morgan medal and prize. This award is made annually to the British chemist who has published, during the year in question, the most meritorious contribution to experimental chemistry and who is also under 36. Mr. Battersby was awarded the prize in consideration of his outstanding work, published in 1959, on the stereochemistry

(*Continued on page 521*)

In today's market place the package is often as important as the product it contains. That's why many best sellers are packaged in miracle plastics from Dow. Dow packaging films seal flavour and freshness in, actually help the product sell itself. Dow latex coatings for boxboard make full colour illustrations of products lifelike and persuasive. Rigid containers not only provide extra protection for the product but lead a double life as re-usable household items.

DOW

TRADE NOTES

Agents Appointed

K. A. Ballard Ltd. have been appointed London agents for the Clyde Structural Iron Co. Ltd., of the Clydeside Iron Works, Scotstoun, Glasgow. This appointment is principally directed to supplying structural steel for the petroleum, petrochemical and chemical industries in the U.K. and abroad. Address of K. A. Ballard Ltd. is Woodthorpe, Church Road, Worcester Park, Surrey.

High-purity Mercury

Two grades of mercury for laboratory and industrial use are offered by Johnson, Matthey and Co. Ltd., following the installation of new equipment.

Re-distilled mercury has a maximum impurity content of 5 p.p.m. (mostly copper and silver), and triple-distilled mercury a maximum of 1 p.p.m. The metal is supplied in 7, 14 or 28 lb. containers, though other packings are available.

The product is described in a newly issued data sheet in the Electrical Engineering series, 1300:492. Details of prices and deliveries are available from the company at 73-83 Hatton Garden, London E.C.1.

Abrac Plasticisers

Revised technical literature on the relatively new Pliabrac series of low-temperature plasticisers (ref. 234c.) is available from A. Boake Roberts and Co. Ltd., London E.15. In general these are similar to di-2-ethylhexyl sebacate. They are arousing much interest because of their competitive price, being something like £80/ton cheaper than the cheapest adipates and about £300/ton cheaper than the cheapest sebacates. Prices range from £260/ton (Pliabrac 980 and 989) and £265/ton (Pliabrac 990) for 10 tons in road tankers to £315/ton (Pliabrac 980 and 989) and £320/ton (Pliabrac 990) in single 5 gall. cans.

Change of Name

Name of the General Chemical and Pharmaceutical Co. Ltd., manufacturers of Judex and Judactan analytical reagents, Oasis accumulator acid and distilled water and Vulcan plating chemicals, Judex Work, Sudbury, Wembley, Middlesex, has been changed to the General Chemical Co. Ltd.

Polychol Surfactants

The newly developed range of ethylene oxide derivatives of lanolin alcohols, originally offered by Croda Ltd., Snaith, Goole, Yorks, under the name of Etolan, is now being marketed under the trade name of Polychol. Croda state they have been advised by the Robinson-Wagner Co., New York, that the latter firm believe the initial name constitutes an infringement of their trade mark Etholan.

'Federal Green Bond' Bentonite

An agreement with the Archer-Daniels-Midland Co., New York, to act as sole distributor for sales of 'Federal green bond' bentonite in the U.K. has been concluded by the Fullers' Earth Union Ltd., Redhill, a member of the Laporte Group. The addition of 'Federal green bond' to their present range of British produced Fulbond bentonites will enable Fullers' Earth Union to supplement their long established service to the British foundry industries. The U.S. product will be backed by comprehensive technical service from Fullers' Earth Union.

New Telephone Number

New telephone number of the Walker Chemical Co. Ltd. is Bolton 23264.

B.I.C.C. Agents for Resins

An agreement has been signed by which British Insulated Callender's Cables Ltd. will act as distributors to the electrical industry in the U.K. of fibre-reinforced resin materials produced by Thermotank Plastic Engineering Ltd.

Both companies are continuing a joint development programme directed towards the special requirements of the electrical industry.

People in the News

(Continued from page 518)

of emetine and its congeners, also his contribution to the chemistry of curare alkaloids and the biogenesis of papaverine.

● **Mr. I. D. Murray, B.Sc., A.M.I. Chem.E.,** chemical engineer with Looker Industries Ltd., Warrington, has now joined Process Plant Contractors (Campbell) Ltd., 89 Oxford Street, Manchester 1, where he is engaged in the technical service department, with special responsibility for customer liaison.

● **Dr. D. W. Cameron, Ph.D.,** has been appointed a demonstrator in the organic and inorganic chemistry department, Cambridge University, for three years from 1 October.

● **Dr. H. C. Smith, M.Sc., Ph.D., F.R.I.C.,** principal, Coventry Technical College, has been elected chairman of the Midlands Section, Society for Analytical Chemistry, in succession to **Dr. S. H. Jenkins, Ph.D., D.Sc., F.R.I.C.,** chief chemist, Birmingham Tame and Rea District Drainage Board. **Mr. W. H. Stephenson, F.P.S., F.R.I.C.,** Deputy chief analyst, Standards Department, Boots Pure Drug Co., is the new vice-chairman; hon. secretary is **Mr. G. W. Cherry, M.A. (Oxon),** assistant senior chemist, Central Laboratories, West Midlands Gas Board; hon. treasurer is **Mr. F. C. J. Poulton;** and hon. assistant secretary is **Mr. R. Adkins.**

● **Mr. Thomas E. Moffitt,** president of the Hooker Chemical Corporation, New York, since 1957, has been elected chairman of the board and chief executive officer. New president is **Mr. F. Leonard Bryant,** who is succeeded as executive vice-president by **Mr. Thomas F. Willers.**

Commercial News

- B.N.S. Plan Further Expansion for 1962
- B.P. to Acquire Rio Tinto Oil Interests
- U.S. Du Pont Achieve Record Sales in 1960
- New $25 Million Nuclear Corp. Formed

A.P.V.

Profits of the A.P.V. Co. for 1960 have expanded from £495,893 to £750,235. After tax the net group profit was £350,151 compared to £243,944 in 1959. The company is raising the dividend from the equivalent of 7.1% to 11¼% on capital increased by a scrip issue.

British Nylon Spinners

Trading balance of British Nylon Spinners Ltd. for 1960 was £11,521,338 (£10,465,832) after depreciation of £2,101,114 (£1,706,078). Net profit was £6,443,862 (£5,665,899). Dividends total 20% (same but on increased capital). Production at the new Gloucester works started in mid-1960 and a further expansion of capacity at this site will be operating during 1962. During 1961, the chairman and deputy chairman will be nominated by I.C.I., who with Courtaulds, jointly hold the B.N.S. £24 million one-class capital.

British Oxygen

An extraordinary meeting of British Oxygen Co. is to be held on 5 May to create capital and to effect a one-for-two scrip issue to holders.

B.P.-Rio Tinto

The oil interests of Rio Tinto are to be acquired by the British Petroleum Co. Ltd. through the purchase of holdings in Trinidad, Canadian and the U.S. The principal consideration will be 3 million B.P. new £1 ordinary shares, worth approximately £8.7 million. B.P. will acquire from Kern Oil all the shares of Kern Trinidad Oilfields, Kern Oil California and St. Helens Petroleum Corporation, plus Kern's shareholding in Devon-Palmer Oils, whose properties are in Canada.

Burt, Boulton and Haywood

The adoption of resolutions to create capital at an extraordinary meeting of Burt Boulton and Haywood, will enable the completion of the purchase of the privately owned shares of Burts and Harvey on 30 March. Burts and Harvey will then become a wholly owned subsidiary.

Staveley Industries Ltd.

Name of the Staveley Coal and Iron Co. Ltd., has been changed to Staveley Industries Ltd. in view of the company's changing interests which now include salt, lime and allied products. The group includes: Beswick's Lime Works Ltd., Buxton; Birmingham Chemical Co. Ltd., Lichfield; and the British Soda Co. Ltd., Sandbach, Ches.

Royal Dutch/Shell

Net income for the Royal Dutch/Shell group of companies for 1960 was £177,485,000 (£175,535,000). The bulk of the income is received as dividends from companies of the Dutch/Shell group. Sales and operating income totalled £2,673 million (£2,578 million). 'Shell' Transport and Trading Co. are increasing their dividend by 3d to 5s per £1 ordinary for Royal Dutch Petroleum from the equivalent of fl.5.15 to fl.5.25 per fl.20 share.

Carbochimique

The Belgian carbon chemical concern Société Carbochimique has announced provisionally a 1960 dividend of 50 Belgian francs per share. Over the previous year the company had recorded an equalled-out profit and loss account after experiencing a small loss.

Celanese of America

Celanese Corporation of America recorded for 1960 a net profit of $19,900,000 ($22,600,000), or $2.07 ($2.44) per share, after sales of $264,100,000 ($265,200,000) and tax of $17 million ($23,600,000).

Commercial Solvents

Commercial Solvents Corporation report a 1960 profit of $4,390,000 ($2,850,000), or $1.70 ($1.00) per share, the profit per share including a stock dividend of 2% declared in December 1960. The rise in profits is due partly to the cutting out of certain unprofitable chemical operations.

Degussa

Deutsche Gold- und Silberscheideanstalt AG (Degussa), Frankfurt-on-Main, announce a turnover for the year ended 30 September last of DM921 million, or a rise of 15.6%. Net profit rose from DM15,930,000 to DM18,660,000. A dividend of 17% is proposed on capital of DM117 million (16% on DM102 million). Of Degussa's German subsidiaries Chemiewerk Homburg AG and Chemische Fabrik Wesseling AG have now been made branches of the parent company, while Chemische Fabrik Grünau AG have changed their name to Chemische Fabrik Grünau GmbH. of Illertissen.

Du Pont

Total sales of E. I. Du Pont de Nemours and Co. Inc. reached a new record of $2,143 m. for 1960, but net earnings from operations declined 14% as a result of the current 'price-per-cost' squeeze on American industry, according to the annual report. Sales advanced 1% in dollar volume and 4% in physical volume over 1959, the previous record year, while the company's index of selling prices declined 3%. Meanwhile, however, the average gross operating investment increased from $2,745 m. for 1959 to $2,933 m. for 1960, chiefly for new and expended manufacturing and service facilities.

Net earnings per share of common stock, as announced on 20 February, were $8.10 of which $5.57 was derived from operating activities and $2.53 from dividends on the company's investment in General Motors Corporation. Earnings for 1959 were $8.92/share, of which $6.38 came from operations and $2.54 from General Motors dividends. Dividends paid on the common stock were $6.75/share compared with $7 in 1959. (Du Pont's European business—see page 505.)

Merck

Merck and Co. recorded last year the record turnover of $218.1 million as against $216.9 million, while net profit showed the first decline since 1954 at $27.8 million (1959: $30 million) or $2.57 ($2.79) per share.

Olin Mathieson

Olin Mathieson Chemical Corporation booked a 1960 turnover of $689,620,000 ($702,030,000). Profit fell from $2,810,000 to $2,590,000.

Reichhold Chemicals Inc.

Reichhold Chemicals Inc., U.S., last year recorded a consolidated turnover of $99,170,000 ($100,920,000). Net profit fell over the year from $3,830,000 to $3,350,000, or from $1.08 to 86 cents per share.

Reichhold Chemie AG, Hamburg, are to raise their capital from DM 8 million to DM 9 million. The new shares will be issued at 300% face value and will have a right to 1961 dividend.

United Nuclear Corporation

A new $25 million company, to be called United Nuclear Corporation, will combine the facilities and personnel of the Nuclear Development Corporation of America, Olin Mathieson's nuclear fuels operation, and Mallinckrodt Chemical's Nuclear Division, Commercial Operations, at St. Louis and Hematite, Mo. Olin will be the majority shareholder.

United Nuclear will have skills and facilities for research and development, reactor system design, manufacture of nuclear fuel materials, reactor and core fabrications, fuel management, cold scrap processing, isotopes and hot radiation energy sources. It will also have personnel skilled in hot core transportation, hot scrap reprocessing and hot waste disposal.

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 7d d/d to 6s 1d; golden, 3s 10d d/d per lb. to 5s 3d 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, £59; 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 10s; extra fine powder, £87; BP gran., £91 10s; crystal, £99 10s; powder, £97; extra fine powder, £99. £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 2¾d.

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. Basic 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, Basic prices: in 5-cwt. drums, per ton for 2-ton lots, Dry English £112 5s; Ground in oil, £131 10s.

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 10s 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 2¼d.

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 11½d; 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, £9 15s—£11 7s 6d per ton; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

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.

R.I.C. Chemistry Film Index

Second edition of the 'Index of Chemistry Films', published by the Royal Institute of Chemistry, is now available. This new edition contains up-to-date details of about 1,200 films and 300 filmstrips on chemistry and related topics, classified by subject, followed by the addresses of the distributors and an alphabetical list of titles. There are about 50% more entries than the first edition. Copies may be obtained from the R.I.C., 30 Russell Square, London W.C.1, price 5s. post free.

DIARY DATES

TUESDAY 28 MARCH

I.Chem.E.—Manchester: Chem. Eng. Dept. of Manchester Coll. of Sc. & Tech., Jackson St., 6.30 p.m. 'The temperature control of exothermic reaction entailing special heat transfer problems', by B. F. Street.

I.Plant.Eng.—Cardiff: South Wales Engineers' Instit., Park Pl., 7.30 p.m. a.g.m. & 'Some engineering problems with chemical plant', by T. C. Veale.

S.C.I.—Banbury: Crown Hotel, Banbury, Oxon, 4 p.m. 'The resistance of aluminium to supply meters', by Dr. H. P. Goddard; and 'Behaviour of aluminium in modern power station condensate waters', by Dr. E. A. G. Cronin & D. Hastings.

WEDNESDAY 29 MARCH

R.I.C.—London: Hendon Tech. Coll., 7.30 p.m. 'Detergents' by K. G. A. Pankhurst.

S.A.C.—London: Chelsea Coll. of Sc. & Tech., 6 p.m. Demonstration of lab. equipment.

THURSDAY 30 MARCH

S.C.I.—Edinburgh: North British Hotel, Princes St., 7.30 p.m. a.g.m. & discussion 'Laboratory design and equipment'.

Market Reports

No Major Changes in Prices

LONDON Home trade demand for industrial chemicals has been well sustained during the past week, and there has also been a steady flow of enquiry for shipment. Interest has been spread over most sections of the market and there has been some pressure for deliveries of fertiliser materials. Prices show no change of importance and the undertone is firm

Creosote oil, phenol, naphthalene and pyridine continue in good demand in a firm coal tar products section.

MANCHESTER A steady contract movement of supplies of most chemical products to leading industrial outlets has been reported, and a fair weight of new business, much of it for near delivery positions, has also been placed. The textile industries are calling for reasonably good supplies of a wide range of chemicals, and there is a steady demand for industrial solvents and plastics materials. A good aggregate tonnage of fertilisers is now moving.

SCOTLAND There has been a steady volume of trading during the past week and most of the usual range of industrial chemicals were demanded. Spot requirements were again predominant while those against contracts were fully maintained. Prices on the whole have shown little change.

There is still a reasonable volume of enquiries for the overseas market. There is much more apparent interest now being shown both in demands and enquiries for agricultural chemicals.

Inorganic Polymer Symposium

A symposium on inorganic polymers is to be held at Nottingham on 18-21 July 1961. Arranged by the Chemical Society, London, in association with Nottingham University, the symposium will consist of nine main lectures and a larger number of short contributed papers.

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 26 April

Manufacture of fertilisers containing trace elements. Minelec Ltd. **866 426**

Fungicidal products. Murphy Chemical Co. Ltd., and Pianka, M. **866 506**

Operation of multi-stage ion-exchange water treatment systems. Neckar Water Softener Co. Ltd. **866 471**

Ion-exchange membranes. Permutit Co. Ltd., and Allen & Hanbury's Ltd. **866 723**

Method of preparing complex compounds of metals with organic acids. Peters, K. **866 718**

Stabilisation of per-compounds. Geigy Co. Ltd. **866 492**

Substituted dinitrabenzamides and veterinary compositions containing them. Salsbury's Laboratories. **866 517**

Veterinary compositions. Salsbury's Laboratories. [Addition to 866 516.] **866 517**

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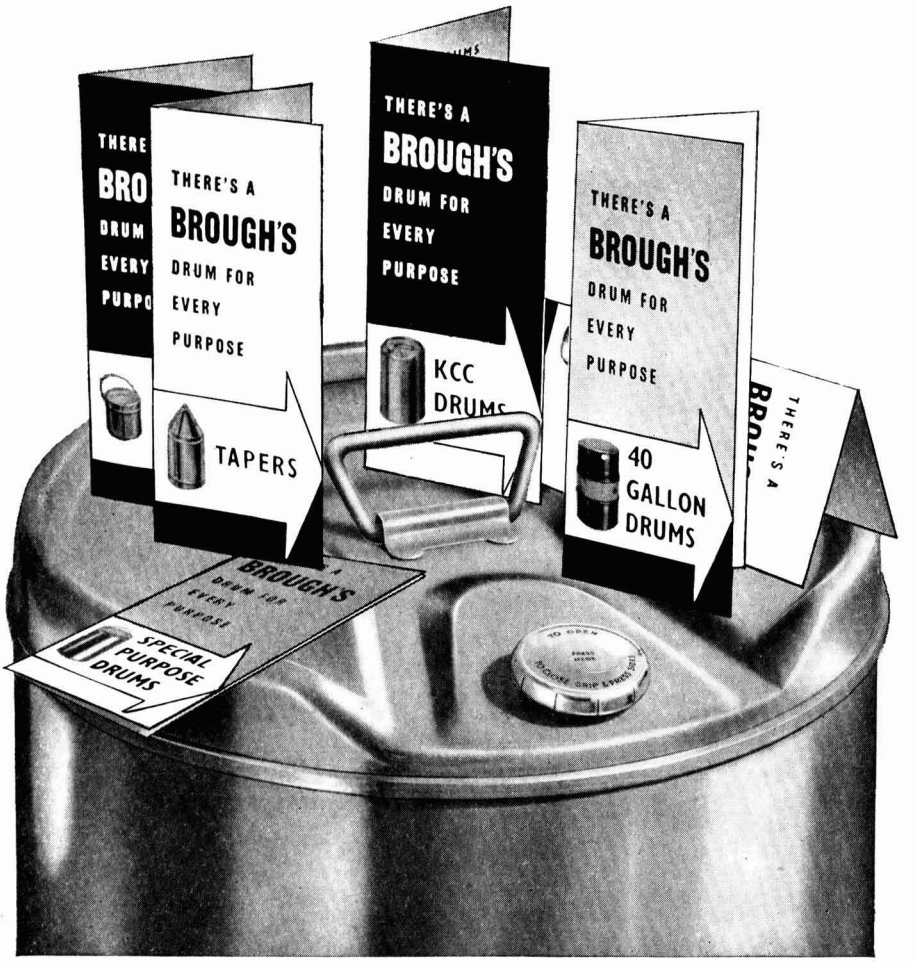

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