

Chemical Age

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PETROCHEMICALS and POLYMERS

VOL. 86 No. 2199

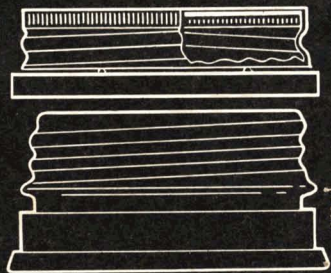
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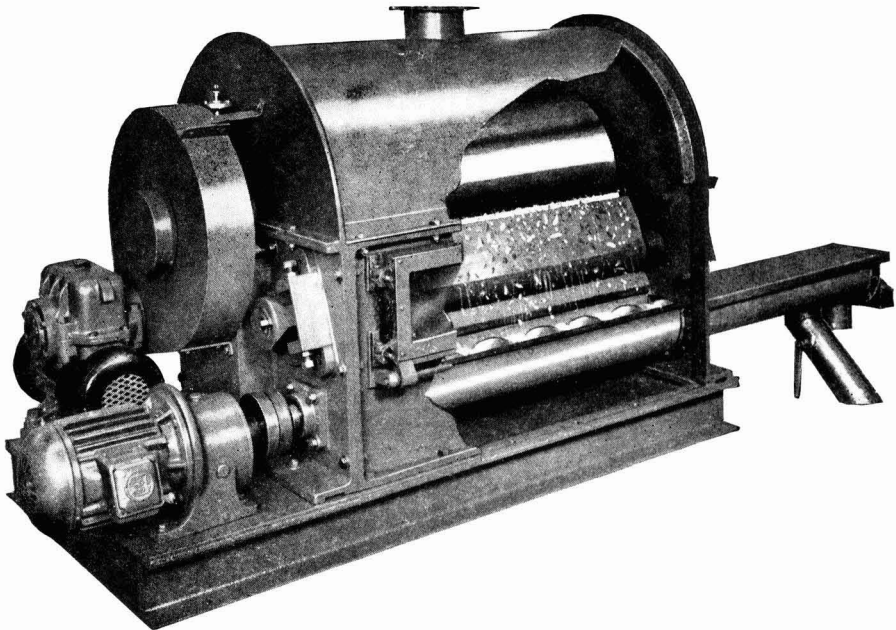
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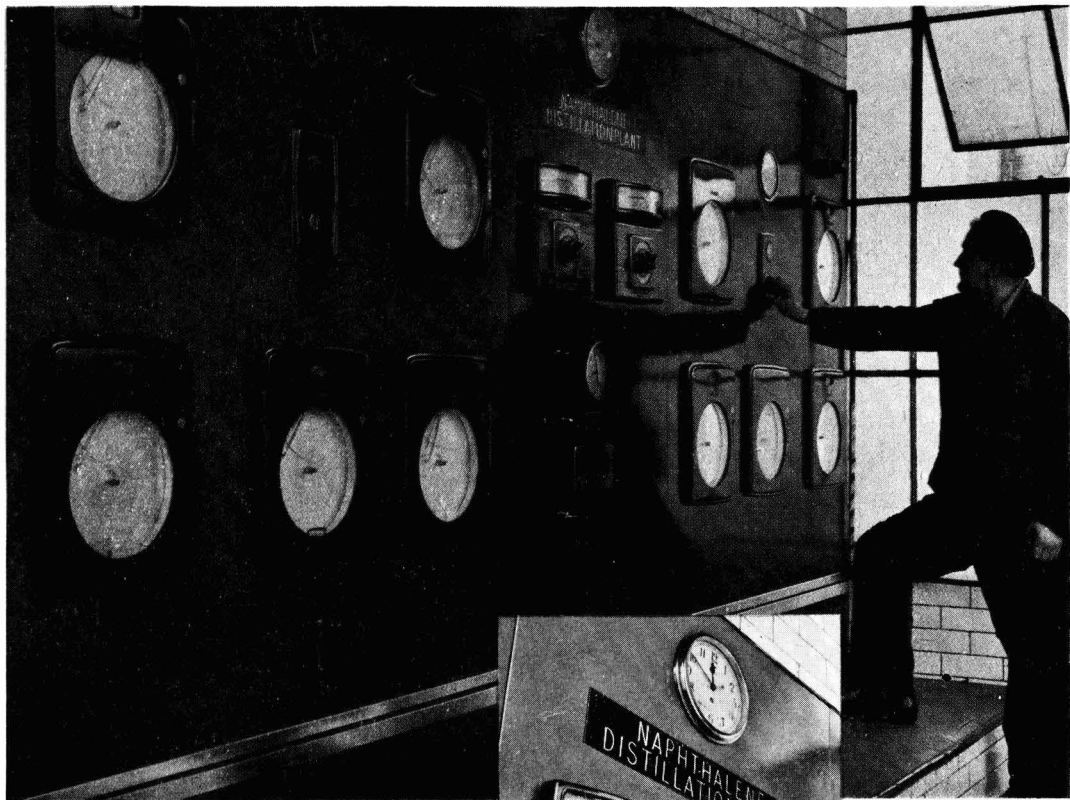
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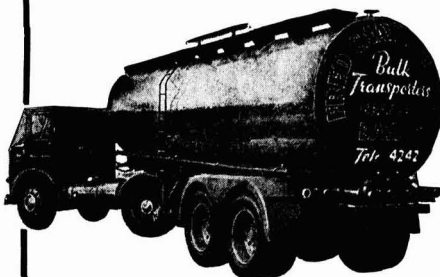
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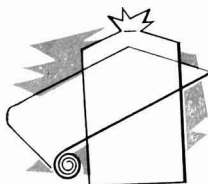
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Ascorbic acid	
(Vitamin A)	Metol
p-Aminobenzoic acid	Methionine
(PAB) and esters	Methanol
p-Aminosalicylic acid	Methylamines
(PAS)	Methyl bromide
Acetyl salicylic acid	Maleic anhydride
(aspirin)	Maleic hydrazide (MH)
Acetophenone	Nitrobenzene
Acetamide	Nitrofurans
Amethocaine	Nicotinic acid
Amphetamine	Nicotinic amide and diethylamide
Barbiturates (barbitone, phenobarbitone thiopentone and most others)	Pethidine
Benzene hexachloride (B.H.C.)	Paraform
Benzyl chloride	Papaverine
Benzyl cyanide	Piperazine
Chloroform	Pilocarpine
Chlorobenzene	Phthalic anhydride
Chlorophyll	Phenylethyl alcohol
Caffeine (and theobromine)	Phenol
Cetyl chloride	Phenylacetic acid
Cyanuric acid and chloride	Procaine
Cyanoacetic acid, ethyl cyanoacetate	Parathion
4- α -Chloropropionic acid (Dalapon)	Phenyl mercury acetate and other salts
Chloroquine	Phenol phthalein
	Phloroglucinol
Diketene	Quinine, cinchonine, totarquin, etc.
D.D.T.	Quotane
Dodecyl benzene	Rayon (viscose)
Dieldrin	Rutin
Dimethyl sulphate	Sulphanilamide
2, 4-Difluorophenoxy-acetic acid	Sulphapyridine (M and B 693)
Diodone	Sulphathiazole
Diacydiamide	Sulphadiazine
Ethylene diamine tetracetic acid (EDTA)	Sulphamezathine
Ethyl benzene	Sulphapyrazine
Ephedrine	Sulphadiazine
Ethyl malonate	Salicylic acid
Ethylene oxide	Salicylamide, Salicyl diethylamide
Fumaric acid	Sorbitol
Formaldehyde	Sorbos
Fluoroacetamide	Sodium dodecylbenzene sulphonate
Fluoroacetic acid and salts	Strychnine
Glycerol	Thiolactic (thioglycollic) acid
Glyceryl stearates	Tocopherol
	Theobromine
Hydroquinone	Ultramarine
p-Hydroxybenzoic acid and esters	Vitamin B 1 (Aneurin, Thiamin)
Histamine	Vitamin B 2 (Riboflavin)
Iodised oils	Viscose (rayon)
	Vanillin
	Vinyl acetate
	p-X

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For further details of the above or other processes write to

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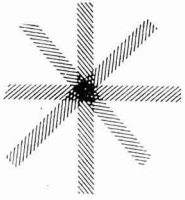
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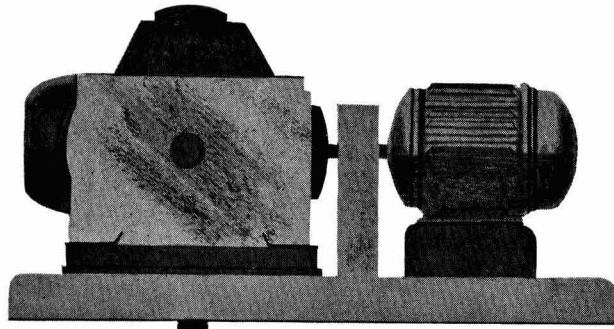
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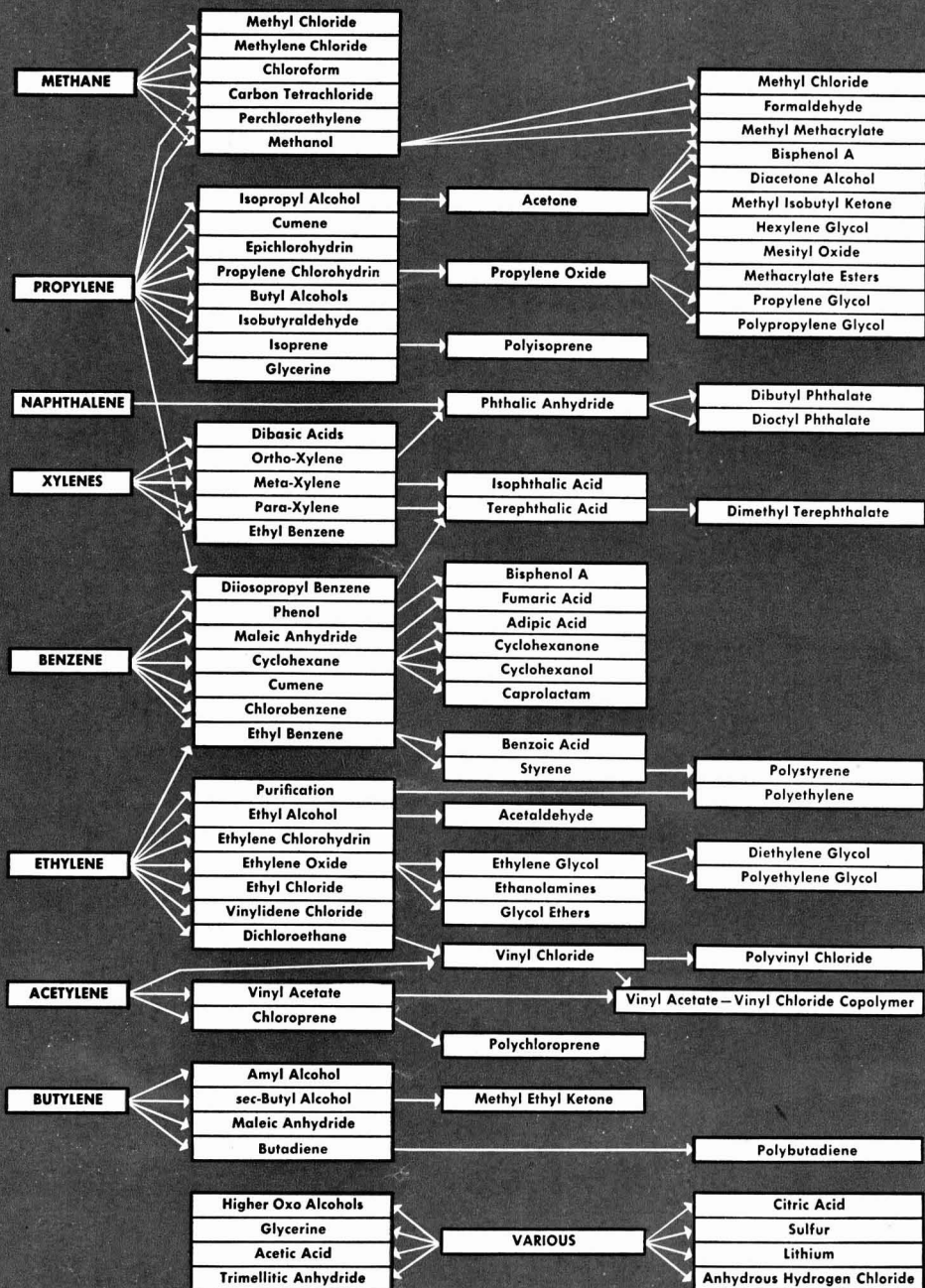
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POLYOLEFIN RESINS

IN his book on polyolefin resin processes (POLYOLEFIN RESIN PROCESSES. Gulf, Houston, 1961. Pp. x + 242. \$6.50), Marshall Sittig makes interesting estimates of the growth of polyolefin production that should follow the present research effort.

He argues that, in 1959, 123 U.S. patents were granted in the polyolefin field, probably as a result of about 250 applications. He accepts \$60,000 as the amount of research and development money behind each patent application. Therefore about \$15 million must have gone for polyolefin research in 1956 or 1957. He further accepts that one dollar of R and D money has to be backed by \$10 in eventual plant investment. One dollar's worth of plant produces about one dollar's worth of polyolefin per annum. Therefore he expects 500 million lb. of capacity to be added each year.

This figure seems very large in comparison with present U.S. capacity of about 2,000 million lb., especially when the rapidly increasing rate of patent application is considered. Sittig has, however, probably considerably underestimated the cost of a patent application on which the whole calculation is based. It nowadays costs about \$45,000 per annum to keep one Ph.D. working at the bench in an American laboratory. Sittig is therefore supposing that only about 2.5 Ph.D.-years' work lies behind each patent. Or, to put it another way, he supposes that Du Pont, for example, had only 15 Ph.D.'s working on polyolefin R and D in 1956. In either case the estimate seems far too low. It seems evident that if polyolefin research is to prove ultimately as profitable as other research has done in the past, the U.S. consumption of polyolefin will probably have to double every year for several years to come.

Polyolefin producers may find themselves in an uncomfortable position. They will each have a product which has cost as much to develop as a unique invention. Unfortunately only the method of manufacture will be unique. In the market, the product will meet intensive competition from materials with similar properties. The profit margins are likely to be as low as those traditionally associated with staple chemicals made by many producers.

This book by Marshall Sittig has much to recommend it. It is an excellent example of technical literature intelligently designed to meet a real and well-defined need.

The blurb accurately describes this book as "the most comprehensive review of U.S. Patents in the polyolefin resin field", but it is not an uncritical work obtained by printing somebody's card index. The author has fully digested his material and written a thoughtful and readable account. He is of course well aware that card indices have their merits and provides handsomely for those who wish to use this book solely for reference. There is a full list of U.S. Patents in order of application. A bibliography of 320 patents is followed by reference to about 40 papers, several of them ephemeral. The subject index covers 15 pages and appears to have been carefully prepared.

The restriction to U.S. Patents is less severe than it might seem because almost all foreign patents of any worth are likely to have their U.S.

(Continued on page 322)

Rise in Polyolefins, Polystyrene Boosts U.K. Plastics Sales

BIG increases in net sales of polyolefins and polystyrene, with a smaller increase for p.v.c., are responsible for the fact that net sales of British made plastics materials reached the new record level in the second quarter of this year of 158,200 tons. This was 10,800 tons up on the previous best quarter—January-March, 1960, 14,000 tons higher than in the second quarter of 1960 and nearly 15,000 tons up on the first quarter of this year.

The improvement in sales seems to be largely due to higher exports and the replacement of imported by home produced materials; U.K. consumption of plastics materials (both home produced and imported in the second quarter of 1961) is estimated to have been only slightly higher than a year ago.

Direct exports of plastics materials in the period April to June, at 46,300 tons, were 4,000 tons, or some 10%, greater than in the same period last year, although a little lower than in the first quarter of this year. Imports totalled 20,300 tons, more than 5,600 tons, or 22%, less than in the same quarter of 1960; imports were a little higher than

in January to March 1961.

Net sales of thermoplastics, at 103,000 tons, were 13,800 tons, or 15%, up on a year ago. Polyolefins and polystyrene were both 27% higher than in the same period of 1960. Net sales of thermosetting materials were virtually the same as a year earlier.

Net Sales of Plastics

	Apr./June 1960	Jan./Mar. 1961	Apr./June 1961
Thermosetting materials:			
Alkyds ...	14.4	11.7	14.6
Aminoplastics ...	15.2	14.2	14.8
Phenolics & cresylics ...	19.3	19.2	19.1
Others (a) ...	5.8	5.7	6.4
Total thermosetting	54.7	50.8	55.0
Thermoplastic materials:			
P.V.C. (b) ...	26.4	27.4	28.6
Polystyrene ...	11.1	12.3	14.1
Polyolefins (c) ...	28.1	28.0	35.7
Others (d) ...	23.8	24.8	24.9
Total Thermoplastic	89.5	92.6	103.3
Total, all plastics materials	144.2	143.4	158.2
Stocks at end of period:			
Thermosetting ...	19.7	20.9	20.7
Thermoplastic ...	56.9	83.5	78.1

(a) Inc. epoxide, resins, casein plastics and unsaturated polyesters.
 (b) Exc. sales of resins.
 (c) Polythene and polypropylene.
 (d) Inc. acrylics, cellulose plastics, polyvinyl acetate, polyamides, p.t.f.e., p.v.c. resins.

1960's Growth Rate for West European Petrochemicals Estimated at 15-20%

THE European petrochemicals industry, which in terms of tonnage of organic chemicals produced, is currently almost doubling itself every two years, will cease to grow as fast as this as the industry's capacity per head of population more nearly approaches that of the U.S.

According to Mr. Julian M. Leonard, managing director of Carless, Leonard and Capel Ltd. and president of the Institute of Resins Petroleum, the extent to which British production of organic chemicals is likely to rise can be judged from the fact that in 1951 chemicals produced per head of population was 50 lb./year, compared with about 140 lb./year in the U.S.

Writing in the August issue of the National Provincial Bank Review, Mr. Leonard says that in the U.S. organics produced from petroleum have become stabilised at about three-quarters of the whole, while in Britain they represent little more than half of the total production of organic chemicals. The change in the proportion in Britain is likely to come about partly by expansion of total production most of which will be based on oil—and partly by the switch from coal to oil for the making of synthesis gas.

Mr. Leonard estimates a growth rate

of between 15 and 20% in the West European market for organic chemicals during the '60's. Since much of this development is being carried out by associates of U.S. firms seeking a place in Europe, it is clear that the position of other plants may be affected by tariff considerations, adds Mr. Leonard.

Polyolefins Resins

(Continued from page 321)

counterpart. Without the restriction the author's considerable task would have become so great that his book would have suffered delay. Indeed he points out that the polyolefin field has been selected by the U.S. Patent Office as a suitable trial ground for the search of claims by computer—so formidable has the quantity of information become.

Sittig restricts himself to solid polymers but otherwise covers everything from the raw materials to the physical properties of the finished product. Chapters are devoted to Process Characteristics, Catalysts, Processes using Non-metallic Catalysts, Processes using Metal-derived Catalysts and Polymer Properties.

Philblack Explore New Activities

THE directors of Philblack Ltd. are currently exploring ways of expanding the scope of the company's activities, states Lieut. Col. C. P. Dawnay, chairman, in his annual report. Until now the company's sole business has been in the production of carbon black and experience has shown that there can be fairly wide variations in demand for that material and that the company's prosperity is vulnerable to fluctuations in the motor industry.

The year ended 31 March was a very successful one says the chairman. He mentions that while the price of feedstock has risen by 30% since 1953, Philblack have been able to cut the selling prices of their main grade of carbon black by nearly 20% over the same period. Pilot plant is to be built at the Avonmouth works for the evaluation of new types of feedstock, research into new carbon blacks, and improvements in efficiency.

It is felt that the large number of new carbon black plants abroad must eventually have some effect on the company's export business.

Expansion for Farnell Carbons

DEVELOPMENTS on the part of Farnell Carbons Ltd. enable U.K. users for the first time to obtain from a British company a range of carbons that is in every way equal to materials previously imported from the Continent, state the company. Farnell Carbons Ltd. of Conduit Road, Plumstead, London S.E.18, who are members of the Forestal Group, will welcome enquiries.

The delay in production referred to in the annual report of Forestal's—and reported in CHEMICAL AGE, 8 July, p. 51—does not concern the factory at Ditton which is now in full production. High-grade carbon is being produced there and sold both in the U.K. and abroad.

The Ditton plant is supplementary to the existing works of Farnell Carbons in London where steam activated carbons are produced. The additional production now means that the company can offer activated carbons for all uses at competitive prices. A key feature of the expansion is the technical service which accompanies the sale of these activated carbons.

Safety in the Plastics Industry

A two-day course on Safety in the plastics industry for supervisors and charge hands will be held on 5 and 6 December 1961 at the Industrial Safety Training Centre in Birmingham. This course was suggested by the Joint Education and Training Committee of the Plastics Institute and the British Plastics Federation. Further details may be obtained from the director, Birmingham and District Industrial Safety Group, 22 Summer Road, Acocks Green, Birmingham 27.

Project News

Japanese Firms to Make Urethane Foam Under I.C.I. Licence

● MANUFACTURING equipment for the production of polyurethane foam has been ordered by the Japanese company, **Kurashiki Spinning Co.**, from **Viking Engineering Co.** of the U.K. The cost of the equipment is \$108,582,000.

Kurashiki are to use I.C.I. technique. It was stated in **CHEMICAL AGE** (22 July 1961, p. 128) that the company was seeking permission to use the I.C.I. polyurethane foam technology, and that they planned to import toluene diisocyanate from I.C.I.

The 100-tonnes-a-month plant will be in production by 1963. It is expected that 80% of the output will be used in the textile industry. The equipment ordered from Viking includes a polyurethane foam block manufacturing plant, table-type and conveyor-type splitting machinery, foam manufacturing machine for testing purposes, etc.

Another Japanese firm is expecting to follow Kurashiki's lead. **Kokoku Chemical Co.** intend to import the same machinery from Viking Engineering Co. They have also obtained I.C.I. permission to use their polyurethane technology.

P.G. to Extend May and Baker Indian Plant

● EXTENSION of the **May and Baker** plant at Bhandup, India, is planned. The contract has been awarded to the **Power-Gas Corporation**, who are building the original plant (see **CHEMICAL AGE**, 17 June, p. 985).

I.C.I. in Agreement on Ti Anodes for Chlorine Production etc.

AN agreement has been reached to pool their appropriate patents and to collaborate on the development and extension of uses of titanium anodes, coated with very fine films of platinum or similar metal by Imperial Chemical Industries Ltd., Magneto-Chimie, NV, Schiedam, Netherlands and Amalgamated Curacao Patents Co., Curacao.

These companies have for some time been separately engaged in developing coated titanium anodes and independently found that potentially they had considerable advantages over more conventional materials in electrolytic cells for chemical production, electroplating and in equipment for converting brine to drinking water. The greatest field is in the production of chlorine by brine electrolysis and many large-scale chlorine producers are evaluating them for this purpose, including the I.C.I. General Chemicals Division, who have carried out tests on such cells for more than a year.

Titanium anodes are also being used for the cathodic protection of ships and structures such as jetties. I.C.I. Metals Division are marketing platinised titanium anodes made by their subsidiary, Marston Excelsior Ltd., Wolverhampton.

Aikman Estimate 7% Rise in World Production and Use of Nitrogen

ESTIMATES of Aikman (London) Ltd. show a world increase both in production and consumption of nitrogen of 7% during 1960-61. World production is given as 13,919,000 tonnes, while consumption was an estimated 13,807,000 tonnes. Production and consumption of nitrogen for industrial purposes is estimated at 2 million tonnes each.

In their half yearly report on the world's nitrogen industry, published in

PRODUCTION AND CONSUMPTION

	1959-60		1960-61	
	Prod.	Con.	Prod.	Con.
W. Europe ...	4,930	3,930	5,100	4,170
N. America ...	3,970	3,750	4,350	4,050
C. & S. America ...	300	434	340	500
Africa ...	35	163	40	210
Australasia ...	22	35	20	37
Middle East ...	70	252	85	280
Asia ...	1,690	2,228	1,824	2,450
E. Europe ...	1,965	1,965	2,160	2,100
	12,982	12,757	13,919	13,807
Less industrial uses ...	1,895	1,895	2,000	2,000
Totals ...	11,087	10,862	11,919	11,807

the July edition of *Nitrogen*, Aikman state that there is still no sign of any improvement in nitrogen export prices and although, as an example, ammonium sulphate averages £10/tonne in bulk f.o.b. and trimmed, some sales, notably to China, have been below this figure. It is surprising, report Aikman, that with world production and consumption so nearly balanced that there should not have been a check of the decline in prices and this trend can mostly be accounted for from nervousness when stocks begin to accumulate above producers' ideas of a satisfactory level. Stocks are now said to be satisfactory and there will be no surplus at the end of the 1960-61 fertiliser year above the normal carry over.

During the current fertiliser year, the Chinese were late in entering the market and did not place orders until the end of November 1960. It is probably for that reason that Chinese buyers were able to purchase at their lowest prices ever—ammonium sulphate at £11/tonne in bags f.o.b. and calcium ammonium nitrate at £10 6s. Total purchases for 1960-61 amounted to 200,000 tonnes of pure nitrogen, against 310,000 in the previous period. Aikman find it surprising that such a low price should have been accepted by European producers who have a virtual monopoly in this market.

Prices in Spain have been well maintained in spite of a continuing anti-dumping duty of 420 pesetas/tonne and the 10-15% *ad valorem* duty. The issue of import licences covered 140,000 tonnes of pure N. Ammonium sulphate prices ranged from \$30 to \$31 a tonne f.o.b.; calcium ammonium nitrate from \$31 to \$33.50 and calcium from \$37 to \$37.50.

Ammonium sulphate was sold at £13 9s 6d/tonne f.o.b. in bags in India, or 9s 6d less than the previous purchasing price. The U.S. sold 36,500 tonnes of urea in Korea at prices ranging to \$124.90, c. and U.S. liner terms, and \$115.17, c. and f. non-U.S. flag; and 18,200 tonnes of ammonium sulphate at \$57.22, c. and f. non-U.S. liner terms, Japan was the only other supplier for 70,500 tonnes of urea at prices ranging from \$91 to \$91.50, c. and f. U.S. liner terms.

In the tender issued by the Sudan Gesira Board, urea was sold by Norway, 8,000 tonnes; Holland, 6,000 tonnes; Germany, 7,000 tonnes; Italy, 3,000 tonnes; and Japan, 8,000 tonnes.

Price Cuts Add to Squeeze on Monsanto Profits, Says Sir Miles Thomas

A MODEST rise in turnover for Monsanto Chemicals Ltd. in the first half of 1960, accompanied by a 37% fall in pre-tax income, did not reflect a substantial rise in the tonnage of production, says Sir Miles Thomas, chairman. A world-wide reduction in prices of many products had its inevitable effect on domestic price levels.

The magnitude of these declines in price overshadowed significant improvements in manufacturing costs and important economies in all items of expense. Sir Miles said it would be apparent that from the lower profits that the trend towards reduced margins, which began to develop in the second half of last year, had been accentuated in the first six months of 1961.

The export percentage has been fully maintained at 35% of sales turnover.

In existing conditions it is more diffi-

cult than ever to forecast the immediate future. "Our constant effort continues to be towards an increase in our productivity and a reduction in our costs," says Sir Miles (see also 'Commercial News', p. 335).

Ambulance Regulations for Chemical Works

DRAFT regulations published by the Ministry of Labour on 22 August require all chemical works to nominate a responsible person to be always available during working hours to summon an ambulance.

The regulations are 'The Draft Blast Furnace and Saw Mills Ambulance (Amendment) Regulations, 1961,' H.M.S.O., 3d.; and 'The Draft Chemical Works Ambulance (Amendment) Regulations, 1961,' H.M.S.O., 2d. net.



★ ANNUAL reports of Italian chemical producers are the most informative in Europe. Montecatini are no exception and their report for 1960 reflects the dynamic expansion policy of the company.

The report is full of news of new projects—in minerals, fertilisers, chemicals, the rare metals (a new field for Montecatini), plastics and fibres. In addition, capacity and production figures are given for a number of products—while most are on the upgrade, it is significant that output of nitrogen fertilisers (in terms of N) was more than halved at 233,735 tonnes, while that of phosphate fertilisers was doubled at 482,999 tonnes and that of complex fertilisers quadrupled at 448,602 tonnes.

I was intrigued at a reference in the report to the fact that "We shall attempt to weld the rings of aliphatic chemistry with those of aromatic chemistry, bearing in mind the availability of benzene, toluene, xylenes and naphthalene which we are going to manufacture as soon as possible by means of our petrochemical activity". (CHEMICAL AGE of 20 May gave first news of Montecatini's intention of making petroleum-based aromatics plus 25,000 tonnes/year of naphthalene.)

★ THE first strike in the Civil Service for 30 years is being planned by junior Government scientists. They are deeply resentful of the wage freeze which they say will deprive them of a pay-rise they have been waiting for since 1957. Assistant Scientific Officers in the Civil Service earn £10 a week at 24.

A group representing more than 5,000 junior grades have voted for a strike in defiance of the Institute of Professional Civil Servants. In 1957, their pay claim went to arbitration. An investigation was ordered to compare their salaries with industry, and the report was made early this year. The rise was expected when Mr. Lloyd announced the wage freeze.

★ BIG problems, both administrative and technical, are being tackled in plans for the construction of two Esso pipelines from Fawley to West London and from Fawley to River Severn. Not least of the problems is the overcoming of hostility from some of the public authorities and private property owners through whose land the pipelines are to run. Engineers, making a close inspection of the course, became as used to cups of tea as to unprintable words, but were always liable to encounter the unexpected. One, for instance, was allowed

by an unwilling farmer to tramp his field without being told that there was a bull in it. However, the current issue of *Esso Magazine* records, the laughter this caused on the engineer's return, seemed to help to establish friendly relations between the two sides.

Taking the two pipelines together, Esso engineers have to cross 19 railways, 164 metalled roads, 60 minor tracks and 70 waterways of various widths. Where the pipeline crosses the Thames, it must be encased in a metal sleeve as an extra safeguard against leakage into the river. But the most complicated and interesting part of the project is the crossing of Southampton Water from Fawley to Hamble, where 6,800 feet of line will be laid 11 ft. below the sea bed. While dredgers are excavating the bed, the entire length of pipeline is to be welded on the Fawley bank and attached to a series of floats. A powerful winch on the Hamble side will drag one end of the assembly roughly into position across the water. Pipes and trench can then be carefully aligned with the help of instruments, and the whole assembly will be lowered into position.

★ THE use of double glazing for heat and sound insulation, although effective, is not without its problems. Ideally, the space between the two panes should be airtight and water vapour-proof, but in practice this is virtually impossible to achieve, and condensation and misting is inevitable.

To prevent the occurrence of misting, Silica Gel, Shaftesbury Avenue, London W.1, have produced a self-contained unit which can easily be replaced when it becomes saturated. The container is made of Vyon, a porous plastic produced by Porous Plastics Ltd., Dagenham Dock, Essex. Vyon is produced from high density polythene of the Zeigler type, is light and flexible and has uniform permeability.

When used as a desiccant container, Vyon tube is filled with the desiccant and sealed at both ends. The complete unit is clipped into position at the base of the window on the frame between the two panes of glass.

★ 'SURVEY of a Chemical Group' is the title of a new book just published by Albright and Wilson Ltd. It is a survey of the Albright and Wilson Group of chemical companies and is "an attempt to give an account of the character and the work of the Group at a specific point in time—mid-1961—rather than to trace its history or speculate

upon its future development".

The Albright and Wilson Group comprises over 30 companies with manufacturing units in eight countries. Illustrated descriptions of some of them including Albright and Wilson (Mfg.), Midland Silicones, Marchon Products, A. Boake Roberts, and the latest member to join, W. J. Bush, are given.

Evident in the book is not only the rapid growth of the group but also its change in character. The capital employed by A. and W. in 1960 (£36 million) was more than four times that of 10 years before; the sales have also quadrupled during the same period—to £42.5 million in 1960.

★ UPRECEDENTED mechanical properties are claimed for aluminium 21% silicon alloys developed by the Ford Scientific Laboratory of Detroit. In addition to high strength (50,000 p.s.i.), the alloys are said to have excellent hardness, impact and anti-friction properties, low densities and lowered thermal expansion coefficients. There is little or no loss in refinement during remelting, superheating or holding at elevated temperatures.

Also from the States comes news that aluminium welding and brazing alloys are now available in 'nuclear grade' certification. This development opens atomic reactor and radiochemical fabrication markets for the welding alloys.

Nuclear grade alloys—produced by All-State Welding Alloys Co. Inc., White Plains, N.Y.—are certified to contain less than a specified amount of certain elements—lithium (0.008% max.), cadmium (0.001% max.), boron (0.001% max.) and cobalt (0.001% max.). Nuclear grade aluminium finds its major application in reactor, tank and pipeline fabrication rather than in nuclear instrumentation.

★ THE home of the future, it seems, will be made entirely of plastics—at least it will if the expectations of an enterprising Rotherham builder are fulfilled. Mr. Howard Parkin has taken out 14 patents to cover a factory-made house which will be delivered to the site in panels, complete with windows. The two panels of the roof would be bonded to the walls by a "chemical process."

The panels consist of a sandwich of fireproofed polyester fibres bonded to a filling of an insulating material. Electric wiring and water pipes would be built into the panels at the factory. The vastly improved insulation would cut down heating costs drastically, it is claimed, and the panels could be fabricated to resemble the appearance of almost any surface.

It looks as though father will have to hose down the house as well as the car on a Sunday afternoon.

Alembic

U.K. FIRM TO MAKE AND SELL LUWA SPRAY DRYERS

TECHNICAL and commercial assets of the spray dryer business of Luwa AG, Zurich, Switzerland, are being taken over by Steel and Co. Ltd., Sunderland, parent member of the Steel Group of companies, and Steel and Co. are to manufacture Luwa spray dryers in the U.K. "in the immediate future."

Design, manufacture and installation of Luwa spray driers will be carried out by Steels Process Plants Ltd., Eastcote, a wholly owned subsidiary of Steel and Co. Swiss engineers will assist the staff of Steels, whose engineers have already undergone training at Luwa's Zurich factory.

Sales and service will not be confined to the home market; the Steel Group will continue to supply and further develop markets already opened for Luwa spray dryers all over the world.

Two test plants—one a spinning disc tower and the other a combined high pressure nozzle and spinning disc tower—are being installed at a research and test laboratory in the Sunderland factory of the Steel Group. The plant, which is equipped with both the spinning disc and pressure nozzle methods of atomisation and arranged alternatively for co-flow and counter-flow of air, permits full scale industrial tests, easy comparisons, the evolution of new drying techniques and the development of new products. The company will permit customers' technicians to operate the plant themselves and to carry out tests and observations in complete privacy.

The Luwa spray dryer is designed either for independent co-current or countercurrent air flow operation. No matter what system is adopted, however, all installations comprise, as essential features:

(1) A device for the production of a spray and the transfer of the feed liquid; (2) the production of hot air for drying and its transfer to the drying tower; (3) the drying tower itself, and (4) removal of the finished product from the tower; removal of the exhaust drying air; and the recovery of the powder carried away in the air stream.

Spinning Disc Method

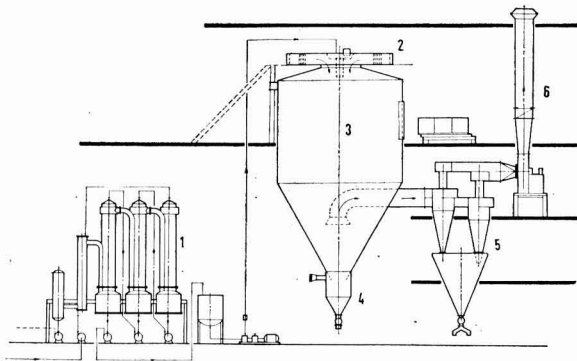
The Luwa spray drying range utilising the spinning disc method of atomisation starts with a laboratory size unit possessing a capacity of 25 lb./hr. of water evaporation. It has a diameter of approximately 9 ft. and is built complete as a small unit ready for despatch. At the other extreme is a unit with a chamber diameter of approximately 23 ft. and a capacity of 3,000 lb./hr. of water evaporation. Nozzle type spray dryers usually cater for considerably larger capacities and units of up to 2-4 tons/hr. water evaporation can be produced.

Luwa spray dryer installations all over the world are currently producing all kinds of foodstuffs, chemicals, pharmaceutical products, soaps and synthetic

detergents. Luwa themselves have carried out trials on over 800 different products.

It may be recalled that, towards the end of last year, Luwa (U.K.) Ltd. was formed with headquarters in London to market Luwa products. Main line offered

by Luwa (U.K.) is the Luwa thin-layer evaporator, used for the concentration of heat-sensitive substances, while a high-vacuum fractionator and self-contained air-conditioning units are also offered. In addition, Luwa (U.K.) act as contractors for the supply of complete plants comprising items of Luwa equipment together with ancillary British-made items. It seems that, while Steel and Co. have taken over the spray dryer business, Luwa (U.K.) are also bound to be associated with them in many spray dryer contracts.



Diagrammatic layout of a Luwa dryer plant for free flowing powder, showing (1) evaporators, (2) air inlet and atomising unit, (3) drying chamber, (4) powder cooler and main outlet, (5) cyclone group and powder bunker and (6) exhaust fan and chimney

U.K.A.E.A. Engineers Build Argon Purifier for Metallurgical Experiments

A PLANT to purify commercial argon, reducing the nitrogen content to less than 50 p.p.m. and the oxygen content to less than 2 p.p.m. has been built and successfully operated at the Atomic Energy Establishment, Harwell, supplying argon to the required specification at a rate of 50 cu. ft./hr. The plant cost £900, and the argon is obtained at a cost of about 1s 8½d/cu. ft.

The gas is used in experiments with uranium at high temperatures, which have to be conducted in an inert atmosphere, and for which argon is the cheapest available atmosphere, but would not be suitable without purification since uranium reacts with oxygen and nitrogen at high temperatures.

The method used for removing the oxygen and nitrogen is to pass the gases over a heated bed of calcium turnings. The plant was intended primarily to supply a furnace chamber which had a capacity of 70 cu. ft. and operated at absolute pressure not exceeding 1 atm.; it would also fulfil the requirements of a number of smaller furnaces operating at pressures up to 30 p.s.i.g.

In the argon purifying plant, impure gas is fed from the supply cylinders at 10 p.s.i.g. through an orifice plate flowmeter to a silica gel drier. It passes then

to one of two purifiers, two purifiers being provided so that a spent charge can be replaced without shutting down the plant. The purified gas passes through a simple dust filter, and a finned copper tube which cools it, before entering the compressor. The compressed gas is further cooled by passing through a copper coil before it enters the storage vessel. A Hersch oxygen meter and a gas discharge tube are provided to monitor the purity of the product. Samples may be withdrawn from the gas as it leaves the purifier, or from the storage tank. Should the stored gas become contaminated, it can be recirculated.

The outer body of the purifier is made from standard 6 in. nominal bore stainless steel tube, 4 ft. long and flanged at both ends. A heating element of nichrome wire, rated at 2.5 kW, is wound on the outside of this tube, from which it is electrically insulated by porcelain beads. The 4.5 kg. of calcium turnings which form the charge are carried in a stainless steel liner, fitted at its lower end with a coarse mesh stainless steel gauze.

A full description of the plant was given by R. F. Clayton and R. H. Phillips in a report, AERE-R3762 issued by the U.K.A.E.A. Research Group and available from H.M.S.O., price 2s 6d.

CONTROLLED CYCLING MAY RAISE EFFICIENCY, CUT PLANT COSTS, FOR MANY PROCESSES

NEW types of distillation and other equipment, with advantages over conventional equipment, may result from a method of operation known as controlled cycling, in which automatic equipment is used to time the period during which material flows in a cyclic process, and/or the amount of material permitted to flow during a cycle or part of a cycle. Advantages claimed for the system include increased efficiency and reduced capital costs.

Experiments carried out in the U.S. have yielded results that look very promising for the application of controlled cycling to plant-scale processes. These results have been summarised by M. R. Cannon and others of the Pennsylvania State University in *Ind. Engg. Chem.*, 1961, 53 (8), 629-634.

The idea of controlled cycling is explained by describing briefly its application to sieve or screen plate distillation column, where the cycle consists of two parts: a vapour flow period and a liquid flow period. A cycle timer and an automatic valve in the vapour line leading to the distillation tower control the time for each period, the general idea being to have operation in the range where the thrust of the rising vapour prevents liquid downflow during the vapour flow period. When the vapour valve closes there is no vapour thrust and liquid flows down the column. Thus, the cycle consists of a

vapour flow period followed by a liquid flow period.

The advantages of controlled cycling in distillation are higher capacity and efficiency, simpler and cheaper plate design (no downcomers are needed), and high flexibility due to a choice of operating conditions dependent on cycle times.

One interesting fact which emerged from experiments with controlled cycling for sieve and screen plate towers is that the maximum rate of phase flow is not dictated by the physical dimensions of the equipment and the properties of the system only, but is also a function of the method of operation employed. Thus, for example, it is believed that the capacity of existing bubble cap plate towers as well as other types can be increased by the use of controlled cycling.

Data are also presented for the performance of packed plate distillation towers with controlled cycling, in which operation it is possible to set the controls to produce maximum tower efficiency or maximum tower capacity, or anywhere in between these limits.

Other fields, besides distillation, in which laboratory experiments have proved controlled cycling effective are liquid-liquid extraction and particle separation. It can also be used to advantage in absorption, filtration and many other processes.

Fresh Water from Sewage Waste by Electrodialysis

RESEARCH on new methods for electrically removing industrial and household pollution from sewage waste water offers promise of effectively doubling the available fresh water supplies in the U.S., according to Ionics, Inc., Cambridge, Mass. The company has received a \$43,000 contract from the U.S. Department of Health, Education and Welfare, Public Health Service, Robert A. Taft Sanitary Engineering Center, to develop novel ion exchange resins and conduct a study of the use of ion exchange membranes in electro-dialysis cells as an advanced method of waste treatment.

Ionics developed and pioneered commercial application of the electro-dialysis process for removal of salts and minerals from brackish well waters and has more than 60 such plants in operation around the world supplying potable water in locations where fresh water was previously unobtainable except by costly transportation over long distances. Using newly developed materials and methods, the same process will be applied to the removal of other types of impurities such as detergents and industrial and household wastes which are not removable by conventional sewage treatment plants.

During the final stages of the research contract programme, a small pilot plant will be constructed to operate on waters obtained from the secondary effluent stream of a municipal sewage treatment plant. Cost estimates can then be prepared for electro-dialysis plants capable of treating 10 million and 100 million gal./day of contaminated waste waters.

Polymer Claim Technical Breakthrough with Monomer-cast Nylon Process

A GENUINE technical breakthrough is what the Polymer Corporation consider their new monomer-cast nylon 6 process to be. The technique was demonstrated recently in the U.S. by the company's officials (*Chem. and Engg. News*, 1961, 39 (33), 58). Monomer casting is simple enough in theory. The caprolactam is melted in a tank under a blanket of an inert gas, mixed with the catalyst and fed into the mould where it polymerises and hardens. The whole process takes place at atmospheric pressure.

In practice, there are many difficulties attached to the technique. Temperature is critical, and time and monomer/catalyst proportions must be carefully controlled. From the casting point of view also, there are problems to be met. Moulds must be non-porous because of the low viscosity of the molten polymer and the sand moulds used for casting metals are not available. Most metals, however, will serve as moulds, as also will glass and ceramics.

Polymer have not revealed details of the process, being particularly reticent about the catalyst. Information they have

issued, however, shows that the pressure at which the process is conducted is atmospheric, the maximum weight of the part that can be produced is unlimited, as is also the maximum thickness, but the process is uneconomical for small parts. The price per lb. of normal ranges is currently \$3 to \$5 and will be \$1.25 to \$2 ultimately. The rate of production is 800 lb. casting an hour.

Polymer are optimistic about the market value of monomer-cast nylon. They have an eye on the industrial outlets for large moulded nylon parts. The company believes that the material will be adding at least \$10 million annually to Polymer's sales in five years.

The original research on monomer-cast nylon was done by Monsanto and is the subject of Canadian patent No. 607,225. The information given in the patent indicates that the polymer is produced under substantially anhydrous conditions and that the catalyst is an alkali or alkaline earth metal. Catalyst concentration ranges between 0.01 and 20 mole, based on ϵ -caprolactam.

Safety Regulations for Construction Work

Workers engaged in site preparation and plant erection on chemical projects will be among those affected by a comprehensive code of safety regulations, covering more than 1 million workers in the construction industry in the U.K., which will come into operation on 1 March 1962. This is the effect of two orders made by the Minister of Labour, Mr. John Hare, which were presented to Parliament on 22 August.

The regulations are designed to provide protection for workers employed both above and below ground in the building and civil engineering industries. They impose requirements for the construction, use and examination of lifting appliances, lifting gear and lifting tackle used for building operations and works of engineering construction.

Rumanian Castor Oil for U.K. Company

A consignment of 1,000 tons of B.S.S. castor oil recently left Constanza for Cookson Oilseeds and Oilseeds Ltd., London. Suppliers were Chimimport, Bucharest.

HOW SURFACTANTS AFFECT HERBICIDES

Significant Modification of Properties Indicated by U.S. Experiments

MINOR changes in the chemical structure or concentration of surfactants may dramatically influence the action of herbicidal sprays.

A single surfactant may increase, decrease, or not affect the action of herbicides, according to studies by plant physiologists L. L. Jansen and W. C. Shaw of the U.S. Department of Agriculture.

For example, one surfactant (an alkylphenol ethylene oxide condensate) was used in a series of herbicidal sprays applied to corn (maize) as test plants. The agent increased the killing action of dalapon sevenfold and trebled amitrole activity, but did not affect 2,4-D and DNBP.

On soya beans, the same surfactant doubled the action of dalapon and amitrole, and trebled the action of 2,4-D and DNBP.

In these experiments, sublethal amounts of herbicides were applied to plants so the comparative effects of surfactants could be measured.

Soaps, detergents, and shampoos are commonly-used surfactants. In agriculture, similar compounds are used as sticking, spreading, and wetting agents.

It is not known definitely why surfactants have such effects as herbicides. But it is known that when surfactants are used at concentrations which have the most influence on a herbicide's activity, there are few changes in sticking, spreading, or wetting abilities.

Slight changes in the chemical structure of a surfactant, however, greatly influence the properties the agent imparts to solutions. Changes occur, for instance, in the solution's ability to conduct electricity and in the relative degree of colloid aggregation (clumping of dispersed, but undissolved substances). Further research is needed to explore the significance of these changes on herbicidal action.

The effectiveness of surfactants used with weedkillers varies, depending on the type and amount of surfactant and herbicide, and the plant the spray mixture is applied to.

The scientists say an increase in the amount of surfactant used in a spray may significantly alter the weedkiller's effectiveness. At a concentration of 0.01% a surfactant usually does not increase herbicidal activity. But at 0.1% the agent might depress activity; at 1% it may significantly enhance activity.

More than 100 surfactants have been studied for their effects on herbicides. Although a few of the agents are slightly toxic to plants, most are normally harmless to plants and animals.

The U.S. scientists believe surfactants

might be used with weedkillers to fit specific crop-weed situations. For instance, an agent mixed with 2,4-D sharply increased the herbicide's activity on mustard without increasing its toxicity to corn (maize) plants and other grasses.

Improper use of a surfactant, however, could destroy a herbicide's selective action, increase injury to desirable plants, or decrease toxicity to weeds. So surfactants should not be added to weed-

killers without knowing their effects on the herbicides used.

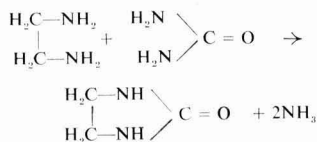
Continuing studies, at the Department of Agriculture's Beltsville Research Centre, are expected to uncover specific information that will indicate specialised uses for surfactant-herbicide combinations for selective weed control in crops.

This research has many implications. If a smaller amount of herbicide with a surfactant controls weeds as efficiently as a greater amount without the surfactant, it may permit lower cost weed control. And herbicide residue hazards might be greatly reduced. Or surfactants might add to a weedkiller's effectiveness in combating weeds unusually difficult to control, without increasing toxic residues on desirable plants.

Russia's DMEU Plant Uses Two-Stage Fully Automatic Process

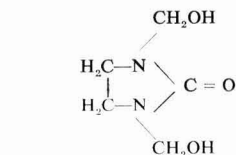
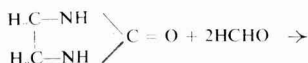
THE expanding use of resin finishes to produce 'easy care' cottons has resulted in the material playing an increasing part in the textiles market. It is believed that in the U.S. cotton supplies 62% of all textile clothing, and crease-resisting resins are used on 1,000 million yards, or 63% of all wash-and-wear materials. In the U.S.S.R., where it is likely that the only resin used for finishing cotton will be dimethylethylene urea supplied from the plant being built by Wycon Services Ltd. (see CHEMICAL AGE, 18 March 1961, p. 449), it is estimated that 400-500 million yards of cotton can be treated annually.

DMEU is produced in a two stage process. The first stage consists of the condensation of ethylene diamine with urea with the formation of ethylene urea and the liberation of ammonia. The plant includes a unit for the recovery of this ammonia.



The excess ethylene diamine is distilled off from the reaction mixture at 250°C and is recycled to the process. The yield of ethylene urea is high.

In the second stage of the process the ethylene urea is condensed with formaldehyde to give DMEU. The reaction temperature of this stage is 60°C and a 50% aqueous solution of DMEU is produced.



The process is a batch one but the whole plant will be controlled from a central panel. Reactions will be added automatically and controlled through a sequence timer.

Fireproof Paper from Trees

MARRIAGE of cellulose from trees with certain man-made polymers like rubber may lead to fireproof paper and major improvements in rayon and cellulose film.

This was suggested by Dr. J. J. Hermans, of State University College of Forestry, Syracuse, in a paper presented to the 18th International Congress of Pure and Applied Chemistry, held in Montreal.

Chemists are now grafting synthetic polymers on to cellulose which has resulted in paper of greater strength as well as a whole variety of new synthetic products.

Still in the experimental stage, researchers must determine different reactions which may result from the union of natural and synthetic material. They expect, according to Dr. Hermans, that better colour reproduction will be obtained, and that paper produced by this grafting method will prove to be fireproof.

The 19th International Congress of Pure and Applied Chemistry will be held in London in 1963.

Montecatini Annual Report Tells of Increasing Output, More Product Development

MORE details of production by Montecatini, Milan, are given by the recently published annual report than in the preliminary report (CHEMICAL AGE, 20 May, p. 804).

Group output of sulphuric acid totalled 1,237,449 tonnes of 100% acid out of a total Italian production of 2,069,000 tonnes. A new acid plant started at Spinetta Marengo last year has been followed by another unit which started production this summer at Porto Empedocle. Construction has also started on plants that will produce sulphuric acid from sulphur recovered from pyrites at Scarlino-Follonica.

The group produced 1,397,783 tonnes of pyrites during 1960. Pyrites extracted from the Maremma mines for use at Scarlino-Follonica will by a series of new, patented original processes, be used for iron ore "which will be compatible with the best in the world". By-product sulphur will be recovered in the form of monohydrate sulphuric acid in modern, high-capacity plants. Acid make will replace material now being produced in plants which are becoming technically obsolete.

Italian sulphur production dropped from about 122,000 tonnes in 1959 to 30,000 tonnes last year—Montecatini estimate world sulphur production at more than 9 million tonnes. The group production was lowered from 33,844 tonnes to 17,845 tonnes; ore output totalled 154,347 tonnes, mostly coming from Sicily.

MONTECATINI OUTPUT IN 1960

	1959	1959
	Tonnes	Tonnes
Pyrites	1,363,605	1,397,783
Crude sulphur and low-grade ore (reduced to 5)	64,229	49,667
Phosphate fertilisers (P ₂ O ₅)	210,289	482,999
Nitrogen fertilisers (N)	479,412	233,735
Complex fertilisers (plant nutrients)	101,246	448,602
Copper sulphate and Aspor	68,656	82,204
Sulphuric acid (100% acid)	1,116,192	1,237,449
Alcohols	53,274	68,286
Aldehydes	56,249	74,235
Resins	103,520	134,988
Artificial and synthetic fibres	16,740	20,843
Dyestuffs and intermediates	60,089	60,463

From the German firm of potash ore producers, Montecatini have acquired interests in Soc. Salsi, Sicily; the Edison Group also participate in the same company. Capacity of the Prestavel (Trento) fluorspar mine is being increased by the building of a new plant for enrichment by flotation.

Montecatini production of nitrogen fertilisers in 1960 totalled more than 233,000 tonnes (pure N) compared with Italian production of 551,000 tonnes. The report states that the company cannot understand why, or by what reasoning on the part of certain authorities and 'pressure groups', it is still maintained that the industry must be forced to sell its products at prices lower than those of producers in Germany, Britain,

France, Holland, Norway, etc. But Montecatini will continue to do everything possible to keep up their production facilities in line with modern technology.

When the present programme of modernising plants for complex fertilisers is completed, the group will be producing these materials in every grade of concentration at works at Porto Marghera, Porto Empedocle, Vercelli, Barletta, Orbetello, Castelguelfo, Montemarciano, Legnago and Crotona.

Dealing with chemicals, the report states that fluorine derivatives occupy "our full attention". As other companies follow well-known paths, thus increasing the uncertainties of the market, Montecatini are directing these activities to "different products derived from fluorine which appear of especial interest."

May and Baker Develop New Method of Preparing Volumetric Solution

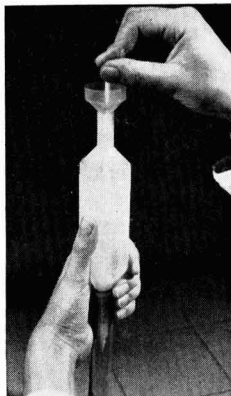
AN improved method of preparing a volumetric solution from a standard concentrate, by which there is no danger of losing material during handling, has been developed by May and Baker Ltd.

The standard is contained in a plastics ampoule which, when a solution is to be prepared, is placed in the neck of the volumetric flask and a funnel, provided in the kit, is placed over the upper stem of the ampoule. The upper and lower diaphragms of the ampoule are broken in one movement with a plastics piercing rod (also provided). The tapered end of the rod together with the seating of the lower stem of the ampoule forms a valve so that the ampoule can be completely filled with distilled water for

washing—the only satisfactory way of washing water-repelling plastics. A second rinse removes all traces of the concentrate, and the solution in the volumetric flask can then be made up to the graduated mark. The ampoule remains in the same position throughout the procedure.

Produced under the name Volucon, each ampoule contains sufficient concentrate to make one litre of standard solution. The Volucon range at present includes N/10, and in some cases N/1, solutions of 15 common chemicals. Among these are hydrochloric and sulphuric acids, sodium and potassium hydroxides, sodium carbonate, oxalic acid, sodium thiosulphate and potassium bromide. May and Baker expect to make further additions shortly.

The Volucon range is sold in packs of six ampoules, together with a plastics funnel and piercing rod and six labels.



Plastics ampoule in position showing the funnel and piercing rod

Oil-extended Isoprene Rubber from Shell

AN oil-extended version of Cariflex isoprene rubber has been introduced to the U.K. by Shell Chemical Co. Ltd. Known as Cariflex I-500, this product is a high molecular weight *cis* 1:4 polyisoprene extended with 25phr of a non-staining naphthenic oil.

Cariflex I-500 will be supplied in 65-lb. bales at 23.5d/lb. ex store or 23.75d/lb. delivered.

The straight Cariflex isoprene rubber already on the U.K. market and priced at 26.5d/lb ex store or 26.75d/lb. delivered will now be known at Cariflex I-300 to distinguish it from the oil-extended type.

Overseas News

HOUDRY DETOL UNIT GOES ON STREAM AT CROWN CENTRAL PETROLEUM

A HOUDRY Detol plant with a design capacity of 17 million gall./year of benzene has gone on stream at the Crown Central Petroleum Corporation's refinery near Houston, Texas.

This new unit is producing the expected high yields of better than nitration grade benzene, by the hydrodealkylation of toluene.

Process engineering of the Crown Central plant was provided by Houdry Process Corporation. Detailed engineering and construction was handled by Catalytic Construction Company. Catalytic completed construction of the Detol unit within five months of the date that they initiated their engineering work.

The Detol process produces benzene by dealkylating toluene, xylenes, mixtures of the two, or alkyl benzene concentrates, all at close to theoretical yields. If the charge stock contains minor quantities of non-aromatics, such as paraffins or olefins, they are converted to light hydrocarbons.

In addition to providing for an unusually high benzene yield, the process is easy to control and relatively inexpensive to operate.

The Crown Central plant was the third Houdry-licensed unit to begin operations within recent weeks.

Ethylene Oxide Plant for Germany

Elektrochemische Fabrik Kempen GmbH, a joint subsidiary of the Deutsche Erdöl-AG oil company of Hamburg and the Rheinpreussen AG für Bergbau und Chemie, have erected a new plant at Kempen, West Germany, for the production of ethylene oxide-based chemicals including nonylphenol polyglycol ether and alkyl polyglycol ether, which will be distributed under the Merpoxen trade name.

India Steps Up Plastics Projects

Union Carbide India Ltd., Indian subsidiary of Union Carbide, U.S., are considering an expansion of the plant which has just opened at Trombay, in Bombay State, for the production of some 15 million lb./year of polythene. The Trombay plant, the second of its kind in India, cost some £3,350,000 to bring on stream; the expansion already planned would need a further sum of about £7.7 million. A further polythene plant is to be erected in Assam and plans for a fourth unit, possibly in southern India, have been approved by the Government.

Other Indian advances in the plastics field include the opening at Kilchands of a polystyrene unit, approval for the erection of three further such plants, 10 or 11

polyvinyl plastics plants, of two for nylon production and of one for polyesters. By 1971 it is estimated that India will be independent of plastics imports.

Biggest-ever Solid Fuel Rocket Motor Claimed

Aeromet General Corporation of the U.S. have test-fired the largest-ever solid fuel rocket motor capable of developing a thrust of more than 500,000 lb. Aerojet are seeking an official contract for the supply of booster rockets in the programme to land astronauts on the moon.

Czech Development of Silicone Rubber

Czechoslovakia's first silicone rubber has now been developed, it is stated from Prague. The synthetic rubber type was the result of work at the Research Institute for Macromolecular Chemistry in Brno.

Edison's Mounting Production of Chlorine

Production of chlorine by the Italian Edison Group has increased rapidly since 1951 when they installed their first De Nora type plant at Porto Marghera. In 1957 another De Nora plant was installed at their Mantua works and in 1958 a third plant went on stream at Priolo.

The group's output of chlorine has totalled the following approximate figures: 1953 20,000 tonnes; 1956 40,000 tonnes; 1957 60,000 tonnes; 1958 80,000 tonnes; 1959 120,000 tonnes; 1960 155,000 tonnes; 1961 (estimated) 160,000 tonnes.

More Soda from Mexico

During last year a total of 65,888 tonnes of soda was produced in Mexico, or almost 27% more than in 1959. National soda consumption is of some 90,000 annual tonnes. Soda imports, mainly from the U.S., fell over the year by 34.6%.

U.S.-French Agreement on Manganese

A technical information exchange agreement relating to manganese metal has been executed by American Potash and Chemical Corporation, Los Angeles, and the new French company, Les Metaux Pura Péchiney-Outreau M.P.O. As reported in C.A., 19 August, p. 270, Péchiney-Outreau, owned in equal shares by the French chemical company Péchiney and Les Acieries de Paris et d'Outreau, Europe's largest ferro-manganese concern, was formed to produce electrolytic manganese metal in a new

3,000 tons per year plant to be built near Boulogne sur Mer, France.

American Potash have a 5,000 tons per year, \$5 million electrolytic manganese metal plant under construction at Aberdeen, Mississippi, which will go on stream early in the first quarter of 1962.

Big Helium Contract Placed in U.S.

The U.S. Bureau of Mines has been authorised by Congress to enter into long-term helium purchase contracts aggregating not more than \$47.5 million during the fiscal year. Of this, \$9.5 million had already been obligated in a contract awarded to Northern Natural Gas Co. Cities Service Co. have also signed a contract for the construction of one of the largest helium extraction plants ever designed in the U.S. It will have a capacity to deliver 2 million cu. ft./day of helium.

Egyptian Chemical Import Control

The Egyptian Government has now placed the import of chemicals in the hands of State trading organisations. These are as follows: Société Générale des Médicaments, 26 Sharia Chérif Pacha, Immobiles Building, Cairo, for chemicals, tanning media and paints; Organisme Supérieur des Médicaments, 56 Sharia Guiza, Cairo, for pharmaceuticals and medicine; Organisme Général de Pétrole, 28 Sharia Soliman Pacha, Cairo, for mineral oil products; and Société Misr pour le Commerce Extérieur (Misr Foreign Trade Co.), 7/9 Soliman Pacha Street, Cairo, for fertilisers.

Canadian Firm to Treble Potash Output

International Minerals and Chemical Corporation Canada Ltd. of Esterhazy, Sask., plan a \$10 million expansion of production facilities at their potash mining project near this Eastern Saskatchewan town. The expansion programme, when completed, will boost surface plant output potential to 1,200,000 tons of potash product annually from the present 420,000 tons.

The expansion will bring the firm's total investment in the project to about \$40 million. Shaft sinking operations are continuing at the site and initial production of potash is expected by early summer of 1962. Kilbourne Engineering Ltd. of Toronto will design and engineer the plant addition.

Market studies indicate that Esterhazy mine will come into production at a time when demand for agricultural potash will be rising at an annual average rate of 6.5%. The Esterhazy shaft will open up the world's largest known deposits of high grade potash ore.

U.S. Silca Gel is Used to Dry Flowers

A silica gel product specifically formulated for use in drying flowers so that they retain their fresh appearance for several months, has been

introduced by the Davison Chemical Division of W. R. Grace and Co., New York. Flowers are buried in the silica gel for about a week, then carefully removed. They have been found to be indistinguishable visually from fresh flowers, with original colours unchanged.

Flower-Dri is a blend of white desiccant gel and Tel-Tale indicating gel. Incorporating blue particles, it changes to white when saturated, thus indicating the need for reactivation in an oven to the original appearance.

A marketing arrangement has been set up with Plantabbs Corporation of Baltimore and distribution begun by the latter to florists, garden supply houses and other outlets. A promotional campaign has been developed concurrently.

Older methods of drying flowers include burying in borax, borax and cornmeal, sand, and hanging in a dry place.

Rumanian Exports of Chlorine and Hydrochloric Acid

A number of contracts have been signed with State import houses in the U.S.S.R., East Germany, Poland and Hungary, as well as with West German firms for the supply of Rumanian chlorine and hydrochloric acid, states Chimimport, Bucharest. Involved are 12,000 tonnes of chlorine and some 7,000 tonnes of HCl.

Caltex-Hoechst Agreement on Petrochemical Feedstocks

Details have been announced of an agreement made between Farbwerke Hoechst AG, Frankfurt-on-Main, West Germany, and Caltex Oil (Germany) GmbH, of Hanover, a subsidiary of the California Texas Oil Corporation, U.S., under which Caltex will supply Hoechst with ethylene, propylene, refinery gas and fuel oil from its planned refinery at Kelsterbach, West Germany. Erection of the refinery is to begin soon and start of production is planned for the end of 1963.

Communist-bloc Claims Parity with West by 1975

According to current claims, the Communist-dominated countries of the world, with the exception of China, will by 1975 have reached the production level of the western world for 1960 for chemical and synthetic fibres, plastics materials and synthetic fertilisers. The 1960 level will be in some cases passed by this year, it is stated. By 1965 the Communist-bloc countries hope to reach the 1958 production level of France or the U.K. in respect of synthetic fibres, rubber and plastics materials.

U.S. Firms Cut Phthalic Anhydride Price

A general cut in the price of phthalic anhydride and plasticisers is taking place in the U.S. due to the recent build up of phthalic anhydride capacity. American Cyanamid took the lead with a cut of 2 cents a lb. in the price of phthalic. This makes present prices 17½ cents a lb. for molten bulk material and 18 cents for flake in bags. Monsanto and Reichhold are following Cyanamid's

lead. Cuts in the price of phthalic plasticisers of 1 cent per lb. in general have been announced by Monsanto and Union Carbide. It is expected that other phthalic anhydride and plasticiser producers will follow suite.

Italian Sulphur Industry

During the period from the beginning of July 1960 to the end of May 1961, 84,025 tonnes of sulphur were sold in Italy and 48,643 tonnes were exported. During the whole period a total of 134,541 tonnes were marketed or about 24% less than during the previous operational year (173,984).

Eli Lilly in Germany and France

Eli Lilly and Co., U.S. pharmaceutical producers, have announced plans for the building in Giessen, West Germany, of plant to take up production during the course of next year. Further, the company plans to form a French subsidiary in the near future. Lilly are already building a plant in Italy and planning another one in Venezuela.

More Pinanhydroperoxide from Hoechst

The pinanhydroperoxide plant at Gersthofen, West Germany, of Farbwerke Hoechst AG is to be "considerably extended". The capacity expansion resulting is intended to meet increased demand for the compound as an activator in cold rubber production.

Expansion of Fertiliser Production in Sicily

Sincat's fertiliser plants in Sicily are being expanded to a capacity of 800,000 tonnes a year. The markets of the company are widening and recent shipments included 4,500 tonnes of potassium sulphate for Formosa.

Falling Canadian Output of Hydrochloric and Sulphuric

Production of chemicals in Canada in the first half of 1961 included the following: hydrochloric acid, 17,984,256 lb. (23,731,956 in the first six months of

1960); sulphuric acid, 825,493 tons (897,960); ammonium sulphate, 156,221 tons (157,652); chlorine 167,536 tons (158,124); compound fertilisers 504,361 tons (486,321), formaldehyde 33,444,505 lb. (29,019,446) and sodium hydroxide, 200,047 tons (185,212).

Shipments of polystyrene in the half year amounted to 27,116,768 lb. (29,267,749).

New Reichhold Firm Will Make Resin in India

A new firm to be formed by Reichhold and Simpson and Co.—Reichhold Chemicals India Private—is to build a plant for the production of phenolic, polyester, melamine, epoxy and other synthetic resins. The plant will be sited at Madras, and the Indian Government has granted the new company a licence to produce 1,500 tons of resin a year.

Coal Chemicals Production for South Vietnam ?

A scheme is reported to be under consideration under which a chemical production centre would be set up in South Vietnam. The project is expected to be concerned mainly with coal chemicals, as it is to be carried out in the country's Nong Son coalfields. Aid in the project will come from Federal Germany and probably other sources.

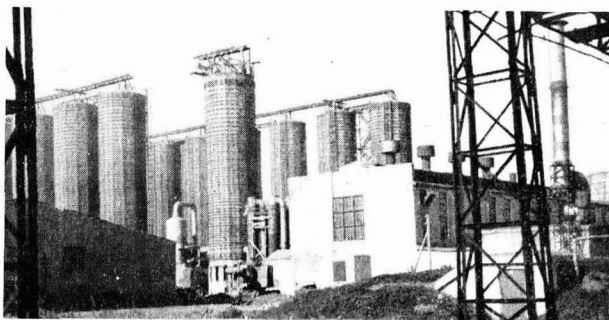
Chemical from Palm Tree Wood

The Institute of Paper Chemistry, of Appleton, Wisconsin, U.S., has developed a process enabling the production of p-hydroxy-benzoic acid by alkaline hydrolysis of the wood of a particular palm-tree native to the United States.

Monsanto to Build Triplephosphate Plant

Construction will start early in 1962 on a phosphoric acid and a sodium triple-phosphate plant for Monsanto. The location selected is a 100-acre site near Augusta, Ga. The plant, expected to be completed early in 1963, will be the fifth Monsanto unit making phosphates for detergents.

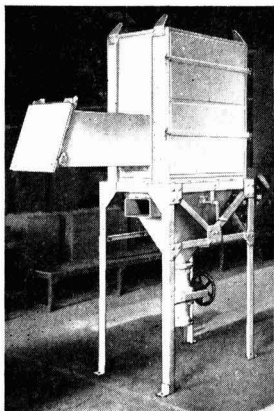
Stalinogorsk Chemical Plant



View of part of the large chemical complex at Stalinogorsk, U.S.S.R.

**SPECIAL
DUST
COLLECTORS**

UNUSUAL features are incorporated in Dal-low Lambert Unimaster dust collectors designed to handle Delapon material which, in addition to posing a possible explosion hazard, tends to arch when in a repose position in the hopper. To offset the former, the inspection doors are strengthened and firmly anchored by hand screws and an extended explosion relief duct is fitted to be taken through



Unimaster dust collector

an adjacent wall, the hinged relief door being fitted with a limit switch which automatically trips the fan motor if it is open, thereby safeguarding against further entrainment of dust and a possible secondary explosion.

To overcome the arching properties of the material a hand operated cranked lever is fitted in the top of the hopper, and the collected dust is discharged downwards back into the system by means of a 6 in. dia. rubber tube pinch valve which has the advantage of offering a very smooth surface for the passage of material.

This modified type of collector is one of several designed and manufactured by **Dallow Lambert Ltd.**, Thurmaston, Leicester, for Lankro Chemicals Ltd.

**DIESEL-
ELECTRIC
AQUAFLASH**

CLAIMED to be the first diesel-electric flash distillation plant ever to be made commercially available is that developed by **Buckley and Taylor Ltd.**, Castle Iron Works, Oldham, a member of the Brightside Group of companies. It is the latest addition to the company's range of Aquaflash plants, has a rated output of 10 tons/day and is operated by a diesel alternator. The unit comprises two portable sections, one comprising the flash distillation unit with its pumps and other ancillary equipment, and the other, the diesel generator. If desired, the Aquaflash can be coupled directly to existing electricity supplies and the diesel alternator dispensed with, the electric input section of the Aquaflash being modified to suit.

UNUSUAL features are incorporated in Dal-low Lambert Unimaster dust collectors designed to handle Delapon material which, in addition to posing a possible explosion hazard, tends to arch when in a repose position in the hopper. To offset the former, the inspection doors are strengthened and firmly anchored by hand screws and an extended explosion relief duct is fitted to be taken through

EQUIPMENT NEWS

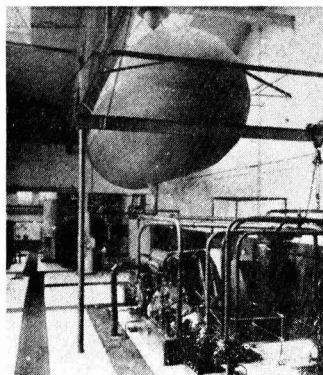
Chemical Plant : Laboratory Equipment : Handling and Control Instruments

In the diesel-electric Aquaflash, impure water is circulated in series through the tubside of four vapour condensers, its temperature being progressively raised. After leaving the highest temperature vapour condenser, the water passes through the tubside of the diesel engine jacket cooler where its temperature is further increased. More heat is added in an electric immersion heater vessel before the water is introduced to the train of flash chambers, arranged in series and with progressively reduced sub-atmospheric pressures. The feed water flashes into steam in these four chambers and, in condensing in the associated vapour condensers, serves to provide heat to the incoming feed. The condensate is withdrawn from the plant by an extraction pump which discharges it to suitable storage tanks.

**BALLOONS
FOR GAS
STORAGE**

MANY undertakings are constant consumers or producers of gases and have to arrange for some sort of gas storage; this often takes the form of costly installations covering a large area. The West German firm, **Ballonfabrik Augsburg, vorm. A. Riedinger**, Austrasse 35, Augsburg, has developed balloons for the storing of industrial gases that are adaptable to available room facilities and specific uses. These gas storage balloons can usually be positioned by simple means close to the consumption of production site; as they can easily be hung under a factory ceiling, either floating freely or in a simple frame, they need no costly floorspace. They are, further, easy to transport since they can be folded up to very small dimensions when not in use.

The balloons are made of a special



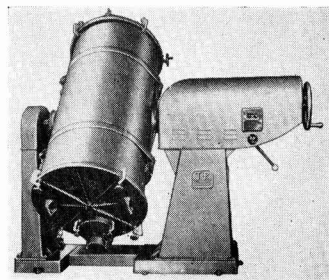
Gas storage balloon of 30 cu. m. capacity installed above a gas producing plant

fabric, the inner rubber lining of which may be adapted to fit the gas to be contained. Working pressure is normally of 100 mm. WS, but may be brought up to 200 mm. WS or more according to the form and size of the balloon.

**RAPID
POWDER
BLENDERS**

BLENDING time has been cut by as much as 97% in one application of the T.P. blender, which handles powders, chemicals, flakes or crystals. Agglomeration is eliminated and there is the added advantage of being able to reduce particle size, state the manufacturers, **T.P. Chemical Engineering Co. Ltd.**, 5 Thornhill Road, Croydon, Surrey.

The system is simple in principle, being based on the use of scoops in the



T.P. powder blender

centre of each cover plate which, in operation, pick up a predetermined volume of aggregate from the centre of the moving mass, distributing it evenly to the periphery, twice during each revolution.

The range covers working capacities of 0.2-80 cu. ft.; vessels are available in various materials.

**DOUBLE
SEAL BALL
VALVE**

In the J.S.L. Double Seal ball valve the rotating member is a sphere located between two non-metallic seats of carefully engineered section. These seats are available in a variety of materials, such as p.t.f.e., Buna-N, neoprene, nylon, etc., to suit particular service conditions. The basic conception is the employment of a seal with a flexible lip which is deflected on assembly to create an initial sealing force independent of line pressure.

Careful attention is paid to the physical dimensions of the lip so that, as the ball is rotated, the lip follows the contour of the radiused port-way, thus ensuring full support throughout the 90° rotation.

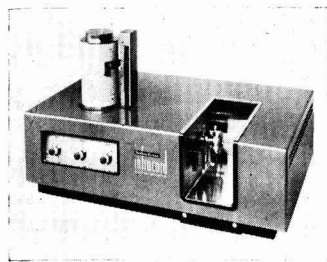
As line pressure is applied, the lip is pushed into more intimate contact with the ball surface and the structural design of the seat ensures that no extrusion occurs.

The ball valve will be manufactured and marketed by **Jamesbury-Serck Ltd.**, Eastern Avenue, Gloucester, formed by Serck Ltd., Birmingham, and the Jamesbury Corporation of Worcester, Mass., U.S.

RAPID INFRARED ANALYSIS

being produced by **Perkin-Elmer Ltd.**, Beaconsfield, Bucks. The instrument gives an automatic record of an infrared

AN improved version of the Infracord spectrophotometer, the Model 137, is now



Infracord spectrophotometer

spectrum from 2.5 to 15 μ and the standard time of 12 min. for a complete spectrum has been carefully chosen to allow accurate quantitative measurements to be made. The new two-speed drive preserves this scanning speed but also allows fast survey spectra to be run in 3 min. These rapid scans can be used except where the highest accuracy is needed.

A new slit system has been incorporated, giving improved resolution, especially at short wavelengths, and in addition the slit programme may be set at a number of different levels. The narrowest programme is used where the highest resolution is required, while wider programmes allow a considerable improvement in quantitative accuracy.

The changes have also allowed a redesign of the front panel. The instrument is simply operated by three control knobs on the front panel. The mains switch and two setting-up controls are located in a small panel at the side of the instrument.

P.V.C. EFFLUENT PIPE

disposal system of **T. B. Ford Ltd.**, blotting paper and filtration media manufacturers of High Wycombe, Bucks, where previously effluent had been carried from the factory in a series of wooden troughs. Geon p.v.c. was chosen as a material that was better in appearance, easy to install, and could be used out-of-doors without the need of continual maintenance.

The combination of strength and

PIPE of Geon high-impact p.v.c. was chosen for the modernised effluent

light weight also proved advantageous, especially as at one stage the system passes over a stretch of water several yards broad and it was essential to use a material that could cross this gap without the support of elaborate bridging.

The pipe carries waste containing dilute chemicals and, in addition, those parts of the system which are indoors function in an extremely damp atmosphere, so that the corrosion-resistant properties of Geon p.v.c. also proved valuable. In all, some 800 ft. of 15 in. diam. pipe have been installed.

The pipe was manufactured by **Extrudex Ltd.**, Western Road, Bracknell, Berks, using p.v.c. material supplied by British Geon Ltd., Devonshire House, Piccadilly, London W.1.

FLAME SAFEGUARD UNIT

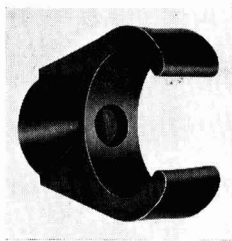
announced by **Honeywell Controls Ltd.**, Greenford, Middlesex. A self-checking circuit disconnects the flame rod and checks all components every second. Such checking has hitherto been incorporated in combustion safeguards during start-up or re-cycling only. The new type, known as the R 4075 Protectoglo, will cause immediate shut down and sound an alarm if the sensing signal, amplifier or related circuitry fails at any time while burners are operating.

FLAME safeguard unit that checks its own complete circuit once every second is

PLASTICS PIPE CLIPS

they are called, are designed primarily

SNAP action plastics pipe clips, made from Propathene (I.C.I.'s polypropylene) are



Maclow pipe clip

for plastics pipes in sizes $\frac{1}{2}$ -2 in. but they can also be used for pipes made in other materials. They provide a speedy, simple and sturdy fixing with one screw only, the tube being snapped into position and firmly gripped.

Maclow clips are specially suitable for situations where corrosion resistance or electrical insulation are required. They are immune to electrolytic action.

ALL-P.T.F.E. PUMP AND COUPLER

pump with all working parts in p.t.f.e.,

PARTICULARLY suitable for corrosive fluids or liquid foods is a self-priming diaphragm

the parts being housed in a cast aluminium body which is bolted directly to a capacitor-run A.C. geared motor. The motor gearbox provides a 7:1 step-down to give a diaphragm reciprocation speed of 200 cycles/min. Life of the diaphragm is stated to be more than 1,000 hours.

Pump delivery at a 1-ft. head is 2 litres/min., and at the maximum working head of 15 ft. is 1.25 litres/min. Power consumption is 50 w. Overall dimensions of motor and pump: length 10 in., width 5 in., height 5 in. Three models are available, to operate from 100/110, 200/220 and 230/250 v. 50 cp. A.C. supplies.

Inlet and outlet ports of the pump are supplied 'belled' to accept a new $\frac{3}{8}$ in. p.t.f.e. pipe coupling produced by the same makers. The coupler is a spring-loaded telescopic unit which expands to grip the tubing inserted at each of its ends. It enables p.t.f.e. tubing to be joined so that only p.t.f.e. is exposed to fluids travelling in the tubes.

The coupler, when used with tubing whose ends have been 'belled', causes no restriction in the flow system and is capable of withstanding pressures up to 50 p.s.i., even at elevated temperatures (e.g. 100°C). It is made in five sizes from $\frac{1}{8}$ in. dia. to $\frac{3}{4}$ in. in $\frac{1}{8}$ in. steps. A simple tool for 'belling' the ends of the pipes is available.

Both p.t.f.e. pump and coupler are made and marketed by the fluorocarbons section of **A.E.I. Radio and Electronic Components Division**, 155 Charing Cross Road, London W.C.2.

COMPACT THICKENER UNIT

thickener unit produced by **Chemical Equipment Engineering Ltd.**, Macclesfield, Ches.

COMPACTNESS and greater efficiency are two features claimed for a 30 ft. dia.

One such unit has been installed at the new Bedford plant of Texas Instruments Ltd., one of the largest manufacturers of semi-conductors in the U.K., where the thickener is used on the neutralised stage of the effluent disposal system. Before neutralisation the effluent produced is extremely complex and contains a very wide range of corrosive chemicals. After neutralisation the effluents produce a large amount of suspended solids in a liquid which is then fed to the thickener at approximately 2% solids concentration.

The thickener uses machine-cut involute/helicoidal worm gears, with which the tooth loading is much higher than the usual loading on large cast wheels and this has the advantage of allowing the use of more compact worm wheels running in a totally enclosed oil bath. The resultant unit, therefore, is very silent in operation and needs hardly any maintenance attention apart from the usual greasing and oiling routine.

The vertical position of the rakes controls the final sludge concentration and in this unit the rakes can be raised a total of 18 in. and stopped at any intermediate position. An audible warning operates electrically from the loading of

the main drive motor. This allows the process operator to press the switch which starts the rakes lifting motor. An automatic limit switch in the top and bottom position prevents over-running. In the absence of the operator and non-starting of the lifting motor the main drive motor would cut out automatically.

The manufacturers of this unit are now designing a completely automatic lifting system which is controlled by the main motor loading by a simple relay system controlled by the motor amperage. The sludge is delivered by the rakes to the bottom of the sump and is then pumped away, but the sludge is prevented from entering the bottom bearing of the main shaft by a drywell construction, and this allows the bottom bearing to be grease lubricated without contamination with sludge. This unit has also been designed so that it can be partially dismantled for ease of shipment and at the same time it can be easily assembled with the minimum of skilled supervision.

Ti CONTACT PARTS FOR CENTRIFUGE

DEVELOPMENT work on a Super-D-Canter with contact parts of titanium has been completed by the metallurgical division of **Sharples Centrifuges Ltd.**, Tower Works, Doman Road, Camberley, Surrey, the Super-D-Canter being a horizontal solid bowl scroll discharge centrifuge. The titanium version is similar in appearance and general specification to the standard P-600 model.

This new model is now available as a production unit and Sharples state that it will be suitable for a whole range of new applications where hitherto there has been no suitable material of construction.

SIMPLIFIED MOISTURE MEASUREMENT

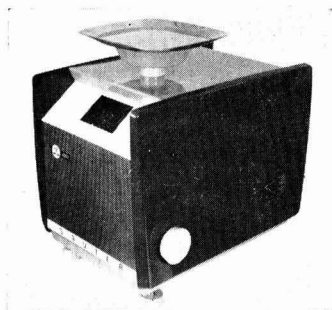
SIMPLIFIED operation is the novel feature of the new Varsity moisture meter, which has only a single control knob. Large samples of up to 2,000 c.c. can be tested and when any material is placed in the removable container of the instrument the amount of moisture is immediately indicated on the meter dial.

The instrument uses the capacitance method as an indication of moisture, operating at the high frequency of 100 megacycles/sec. to ensure accuracy. Any number of meters can be standardised to read alike and the dial is adjustable to cover any change of moisture by means of the single control knob. This has a new type of 10 turn indicator which can be read to better than one part in a thousand.

Makers are **Shaw Moisture Meters**, Rawson Road, Westgate, Bradford.

SELF-LEVELLING PRECISION BALANCE

A SPECIAL out-of-level device which obviates the need for critical levelling is a feature of the **Sauter Top-Pan**—a single-pan balance designed on the substitution weighing principle, providing constant sensitivity. The large, interchangeable load pan, available in chromium-plated



Sauter Top-Pan balance

brass or in stainless steel, is freely accessible, being mounted on the top of the instrument, while clear, illuminated scales at back and front of the instrument facilitate checking by a second operator. The balance incorporates near-instantaneous magnetic damping for really rapid operation.

Makers: **Shandon Scientific Co. Ltd.**, 6 Cromwell Place, London S.W.7.

FINE TUBES FOR GAS CHROMATOGRAPHY

TUBING for gas chromatography is available in Maranyl nylon in any required length up to 1,000 ft. Usual bore sizes are .010, .020, .030, and .040 in. Makers are **Portland Plastics Ltd.**, 197 Knightsbridge, London S.W.7.

The same company also supply p.v.c. laboratory tubing a highly elastic tubing available in five opaque colours; red, yellow, blue, green and black. It is available in any required length, with bore diameters from .062-375 in. A further product is non-toxic transparent vinyl tubing, suitable, for example, for use in pharmaceutical laboratories.

LABELLING WITHOUT LABELS

MARKING of bottles and other containers, eliminating stick-on labels, is among the applications of the **Weber Tab-on** and

Continu-matic stencils, marketed by **Fanfold Ltd.**, Bridport Road, London N.18. These stencils can be used with quick-drying inks to mark metal, glass, plastic, rubber and other non-porous substances.

The stencils are cut by typewriter, ball-point pen or pencil and slipped into a small hand printer which contains its own ink reservoir. With a smooth, easy, one-hand movement, the objects to be marked are 'touch-stencilled' with a clear and permanent print. Some 3,000-5,000 prints can be made before the ink reservoir requires re-filling. Stencils are available pre-cut with static information, variable information being added before use.

Weber stencils can also be used for addressing, eliminating labels completely by touch-stencilling addresses direct on to the containers.

Obituary

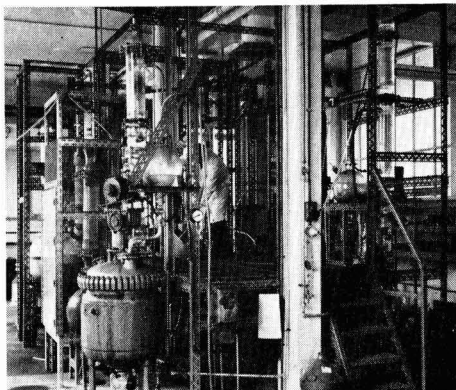
Mr. William Smith, who had been associated with James Crean and Son Ltd., oil refiners and margarine and compound manufacturers, Liverpool and Leigh, for 53 years, has died. He was managing director until his retirement twelve months ago. Mr. Smith had also been president of the Seed Oil Cake and General Produce Association and hon. treasurer of the Association of Manufacturers of Shortening Compounds.

Wills

Professor William Astbury, one of the world's leading authorities on synthetic fibres, and Professor of Biomolecular Structure at Leeds University, left £7,720 net (duty paid £225).

Mr. William Ernest Neal, of 1 Kingsgate, Bridlington, Yorks, managing director of W. Neal and Son Ltd., furnishes, who died on April 22 last, left £17,372 15s 0d gross, £6,598 17s 0d net value. (Duty paid £221.)

Dexion for Welwyn Pilot Plant



In a chemical-producing pilot plant at the Welwyn premises of **Carnegies Ltd.**, pharmaceutical and fine chemical manufacturers, flexibility is ensured by the use of **Dexion slotted angle**. When work has been finished on one product, the material can be unbolted quite simply and the design of the pilot plant altered

● **Mr. L. M. Read**, administration and services manager of the Research and Development Laboratories of the Distillers Plastics Group, has been appointed chairman of the Plastics Institute's council. **Mr. Maldwyn Jones**, development director since 1957 of I.C.I. Plastics Division, is the new vice-chairman. Mr. Read was assistant works manager of Rockhard Resins Ltd. in 1935 and became works manager of Cellomold Ltd. following the merger of the two companies. When Cellomold was amalgamated with British Resin Products Ltd. he became works manager of the B.R.P. Feltham works, transferring to South Wales in 1949. Mr. Jones worked in the Dunlop technical department from 1927 to 1930, and until 1945 was with the I.C.I. Dyestuffs Division. He became manager of the Plastics Division Technical Service and Development Department in 1946.

● **F. W. Berk and Co. Ltd.** have appointed **Mr. E. G. Jewell**, of their London Colney works, to be responsible for advising and assisting all those Berk customers who wish to take advantage of the company's bulk delivery service.

● **Mr. E. G. Woodroofe**, a director of Unilever Ltd., has been appointed vice-chairman of the board in succession to **Mr. J. A. Connel**. Aged 59, Mr. Woodroofe has been a member of the board since 1956. He joined the business in 1953 and started his career in the Unilever group of oil milling companies at Loders and Nucoline, Silvertown, London. For the past four years he has been head of the research division and responsible for the co-ordination of the work in Unilever's research establishments throughout the world.



Prof. Giulio Natta, who has been awarded the Medal of the Benemeriti della Scuola della Cultura e dell'Arte (see 'People in the News' 19 August) is seen here (right) in conversation with **Mr. Piero Giustiniani**, general manager of Montecatini

● **Mr. L. J. Davies**, director of research of A.E.I. (Rugby) Ltd., has been appointed to the newly created post of director of research for Associated Electrical Industries Ltd. He will be responsible for the direct supervision of the four A.E.I. research centres in which research and development account for

PEOPLE in the news

about £7.5 million a year. **Dr. J. E. Stanworth** has succeeded Mr. Davies as director of research at A.E.I. (Rugby).

● **Mr. J. M. Lassen** has been appointed sales manager, Polyethylene Sales Department, of Bakelite Ltd., and **Mr. J. M. Platje** has been appointed sales manager of the Vybak Sales Department.

● A Building Sub-committee has been set up by the Plastics Institute to deal with all matters relating to the development of the use of plastics in building. The following are members: **H. D. Atkin**, Allied Structural Plastics Ltd.; **G. A. Britton**, John Laing Research and Development Ltd.; **Dr. W. B. Brown**,

Monsanto Chemicals Ltd.; **Dr. W. Dawson**, I.C.I. Plastics Division; **D. Gonda**, E.P.S. (Research and Development) Ltd.; **D. B. Honeyborne**, D.S.I.R. Building Research Station; **D. S. Mahon**, Bakelite Ltd.; **Dr. Z. S. Makowski**, Imperial College; **H. Stanley Smith**, Richard Costain Ltd.; **K. Turner**, chartered architect; **V. H. Wentworth**, Monsanto.

● **Mr. N. C. Lake**, deputy managing director, Head Wrightson and Co. Ltd., has been appointed chairman of the North East Regional Council of the British Institute of Management.

● **Mr. W. Morris**, secretary of Colt Ventilation Ltd. and its associated companies, and **Mr. F. W. Price**, sales manager of Colt Ventilation Ltd. and W. H. Colt (London) Ltd., have been appointed directors of the Colt associated companies.

● **Mr. R. M. Bateman** has been appointed chairman of British Industrial Plastics. Mr. Bateman, who is deputy chairman of Turner and Newall, was appointed to the Board of B.I.P. last May. **Dr. W. Blakey**, a joint managing director of B.I.P., has been appointed deputy chairman of that company.

● **Dr. D. Train** has resigned his readership in pharmacy in London University and is joining Cremer and Warner, consulting chemical engineers, at 8 Buckingham Palace Gardens, London S.W.1, as a partner.

Latest Survey Shows Sharp Increase in World Synthetic Fibre Output

LAATEST review of fibre production, trade and consumption compiled by the Intelligence Branch of the Commonwealth Economic Committee ('Industrial Fibres,' H.M.S.O., 10s) notes that in 1959 the non-cellulosic man-made fibres further consolidated their position, total output of 1,200 million lb. in that year—40% more than a year previously—being equivalent to about 26% of rayon and acetate production in the free world against 21% in 1958. The U.S. remained by far the largest producer and its output rose by 31% to a new peak of 645 million lb., although its share of the free world total declined by 3 points to 54%.

An especially sharp increase, of 75%, was recorded in Japan, while output in the U.K. rose by about 30% to a new peak of 86 million lb. and in the six Common Market countries it was 44% higher at 234 million lb.

Estimated production of non-cellulosic fibres in the Soviet Union and Eastern Europe, at 66 million lb., was about 14% more than in 1958; of this total the Soviet Union accounted for just under half while East Germany and Poland were responsible for much of the remainder.

The report notes that nylon still

accounts for the greater part of the world total of non-cellulosics, but a growing proportion now consists of polyester and acrylic fibres, such as Terylene, Orlon and Acrilan.

Figures for U.K. production of man-made fibres in 1960, with a breakdown into the main groups of cellulosic and synthetic fibres, were given in C.A., 29 April, p. 698.

Duty Drawback Sought on Cadmium Metal

The Board of Trade give notice that they are considering an application for the allowance of drawback of duty on imported cadmium metal when used for the production in the U.K. of cadmium colours for export.

Representations which interested parties may wish to make should be addressed in writing to the Board of Trade, Tariff and Import Policy Division, Horse Guards Avenue, London S.W.1, not later than 11 September.

Will

Mr. Eric Freer, a director of the Staveley Iron and Chemical Co., who died on 29 October, aged 58 years, left £9,278 net.

Commercial News

Albright and Wilson

Albright and Wilson have declared an interim dividend of 6%. Profit for six months ended 30 June 1961, before depreciation, was £4,358,000. This compares with £3,962,000 for the same period of 1960 but with £4,419,000 when adjusted to include W. J. Bush. Profit attributable to A. and W. shareholders after all deductions was £1,365,000.

Albright and Wilson state that trading profit, after depreciation, in the second half of the year is expected to be below that now reported because it will be more fully affected by the narrowing margins experienced in the first half of the year, and because of depreciation charges on new plant coming into operation mid-year.

Lawes Chemical

Group trading profit of Lawes Chemical for the year to 30 June shows a reduction of 42% from £155,000 to £90,000, before tax of £36,000 (£78,000). The dividend for the year is maintained at the same rate of 14% paid last time but is paid on capital increased by a rights issue of one for four made in November last when the payment now proposed was forecast.

The directors state that the reduction in profit is attributable to two causes, heavy expenditure consequent on a major overhaul of the sulphuric acid plant and the failure of a raw material supplier to make the required deliveries.

Monsanto Chemicals

Pre-tax net income of Monsanto Chemicals Ltd. for the first half of 1960 was down 37% from £1,320,228 to £826,343. After estimated taxes of £445,300 (£699,000) net income was more than 40% down at £381,000, compared with £651,228 for the first half of 1960 and £1,416,569, including investment income, for the full year. Net sales increased from £10,373,651 to £10,671,960. Interim dividend is maintained at 5%—last year this was followed by a final of 10%.

The results relate only to Monsanto Chemicals and do not reflect the company's proportion of the results of the Australian subsidiary, which in the first six months showed a small loss. (See also p. 323).

Commercial Solvents

Commercial Solvents Corporation, New York, have taken over an 80 per cent holding in the two Italian pharmaceutical concerns Hoffman Lampis S.p.A. and Fabbrica Italiana Articolli Terapeutici. The Italian firms are producers of vitamins, hormones and antibiotics among other items.

B.A.S.F. Holding-AG

B.A.S.F. Holding-AG is the name of a new joint stock company formed in Zurich, Switzerland, by the Ludwigshafen-on-Rhine, West Germany, chemical producers Badische Anilin- und Soda-

- A. & W. Expect Lower Second-half Profit
- Acid Plant Overhaul Affects Lawes Profits
- Monsanto Half-year Income Down 37%
- B.A.S.F., Bayer Form New Companies

Fabrik AG. The company, which has an initial capital of SF.2 million, will undertake the purchase and administration of holdings in other concerns, particularly those in the chemical industry. The concern has a mixed German-Swiss board.

S. A. Bayer

Société Anonyme Bayer is the name of a company formed in Antwerp, Belgium, with a capital of 1 million Belgian francs, by West Germany's biggest chemical producer Farbenfabriken Bayer AG, Leverkusen. Farbenfabriken Bayer hold 93% of the company's capital. The new firm has been set up to operate the chemical plant which Bayer are to build in the Antwerp port area over the coming years, no details as to scope of capacity of which have as yet been made known.

Dow Chemical Co.

Dow Chemical Co., Midland, Mich. report for the financial year ended 31 May, a net profit of \$64,440,000, or \$2.23 per share (\$82,400,000 or \$3.01 per share). This fall in profits is in the face of increased sales of \$817,510,000 (\$781,430,000) and decreased tax stoppages of \$43,700,000 (\$68,320,000).

Jefferson Lake

Net income of Jefferson Lake Petrochemicals of Canada Ltd. for the first half of 1960 amounted to \$145,128 (\$37,853). Income tax was not applicable because of a tax loss carry-forward amounting to \$2.3 million on 30 June 1961.

Hallesche Salz

The Dusseldorf, West Germany, concern Hallesche Salzwerke und Chemische Fabrik Kalbe AG have recommended the payment of a 4% dividend (same) for the past financial year on capital of DM975,000.

Quimica General

Quimica General S.A. is the name of a new company formed in Mexico by the Celanese Corporation of America. The company will be in charge of chemical operations of the U.S. firm in Mexico.

Rexall

Rexall Drug and Chemical Co., U.S., have stated that net profit should exceed \$10 million during the current year. This compares with a 1960 figure of only some \$9,300,000.

Rutgerswerke

Rütgerswerke AG, of Frankfurt-on-Main, West Germany, have taken over 45% of the capital of the Hamburg concern Ruberoidwerke AG. Both com-

panies are producers of coal-tar products, synthetic resins and plastics.

Sandoz AG

Sandoz AG, of Nuremberg, West German subsidiary of the Basle, Switzerland, chemical company of the same name record 1960 turnover of DM277 million and a net profit of DM440,000. Company capital is DM4 million.

Surpass Petrochemical

A large chemical concern has made an offer to purchase all of the 614,848 outstanding shares of New Surpass Petrochemical Ltd., plus their debts, for \$380,000. The buying company has not been identified. The offer was made to Chemalloy Minerals Ltd., who hold 319,000 shares of New Surpass as well as non-interest bearing notes of New Surpass amounting to \$169,000.

Chemalloy have appointed Prudential Trust Co. as trustee to extend the offer to other shareholders. Prudential are now offering 46 cents per share for New Surpass shares up to an expiry date of 15 September. The offer is subject to 100% acceptance. If Chemalloy received full payments of the debt, the offer would approximate 34 cents a share.

New Surpass have had a history of losses since their initial operation in 1955 and were recently advised that their major contract was to be terminated. The directors felt that the company could not carry on after the end of 1962 and would have to be put in liquidation.

Thiokol Chemical

Thiokol Chemical Corporation, U.S., report for the first half of the current year net profit of \$2,240,000, or 48 cents per share (\$1,740,000 or 37 cents/share). Over the period sales rose from \$83,360,000 to \$85 million. Net profit for the second quarter was \$1,200,000 (\$920,000) or 26 (19) cents/share.

NEW COMPANY

DICKSON'S (CARBON-MONOXIDE) BURNERS LTD. Cap. £100. Manufacturers of catalyst chambers, vessels and similar receptacles; manufacturers of and dealers in chemical gases, acids, chemical and laboratory reagents, etc. Directors: L. R. J. Dickson (permanent managing director), Crawley, Sussex, and J. E. Martin. Reg. office: 16 High Street, Crawley, Sussex.

INCREASE OF CAPITAL

LINDSEY AND KESTEVEN FERTILISERS LTD. (formerly Lindsey and Kesteven Chemical Manure Co.), 5 and 6 Bank Street, Lincoln. Increased by £150,000, beyond the registered capital of £100,000.

Company Report

PHILBLACK LIMITED

Lt. Col. C. P. Dawney's Statement— "A Very Successful Trading Year"

The Twenty-fifth Annual General Meeting of Philblack Limited will be held on the 26th September, 1961, at the May Fair Hotel, London, W.1.

The following is an extract from the statement by the Chairman, Lieutenant Colonel C. P. Dawney, C.B.E., M.V.O., circulated with the Report and Accounts for the year ended 31st March, 1961:

You will notice that the Accounts now placed before you present a consolidated Balance Sheet and Profit and Loss Account as well as the Balance Sheet of Philblack Limited. This is necessitated by our acquisition during the year of the balance of the capital of Philtanks Limited, which owns the 15,000 dead weight tons motor tanker "Avon Ranger", and which thus becomes a wholly-owned subsidiary. The comparative figures for last year appearing in these Accounts are, of course, those of the Parent Company alone.

RESULT OF YEAR'S OPERATIONS

I am pleased to say that we have had a very successful trading year, with a group profit before taxation of £908,873, and after allowing for taxation of £451,358, the nett group profit for the year is £457,515. Out of the amount brought forward we have provided £104,446 in respect of royalties relating to previous years. £250,000 has been transferred to General Reserve, which now stands at £1,100,000, and £7,500 has been placed to a Pension Reserve.

An interim dividend of 6% actual, less tax, was paid in February last, and the Directors recommend the payment of a final dividend of 9%, less tax, and a bonus dividend of 5%, less tax. The total dividends for the year to 31st March, 1961, will therefore be 20%, as against 17½% in respect of the year to 31st March, 1960.

RECORD SALES AND PRODUCTION FIGURES

In the year to 31st March, 1961, the sales and production figures were the highest yet recorded, and we are proud to be able to record that our exports were higher than ever before.

Whilst I feel confident that the world-wide demand for Carbon Black will continue to increase, and whilst we shall not slacken our efforts to maintain our share of the market, the large number of new Carbon Black plants abroad must eventually have some effect on our export business.

SELLING PRICES AGAIN REDUCED

In June and July, 1960, our selling

prices in the home market were again reduced. It is interesting to note, and we are proud of our achievement, that whereas the price of feedstock, which is our main raw material, has risen by 30% since 1953, we have been able to lower the selling prices of our main grade of carbon black by nearly 20% over the same period. This has been made possible by the greater output and efficiency at our Works and by the many improvements to our plants.

We are now decided to undertake certain development and research work and for this purpose we propose to erect a Pilot Plant at our Avonmouth Works which we consider is essential to keep abreast of technical developments in our industry. It is intended that this plant should be used primarily for experiments in the use and evaluation of new types of feedstock, research into the production of new grades of Carbon Black, and general improvements in efficiency.

EXPANDING SCOPE OF ACTIVITIES

Up to now the Company's sole business has been the production of Carbon Black. Our experience over the past few years has shown us that there can be fairly wide variations in the demand for this commodity, and that our prosperity is vulnerable to fluctuations in the motor industry. We consider that we should endeavour to give more stability to our business by expanding the scope of the Company's activities, and the Board are exploring ways and means to this end.

On the 1st May this year we reached the tenth anniversary of our first production of Carbon Black at the Avonmouth Works. I think we are justified in looking back with pride at our achievements over that period, and I would like to thank my co-Directors, the Managing Director—Mr. J. C. H. Barrow, the Executives, Staff and Works' personnel who have worked so hard and conscientiously with such excellent results.

THE OUTLOOK

We must now look to the future. There is no doubt that local production will have an effect on our exports in certain markets. On the other hand we do look forward to a steady increase in the demand for our products in the home market. I am sure, however, that our Sales Agents, R. W. Greeff & Co. Ltd., who have done sterling work on our behalf in the past, will make every effort, and take all opportunities which may arise, to maintain or increase our sales.

Market Reports

Good Demand for Basic Slag

LONDON New home trade demand for industrial chemicals has been on the quiet side, but not more than can be expected for the period. However, there has been a steady movement against contracts with delivery specifications covering good quantities, and the flow of overseas enquiry has been satisfactorily maintained. The price position of the routine soda products and potash chemicals continue on a steady basis, and the undertone generally is firm.

In the agricultural chemicals market there has been a good demand for basic slag. There has been little change in the position of the coal tar products.

MANCHESTER The past week has seen little change in the general price position of chemical products or in the extent of trading activity, which continues under holiday influences, although the effect of these is not now so pronounced as during the past month or so. Contract deliveries of the alkalis and other leading heavy chemicals has been on a fair scale and a moderate weight of new business, the bulk of it for prompt or early supplies, has been reported.

The tar products generally are meeting with a quietly steady demand, and fair buying interest is being displayed in the compound fertilisers, as well as in the nitrogenous materials and basic slag.

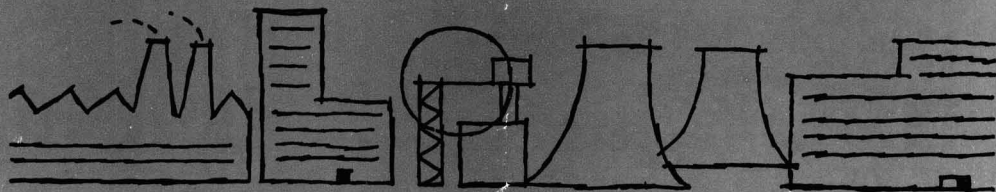
SCOTLAND From a survey of last week's trading, the pattern is more or less the same as the preceding three or four weeks. Some sections of the industry are extremely busy, the reverse being the case in other trades. On the whole, however, the past week has been a favourable one; prices have remained steady apart from the usual more or less day-to-day fluctuations of some of the metal derivatives. The demand from the agricultural trade has slackened off, but this is purely seasonal. As far as export is concerned, some interesting enquiries are going around, but if anything the past week has been quiet.

M.Sc.Tech. in Corrosion Science

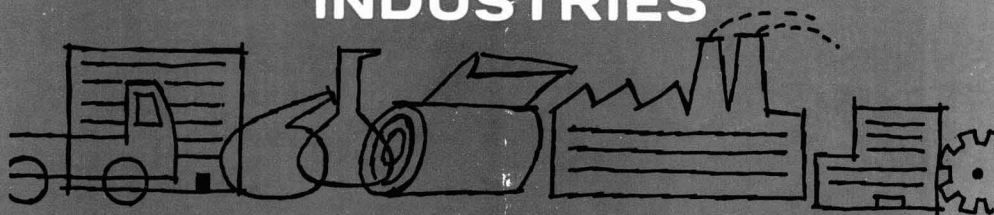
The Manchester College of Science and Technology is now offering a course in corrosion science leading the degree of M.Sc. Tech. The chemical engineering department at the college already includes within its scheme for a first degree the subject of corrosion engineering as a final year special topic, and, together with undergraduate teaching the department includes an active post-graduate school which conducts research into fundamental aspects of corrosion.

The new advanced course is for candidates with an approved first degree in science, engineering or technology. Further information is obtainable from The Registrar, The Manchester College of Science and Technology, Manchester 1.

HYDROGEN PEROXIDE

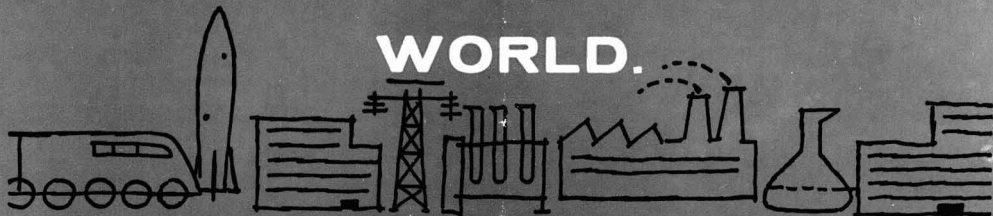


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DOW

TRADE NOTES

Butyl Rubber Modifier

Properties of Pronar—a promoter for the heat treatment of butyl rubber—are discussed in a technical bulletin, No. 159/R/61, issued by the Anchor Chemical Co. Ltd., Manchester 11, who are distributors of Pronar on behalf of the American Cyanamid Co. The 11-page bulletin includes a discussion of the effect of time and temperature on heat treatment, and also notes on precautions to be observed in handling Pronar.

Glass Chemical Apparatus

New electrically heated circulatory evaporator and automatic water stills are included in apparatus being displayed by Quickfit and Quartz Ltd., Stone, Staffs, at an exhibition of chemical apparatus and techniques organised by Glasgow and West of Scotland Section, Royal Institute of Chemistry 20-22 September. The exhibition is being staged at the Royal College of Science and Technology, Glasgow.

Furnascote Coatings

Furnascote refractory coatings formerly manufactured and marketed by Corrosion Ltd., Southampton, will in future be manufactured and marketed by Furnascote Ltd., working from 16-18 Malvern Road, Southampton. From 1 September 1961, all enquiries and correspondence should be sent to the sales director, Dr. G. L. Farron.

U.S. Equipment Licence

Chain Belt Co., Milwaukee, U.S., have granted Vokes Ltd., Guildford, an exclusive licence to manufacture the Rex range of process equipment in Great Britain and certain European countries. This range includes sludge collectors, skimming pipes, mechanically cleaned bar screens, grit collectors and washers.

Lauryl Sulphates

A new range of improved lauryl alcohol sulphates, known as Super Sipsos, is described in technical bulletin No. 1561 from Sipon Products Ltd., 23 Dryden Chambers, 119 Oxford Street, London W.1. Data are given on physical appearance, chemical composition, physical characteristics, foaming power and surface active characteristics, and suggested formulae for various types of shampoos are also included.

B.D.H. Laboratory Chemicals

The 1961 edition of the B.D.H. Laboratory Chemicals Brochure has been published by the B.D.H. Laboratory Chemicals Division, Poole, Dorset. The catalogue lists 7,000 products under the following sections: organic and inorganic chemicals for laboratory use; Analar laboratory chemicals; amino-acids, carbohydrates, enzymes, lipids, proteins, nucleic acids and related substances, sterols and related substances, vitamins and coenzymes; miscellaneous biochemicals and biochemical reagents;

pH indicators, oxidation-reduction and adsorption indicators, colorimetric and analytic apparatus; microbiological stains; and other accessories and special materials, ion exchange resins and molecular sieves.

Heat Transfer Medium

Thermex heat transfer medium is a diphenyl oxide/diphenyl eutectic mixture produced by I.C.I. Heavy Organic Chemicals Division. A new booklet discusses its properties and applications and provides tabulated data on physical properties. There is also some discussion of data for heat transfer calculations, while curves are given for vapour pressure, viscosity, specific heat and density of Thermex.

Enquiries should be addressed to Imperial Chemical Industries Ltd., Millbank, London S.W.1.

PVdC Emulsions

Scott Bader and Co. Ltd., who believe they are the first U.K. firm to produce polyvinylidene chloride emulsions in freely available quantities (see CHEMICAL AGE, 1 April 1961, p. 540) have published a technical pamphlet dealing with the uses of this type of emulsion, which they are intending to sell under the trade name Polidene. Chief applications are in the packaging and allied industries, where Polidene coatings provide an excellent barrier to grease, oils and odours, and because of their low M.V.T.R. are expected to find wide and immediate applications to paper, board and foils. The pamphlet is available from the company at Wollaston, Wellesborough, Northants.

Water Treatment

Combustion Chemicals Ltd. have formed a subsidiary company, under the name of Water Engineering Ltd., 33, Dorset Square, London N.W.1, which will manufacture in this country under licence the range of water clarification and purification plant marketed on the Continent by Cie. D'épuration et de Traitement des Eaux, Paris, during the last few years.

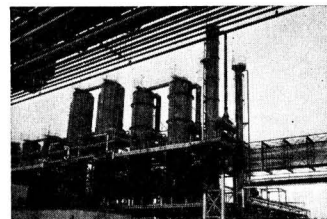
The present range comprises an instantaneous separator (known on the Continent as the Danor); high speed clarifying filters; water sterilisation; H, OH total demineralisation; H, Na pre-treatment; and a continuous purge type water purifier.

Commercial Plastics Ltd.

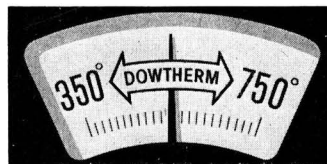
Marketing and administrative companies in London of Commercial Plastics Ltd., plastic sheet and film manufacturers, are now all located at Eerkeley Square House, Berkeley Square, London W.1. Companies affected are Commercial Plastics Ltd., Commercial Plastics (Sales) Ltd., Anglo American Plastics Ltd., Fablon Ltd., Mondart Ltd., Iridon Ltd., Thermalon Ltd. Export, legal, personnel and publicity departments are also to be contacted at the new offices.



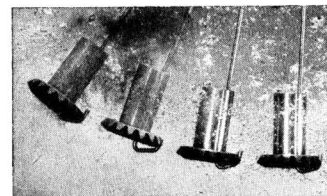
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NEW PATENTS

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 4 October

Production of alkali metal perchlorates. Olin Mathieson Chemical Corporation. **878 904**
 Production of basically substituted esters. Ward Blenkinsop & Co. Ltd. **878 630**
 Production of a chemical element by the dissociation of a gaseous hydride thereof. **878 766**
 Purification of gases. Humphreys & Glasgow Ltd. **879 112**
 Polymerisation of compounds containing olefinic linkages. Dunlop Rubber Co. Ltd. **878 744**
 Aqueous polymer dispersions. Dunlop Rubber Co. Ltd. **878 561**
 Process for the production of chlorobenzoic acids. Fisons Pest Control Ltd. **879 120**
 Process for the manufacture of olefine polymers of high molecular weight. Farbwerke Hoechst AG. **878 516**
 Dyestuffs of the naphthoylenebenzimidazole series and their methods of preparation. Compagnie Francaise Des Matieres Colorantes. **878 632**
 Ethylene oxidation process. Stone & Webster Engineering Corporation. **878 652**
 Cyclopentanophenanthrene compounds and process for the manufacture thereof. Syntex S.A. **879 100**
 Substituted cycloalkanes and process for their manufacture. Ciba Ltd. **878 677**
 Manufacture of polymeric fatty acids. Wolf Ltd., Victor, and Rowe, R. **878 985**
 Process for the polymerisation of olefins. Ruhrchemie AG. **878 635**
 Process for the purification of hydrocarbon high polymers. Ruhrchemie AG. [Addition to 817 132.] **878 678**
 Methods of dissolving polymers. Polyplastic. **879 145**
 Aminoplast resins and coating composition based thereon. Rohm & Haas Co. **878 986**
 Aromatic polyesters. Diamond Alkali Co. **879 124**
 Synthesis of steroids. Olin Mathieson Chemical Corporation. **879 125**
 Catalytic treatment of alumina. Dorr-Oliver, Inc. **878 827**
 Arylmercaptan substituted aliphatic halides and derivatives thereof. Monsanto Chemical Co. **878 828**
 Manufacture of polymeric materials. Imperial Chemical Industries Ltd. **879 166**
 Synthetic resins. Rohm & Haas GmbH. **879 207**
 Process for the manufacture of chloroacetates and aminoacetates of saturated and unsaturated 21-hydroxypregnane compounds and acid addition products of the aminoacetates. **879 208**
 Manufacture of cellular polyurethanes. Imperial Chemical Industries Ltd., Chapman, J. F., and Jones, B. F. **879 167**
 Prevention of discoloration of salicylic acid and esters thereof. Monsanto Chemical Co. **878 522**

Process for grafting polymeric chains on manufactured articles consisting of linear propylene high polymers. Montecatini Soc. Generale per L'Industria Mineraria e Chimica. **878 523**
 Organic compounds of metals and production thereof. Monsanto Chemical Co. [Addition to 868 650.] **879 168**
 Manufacture of cellular polyurethane products. Imperial Chemical Industries Ltd. **879 056**
 Preparation of melamine-formaldehyde resin syrups stable at low temperatures, and dried resins obtainable therefrom. Monsanto Canada Ltd. **878 660**
 Production of black oxide of iron. Frey, F. **878 679**
 Manufacture of polymeric materials. Imperial Chemical Industries Ltd. **879 169**
 Dioxazine pigments and their use. Geigy, AG. J. R. **878 661**
 Dioxazine dyestuffs and their use. Geigy AG. J. R. **879 170**
 Process for the catalytic polymerisation of olefins. Leuna-Werke Walter Ulbricht Veb. **878 695**
 Glyceride esters. Bibby & Sons Ltd., J. **879 211**
 Thermoplastic synthetic polymers. Telegraph Construction & Maintenance Co. Ltd. **878 908**
 Process for the manufacture of aldehydes and ketones and catalyst therefor. Consortium für Elektrochemische Industrie GmbH. **878 777**
 Manufacture of polyvinyl alcohol fibres. Farbwerke Hoechst AG. **879 193**
 Resinous polymeric quaternary salts derived from vinyl ketones and photographic films rendered antistatic therewith. Kodak Ltd. **878 662**
 Method of stabilising trichloroethylene and stabilised compositions thereof. Sicedison S.p.A. **878 718**
 Carboxylic esters. Geigy Co. Ltd. **878 910**
 Transalkylation of organo-metallo compounds. Goodrich-Gulf Chemicals Inc. **878 746**
 Elastomeric adhesive compositions and their use in bonding. Borg-Warner Corporation. **878 719**
 Production of titanium-dioxide. Columbia Southern Chemical Corporation. **878 720**
 Derivatives of polysaccharides which are soluble or dispersible in cold or hot water. Schollen's Chemische Fabriek N.V., W. A. **879 133**
 Steroids and the manufacture thereof. Upjohn Co. **878 705, 706, 707, 622**
 Adhesives. Badsey, G. B. W. **879 134**
 Heterogeneous mixture of copolymers. General Tire & Rubber Co. **878 749**
 Thiophosphoric acid esters. Farbenfabriken Bayer, AG. **878 663**
 Production of nitrofurans derivatives. Norwich Pharmacal Co. **878 628**
 Epoxide compositions. Ciba (A.R.L.) Ltd. **878 750**
 Production of unsaturated aliphatic aldehydes and the corresponding acids. Distillers Co. Ltd. **878 802**
 Metallised monoazo dyestuffs containing halogenotriazinylamino groups. Imperial Chemical Industries Ltd. **878 527**
 Process for the production of chlorine-containing pigments of the phthalocyanine series. Sandoz Ltd. **878 753**
 Heterocyclic 6-purinyll sulphides and the manufacture thereof. Wellcome Foundation Ltd. **879 194**
 Mercapto compounds and process for their manufacture. Ciba Ltd. **879 194**
 Polymers. Goodrich Co., B. F. **878 926**
 Polymerisation of ketones. British Nylon Spinners Ltd. **878 898**
 Pregnenolone derivatives and processes for their production. Ormonoterapia Richter S.p.A. **878 725**
 Copper complexes of azo dyestuffs containing halogeno-s-triazinylamino groups. Imperial Chemical Industries Ltd. **878 726**

Production of linallyl acetate. Distillers Co. Ltd. **878 680**
 Heterocyclic azo dyestuffs containing sulphohalogenalkylamide groups and their production. Badische Anilin- & Soda-Fabrik AG. **879 073**
 Imindobenzyl derivatives. Soc. Des Usines Chimiques Rhone-Poulenc. **878 683**
 Purification of low-pressure polyolefins. Petrochemicals Ltd. **879 142**
 Unsaturated esters of thiophosphorus acids. Farbenfabriken Bayer AG. **879 087**
 Dithiophosphonic acid esters. Farbenfabriken Bayer AG. **878 729**
 Stabilised polyethylene compositions. Imperial Chemical Industries Ltd. **878 868**
 Antimony derivatives. Rhone-Poulenc. **879 155**
 Manufacture of organic fluoro-halogen compounds. Imperial Chemical Industries. **878 585**
 Manufacture of particulate solid catalysts. Shell Internationale Research Maatschappij N.V. **878 730**
 Modification of polypropylene. Imperial Chemical Industries Ltd. **879 195**
 Production of aldehydes and ketones. Imperial Chemical Industries Ltd. **879 197**
 6 α -Chloro-steroids and process for the preparation thereof. Syntex S.A. **878 731**
 Esters of amino acids and peptides, and derivatives thereof. American Cyanamid Co. **878 732**
 Steroids and the manufacture thereof. Upjohn Co. **878 733**
 Polymerisation of ethylene. Distillers Co. Ltd. **879 175**
 Preparation of dibenzyltin dihalides. Deutsche Advance Production GmbH. **878 958**
 Halogenated 5,6-dimethylene-bicyclo-(2,2,1)-heptenes-(2) and their production. Badische Anilin- & Soda-Fabrik AG. **878 650**
 Compositions useful as thermoplastic adhesives. General Mills Inc. **878 959**
 Caulking compositions. Du Pont de Nemours & Co., E.I. **878 542**
 Formic acid esters of 1-alkinyl-cycloalkanol and a process for their manufacture. Schering AG. **879 004**
 Aqueous emulsions of elastomeric chloroprene copolymers. Farbenfabriken Bayer AG. **878 736**
 Producing water-soluble azo dyestuffs on fibres or foils of aromatic polyesters. Farbenfabriken Bayer AG. **878 738**
 Preparation of alkyl chlorides. Continental Oil Co. **878 737**
 Production of vinylidene chloride co-polymers. Grace & Co., W. R. **879 008**
 Production of unsaturated aliphatic aldehydes. Distillers Co. Ltd. [Divided out of 878 802.] **878 803**
 Process for protecting synthetic fibres from ultra-violet rays. Ciba Ltd. **879 144**
 Condensed alkali metal phosphates. Knapsack-Griesheim AG. **878 739**
 Water-insoluble mono-azo dyestuffs. Farbenfabriken Bayer AG. **878 741**
 Diene polymers. Phillips Petroleum Co. **878 841**
 Process for the preparation of halogenated esters of carboxylic acids. Montecatini. **878 629**
 Derivatives of benzoic acid and processes for their preparation. Uclaf. **879 050**
 Production of perfluoro-alkanes and perfluorocycloalkanes. Saline Ludwigshalle AG. **879 057**
 Production of acrylic acid esters. Union Carbide Corp. **879 052**
 Production of acrylic acid esters. Union Carbide Corp. **879 009, 879 010**
 Substituted hydantoin derivatives, processes of preparing them and herbicidal compositions containing them. Geigy AG, J. R. [Divided out of 863 443.] **879 217**
 Making *p*-ureidobenzenesulfonic acid. Whitmoyer Laboratories Inc. **878 843**
 Thiopyrimidine derivatives. Farbenfabriken Bayer AG. **878 696**
 Preparation of *N*- β -hydroxy-ethylthylenediamine. Rhone-Poulenc. **878 967**

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CLASSIFIED ADVERTISEMENTS

Continued from page 344

SITUATIONS VACANT: *continued*

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