Chemical Age

AUSTRALIA'S PETROCHEMICAL PLANS
(page 317)

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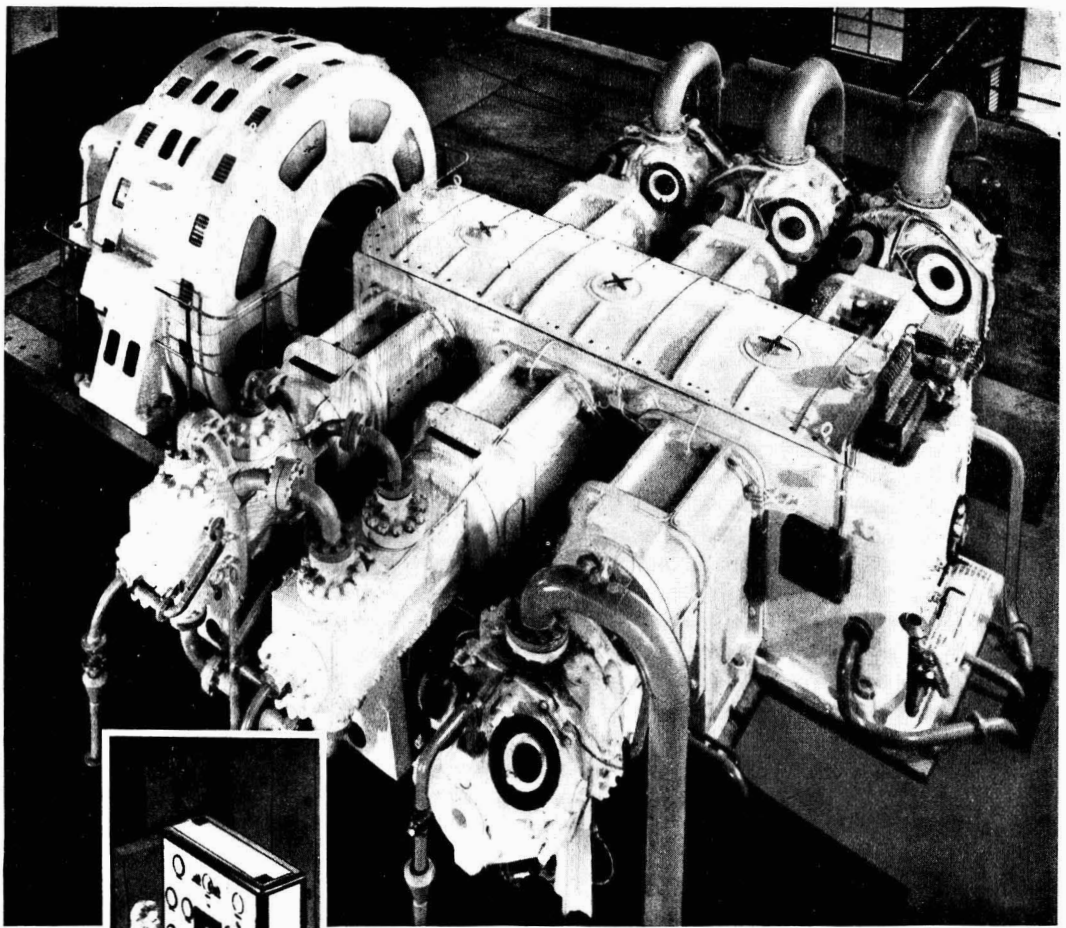
27 August 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY



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Brotherhood compressors are designed to customers' exact requirements.

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P.3629

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

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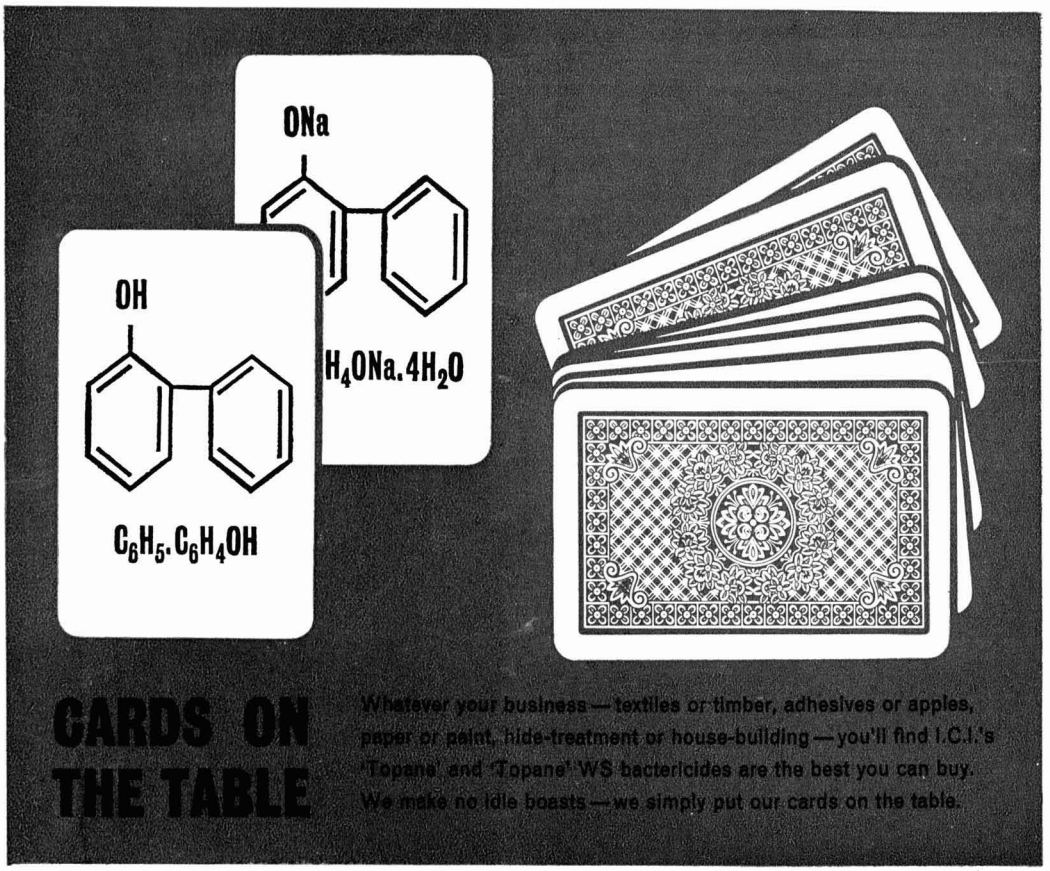

This is the table which compares 'TOPANE' with four other bactericides in common use

	Safety and Ease of Application (Max. 20)	Germicidal Efficiency (Max. 20)	Lack of Toxicity (Max 20)	Persistence (Max. 20)	Economy of Price (Max. 20)	(Max. 100)
Old type Non-Phenolic	10	2	10	1	20	43
Modern High Efficiency Non-Phenolic	12	20	1	20	4	57
Modern Phenolic Derivative (1)	16	9	14	15	8	62
Modern Phenolic Derivative (2)	15	12	10	17	15	69
'TOPANE'	**20**	**11**	**20**	**12**	**12**	**75**

'Topane' (I.C.I.'s brand of ortho phenylphenol) is soluble in organic solvents. It provides a valuable base for household and industrial disinfectants, for it extends their range of bactericidal effectiveness. Other specific formulations — for example, for the treatment of wet and dry rot in timber — may be economically based on 'Topane'.

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Both 'Topane' and 'Topane' WS are supplied as non-dusting, free-flowing, safe-to-handle flakes.

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INDEX TO ADVERTISERS

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

Araldite at Mach 2.8

Britain's newest, largest and most advanced wind tunnel is now in use at the Royal Aircraft Establishment, Bedford. It is employed for fundamental research and for tests on models of aircraft and missiles. The working section consists of two flexible top and bottom plates, 64 ft. 8 in. long and 8 ft. wide, supported between side walls 62 ft. 6 in. long and 8 ft. 6 in. high, forming a rigid structure weighing 400 tons. Both the flexible plates and the side walls of the tunnel are protected by 'Araldite' epoxy resins—yet another vitally important use for these tough, flexible coatings combining remarkable adhesive properties with outstanding resistance to corrosion.

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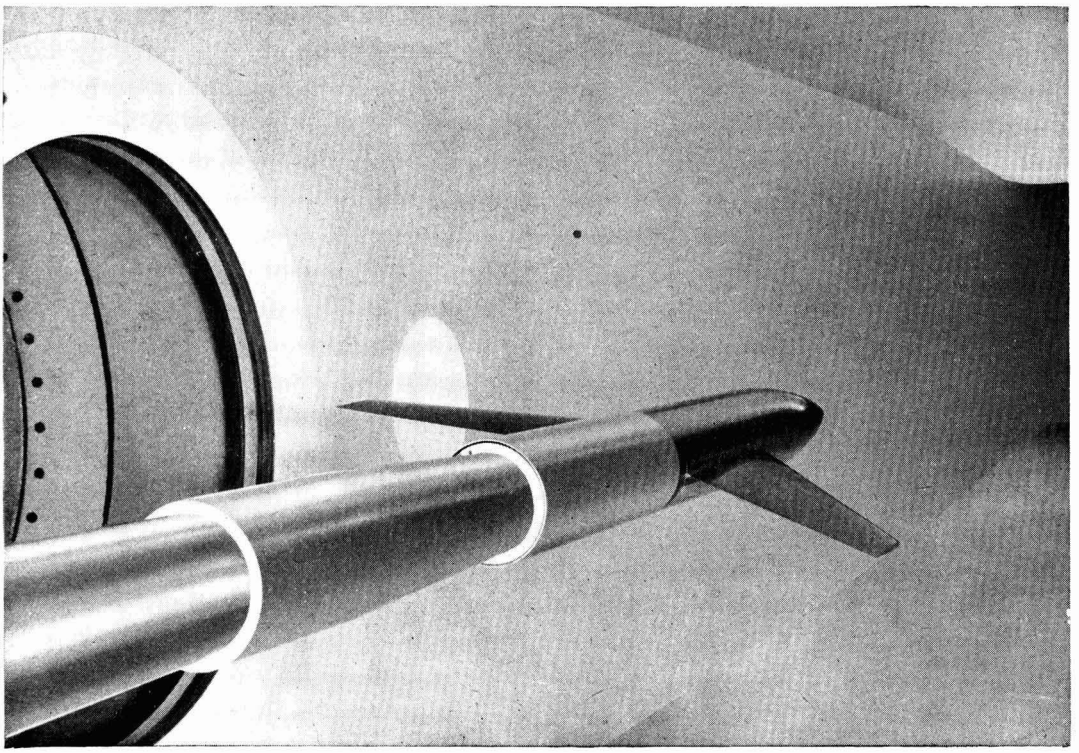

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Araldite epoxy resins

Araldite is a registered trade name

Araldite epoxy resins are used

- ★ **for casting high grade solid insulation**
- ★ **for impregnating, potting or sealing electrical windings and components**
- ★ **for producing glass fibre laminates**
- ★ **for making patterns, models, jigs and tools**
- ★ **as fillers for sheet metal work**
- ★ **as protective coatings for metal, wood and ceramic surfaces**
- ★ **for bonding metals, ceramics, etc.**

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AP 405

VOL. 84 No. 2146
AUGUST 27 1960

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CHEMICAL AGE

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POLYURETHANE GROWTH

WITH a big growth-rate forecast in the next few years for the U.K. polyurethanes market, interest has recently been focused on toluene diisocyanate (TDI). Currently, U.K. demand for polyurethanes is about 9,000 tons a year and Dunlop are thought to hold about a third of this.

The more optimistic estimates place total U.K. demand by 1965 at between 40,000 and 50,000 tons a year—a five-fold increase. The market should certainly be more than doubled by 1963, but whether it will sustain such a big growth by 1965 must depend on a number of factors which cannot as yet be very accurately assessed. For instance, development of a one-shot process for cushioning moulding would change the position materially; at present such a technique is seen as a long-term research project—although the Marley Tile Co. are using, under licence from Davidson Rubber of the U.S., a moulding technique that is not a 'one-shot' process and details are not available. Even without a moulding process, Aeropreen Products have already built-up a substantial trade in seating cushioning for cars, aircraft and trains. They are now in production with a flame-retardant polyether foam.

The biggest growth in the coming years will undoubtedly be in flexible foams, rather than in rigid types. Expansion will centre mainly on the polyether-based foams, in preference to the polyesters. Better resiliency, greater wear-resistance and improved insulation properties are attributed to polyethers. But no doubt a contributing reason why they will continue to oust polyesters, for both rigid and flexible foams, is the fact that they are based on a C-3 stream, a low-cost raw material likely to remain in good supply.

This large-scale expansion forecast for polyurethane foams explains why more than one company is reported to be interested in the TDI field. It also explains why I.C.I. Dyestuffs Division is in the throes of constructing a new TDI plant near Fleetwood, Lancs, to supplement present output which is centred on the division's plant at Huddersfield. For the new plant—a major installation—the division has taken over a wartime 'shadow' factory, where much of the process plant will be of the open type. New buildings are to be erected, however, to house some of the units.

Construction work and assembly of equipment is said to be up to schedule; on completion the works will employ about 150 payroll and 50 staff. Processes now used at Huddersfield will be employed—initially on a proving basis, and gradually building up to rated capacity over a period of months. Capacity has not been announced, but it is believed that it will cater for all U.K. needs when the plant becomes fully operational (completion rate has not been disclosed).

The company is the only U.K. producer of TDI and supplies to meet U.K. demands are also being imported, both from Bayer in West Germany and from the U.S. As already stated, more than one company has been investigating the possibilities of entering the TDI field, doubtless encouraged by the level of imports and by the fact that there is only one domestic producer. While it is obvious that the new I.C.I. plant must cause second

thoughts to any firm contemplating entry into this field, the phosgene route to TDI, admittedly a difficult one, is not likely to deter any newcomers because it is well known.

The next 12 to 18 months should provide a much clearer picture of the future growth rate of polyurethane foams. In addition to foams, polyurethane expansion is expected in durable paints, floor and textile finishes. Interest in isocyanate-based durable paints in this country is at present high and " very substantial " increases in sales are reported by J. M. Steel and Co., who import the raw materials from Bayer. These finishes are air-drying and extremely tough. It is of interest to note that in Desomodur L, the Bayer isocyanate, a non-volatile has been formed from TDI containing a maximum of 0.5% volatile TDI. This volatile component is so slight that in normal applications there is no irritation to respiratory organs. This overcoming of the toxicity problems associated with the use of low-molecular weight isocyanates, such as TDI should lead to even bigger sales increases in the polyurethane coatings market.

SYNTHESIS OF CHLOROPHYLL

SINCE the simultaneous but independent announcement of the successful synthesis of chlorophyll *a* by Dr. Woodward in America and Dr. Strell in Germany (CHEMICAL AGE, 9 July, p. 56), details of both processes have been published by *Chem. and Engng. News*, 1 August. The processes differ in the routes taken. The American method is a 30-step synthesis from monocyclic pyrroles whereas the German synthesis is an extension of the plan developed by Dr. Hans Fischer. Fischer's approach was to make chlorophyll by breaking down the natural material to simpler intermediates and chemically synthesising chlorophyll from them. The German method has been to start from previously synthesised intermediates.

The four pyrroles used for the start of the American process are synthesised from 2,4-dimethyl-3,5-dicarbethoxy pyrrole. These form the corner stones of the chlorophyll molecule. The synthesis goes through a porphyrin, several purpurins and finally to chlorine e_6. From there it is a three-stage step to chlorophyll *a*.

The synthesis, taking four years to complete, follows a general advance plan but includes several discoveries that could not have been anticipated. The first part consisted of producing a key porphyrin intermediate, each of the two halves of the molecule being dipyrrylmethanes, which were synthesised from pyrroles.

The amalgamation of the dipyrrylmethanes was achieved by the introduction of a thioformyl group at the 5-position of the right hand dimethylpyrrylmethane. This was reacted with the aminoethyl group on the left-hand intermediate to form a bridge between the two molecules, which were then condensed to the porphyrin. This step is accomplished under mild conditions and has a yield of about 50%.

The next step was to oxidise the porphyrin by air in warm acetic acid. This removes two hydrogens from one of the carbomethoxyethyl side chains. The next stage was to convert the porphyrin to purpurin and it was found that the two compounds could be equilibrated in acetic acid under nitrogen and the desired purpurin separated.

After adding two vinyl groups within the molecule, the first purpurin was oxidised to 7-methoxallylpurpurin 5 by air in the presence of visible light. Potassium hydroxide in methanol converts this compound to racemic isopurpurin 5 methylester. This stage is particularly interesting since a corresponding optically active compound was made by Fischer during his chlorophyll work in the 1940's. Infra-red and visible spectra of the isopurpurin 5 made by Dr. Woodward showed that it was identical to the compound from the natural source.

The final tages were the separation of the optically active isome from the racemic isopurpurin 5 by conversion to racemic chlorin 5 from which a quinine salt that yields active chlorin 5 can be removed. This is converted to active purpurin 5 dimethyl ester, and finally to chlorine e_6 trimethyl ester. The final three steps had been previously detailed by earlier workers.

The German process starts from the intermediate 2-desvinyl-2-acetyl isochlorin e_4. The 2-acetyl group is reduced with sodium borohydride and the product is complexed with iron and the resulting compound reacted with ethyldichloromethyl ether. This builds a ring on to the third pyrrole group.

The next step was the oxidation of the C—OH group in the new ring to C=O which is achieved with PtO_2 and oxygen in acetic acid. The carbonyl intermediate was then partially saponified with acid, followed by hydrolysis of the hydroxyethyl group in the 2-position to give the final intermediate phaeophorbid. Introducing the phytyl group and magnesium into the phaeophorbid molecule—accomplished by Fischer and Wilstaetter earlier—gives chlorophyll *a*.

The synthesis of chlorophyll not only completely confirms the structure proposed by Fischer in 1940, but greatly increases knowledge of the chemistry of chlorophyll and its intermediates, and also provides a number of new techniques in organic synthesis.

Chlorophyll plays a central part in photosynthesis but biochemists are still not sure if it is involved chemically, and both Dr. Woodward and Dr. Strell emphasise that, although the syntheses of chlorophyll are undoubtedly a major step towards the understanding of the complicated life processes of plants, photosynthesis is not a single process, but is a whole branch of biochemistry.

FREE RADICAL ENERGY

POSSIBILITY of using the energy of free radicals as a portable source of power for remote areas and underdeveloped countries is the hope of S. R. Ovshinsky, president of Energy Conversion Laboratories, Detroit. Free radicals can be produced by the effect of radiant energy on a diatomic gas such as hydrogen which has been adsorbed on to palladium or other catalysts. The apparatus developed by Ovshinsky, which he says contains no moving parts, converts the hitherto untapped energy of the free radicals into power. The radicals, emitted from the palladium when it is subjected to radiation (solar, thermal or other radiations), are directed on to a selective catalytic surface, where the radicals recombine releasing their energy and so heating the surface. This recombination surface can also be used to emit electrons and so become part of a system to generate electricity. Alternatively, it can provide the thermal driving force for other types of power production. The hydrogen molecules that result can be recycled to produce more atomic hydrogen for the process. The process which needs no cryogenic equipment and can take place near room temperature, is only limited by the method used to convert the released heat to electricity or other forms of power.

E.C.L. have several small working models of the unit (apparatus no larger than half a dollar will produce at least 200 watts of electrical power) and intend to build larger models for demonstration purposes. The company has applied for patents but will not produce the apparatus commercially but say they will licence the method to " qualified companies ".

Mr. Ovshinsky has indicated that he has found less costly materials that can work in his system and suggests that hydrogen might be produced from water using solar energy.

Project News

Dow and Staatsmijnen will Build Phenol Plant in Rotterdam

CONSTRUCTION of a new phenol plant in the Botlek area near Rotterdam, Netherlands, has been announced by Dow Chemical International Ltd. S.A. The plant will be jointly owned by Staatsmijnen in Limburg, Netherlands, and Dow Chemie AG, Swiss subsidiary of the Dow Chemical Co. Capitalisation of the project is estimated at 40 million Dutch guilders. A substantial portion of the phenol produced will be used for the caprolactam manufacturing requirements of Staatsmijnen in Limburg; the rest will be marketed by Dow Chemical International. Staatsmijnen initiated the production of caprolactam in 1952, and since then has repeatedly increased production capacity, which will be doubled in the course of 1960. This increase created a growing need for a new phenol production.

Howards and Sons Plan £500,000 Capital Development

● CAPITAL development projects involving expenditure of more than £500,000 over the next two years have been announced by the chairman of Howards and Sons, Mr. T. W. Howard. This is in addition to the £114,000 for capital expenditure contracts as at 30 April this year.

The most important capital development during the last year was the construction of the phthalic anhydride plant. This reached its designed output in February and plans are now in hand to double its capacity (CHEMICAL AGE, 13 August, p. 235). Present and future output of the plant is already fully taken up by the group's own manufacturing requirements and those of customers.

A new aspirin purification plant was completed during the year but the full increase of productive capacity will not be realised until the immediate aspirin unit is completed during the present year. Other plant extensions are in hand.

Company's financial prospects—see 'Commercial News', p. 329.

● THE sulphuric acid plant at the Hapton Works of William Blythe and Co. Ltd., which came into operation earlier this year after having been shutdown for some time, is the first outside West Germany to use the B.A.S.F. fluidised bed roaster.

● INSTALLATION of an Onia-Gegi catalytic reforming plant at the Partington Works of the North Western Gas Board is to be carried out by Humphreys and Glasgow Ltd. The plant will be built in two sections and completed in January 1962. Output is designed to be 12 million cu. ft. of town gas a day, but substantial overload capacity will be built in. Feedstock is refinery gas from an adjacent petrochemical works at the rate of 60,000 therms/day. Alternatively there is provision for using liquified petroleum gases as standby.

● FISHER valves have been provided by the Fisher Governor Co. Ltd., a member of the Elliott-Automation Group, to the new ethylene plant at Grangemouth of British Hydrocarbon Chemicals Ltd. and the new synthetic rubber plant at Pernis of Shell.

The new B.H.C. plant has some 200 control valves of the pneumatically-operated type, ranging from 1 to 10 in. in size. The 50 Fisher Level-Trols installed ranged from a few inches to 10 ft. in height. Some of these liquid-level control and measuring devices are designed to prevent liquid ethylene boiling in the displacer chamber.

Most of the pneumatic instruments incorporate Fisher 67 FR type filter regulators, over 400 of which are used to ensure a constant supply of clean, dry air to the controllers.

More than 450 of the company's valves are used in the automatic control of the Pernis plant. Automatic control valves are used in process-lines throughout the plant, and in the cooling and heating of the processes. They range from ½ in. to 14 in. in pipe diameter, and are of the spring-opposed diaphragm type, operated by a pneumatic controller. Pneumatic controllers incorporate over 1,000 Fisher series 67 small volume regulators, which reduce air pressure to the constant value required by the instrument.

● A CONTRACT worth about £11,500 has been awarded to William Boby and Co Ltd., Herts, by Foster Wheeler Co. Ltd., for a hot lime-base exchange plant and deaerator to be installed in the Tideway Oil Refinery near Copenhagen.

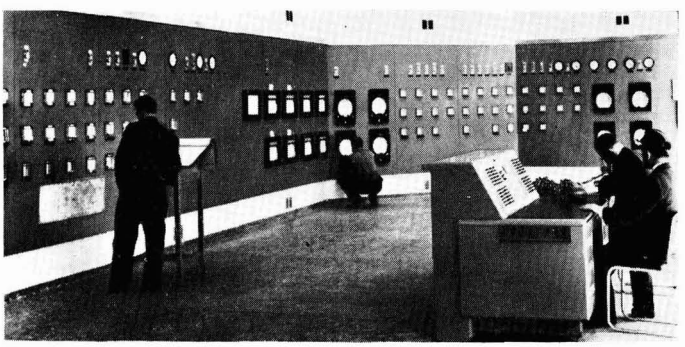
ICIANZ and Yorkshire Imperial Metals Plan New N.Z. Copper Industry

UNDER a joint arrangement by Imperial Chemical Industries of Australia and New Zealand Ltd. (ICIANZ) and Yorkshire Imperial Metals Ltd. of Leeds, U.K., a new industry is to be set up in New Zealand for the manufacture of copper and copper alloy sheet, strip and tube. Capital of over £(NZ)2 million will be required, and it is expected that an ICIANZ subsidiary company will be formed in New Zealand to conduct manufacturing operations. Although details of capital structure are not available, it is stated by the parent companies that 25% of the equity capital would be offered for subscription by the New Zealand public. The New Zealand Government has announced its support for the project.

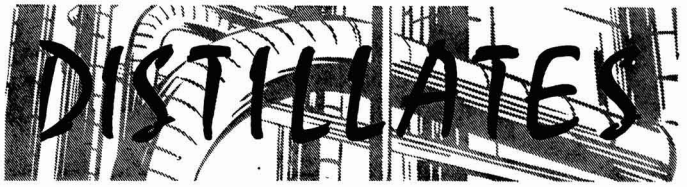
The arrangement is still subject to ratification by the Boards of ICIANZ and Yorkshire Imperial Metals Ltd., and also by the United Kingdom Capital Issues Committee and Treasury. The plant is likely to be in the Auckland area, and production is expected to commence in about 18 months.

I.C.I., with Yorkshire Imperial Metals Ltd. (in which I.C.I. is an equal partner with Yorkshire Copper Works Ltd.), is the largest producer of wrought non-ferrous metals in the British Commonwealth.

AUTOMATIC CONTROL OF PHENOL MANUFACTURE



Control room at British Hydrocarbon Chemicals Ltd., Grangemouth, where Honeywell standard and miniature recorders and controllers control the manufacture of phenol and acetone from cumene. Continuous automatic production started up this year at a rate of 13,000 tons of phenol a year



★ FOLLOWING the claim by the Socony Mobil Oil Co. that within five years tetramethyl lead (T.M.L.) will be widely used by petroleum refiners as an anti-knock additive (CHEMICAL AGE, 25 June, p. 1068), I was interested to note this week that their U.K. subsidiary, Mobil Oil Co. Ltd., have introduced Tetramel —a T.M.L. additive. So far only small quantities of T.M.L., imported from the parent company, are available so Mobil Oil decided to add it to their top grade petrol, but as more becomes available they will use it more extensively.

At the moment, there is no U.K. source of T.M.L. but Associated Ethyl, the only producers of tetraethyl lead in this country, say they can supply imported T.M.L. and have plans to make the product available from U.K. sources.

★ THE review of the Australian chemical industry on page 317 of this issue shows how heavily dependent its development has been on investment by British and American interests. The question arises how much Australia will continue to rely on overseas resources and know-how. Speaking at the annual dinner of the Sydney University chemical engineering association recently the chairman of the Commonwealth Banking Corporation, Mr. W. D. McDonald, urged a greater application of Australian technology, pointing out that much chemical development work in Australia consists of adapting processes which have been used and proved overseas, while design and construction of chemical plant in Australia is still largely carried out by overseas organisations. He said Australian chemical engineers should be given more opportunity to show how their efforts in building plant locally and operating existing plant more efficiently could reduce costs.

★ THE New Zealand Government is currently negotiating with an overseas organisation interested in the possibility of setting up a calcium carbide plant worth some £ millions. I learn that much more investigation is needed to establish the economic feasibility of such an industry.

The industry would depend largely on exports, particularly in the early stages, and the Government approached an overseas firm—at present not named—because it had the necessary overseas interests and markets. The firm concerned had been assured that the necessary electric power would be available. A more detailed assessment of the cost of bulk power supplied as part of the manufacturing process will be made.

The type of limestone required for such a project is almost all in the South Island—in Westland, Nelson, North Otago and Southland. The west coast is thought to be a likely plant site. Drilling in the limestone areas—at a cost of about £20-30,000—would be carried out by the company after the conclusion of an agreement on power supply.

★ A NEW crease-resistant process that is attracting attention in the textile world is that of Coronising, now being developed by Fothergill and Harvey Ltd. under an exclusive licence from a U.S. concern.

To ensure better processing during weaving of glass fibres, yarns are sized or coated. By the new process the yarns are sized with a certain unnamed chemical which is not removed until after weaving has taken place. Removal of the size from the glass fabric then allows a crease-resistant property to be imparted to the material. This, it is claimed, is 100% efficient.

Coronising is believed to be the first process which enables glass fabrics to be produced with complete crease resistance.

★ THE recent *cri de coeur* of Mr. B. Breyev, director of the Society Central Research Institute for the Leather Industry, published in the Economic Gazette, Moscow, reinforces my note on the Soviet plant and equipment industry in these columns recently. Apparently the U.S.S.R. footwear industry has been set an impossible target for footwear production.

Impossible because, according to Mr. Breyev, equipment in the Soviet leather industry is obsolete and in some important enterprises, manual work accounts for as much as 75% of output. Also the U.S.S.R. chemical industry does not produce chemicals specifically for tanning. There is a lack of synthetic tanning and leather finishing agents such as crystallised phenol, dry chromium preparations, organic silicon preparations and other materials needed to improve the quality of leather. This criticism also applies to pigments and dyestuffs.

An opportunity surely for British producers of tanning materials, leather chemicals and dyestuffs.

★ ACTIVE ingredient of the artificial sun-tan lotions which appeared in British shops earlier this summer—and which must surely be responsible for more 'tans' than the elusive sun—is dihydroxyacetone. At the beginning of August, the Wallerstein Co., a division of Baxter Laboratories Inc., was granted a U.S. Patent 2,948,658 for making the material by the fermentation of glycerol. How the patent will affect other U.S. producers is not yet known, but it must complicate matters.

Wallerstein developed a commercial process and started it up in two months. The company produces dihydroxyacetone by fermenting glycerol with *Acetobacter suboxydans*. I understand that pH control is critical and while *A. suboxydans* grows quickest at about pH6.5 maximum conversion of glycerol to dihydroxacetone takes place at pH5.0 to 5.9. Also important in the process is the addition of various inorganic constituents, which can be provided by corn steep liquor. Glycerol concentration is also an important factor and the company is currently using substantially above the 6% level referred to in the patent.

Apart from the topical usage in manmade tans, dihydroxacetone has a number of potential applications in chemical syntheses. Suggested uses are in the production of pharmaceuticals, dyestuffs, emulsifiers, plasticisers, fungicides, alkyd resins, while reaction products of the material and sulphonamides show promise as leather tanning agents and wood preservatives. Dihydroacetone is a possible catalyst for redox polymerisations and as a modifier for starches, textiles and certain papers.

★ SCIENTISTS at the C. F. Kettering Foundation, Yellow Springs, Ohio, claim to have discovered a new mechanism for photosynthesis. It is believed that carbon dioxide, assisted by manganese, is converted directly to glycolic acid.

There are thus two mechanisms for photosynthetic fixation of carbon dioxide in plants, for at the University of California, Dr. M. Calvin has found that carbon dioxide reacts with ribulose diphosphate to form phosphoglyceric acid.

★ OPENING of new pyrites deposits in Norway is meeting strong opposition from the pyrites industry because of current over-production. I learn from Oslo that test operations in the Gjersvik deposits are expected to begin in 1960. These deposits, part of the extensive Grong deposits in North Trondellag County, belong to the state-owned A/S Joma Bergverek.

The A/S Unndal Verk, a pyrite mine in Central Norway, closed last year and another, the Bjorkaasen Gruber, a Swedish-owned mine in Troms County, is nearing exhaustion and is expected to cease operating within the next two years. Norwegian extraction of pyrites, which has been declining since 1956, decreased from 792,800 tonnes in 1958 to 732,000 tonnes in 1959. Of that quantity, the non-cupriferous pyrite decreased 20% or 285,000 tonnes.

Alembic

B.o.T. Releases U.K. Dyestuffs Output and Sales Figures

NET output of the U.K. dyestuffs industry in 1958 was worth £24,560,000, compared with £24,532,000 in 1954. This was stated in Part 25—Dyestuffs of the Board of Trade report on the 1958 Census of Production (H.M.S.O., 1s 9d net). In 1958 there were 15 dyestuffs firms employing 25 or more persons, with 23 establishments, compared with 18 enterprises and 28 establishments in 1954.

Sales by the industry in 1958 (goods produced and work done) were valued at £51,395,000 (£57,825,000 in 1954); stocks at the end of 1958 were worth £12,075,000 (£10,004,000). Net output per person employed in the census year was £1,418 (£1,280). Capital spending on new building work, excluding expenditure at establishments not then in production, was valued at £394,000 (£477,000). Plant and machinery acquired was valued at £1,499,000 (£1,573,000).

Of the total net output of £24,560,000, £21,832,000, or 88%, was produced by firms employing 500 or more. Net output per employee in the largest establishments was valued at £1,402; for those with between 200 and 499 employees, it was £1,672; for those with between 100 and 199 it was £1,518; and for those with between 25 and 99 it was £1,071.

In addition to dyestuffs output, the industry sold general chemicals to the value of £14,486,000, compared with £14,445,000 in 1954.

SALES OF PRINCIPAL PRODUCTS

	1954		1958	
	'000 cwt.	£'000	'000 cwt.	£'000
Syn. org. dye. intermediates	949.8	10,400	690.0	8,979
Finished syn. orgn. dyes & preparations for dyeing				
Direct (a)	173.1	4,050	120.7	3,078
Acid wool (a)	114.2	3,926	99.9	4,197
Chrome & Mordant (inc. alizarine) (a) (b)	—	1,768	47.2	1,137
Basic (a)	63.1	2,412	53.4	1,888
Sulphur (a)	134.0	941	72.1	649
Vat (b)	18.7	5,434	13.7	4,090
Oil spirit & wax (ex. pigment dyestuffs) (a)	28.3	787	30.8	987
Acetate rayon (b)	8.0	981	10.4	1,474
Azoic (a)	43.8	2,256	24.8	1,292
Other (a) (b)	57.3	3,433	74.6	4,397
Purchased dyestuffs blended & household dyes	—	839	—	806
Extracts for tanning & dyeing				
Quebracho	230.1	735	388.3	877
Wattle	640.7	1,530		
Other veg. extracts	432.0	801	225.5	507
Syn. org. tanning extracts	33.8	94	68.5	236
Other Products	—	34	—	262
Waste products	—	74	—	127
Total	—	40,496	—	34,985

(a) In terms of domestic standard powder strength.
(b) In terms of 100% pure dye content.

Indopol Polybutenes for Caulking Formulations

The use of Indopol low molecular weight polybutenes in various specialised caulking formulations has been the object of a research programme of Amoco Chemical Corp., part of which is now completed.

Indopol polybutenes are a series of butylene polymers composed predominantly of high molecular weight mono-olefins. They have applications as sealing and caulking compositions, in adhesive compositions, for imparting moisture-proof and vapour-resistant characteristics to paper, in the preparation of laminated paper products, in blends for electrical insulation purposes, in blends with asphalts, in lubricating applications and as leather impregnants.

There are now 10 members of the Indopol range available, ranging in molecular weight of 300 up to 1,900.

Information sheets have been published giving details on: Elastic glazing compound formulation; Non-drying sealant formulations; Rope caulk formulations; Glazing compound formulation; and Aluminium pigmented gun-grade caulk; all of which will be supplied on request by Kingsley and Keith (Chemicals) Ltd., Rex House, 38 King William Street, E.C.4.

Experimental Electrorefining of Scrap Beryllium Metal

A promising new source of high-purity beryllium metal, reported by the U.S. Bureau of Mines, is the electrorefining of beryllium scrap, using what is known as the fused-salt technique. A Bureau publication (Report of Investigations 5581, 'Electrorefining beryllium: preliminary studies', from the Publications-Distribution Section, Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa.) credits the process with reducing metallic contaminants so that the resulting beryllium reached a purity of at least 99.5%.

Beads of beryllium were used as an anode in the bottom of a special air-free electrorefining cell of the type devised by the Bureau to refine titanium. Molten salts of potassium, lithium and beryllium served as the electrolyte. Crystals of the near-pure beryllium formed on the cathode much as rock candy builds up on a string. It is concluded that the procedure offers an encouraging route for recovery and purification of beryllium scrap and possibly for production of a high-purity metal. Similar preliminary investigations in using the technique on other metals will be reported separately.

Belco Processes Treat Water Contaminants

DEMINERALISATION of water that will remove practically all dissolved solids and will produce water equal to or better than distilled water is claimed for the Belco water treatment processes, which as a result of a recent agreement between Belco Industrial Equipment Division of New Jersey and Head Wrightson and Co., can now be offered by the latter firm.

There are a number of processes available depending upon the requirements and economics of a particular application.

In the weak base system, demineralisation is a two-step process in which the water is first passed into a hydrogen cation exchanger which converts the salts present into their corresponding acids after which the acid water is passed through an anion exchanger so removing the mineral acids. Carbon dioxide can be removed by aeration if required, but silica is not removed. The strong base anion system removes the weak acids, carbon dioxide and silica as well as the mineral acids removed by the weak base system.

In cases where the raw water is low in alkalinity and also contains appreciable amounts of chloride and sulphate, it is usually more economical to precede the strong base anion exchanger with a weak base exchanger. This is known as a three bed demineralising system. In this way the strong base anion exchanger does not become exhausted during normal operation and there is no danger of a silica creak through.

The final process available is the mixed bed demineralisation unit which provides a high quality water. The process requires only one ion exchange vessel which contains an intimate mixture of anion and cation exchange resins. The chemical reactions are the same as those in the three bed system but the quality of water produced is superior.

In addition to the above systems, a number of special ion exchange processes are available for the treatment of water for particular industries such as brewing and transistor manufacture. Other processes are available for the treatment of trade effluents.

Beecham Deny 'New Cancer Drug' Rumour

THERE was "no truth whatsoever" in a rumour that the Beecham Group had developed a new drug to combat lung cancer, according to a spokesman of the group. The denial came after, mainly due to the rumour, Beecham ordinary shares rose by 2s 9d to 47s 6d on 22 August. Tobacco shares were also affected, since the rumour went so far to suggest that Beecham's were co-operating with a tobacco manufacturer in development of a cancer drug.

The spokesman said the group were not about to announce or produce any drug which had anything to do with cancer.

New Du Pont Fluorochemical Products Marketed in U.K.

THE organic chemicals department of E.I. Du Pont de Nemours has recently developed a new range of fluorochemical products which are being marketed in the U.K. by Brown and Forth Ltd., Clifton House, 83-117 Euston Road, London N.W.1 Three of these chemicals are described below.

Fluoroalcohols. Known as C3, C5, C7, C9 and C11 Fluoroalcohol technical, these compounds represent a series of trihydrofluoroalcohols containing an odd number of carbon atoms prepared by the free radical telomerisation of tetrafluoroethylene with methanol. The fluoroalcohols provide a convenient means of introducing fluoroalkyl groups into an organic molecule and should prove of value as intermediates for the preparation of derivatives having improved thermal and chemical stability.

Potential uses may be illustrated as:

(1) As a means of conveniently introducing fluoroalkyl groups into organic molecules for application in the pharmaceutical, dye, surface active agent and other fields;

(2) As an intermediate for the production of thermally stable lubricants, non flammable hydraulic fluids, instrument oils, dielectric materials, textile treating agents, mould lubricants, anti-corrosion agents, plastics, plasticisers, cosmetic ingredients, additives for waxes and polishes and surface treatment of metals and other substrates to impart oil and water repellence; (3) As a speciality solvent for various polymeric and otherwise intractable materials.

Sulphur Tetrafluoride Technical. Sulphur tetrafluoride, SF_4, is a reactive gas with novel fluorinating properties. It has the unusual ability to replace oxygen in many organic, inorganic, and organometallic compounds with fluorine. By means of this reagent, it is now possible to prepare a wide range of selectively fluorinated products heretofore unavailable by practical routes.

Because of the unique properties of fluorinated compounds, it is expected that sulphur tetrafluoride technology will be useful for a range of products in the field of pharmaceuticals, insecticides and herbicides with biological activity due to or modified by fluorine. It should be useful in surface active agents, water and oil repellants and lubricity improvers because of the low surface energy characteristics of many fluorinated compounds. The chemical stability contributed by fluorine should prove advantageous in oxidation resistant and thermally stable oils, films, plastics and elastomers.

Vinyl Fluoride MS Technical. Vinyl fluoride is a low-boiling monomer manufactured from acetylene and hydrogen fluoride. It undergoes typical olefin reactions, and will be of interest as a chemical intermediate. Vinyl fluoride can be polymerised to form a homopolymer, and can also be copolymerised with other vinyl monomers. It is also a useful intermediate for introducing fluorine atoms into organic compounds. The presence of such fluorine atoms often increases the chemical stability of organic compounds, decreases their solubility, and retards their degradation by light or other physical agents.

Non-sparking Magnesium Oxychloride Floors

THE development of magnesium oxychloride floors, meeting the need in some industries for a floor covering of a non-sparking nature or one to protect a clean floor from oil is referred to in the summer edition of the *Fire Protection Bulletin*. It is pointed out that a protective floor covering is also useful in preventing further oil seepage through an oil-affected floor to the floors below and in making an oil-soaked floor burn less readily if involved in a fire.

A magnesium oxychloride flooring would serve all those purposes. It is a composition of magnesite mixed with a filler such as sawdust or wood flour, plus small quantities of other materials. It can be applied to most types of subfloor, such as concrete or timber provided the floor is not too absorbent and is rigid and dry.

This covering also minimises water damage to floors below during fire-fighting operations.

A Flexible Plastics Foam to Compete with Paper?

A NEW flexible plastics film, made from foamed styrene, with properties and price said to enable it to compete with paper in many markets has been developed by the Monsanto Chemical Co., U.S. With the name of Santofome, it is available in thicknesses from 0.01 to 0.03 in. and sells for $4 per 1,000.

Claimed to be waterproof, non-abrasive and grease resistant the new film looks and feels like kidskin. Uses are in the wrapping of frozen foods and protection of polish on finished goods. Because it can be embossed and printed it might be used for greeting cards and sales promotion literature.

U.S. Bureau of Standards Issues Monograph on Free Radicals

Accumulation of data on the properties of the elusive molecular fragments known as free radicals was the purpose of a three-year research programme carried out by the National Bureau of Standards, U.S. Department of Commerce, between 1956 and 1959. This programme is reviewed in a monograph which has now been issued by the Bureau, and which is based on a collection of seven papers presented at the Fourth International Symposium on Free Radical Stabilisation in Washington, D.C., 31 August-2 September, 1959. The first paper describes the general technical management of the programme and the remaining papers deal with the technical aspects of trapping, storing, and studying free radicals at extremely low temperatures. Also included are a cross-referenced bibliography of papers published as a result of research completed during the three-year research programme, and a summary account of the 1959 symposium.

Monograph No. 12, entitled 'Stabilisation of Free Radicals at Low Temperatures' is available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. (Pp. 110, $1.50). Foreign remittances should include an additional one-fourth of the publication price to cover mailing costs.

Hazards in Enriched Uranium Processing

THE U.S. Atomic Energy Commission has published a 200-page report, 'Safety Analysis of Enriched Uranium Processing' (NYO-2980), which is available from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C., price $3.75.

The document represents the results of a study conducted to provide basic information and to evaluate the potential hazards involved in the processing of unirradiated, enriched uranium. The potential sources of nuclear accidents, the range of possible excursion magnitudes, and the possible consequences in terms of the extent of the radiation hazards from direct radiation and the dispersal of radioactive fission products are considered.

Radioactivity in Water and Sewage

A SHORT course of lectures on 'Problems of radioactivity at water and sewage works' will be held at the Manchester College of Science and Technology on 29 and 30 September. The course is designed as an introduction to the subject of radioactivity for water and sewage engineers and chemists, who wish to become familiar with the principles of radiological protection. Inquiries concerning the course should be addressed to the Registrar, Manchester College of Science and Technology, Manchester, 1.

AUSTRALIA'S PETROCHEMICAL PLANS

Affiliations with Overseas Groups Will Play a Big Part

- **With £130 million investment by British and American interests since the war, Australia's oil refining industry is well established and the stage is set for development of petrochemical industry in a big way.**
- **Some £40 million is being spent on petrochemical plants, opening the way to a wide range of synthetic products.**
- **However, Australia is still keeping a grip on more conventional methods of chemical manufacture; production of fertilisers and inorganic chemicals, as well as coal tar and other products, continues to grow.**

IN less than a century the Australian chemical industry, which began as a provider of fertilisers for agriculture and of explosives for mining, has progressed to an investment in petrochemicals which places Australia among the most technically advanced nations. By a series of alliances between Australian capital and some of the world's leading petroleum refiners and chemical manufacturers, the industry has entered the stage of large-scale production of synthetics. Although the basic importance of fertilisers remains (Australia's annual production of superphosphate is now about 2¼ million tons, made in 20 factories) the chemical industry is now sufficiently sophisticated to cover—or to plan—production of many petroleum-derived solvents, detergents, plastics, fibres and rubber, as well as equivalent products derived from conventional raw materials. Currently about £40 million is being spent on petrochemical plants as adjuncts to a petroleum refining industry in which £130 million has been invested since the war.

Two-phase Development

The development of the Australian chemical industry can be seen to have two fairly distinct phases. In what might be termed the pre-petrochemical phase, covering products ranging from oleum to synthetic resins, two companies in particular have played an important part. One is Imperial Chemical Industries of Australia and New Zealand Ltd. (ICIANZ) which, with a paid capital of over £18 million, is the biggest of Australia's chemical enterprises. The other is Commonwealth Fertilisers and Chemicals Ltd., the alkali section of whose operations was acquired by ICIANZ in 1957. Other companies of importance (excluding those concerned exclusively with pharmaceuticals) are CSR Chemicals Pty. Ltd., formed by the Colonial Sugar Refining Co. Ltd. of Australia and the Distillers Co. of the U.K.; Timbrol Ltd., specialising initially in coal tar distillation products and derivatives, and now merged in Union Carbide Australia Ltd.; and Monsanto Chemicals (Australia) Ltd. and Reichhold Chemical Industries (Australia) Ltd.

The setting up of CSR Chemicals Pty. Ltd. in 1950 was a significant development, since this company was initially created as a user of ethyl alcohol from one of the by-products of the sugar industry—molasses—and set out to make cellulose flake for the rayon industry, solvents, phthalate plasticisers, etc.

The latest phase of development of the Australian chemical industry has been precipitated by the large post-war expenditure in Australia by British and American petroleum refining companies. The petrochemical industry is already functioning in a comparatively small way, but developments of the next few years, when a number of important plants will come on stream, will transform the scene. The dominant chemical industry groups ICIANZ and CSR Chemicals, are both vitally concerned but many other organisations of international scope have been brought into the field.

The intricacy of these affiliations is best illustrated by what is called the Altona complex—the group of petrochemical industries now arising around the refinery of the Standard-Vacuum Refining Co. Australia Pty. Ltd., at Altona, a suburb of Melbourne. This refinery will pipe a specific distillate cut to the petrochemical plant of its affiliate, the Vacuum Oil Co. Pty. Ltd., which will produce ethylene and butadiene. At least four other companies will make use of one or other of these materials, thus:

C.S.R.C.-Dow Pty. Ltd. will make styrene from Vacuum's ethylene and from benzene from the coke ovens of the steel industry.

B.F. Goodrich-CSR Chemicals Pty. will make polyvinyl chloride from ethylene.

Australian Synthetic Rubber Pty. Ltd. (the Vacuum Oil Co. Pty. Ltd.) will make synthetic rubber from butadiene and styrene.

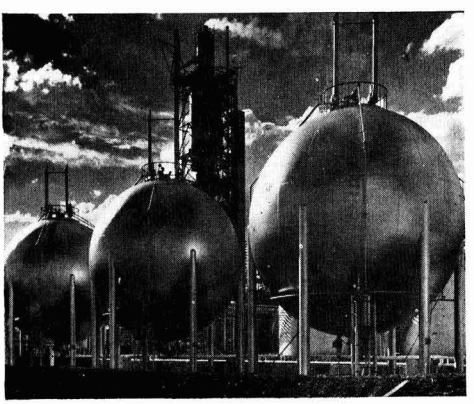
Union Carbide Australia Ltd. (the Union Carbide Corporation of America and Australian stockholders) will make polythene from ethylene.

There are other alliances of a similar nature in the neighbouring State of New South Wales. Thus Shell Chemical (Australia) Pty. Ltd. will produce ethylene at a plant adjoining the Shell refinery at Clyde; it will be piped to ICIANZ, where its immediate use will be in the manufacture of polythene. Currently ICIANZ draws its supplies of raw materials for the manufacture of polythene from ethyl alcohol produced from molasses.

There is yet a third group in the field. The Monsanto Chemical Co. of the United States in alliance with the Petroleum and Chemical Corporation (Aust.) Ltd., will produce, initially, styrene monomer.

The Australian chemical industry has been expanding at 6½% per annum, compared with 4½% for industry as a whole, and there is reason to think that this rate of expansion will be maintained. Total value added in production has been in excess of £250 million and this will be greatly increased when the new petrochemical plants come on stream.

Irrespective of the new synthetics, however, continued growth may be expected in the manufacture of conventional chemicals, with the raising of the rates of production in primary industry



Symbolising the petrochemical industry potential of Australia are these three Hortonspheres for storing the liquid petroleum gas produced in the cracking unit (in the background) of Standard Vacuum's £25 million refinery at Altona, Victoria

and with new methods of application, such as aerial top-dressing, or "crop-dusting" with superphosphate from agricultural aircraft. Nitrogenous fertilisers are now used in Australia on sugar, fruit and vegetable crops at rates comparable with those in the United States and more will be used in future for dairy pastures, grassland and cereal crops where, in many cases, legumes at present supply nitrogen. Other methods of applying nitrogen will also be adopted such as the use of urea, ammonium nitrate and the direct injection of ammonia into the soil.

The South Australian gulfs are particularly suitable for the production of salt by solar evaporation and works were established at Osborn, near Adelaide. Production of alkalis began in 1940, the main products being soda ash, sodium carbonate, caustic soda, refined bicarbonate of soda and calcium chloride. The salt harvest last year was 400,000 tons.

Other developments appear to be implicit in the present pattern of industrial growth—the production for the oil industry, for instance, of tetraethyl lead fluid, about 3,000 tons of which are now imported annually by Australia. Exploitation of the enormous deposits of bauxite in Northern Queensland will likewise require a greatly increased supply of soda ash for the production of alumina. Beyond these lie the possibilities of chemical industries based upon Australia's deposits of black and brown coal.

RESEARCH AND DEVELOPMENT PROGRESS ON O.E.E.C. 'DRAGON' REACTOR

DRAGON, the O.E.E.C. high-temperature reactor project, was originally suggested by the U.K. Atomic Energy Authority at the first meeting of the European Nuclear Energy Agency's committee on co-operation in the reactor field. This was in March 1958, and now the first annual report of the Dragon project which covers the period from the start of the project on 1 April 1959 to 31 March of this year, has been published.

The Dragon project has two main objectives; the carrying out of a research and development programme in connection with the high-temperature gas-cooled reactor system and the development, design, construction and operation of a 20 MW (thermal) experiment at the A.E.A. establishment at Winfrith in Dorset.

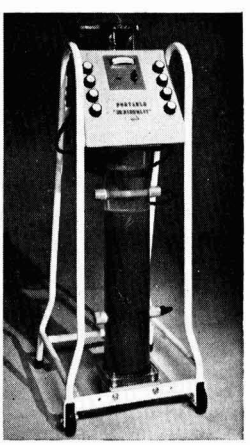
During the first year of the project, the original basic design for the experimental reactor at Winfrith has been extensively studied, both theoretically and experimentally, and all aspects which could fundamentally influence the building and engineering design are considered settled. The reactor will have a thermal output of 20 MW, the coolant will be helium at 20 atmospheres pressure, the inlet temperature will be 350°C and the outlet 750°C, and the reflector will be graphite. Other details of the reflector and of the core are also given. Much of the detailed design work, particularly of the fuel elements, requires experimental facilities where high temperatures or high neutron flux are available, and final arrangements have been made for both high temperature and high flux tests in the PLUTO reactor.

The zero-energy reactor at Winfrith, which in many respects resembles the proposed Dragon reactor, has been made available for the project and has been used for reactor physics and other experiments.

Permutit's New Portable Demineraliser

THE mark 6 portable Deminrolit manufactured by the Permutit Company Ltd., Permutit House, Gunnersbury Avenue, London W.4, can convert up to 12 gall. hourly of clean cold water into demineralised water having a conductivity of less than 1.0 reciprocal megohm c. The quality of water produced by the unit conforms to the 'purified water' standard, B.P., 1958. The new unit is a mixed-bed ion exchanger. Ion exchange materials used are Zeo-Karb 225 and De-Acidite FF, manufactured by Permutit.

This model is designed for on-the-spot simple and reliable regeneration. A conductivity tester continuously monitors treated water quality. Constructed as a free-standing unit of robust, non-corrodible construction throughout, it is suitable for workshop as well as laboratory conditions. No expensive plumbing is necessary, the unit being simply connected by flexible hose.



Permutit mark 6 Deminrolit

Meldola Medal Offered for Promising Chemical Work

THE Meldola Medal is the gift of the Society of Maccabaeans and is normally awarded annually. The next award will be made early in 1961 to the chemist who, being a British subject and under 30 years of age at 31 December, 1960, shows the most promise as indicated by his or her published chemical work brought to the notice of the Council of the Royal Institute of Chemistry before 31 December, 1960.

No restrictions are placed upon the kind of chemical work or the place in which it is conducted. The merits of the work may be brought to the notice of the Council, either by persons who desire to recommend the candidate or by the candidate himself, by letter addressed to The President, The Royal Institute of Chemistry, 30 Russell Square, London, W.C.1, the envelope being marked 'Meldola Medal'.

The letter should be accompanied by six copies of a short statement on the candidate's career and of a list of titles, with references, of papers or other works published by the candidate, independently or jointly. Candidates are also advised to forward one reprint of each published paper of which copies are available.

Cold-setting Adhesives Developed in Canada

An extract of western hemlock bark can be used to obtain spectacular results in cold-setting laminate adhesives at low costs. This was announced by a member of Rayonier Inc., Canada, at the recent annual meeting of the Forest Products Research Society. The new adhesive was obtained from HT-120, a unique and highly reactive polyphenolic intermediate, with resorcinol and phenol-modified resorcinolformaldehyde resins to which a setting agent composed of paraformaldehyde and fillers was added. The new adhesive bonds were found to be fully resistant to delamination by water during several cycles of vacuum-pressure treatment followed by drying or by prolonged boiling water treatment. HT-120 is available in limited quantities for laboratory or pilot plant testing.

Change of Location for Routine Testing of Dust Explosion Hazard

Many combustible dusts used in manufacturing processes, or generated as by-products in industry, can form flammable suspensions in air. Routine testing of the explosibility of dust clouds, previously carried out at the Safety in Mines Research Establishment, Buxton, is being transferred to the Joint Fire Research Organisation, Boreham Wood, of the Department of Scientific and Industrial Research and Fire Offices' Committee. The dusts are tested on behalf of the Factory Inspectorate, Ministry of Labour, with the object of reducing fire explosion hazards in industry, thus leading to safer working conditions.

Chemical Industry Gets Priority in Pakistan — Fertiliser and Alkali Projects Make Headway

THE Pakistan Industrial Development Corporation, an organisation set up in 1952 to undertake investments in branches of industry in which private investors had no or insufficient interest, has since its formation concentrated mainly on the build-up of the country's chemical industry. A survey now made by the Rotterdam Chamber of Trade's commercial information department shows how this industry is developing.

Two fertiliser plants are already in use in Pakistan and two further units under construction. When all four are on stream annual combined output will be of 16,000 tons of superphosphate, 50,000 tons of ammonium sulphate, 103,000 tons of ammonium nitrate and 176,000 tons of urea annually, together worth some 178 million Pakistani rupees (£13.7 million) per year. The two plants already on stream are that at Daudhkel, producing since early this year at an annual rate of 50,000 tons of ammonium sulphate from indigenous raw materials including high sulphur-content hard coal, and that at Lyallpur, with a daily output of 20 tons of sulphuric acid and an annual production of 16,000 tons of superphosphate and using imported U.S. sulphur. In October the third plant is to be opened at Multon, using Sui natural gas to produce 103,000 tons of ammonium nitrate and 59,000 tons of urea per year. The fourth unit, due to be opened next July, will be at Fenchuganj and will have a daily output of 333 tons of urea.

Sulphuric Acid

Five sulphuric acid plants, of which three are classed as 'modern,' are in existence in Pakistan, the three 'modern' units being at Lyallpur, Chandraghona and Karachi. Two further plants are now to be opened, one in East Pakistan and one in West Pakistan, each to have an annual capacity of 3,000 tons. The total national capacity will thereby be raised to 18,300 tons/year.

In addition to the one old-established soda plant operating in Pakistan with an annual production of 25,000 tons, plans are under way to bring into operation a Solvay unit with a capacity of 75,000 annual tons of sodium carbonate. Of this total production, 35,000 tons would be used for the production of sodium lye and the rest sold to projected rayon plants and other consumers.

Two sodium hydroxide plants are already at work—one forming part of the Karnaphuli paper plant at Chandraghona and the other at Nowashera. Both produce virtually entirely for the paper industry, and each has a capacity of 3,000 tons a year. Two further units are planned, one in East Pakistan and one in West Pakistan and each similarly with an annual capacity of 3,000 tons.

Some 60 small-scale pharmaceutical plants now exist in Pakistan, producing a wide range of products. Added to their output at the end of 1959 was a penicillin works built by the P.I.D.C. at Daudhkel with the support of the World Health Organisation and with an annual capacity of 8 million megaunits. A large pharmaceutical plant is planned to be built in East Pakistan.

Also in Daudhkel is a dyestuffs plant with an annual capacity of 550 tons, opened last year by the corporation. A second such unit is to be erected at Dacca in East Pakistan. Some 18 paint and varnish factories in the country now produce a total of 36,000 tons of products a year and whether further plants should be built in East Pakistan with a combined annual capacity of 16,000 tons is the subject of further study.

A DDT plant producing 700 tons of 100% DDT was recently opened at Nowashera, West Pakistan, again by the P.I.D.C. with the aid of the World Health Organisation, and a similar plant is now projected for East Pakistan at Chittagong. A planned sodium lye unit to be built at Chittagong will supply the second plant with chlorine.

The supply of resins and turpentine—from one small plant in the country—has long been insufficient, so the corporation has, with the co-operation of West Pakistan regional Government, set up a plant at Haripur for the production of 40,000 tons of resins and 220,000 Imp. gall. of turpentine annually.

Under the second five-year plan, which starts at the end of 1960, the corporation hopes to expand chemical output further by the increased exploitation of indigenous mineral reserves such as brown coal, hard coal and natural gas. A large-scale project foresees the production from the latter of p.v.c., oxygen, ammonia, acetylene, synthetic fertilisers, sodium lye and other chemical products. Coal—particularly brown coal from the Faridpur district of East Pakistan—is planned to be used for the production of a number of products, including pharmaceuticals, dyestuffs and synthetic fertilisers.

From another source comes information that the Corporation has already carried out a total of 54 projects, involving the expenditure of Rs. 10,800,000, of which Rs. 6,900,000 came direct from the Government. A further five projects in hand are to be completed within five years—they include the synthetic fertiliser plants mentioned above and the Faridpur coal exploitation—will take a further Rs. 4,300,000. In the 1959-60 financial year, P.I.D.C. projects produced goods worth Rs. 6,030,000, or 24% more than in the previous period, while exports rose by as much as 46% to a value of Rs. 2,300,000.

New Surface Active Agent, Fomescol, Gets Anti-oil Pollution Try-out

THE surface active agent, Fomescol, a British invention designed to combat furnace corrosion in ships, will soon be used by the new P. & O. liner *Canberra*. It was specially developed by research scientists of the Department of Scientific and Industrial Design and Glovers (Chemicals) Ltd., Wortley Low Mills, Wortley, Leeds 12.

Fomescol is to be used in the liner's sludge tanks to break down the water-in-oil emulsion collected from the oily water separators used to strip ballast water of oil contamination. This is a particularly important application, as the double bottom fuel tanks in the *Canberra* will be filled with sea water as ballast when the fuel oil has been used up.

Inevitably, the sea water used as ballast in dual purpose fuel tanks becomes contaminated with fuel oil which must be separated before the water is discharged ready to take in a fresh supply of fuel oil when the ship reaches a bunkering port. Under international convention it is an indictable offence to discharge contaminated ballast water in a harbour as obviously severe pollution could result.

The ballast water has therefore to be stripped of oil contamination by the oily water separators. The oil collected in the separators is drawn into the sludge tank but cannot be used as fuel as it still contains some salt water. The great advantage of Fomescol is that it enables the oil to be stripped of this salt water and the dry oil recovered to be used as fuel. Another advantage is that more than 80% of the agent itself can be recovered for re-use.

In addition to its economic value in saving in oil, Fomescol can be used for cleaning tanker washings at sea, and in this way it helps to prevent oil pollution of the sea. British ships which put salt water ballast into fuel tanks are required by law to use an oily water separator when deballasting, but the oil recovered from such a separator can contain as much as 30% sea water (by weight).

The D.S.I.R. was asked by the Admiralty to undertake an investigation of this problem. After an examination of all possible methods of de-emulsification it was decided to tailor-make a molecule specially for this purpose.

Facilities for such synthesis were not available within the D.S.I.R., but with the co-operation of Glovers (Chemicals), an efficient molecular structure was developed. This agent has now been patented jointly under the name of Fomescol by D.S.I.R. and Glovers (Chemicals) Ltd. The cost of using the agent is low, due mainly to the ability to re-use the recovered solution.

Awards 'For Advancement In Science and Practice'

ADMINISTATORS of the Sir George Beilby Memorial Fund, from which awards are made to British investigators in science in recognition of individual original work of exceptional merit, have decided that in future each award shall consist of a gold medal as well as a substantial sum of money, and shall be known as the Beilby Medal and Prize.

Consideration will be given in due course to the making of an award in 1961. Outstanding work of the nature indicated may be brought to the notice of the administrators either by persons wishing to recommend the candidate or by the candidate himself, not later than 31 December 1960, by a letter addressed to the Convenor of Administrators, Sir George Beilby Memorial Fund, the Royal Institute of Chemistry, 30 Russell Square, London W.C.1.

The letter should be accompanied by nine copies of a short statement on the candidate's career, and a list of titles, with references, of papers or other works published by the candidate, independently or jointly, together with one reprint of each published paper of which copies are available.

Blue Not a 'Sad' Colour, says Experts

With the increasing stress of modern life, blue will come to be used more and more as a restful, tranquil colour in the home, say colour experts in the U.S. Psychologists, we are assured, say that man identifies his more tranquil moods and peacefulness with the colour blue.

Cyanamid International are already prepared for the expected increase in the use of blue and have produced a pigment known as phthalocyanine or by its registered trademark Cyan Blue, produced in seven types. Its pigment is said to be stronger than iron, peacock or ultramarine blues and has an excellent resistance to acid, alkali and organic substances.

Marketed in the U.K. by Cyanamid of Great Britain Ltd., Cyan Blue is mainly used to give extra brilliance, cleaner tone, light and heat stability and chemical resistance to car body finishes. Production of the phthalocyanine blues is "still insufficient to meet the world demand and Cyan Blue is available in the U.K. only in limited quantities."

Roche Worker Dies from Cyanide Poisoning

The death occurred on Thursday of last week of Mr. John Blake, a laboratory assistant of Roche Products, who was overcome by cyanide fumes at his work at the Roche laboratories in Welwyn Garden City. An inquiry into the cause of the accident is still going on. The head of the research department of the Broadwater Road factory, Dr. A. Cohen, who went to the assistance of Mr. Blake, also collapsed, but recovered after treatment.

New Compound Prepared from Benzene Has Useful Insecticidal Properties

THIOACETAMIDE has been made by heating acetamide with phosphorus pentasulphide in benzene; it has been used as an intermediate in the preparation of 2:4 dimethyl thiazole (*Organic Syntheses*, **25** p. 36). Thioacetamide has been shown to cause experimental carcinoma in rats by oral administration (Ambrose et. al. J. *Indust. Hyg. and Tox.* 1949, **31**, 158; *Proc. Soc. Exp. Biol. Med.* 1950 **74** 1321.

By heating fluoroacetamide in benzene or in dichloromethane with phosphorus pentasulphide, a new compound, thiofluoroacetamide (thioflor) is obtained:

$$5F.CH_2\ CO.NH_2 + P_2S_5 =$$
$$5F.CH_2\ CS.NH_2 + P_2O_5.$$

Crystallised from benzene, thioflor forms pale yellow elongated rhomboidal crystals, m.p. 60°C; it is soluble in water, benzene, alcohol, chlorinated solvents and acts generally as a polar rather than as a non-polar substance. It resembles fluoroacetamide in its physical properties and has a characteristic faint thiol odour.

Its toxicity to laboratory white rats is LD 50 60 mg./K, LD 100 90 mg./K by the oral route (courtesy of Nutritional Research Unit, Huntingdon); it has been shown to possess systemic aphicidal properties by the cutting test v. roseaphids (giving good kills) down to dilutions of 1 part in 20,000 but its action is slower than that of fluoroacetamide, due, probably to slow hydrolysis to the latter.

M. A. PHILLIPS, D.S.C., F.R.I.C.

F.P.A. Issue Data on Fire Properties of Plastics and Plastics Dusts

THE fire properties of different plastics, thermosetting and thermoplastic, are classified in a technical information sheet issued by the Fire Protection Association, 31-45 Gresham Street, London E.C.2. At temperatures above 400°C most thermosetting materials char and at temperatures of 700-900°C burn sluggishly. The fire properties of thermoplastic materials differ widely, relating as they do to a number of factors apart from chemical composition of the plastics, mainly the form of the material, the degree of free access to air, and the support given to combustion of the burning material by others burning nearby.

Since all plastics are inorganic, their dusts are nearly all capable of forming explosive mixtures with air and emit toxic gaseous products of combustion in addition to carbon monoxide. The concentration of carbon monoxide, present in all fires, is so much greater with plastics and constitutes the major toxic hazard.

The present 2,000 proprietary plastics, a number which is growing daily, are divided into broad chemical classes, the properties of which are listed with examples of the more common compounds in each group. The association can provide details of many products on request.

Chemical Prices Steady in July

WHOLESALE prices in the chemical and allied industries in July showed little change according to the Board of Trade wholesade price index. The following is an extract from the index, 1954 being based on 100:

	July 1960	June 1960	July 1959
Chemical and allied industries			
Total sales	104.4	104.3	105.2
Home market sales	106.3	106.2	106.3
General chemicals ...	104.8	104.8	106.6
Pharmaceutcial chemicals	81.4	81.4	82.2
Soap	128.8	128.8	128.0
Soapless detergents ...	103.6	103.6	103.6
Commodities wholly or partly imported			
Pyrites, c.i.f. U.K. ports	61.5	60.8	65.5
Sulphur, crude (for acid making), c.i.f. ...	75.4	75.4	77.6

U.S. General Electric Gets Synthetic Diamond Patent Rights

The U.S. Patent Office has granted patent rights to the General Electric Corporation for its synthetic diamonds and the process for manufacturing them, together with apparatus used. Up to autumn of last year the process, developed by G.E.C. in 1955, could not be patented owing to the 'Secrecy Rules' of the United States Government. The registration by De Beers of a synthetic diamond process in competition with the General Electric method is seen as being the main spur for the patenting of the American process.

Petroleum Equipment and Services

Council of British Manufacturers of Petroleum Equipment announces the publication of the 1960 edition of the "Classified List of Equipment and Services", revised and enlarged to bring up to date the information in the biennial catalogue "British Petroleum Equipment", 1959/60 edition. This separate edition lists an additional 78 members. There has also been considerable extension of headings and sub-headings to cover the widening sphere of Members' activities and to facilitate the rapid location of equipment items and the manufacturers concerned.

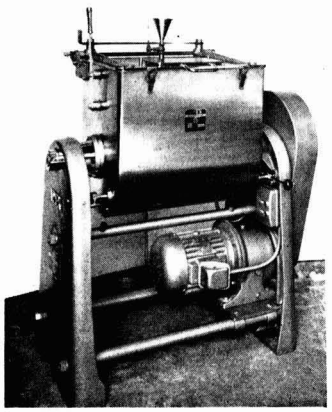
EQUIPMENT NEWS

Chemical Plant: Laboratory Apparatus: Handling and Control Equipment

RE-DESIGNED GRANULATING MIXER

In the re-designed Apex model 49C granulating mixer, the trough, lid, spray pipe, agitator and half shafts are in 18/8 stainless steel and all interior surfaces are polished, as is also the exterior of the trough. The lid is hinged on the back of the trough, and a locating pin is provided so that the lid can be fixed in position at 90° or 180°. Two locking bars are provided on the front of the machine to hold the trough rigid in the working position.

Agitator shaft bearings are of the outboard type and a gland is provided;



New Apex granulating mixer

thus, contamination of the mix by lubricant and, conversely, contamination of the bearings with powder are prevented.

The side standards are of cast iron, with a smooth exterior, for easy cleaning. The driving motor and gear box are mounted below the trough, reducing the floor space required and the final drive is by spur gears, which are complete with guard.

The lid is held in position on the trough by means of toggle fasteners, and a limit switch is provided which shuts off the electric supply to the motor when the lid is raised. The lid incorporates an inspection grid, complete with hinged stainless steel cover. The makers are **Apex Construction Ltd.**, 15 Soho Square, London W.1.

AUTOMATIC BUTTERFLY VALVES

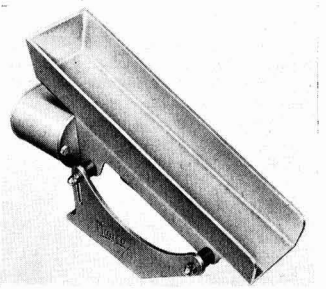
Butterfly valves recently introduced by **Boving and Co. Ltd.**, 41/47 Strand, London W.C.2, are claimed to have a number of advantages stemming from the asymmetrical blade design and the flexibility of the oleo-pneumatic package operating units. The torque characteristics of the asymmetric blade make it possible to use the valve as a combined stop and non-return valve. Full flow in the normal direction exerts a closing torque on the blade at all angles from fully closed through approximately 84° to within 6° of the fully open position. At this point the torque reverses and the blade is then held in the fully open position as long as the flow continues in the same direction, until closed by the ram. If the direction of flow reverses a closing torque is exerted on the blade at all angles from fully open to fully closed. The blade design also contributes to drop-tight sealing.

The flexibility of the control system means that opening and closing times may easily be varied to suit pipelines operating conditions. The control can be varied for many different applications, including normal power operated opening and closing, and power operated opening and closing incorporating a 'cracked' open position. The control cabinet is weatherproof and can be used to operate the valve by push button remote control.

The new valves are available in sizes from 12 in. to 120 in. diameter, and larger sizes can be made to order.

MAGNETIC VIBRATORY FEEDER

A magnetic vibratory feeder in which the magnet is attached to the tray, which is of cast aluminium, is claimed to overcome an apparent drawback of designs in which the magnet is attached to the base unit; namely, the difficulty of producing constant 'feeds' when varying loads of materials are placed on the tray. In addition, the use of cast aluminium provides a tray of extreme lightness and greater comparative thickness which is claimed to show no flexing in unwanted positions.

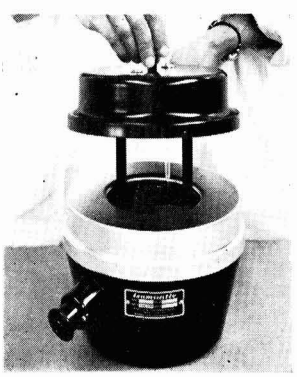


Magnetic vibratory feeder

The new feeder is produced by **Magco Ltd.**, Lake Works, Porchester, Hants, in a range of sizes. There are only three parts: the tray complete with magnetic vibrator and two cast aluminium reversible stands for either base or overhead fixing, provision also being made for a 10° angle adjustment of the tray. The tray is fitted to the two stands by means of four anti-vibration rubber mountings which prevent the transmission of vibration, thus, the feeder can be mounted as an integral part of any machine as required and when suspended from the roof or ceiling just four small tie-rods or straps only are needed, there being four fixing holes in the stands for this purpose. The absence of moving parts eliminates lubrication problems and the whole magnetic vibrator unit is entirely enclosed in a dust-proof non-rusting material which, it is claimed, will withstand the worst conditions of dirt and damp. The special angular fixing to the feed tray causes the "feed" to flow with an action which prevents wear to the tray, for which special finishes such as stainless steel or plastic linings can be provided. A controller enables an infinitely variable feeding rate from zero to maximum to be achieved.

In one application, a feeder with a maximum output of 10 tons/hr. is providing an even, constant feed of fine silicone sand over the full 8 in. width of its tray at the rate of 1 lb./hr.

MICRO-OVEN FROM ISOPAD



Micro-oven now available from Isopad Ltd., Barnet-by-Pass, Boreham Wood, Herts, for small scale work and semi-micro analysis, has an anodised aluminium outer casing and an inner metal casing forming a cylindrical cavity 4 in. deep by 4 in. diameter. A small tray fitted to the double-walled lid locates in the centre of the cavity as the lid is placed on the mantle. Venting holes are provided in the base and lid, with a second hole for a thermometer. Two in. thick high-temperature lagging provides good thermal efficiency and temperatures up to 300°C can be quickly reached. Loading is 200 watts and price is £12.

AUTOMATIC WEIGHT CONTROL

Two alternative control units, LC4 and LC5, are now offered by **Elcontrol Ltd.**, Wilbury Way, Hitchin, Herts, following the introduction last year of their first automatic weight control equipment, making use of load cells. They have also extended the range of load cells downwards to cater for weights of approximately 20 lb. and upwards. By using this equipment it is now possible to provide automatic level control in

relation to any vessel or container that is capable of being supported by a compression load cell or suspended from a suspension load cell. Further, the properties of the material being controlled are no longer relevant to the operation of the equipment. Problems of conductivity and specific inductive capacity will not, therefore, arise.

In addition, this equipment is designed to give a differential ranging from practically 0-9% of the load concerned and this is very easily adjustable at any time on the control unit itself. Once the load cells are in position, it is unnecessary to mount any electrodes or detecting heads on the vessels and the units can be adjusted at any time to give varying services. A complete equipment costs from approximately £110 upwards, according to duty.

In the LC5 unit, facilities are arranged for one or more remote deviation indicators which can show in percentage the approach to trip point condition, this being adjustable by the simple manipulation of a ten-turn potentiometer control mounted in a convenient position on the front panel.

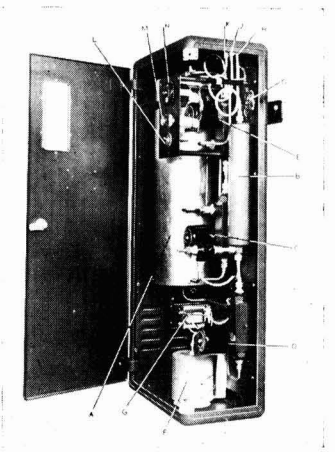
PROTECTIVE CLOTHING AND RESPIRATORS FOR protection of personnel in conditions where toxic fumes and/or dust are present, lightweight garments in p.v.c. are available in a variety of styles from **Siebe, Gorman and Co. Ltd.,** Neptune Works, Davis Road, Chessington, Surrey. They are claimed to give complete body protection against splashes from harmful liquids. Hoods and capes are available in a number of different designs, ranging from the air-fed, all-transparent hood attached to a p.v.c. cape, to the opaque hood and cape fitted to an air-line Vista mask at the front. Jackets and trousers to match are also available in small, medium and large sizes.

Other items in the range include protective armlets with elastic above the elbows and at the wrists, p.v.c. and rubber coated gloves and gauntlets, and a combination p.v.c. suit with covered front fastening, cap and visor.

The same company also produces, in several different types, the Puretha gas respirator, with a mask of moulded rubber attached to the head by six elastic adjusting straps. The window is of clear vision plastic and a flexible corrugated breathing tube connects the facepiece to the canister of chemical absorbent, which can be positioned on the chest, on the back, or in a haversack slung on the hip.

PURIDRYER FOR PURE DRY HYDROGEN To meet the demand for a self-contained unit for the production of pure hydrogen, combining the features of the Deoxo purifier with those of an automatically-operated drying unit containing Linde molecular sieve, **Englehard Industries Ltd.,** 52 High Holborn, London W.C.1, have produced the Deoxo Puridryer. This unit, with a maximum capacity of 100 s.c.f.h., will purify normal commercial grade hydrogen to give a gas with an oxygen content of less than 1 p.p.m. By using a Linde molecular sieve as the drying agent, it achieves a dew point as low as −100°F (−73°C), which enables the gas to be fed directly to a furnace.

Maximum operating pressure is 5 p.s.i.g.; pressure drop at 100 c.f.h. is 1 p.s.i.g. approximately. Power requirements are 200-250 volts a.c. (200 watts during re-activation); re-activation of the



Deoxo Puridryer: A, drying unit; B, Deoxo catalyst chamber; C, upper 3-way solenoid valve; D, lower 3-way solenoid valve; E, 2-way solenoid valve; F, converter; G, transformer; H, gas inlet; J, gas outlet; K, standby gas inlet; L, reactivation switch; M, pilot light; N, reactivation cycle timer; O, power connection

drying unit is automatic and the time required is five hours. Overall dimensions are 32½ in. by 13½ in. wide by 8⅜ in deep.

The Puridryer should be installed on the low pressure side of the gas supply line to avoid gas at pressures greater than 5 p.s.i.g. The platinum metal catalyst used in the Puridryer to remove oxygen requires no re-activation, and unless poisoned by sulphur compounds, carbon monoxide, chlorine, and some organic compounds—which are rarely found in commercial hydrogen—should last indefinitely.

The Puridryer may also be used with other gases such as nitrogen, argon, neon and saturated hydrocarbons, providing that two volumes of hydrogen are present in the gas to react with each volume of oxygen impurity to be removed.

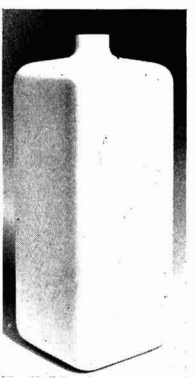
CRANE HEAT DISSIPATOR PRIMARILY developed by **Crane Packaging Ltd.,** 157 Victoria Street, London S.W.1, to form an integral part of cooling systems for mechanical shaft seals, the Crane "heat dissipator" is also capable of application as a heat exchanger in its own right, for a number of other purposes.

It has a capacity of 10,000 B.Th.U/hour, but two or more units can be used either in series or parallel, when the rate of flow and the required temperature drop exceed the capacity of a single unit.

With the exception of the connections for the coolant—which are mild steel, cadmium plated—all metal component parts are in stainless steel for protection against corrosive liquids or gases.

Information Bulletin No. 23, includes a chart showing the recommended flow rates for both product and coolant, which range between 20 and 120 g.p.h. This chart may be used to calculate the approximate working temperature of the dissipator for given rates of flow of product and coolant. It is designed for pressures up to 2,000 p.s.i. for the product, and 150 p.s.i. for the coolant. Price is £65.

ONE-GALLON POLYTHENE CONTAINER BLOW-MOULDED in Rigidex high density polythene, a new 1-gall. container is competitive in price with containers made from glass or tin plate. It is square in section, measuring 5⅜ in. by 13¾ in. high and weighs only a few ounces. Other



Cascelloid polythene container

features include rigidity, and resistance to denting and rough handling. It has no seams and is virtually unbreakable.

The 1½ in. neck is stated to provide an efficient pouring spout, and the container is sealed with a urea cap incorporating a liquid-tight polythene gasket. Trademarks, instructions and sales messages can be printed in full colour on the flat sides of the container. Makers are **Cascelloid,** Abbey Lane, Leicester.

RAPID AIR SAMPLER QUICK testing of air for the presence of toxic dusts is provided by the Hurricane air sampler produced by **Gelman Instrument Co.,** 106 North Main Street, Chelsea, Mich., U.S. The sampler draws air through a 3.9 in. diameter filter at rates up to 125 c.f.m. The air mover is a cast aluminium rotor coupled to a ½ h.p. universal, 110 V 60 cycle motor. The air sampling rotor is in its own casing. Sampling air is not recirculated through the motor. The motor has its own fan cooling system. A flowmeter

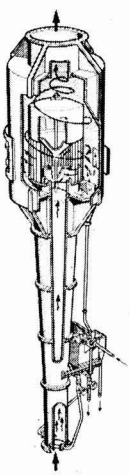
shows the air flow through the sampler. A bleed valve on the flow-meter allows the user to adjust the scale reading to fit individual conditions.

A range of filter papers include Microsorban, a new thin mat-like material composed of microfibres of polystyrene. The efficiency of this filter is 99.99% for particles of 0.1 micron diameter and above. Another filter paper is Whatman 41, an ashless cellulose filter which has good sampling efficiency but has a tendency to clog rapidly when sampling certain type of dusts. Various other papers provide further filtering characteristics.

AIRMIX WET COLLECTOR

THE Airmix wet collector newly developed by **Thermix Industries Ltd.**, of the Dunford and Elliott Engineering Group, 143 Maple Road, Surbiton, has a variety of uses in applications involving industrial dust collection. Apart from its use on new systems, it is easily adapted for installation as a secondary collector on existing plants where increased efficiency is desired.

This device is a self induced spray type vertical venturi wet washer which separates the dirty water from the cleaned gases by means of centrifugal action. The washing water is fed tangentially to the venturi throat and the gases flowing through the throat at high speed spread the water on to the cylindrical surface in a continuous film, carrying it vertically. The great difference in the velocity intimately mixes the dust laden gas and the water droplets in the fine spray produced.



Airmix wet collector

The mixture then enters a tapered diffuser section where its speed is slowed down and dust particles that have escaped are wetted as the gas again passes through a cloud of water droplets which, owing to their tendency to agglomerate, have a slower upward movement. On reaching the top section, the mixture is diverted into a ring of curved vanes which impart a strong rotational motion which separates the gases and water by centrifugal action. Any particles still in a dry state are wetted by impingement with the vanes. The dirty water is evacuated by a discharge pipe and the cleaned gases pass out through a chimney.

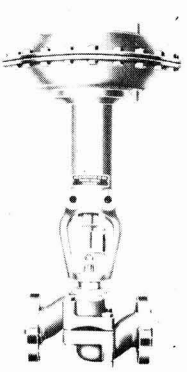
There are two type of sludge disposal system available, one consisting of a small three-compartment tank which separates the slurry through a discharge valve and another consisting of a large two-compartment sludge settling and dewatering tank in which the sludge is allowed to settle for eventual discharge down a chute into lorries for disposal, the clean water being fed in both cases back to the venturi throat.

The Airmix has been used in the chemical industry for the drying of chlorine, for the washing of nitrous, sulphurous and ammoniacal vapours and as a pre-filter before a wet electrostatic filter. The unit is of mild steel and is available in a range of standard sizes with capacities from 1,300 c.f.m. to 30,000 c.f.m. For handling larger volumes, a number of units can be operated in parallel. A galvanised finish or, for certain applications corrosion resistant linings or special materials such as stainless steel can be supplied.

SPLIT-BODY DIAPHRAGM VALVE

MODEL 1550 split-body single-seated diaphragm valve has been developed by the Audco Annin Division of **Audley Engineering Co. Ltd.**, Newport, Shropshire, at the request of instrument engineers. It is intended to supplement the range of Audco Annin Domotor valves for the simpler applications which do not justify the use of a positioner.

This model retains all the advantages of split-body construction used with Domotor operated valves, and sub-assemblies of body and actuator are interchangeable. Should a change of service justify the use of a positioner, this can be mounted on the top or side. The valve body is produced in a variety of metals including cast iron, stainless steel and bronze, and is available in sizes up to 1 in., and will shortly be available up to 2 in.

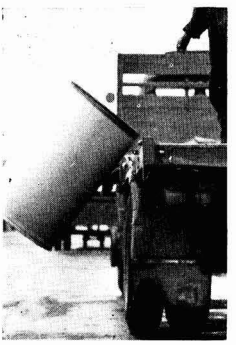


Audco Annin model 1550 diaphragm valve

UNBREAKABLE 50-GALLON DRUM

THE toughness and resilience of Hycar nitrile rubber has enabled **Fireproof Tanks Ltd.**, The Airport, Portsmouth, to produce a 50-gall. drum which can be bounced off a lorry without fear of damage. These drums, made of Hycar-coated impregnated rayon, are said to be especially useful for special purpose applications such as the transport of liquid synthetic resins.

The problem of corrosion and the resultant contamination of contents, often encountered in metal form, does not arise. There is little or no risk of bursting since the walls are almost $\frac{1}{4}$ in. thick. The drums, which may be folded up when empty, can be made to special order in larger sizes.

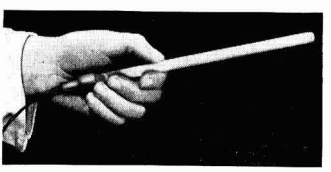


Hycar drum takes rough handling

Hycar nitrile rubber is made by British Geon Ltd., a company in the Distillers Plastics Group.

RADIATION IMMERSION HEATER

A COMPACT and powerful source of heat, lending itself to the heating of liquids in laboratories, etc., is provided by the Red-Rod radiant immersion heater introduced by **Electrothermal Engineering Ltd.**, 270 Neville Road, London E.7. The heating element is contained in a cylindrical quartz sheath varying in length between 10 and 14 in. and with an outside diameter of either 13/32 in. or 9/16 in.



Red-Rod heater

The quartz sheath of the heater is easily cleaned and is immune to attack by almost all chemical solutions with the exception of hydrofluoric acid, phosphoric acid and concentrated caustic alkalis. Infra-red radiation passes through quartz with little absorption, so that a large proportion of heat is tranferred to the liquid by radiation. Due to the low co-efficient of thermal expansion of the quartz, the heater is unaffected by violent thermal shock.

PEOPLE in the news

● New Ramsay Memorial Fellowships in Chemistry for 1960-61 have been awarded to: **Mr. Alan Bewick,** a general fellowship at Durham University; a Glasgow fellowship to **Dr. D. G. Watson** at Cambridge University; a New Zealand fellowship to **Mr. G. A. Rodley** at University College, London; Spanish fellowships to **Mr. José García Contreras, Miss María Covadonga Rodríguez Pascual** and **Mr. Salvador Oliver Moscardó,** all at Rothamsted Experimental Station; a U.S. fellowship to **Mr. Herbert L. Strauss** at Oxford University. The trustees have renewed the following fellowships for the same year to: **Dr. P. J. T. Tait** (general fellowship at Aberdeen University), **Dr. W. G. Paterson** (Canadian fellowship at Oxford University); **Dr. T. Anno** (Japanese fellowship at University College, London); **Mr. F. Balta Calleja** (Spanish fellowship at Bristol University).

● **Sir Alexander Fleck, K.B.E., F.R.S.,** president of the Society of Chemical Industry, will open the Corrosion and Metal Finishing Exhibition to be held in the Empire Hall, Olympia, London, from 29 November to 2 December. The opening ceremony will take place at 11 a.m. on 29 November. The exhibition will be at least twice as big as the first Corrosion Exhibition held in 1957.

● **Mr. James A. Petrie, Jnr.,** has been appointed assistant to the president of Kellogg International Corporation, 7-10 Chandos Street, London W.1, a subsidiary of M.W. Kellogg Co. Mr. Petrie

James A. Petrie

has been a member of the Kellogg organisation for 24 years and is assistant vice-president of the parent company and vice-president and director of Kellogg International Corporation.

● **Dr. Adalbert Farkas,** assistant director of research, Houdry Process Corporation, Philadelphia, has been re-elected president of the International Congress on Catalysis. An international authority on catalysis, he was elected at the 2nd international congress recently concluded in Paris. The third catalysis congress has been scheduled for 1964 in Holland.

● **Lord Rank** has been appointed president of the first international congress of food science and technology to be held in London in September 1962. The executive committee comprises: **Prof. H. D. Kay, C.B.E., F.R.S.,** chairman; **Dr. A. J. Amos,** chairman, publications committee; **Dr. E. C. Bate-Smith,** chairman, scientific programme committee; **A. P. Buchanan,** chairman, transport and visits committee; **Dr. J. B. M. Coppock, F. J. Monkhouse,** chairman, finance committee; and **F. J. Griffin,** hon. secretary.

● Changes in the board of Howards of Ilford Ltd. are announced as follows: **Mr. J. A. E. Howard** to be chairman; **Mr. E. W. M. Fawcett** and **Mr. H. P. P. Hodgkins** to be joint managing directors; **Mr. W. A. Levick** and **Mr. R. C. Patrick** are appointed to the board. **Mr. T. W. Howard** remains on the board of Howards of Ilford Ltd. and continues as chairman of the holding company Howards and Sons Ltd.

● Council of the Plastics Institute has awarded the Swinburne Medal to **Professor G. Gee, C.B.E., F.R.S.,** Professor of Chemistry at Manchester University, for his outstanding contributions to the advancement of polymer chemistry. Professor Gee will deliver his Swinburne address at the Royal Institution on 16 February, 1961, at 6.30 p.m., when he will be presented with the Gold Medal and the sum of money which accompanies the award.

● **Mr. D. S. Mahon** has been appointed manager of market research for Bakelite Ltd. and will continue to serve as manager of the sales development department. **Mr. C. T. Coward** and **Mr. M. C. Dixon** have been appointed assistant managers of the sales development department.

● After winding up his four-year assignment as managing director of Chemstrand Ltd., manufacturers of Acrilan, **Mr. Arvon L. Davies** returns to U.S. In 1956, Mr. Davies came to this country to set up the distribution and manufacture of Acrilan. Under his leadership Chemstrand Ltd. pioneered the production of acrylic fibre in this country from their 10 million lb. a year plant at Coleraine, N. Ireland. Mr. Davies will be taking up an appointment with the parent company, the Chemstrand Corp., as executive director, administration.

● Postgraduate fellowships have been awarded by the British Oxygen Co. Ltd. to **Mr. J. W. May, B.A.,** Oxford University, for research training at the inorganic chemistry laboratory, Oxford, and to **Mr. P. C. Bonsall, B.Sc.,** of Birmingham University, for research training at the Royal Technical College, Salford. Fellowships have been renewed for a third year for **Mr. G. Saville, B.A.,** for research training in inorganic chemistry at Oxford, and for **Dr. P. G. Clay, B.Sc., Ph.D.,** for research training at King's College, Newcastle upon Tyne.

● **Mr. Edwin Baden** has been appointed chairman of Matthew Hall and Co., and has resigned as managing director. **Mr. R. R. Baden** has been appointed deputy chairman, and **Mr. P. D. Doulton** and **Mr. S. Kindler** managing directors. **Mr. R. M. Speir** has been appointed a director.

● **Mr. E. C. Swift, B.A.,** and **M. Jean Esmieu, Chem. Eng. I.N.C.,** have recently joined the board of Sharples Centrifuges Ltd., Camberley, Surrey. Mr. Swift is president of the Sharples Corporation, of Philadelphia, U.S., and M. Esmieu is president-directeur général of Sharples France. **Mr. M. E. O'Keeffe Trowbridge, B.Sc., A.C.G.I., A.M.I. Chem. E.,** managing director of Sharples

M. E. O'Keeffe Trowbridge

Centrifuges, has joined the board of Sharples France, Paris.

● **Dr. James Sword, M.A., B.Sc., Ph.D., F.R.I.C.,** chief chemist of the flour and allied departments of the Scottish Co-operative Wholesale Society, has retired after 30 years' service. He has been succeeded by **Mr. Samuel Sloan,** a member of the laboratory staff at the society's Junction Mills, Edinburgh.

● **Mr. W. T. Bradley** has been appointed a director and will succeed Mr. E. F. Perkins as managing director of International Minerals and Chemicals Ltd., with effect from 1 September 1960. Mr. R. E. Ford has also been appointed a director of the Company as from 3 August.

● **Mr. E. K. Martin** has been appointed assistant manager, industrial filters, in the Filtration Division of Simmonds Aerocessories Ltd., Treforest, Glam, a member of the Firth Cleveland Group.

Will

Mr. Cyril Thurland Thonger, founder and director of the University Drug Co. Ltd., Birmingham, who died on 15 April last, left £13,261 12s. 10d. net (duty paid £1,065).

Overseas News

NEW PROCESS GIVES CONTINUOUS SHEET SYNTHETIC RUBBER

A NEWLY developed process, which it is hoped will become standard in the production of stereospecific synthetic rubbers, coagulates polymers from solution into continuous sheet, rather than into crumb, giving lower capital and operating costs. Crawford and Russell Inc., Stamford, Conn, state that pilot scale units have already shown that rubbers such as polybutadiene, polyisoprene and ethylene-propylene copolymers can be handled and it is thought that the equipment would also operate successfully for any solution-process elastomer and, possibly, polymer (*Chem. & Engng. News*, 1960, **38**, No. 33, 55).

The packaged process, which ranges from the handling of raw materials to final product can, it is claimed, be adapted to any catalyst and any solvent. The polymerisation reactor produces a concentrated solution with about a 5:1 solvent ratio. The desolventiser eliminates the troublesome crumb-type coagulation stage. Instead the rubber solution leaves the desolventiser in a continuous sheet with a water content of 10 to 15%, instead of the normal 30 to 40%.

In pilot scale tests, concentrated polymer solution from the reactor has been extruded into a hot water trough through a series of holes in the feed line. As the viscous polymer strands contact the water, they join to form a sheet or belt. As the belt floats through the trough, solvent is vaporised and taken off to the solvent recovery unit.

Polyisoprene sheet is said to dry in seven minutes at temperatures of 180° to 200°F. A low-cost hot air dryer was used and it is claimed that the use of this method of drying reduces any tendencies of discoloration or degradation.

Big Phosphoric Acid Rise for U.S. Company

A new wet-process phosphoric acid plant is to be built near Bartow, Fla., by Swift and Co., to double their phosphoric acid capacity to a total of 175,000 tons/year. Dorr-Oliver Engineering will handle construction.

Cuba Plans New Chemical Projects

The Cuban state bank has announced plans for setting up some 12 new plants, involving an investment of about $15 million at Matanzas. The programme includes a calcium carbide plant with an initial capacity of 9.9 million lb./year. Calcium carbonate, the raw material, is available locally. Cuban imports of calcium carbide have come mostly from Canada.

Spun rayon is to be added to the range of an existing factory, which previously produced its sulphuric acid from imported sulphur. This acid plant is being redesigned to produce sulphur from Cuban pyrites. Equipment costing some $350,000 will be installed and acid output raised to between 60 and 100 tons/day. A new sodium sulphate plant will involve an investment of $400,000 and will have an output of 8 tons/day.

Another plant will produce 2.7 million lb. of polythene film a year and will use a U.S. process on a royalty basis; it is reported that royalties will be reinvested in Cuba.

Dyestuffs and Pharmaceutical Projects for Siam

Thai Udom Usahakam Co. are planning to build a dyestuffs plant in Siam and state that the project has received the consent of the Thai Board of Investment. The company has a capital of 6 million baht, of which 2,100,000 baht comes from Siamese sources; Hong Kong interests have a holding worth H.K.$1,053,000 in the concern. At present no details are available about the new plant other than that it will employ a labour force of 380 plus 40 non-Siamese technicians.

Lepetit intend to form a company called Lepetit (Thailand), which will undertake the operation of a plant producing sufficient pharmaceuticals to cover national demand. It is later planned to expand the works and take up the production of basic chemicals.

Dutch State Mines to Use S.D. Phthalic Process

The new phthalic anhydride plant that is being constructed for the Dutch State Mines by the Chemical Construction Division of Stamicarbon N.V., will use the process developed by Scientific Design. As stated in the annual report of Staatsmijnen in Limburg (CHEMICAL AGE, 23 July, p. 140), use of this process to double their existing capacity for phthalic will lead to better yields.

Rubber Processing Improved by Use of Polythene

Low-molecular weight polythenes are now being used commercially in the processing of natural and synthetic elastomers, state Allied Chemical International, New York. Their A-C polythenes are said to represent a new class of rubber compounding ingredients that are currently used for improving processability, and for conferring vulcanisate properties suitable for many types of rubber products. This is due, in part, to their outstanding tack-modifying and lubricating properties, and to their relatively high compatability.

Hatfield Wire and Cable have recently supplied neoprene-jacketed lighting and power cables for a number of public facilities for which they used neoprene processed with the aid of the new low-molecular weight polythenes. Prior to using A-C polythene as a processing aid, Hatfield had experienced difficulties with sticking and scorching. Since using them, however, sticking has been eliminated and the danger of prevulcanisation has been greatly reduced.

Hydrazine from Olin Mathieson Will Fuel New I.C.B.M.

A $25 million contract calling for delivery of the chemical rocket fuel, hydrazine, to the U.S. Air Force for use in the Titan II intercontinental ballistic missile has been awarded to Olin Mathieson Chemical Corporation. Deliveries will begin in 1961 and will continue for three years. The hydrazine will be manufactured at a new plant at Saltville, Va, being built at a cost of over $14 million by Olin Mathieson for the Air Force.

The Titan II fuel is a mixture of two types of hydrazine-anhydrous and unsymmetrical dimethylhydrazine (UDMH). Nitrogen tetroxide is used as an oxidiser for the fuel. Olin Mathieson, who will supply the anhydrous hydrazine, are the only U.S. manufacturers of that type.

Hydrazine and not kerosene is being used for the Titan II because of difficulties in storing liquid oxygen, the oxidiser for the kerosene.

Fertiliser Output Up in Hungary

In the first six months of this year, production in Hungary of nitrogenous fertilisers increased by 17% and of superphosphate by 7%, compared to the corresponding period last year. Total output of nitrogenous fertiliser was 132,000 tons (109,000 tons); production of superphosphate reached 124,000 tons (117,000 tons).

Vinyl Acetate Plant Starts Up in Rumania

Production of vinyl acetate has started at the Rasnovo chemical plant in Rumania and is based on acetic acid, acetylene and natural gas.

Lire 1,500 M.-a-year Subsidy for Sicilian Sulphur

Under a decree of the Sicilian provincial Government, a sum of L.10,500 million (£6 million) will be granted to the island's sulphur industry as a subsidy between 1960-61 and 1966-67 at the rate of L.1,500 million (£860,000) annually.

Petrochemical Operations in Siberia

'One of the biggest oil refineries in the world', which apart from producing petrol, diesel oil, fuel oils and bitumen will also turn out technical fats and

spirits and paraffins, has been opened at Irkutsk in Siberia. The plant is to supply by-products and waste products for processing into petrochemicals at the Angarsk-Ussolsk petrochemical combine on the nearby Angara, as soon as this is completed; this future plant will concentrate its production programme on plastics.

The Irkutsk refinery processes Bashkirian oil, at present transported by train but as from next year to be carried north by a 2,500-mile long pipeline.

Euratom/U.S. Research Contracts Placed

Euratom/U.S., the combined nuclear research and development committee made up of the six Euratom (Common Market) countries and the U.S., has issued a list of 45 research and development projects granted to research firms in the seven countries under contracts worth a total of $7,800,000. The projects, most of which deal with the chemistry of nuclear reactor techniques, are to be carried out by 28 European and 10 U.S. concerns.

Italian Production of Detergent Alkylate

Joint output of the two Italian detergent alkylate producers—Sicedison in Mantua and Soc. Italiana Resine at Seste San Giovanni near Milan—is estimated at about 25,000 tons a year, of which between 18,000 and 20,000 tons are used in Italy.

South Africa Increases Chemical Exports

Over last year South Africa exported drugs, chemicals and fertilisers worth a total of £4,994,951, as against a 1958 total of only £4,331,756. Total exports of chemical products for the year amounted to a worth of £23,810,804 (£22,755,333), of which £3,225,963 (£3,124,661) was accounted for by fertilisers, £5,576,377 (£5,546,772) by pharmaceuticals and £1,048,628 (£1,113,540) by sulphur in bulk.

International Plastics Congress in Amsterdam

An international congress on processing technology in the plastics industry is to be held from 17 to 19 October next in the Koninklijk Instituut voor de Tropen, Amsterdam.

Olin Mathieson Steps up Output of HTH Dry Chlorine

Olin Mathieson Chemical Corporation are doubling the output of a water sanitising, dry chlorine chemical manufactured at Niagara Falls, N.Y., one of the chief reasons being the market created by the growing number of home swimming pools. The chemical, 'HTH', contains 70% available chlorine. Available in both granular and tablet form, it also has industrial uses.

The expansion, part of an announced multi-million dollar programme, will be completed in two stages. The first stage will be completed by March, 1961, the second by the end of 1961. Both phases call for new equipment and increased capacity of present machinery.

Duty-free French Imports of Nitrogenous Fertilisers

For the year to 30 June 1961, the French Government has fixed the quota for duty-free imports of nitrogenous fertilisers at 10,000 tons. The quota covers ammonium chloride; sodium and calcium nitrate (16% N by weight in anhydrous state); calcic cyanamide (more than 25% N by weight in anhydrous state); urea (more than 45% N in anhydrous state); ammonium sulphonitrate; ammonium sulphate; calcium nitrate-magnesium nitrate; calcium cyanamide (not more than 25% N); ammonionitrates.

U.S. Interest in Australian Emulsifiers Project

Reichhold Chemical Industries (Australia) Ltd., which has an Australian partnership with Hercules Powder Co., U.S., will begin producing resin-based emulsifiers next year at a new plant at Springvale (Victoria). The plant will be operated by a company representative of the American company and of C. Hatrick Pty. Ltd., a wholly-owned subsidiary of Reichhold's. The resin emulsifiers produced will be sold to Australian Synthetic Rubber Co. The plant will also produce chemicals for use in paper manufacture.

Approval for Canadian Gas Pipeline

With the approval of the California Public Utilities Commission for the construction of a pipeline by Pacific Gas Electric, the last obstacle for the export of Canadian natural gas has been cleared. The 36 in. pipeline will take 415 m. cu. ft. of gas into California daily.

German Chemicals Plant in India

West German companies—Farbenfabriken Bayer, Badische Anilin- und Soda-Fabrik, Farbwerke Hoechst and Friedrich Uhde—are to build a factory near Bombay costing about DM35 million for the production of chemical products and to provide the basis of a pharmaceutical and plastics industry in India. Under the agreement with the Indian Government signed in Bonn recently, the German companies will, as well as building the factory, send scientists and technicians to run it.

New 16 Million Lb./Year Citric Acid Plant in U.S.

Process modifications during construction have enabled Bzura Chemical to raise the capacity of their new citric acid plant at Fieldsboro, N.J., from a planned 8.5 million lb./year to 16 million lb. The plant, which has now been started up, is based on the fermentation of blackstrap molasses.

Albanian Plans for Two Fertiliser Plants

Negotiations are said to be nearly complete between Albania and East Germany for the construction of two fertiliser plants near Miloti, to the north of the Albanian capital of Tirana. Plans for the plants and most of the equipment are to come from East Germany and Czechoslovakia, while Albania will undertake construction.

German White Lead Producers Seek Cartel

Eight West German producers of lead carbonate and white lead pigments have applied to the Federal German Cartel Bureau for permission to set up a rationalisation cartel. The companies want to be able to undertake the uniform marketing of their products and participate in mutual co-operation.

Potassium Titanate Price Cut for Market Evaluation

The price of their loose-fibre form of potassium titanate has been cut by E. I. du Pont de Nemours from $16.50 to $5.10/lb. for market evaluation purposes in the field of thermal, electrical and acoustic insulation. Production is at present at the pilot plant stage.

Glaxo Produce Vitamin A Precursor from Lemon Grass Oil in India

FURTHER news is reported about the expansion of β-ionone manufacturing activities by Glaxo Laboratories (India). As mentioned in CHEMICAL AGE, 25 June, p. 1069, Glaxo's Indian subsidiary are now producing β-ionone, starting material for vitamin A, at Worli (Bombay); at present the whole output is exported to the U.K. and Glaxo (India) are manufacturing their own vitamin A from imported intermediates. However, when the company's new plant at Thana is completed it is expected that vitamin Apalmitate will also be synthesised from the β-ionone made there. β-ionone will also be exported to other Glaxo factories.

The company is manufacturing beta-ionone from lemon grass oil produced in South India. Glaxo is one of two companies manufacturing vitamin A in India and the only company producing corticosteroids on a large scale. The first building schedeuled for completion at the Thana site is for vitamin A production and work has also started on the construction of a corticosteroids plant.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

Acetic Anhydride. Ton lots d/d, £128.

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

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

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

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

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

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

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

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s 6d d/d to 6s; golden, 3s 9d d/d per lb. to 5s 2d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 5-ton lots or more, bag packing, £37 10s per ton.

Barium Chloride. 2-ton lots, £45.

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

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

Borax. Ton lots, in hessian sacks, c.p. Tech. anhydrous, £70; gran., £47; crystal, £50 10s; powder, £51 10s; extra fine powder, £52 10s; BP, gran., £56; crystal, £59 10s; powder, £60 10s; extra fine powder, £61 10s. Most grades in 6-ply paper bags, £1 less.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

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

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

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2½d.

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

Citric Acid. In kegs, 1-4 cwt. lots, per cwt., £11; 5-19 cwt. lots, per cwt., £10 16s; 1 ton lots, per cwt, £10 15s; packed in paper bags, 1-4 cwt. lots, per cwt., £10 12s; 5-19 cwt. lots, per cwt., £10 8s; 1 ton lots, per cwt., £10 7s.

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

Copper Carbonate. Per lb., 2s 1d.

Copper Sulphate. £80 10s. per ton less 2% f.o.b. Liverpool.

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

Formaldehyde. In casks, d/d, £40.

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

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

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

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

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

Iodine. Resublimed BP, under 1 cwt., per lb., 11s; for 1-cwt. lots, per lb., 10s 6d.

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

All prices per ton unless otherwise stated

Iodoform. Under 1 cwt., per lb., £1 2s 4d for 1-cwt. lots, per lb., £1 1s 8d, 5 cwt., per lb., 21s 1d, crystals, 3s more.

Lactic Acid. C.P., d/d, 44% by wt., per lb., 13d; 50% by wt., 14½d; 80% by wt., 23d; dark tech., ex-works, 44% by wt., per lb., 9d; 1-ton lots, ex-works, usual container terms.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basic prices: 15-cwt. drum lots, Genuine dry red, £104 5s per ton; orange lead £116 5s per ton; Ground in oil: red, £125, orange, £137.

Lead, White, Basic prices: in 5-cwt. drums, per ton for 2 ton lots, Dry English £116 15s; Ground in oil, £136.

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

Litharge. In 5-cwt. drum lots, £116 5s per ton.

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

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

Magnesium Chloride. Solid (ex-wharf), £17 10s.

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

Magnesium Sulphate. Crystals, £16.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, £1 0s 3d; 5-cwt. lots, in 28-lb. parcels, £1 0s 9d; 1-cwt. lots, £1 1s.

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

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

Nitric Acid. 80° Tw., £35 2s.

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

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

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

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

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

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

Potassium Iodide. BP, under 1 cwt, per lb., 7s 6d., per lb for 1-cwt lots, 7s 3d.

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

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

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

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

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

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

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

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

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

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

Sodium Chlorate. 1-cwt. drums, c.p. station, in 4-ton lots, about £80 per ton.

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

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

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

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

Sodium Iodide. BP, under 56 lb. per lb., 10s; 56 lb. and over, 9s 9d.

Sodium Metaphosphate [Calgon]. Flaked, paper sacks, £136.

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

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

Sodium Nitrite. 4-ton lots, £32.

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

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

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

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

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

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

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

Sodium Sulphide. Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

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

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

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £9 15s. per ton. £11 7s 6d; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

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

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

Zinc Oxide. Per ton: white seal, £107 10s; green seal, £105 10s; red seal, £102 10s.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84; 5-10 tons, £82; 10 tons and up, £80; in 500-gal. tank wagons, £79. In bulk minimum 2,500 gal. £75 per ton.

Butyl Acetate BSS. 10-ton lots, £165.

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

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45

gal. drums, under 1 ton, £133; 1-5 tons £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

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

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

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £203; 45-gal. 1-4 drums, £209.

Diethyl Phthalate. In drums, 10 tons, per ton, £187 10s; 45-gal. 1-4 drums, £193 10s.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £179; 45-gal. 1-4 drums, £185.

Dioctyl Phthalate. In drums, 10 tons, d/d, per ton, £276; 45-gal. 1-4 drums, £282.

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

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

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

Methanol. Pure synthetic, d/d, £40.

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

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

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

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

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

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

RUBBER CHEMICALS

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

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

Carbon Tetrachloride. Ton lots, £83 15s.

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

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

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

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

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

COAL TAR PRODUCTS

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

Carbolic Acid. Crystals, min. price, d/d bulk, per lb., 1s 4½d; 40/50-gal. ret. drums extra, per lb., ½d.

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

Cresylic Acid. Pale 99/100%, per gal., 12s. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

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

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

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

Pyridine. 90/160, per gal., 16s 6d about.

Toluol. Pure, per gal., 5s 9d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s 1d. MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 8d-5s 9d.

INTERMEDIATES AND DYES
(Prices Normal)

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

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

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

Dichloraniline. Per lb., 4s 6d.

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

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

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

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

Nitroanphthalene. Per lb., 2s 5½d.

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

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

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

Union Carbide Make Large 'Organic' Research Grant

To encourage and advance research in the field of chemistry, the Chemicals Division of Union Carbide Ltd., who have a major petrochemicals plant at Hythe, is making a grant of £2,150 a year for three years to Southampton University and will later consider an extension of this grant. The grant will provide for a research studentship and a research fellowship in synthetic organic chemicals in the university's Department of Chemistry. The studentship will assist promising students chosen by the University to work for a master's or a doctor's degree and the fellowship should stimulate a research atmosphere.

Market Reports

STEADY DEMAND FOR SODA AND POTASH

LONDON Trading conditions in most sections of the industrial chemicals market have been moderately active with a steady movement against contracts. The call for the routine soda products and potash chemicals keeps up to a good level, and a fair trade has been reported for hydrogen peroxide, formaldehyde and the barium compounds. Copper sulphate is in fair request on export accounts. Prices generally are steady. There has been little of fresh interest to report in the agricultural chemicals market, while the outlet for most of the coal tar products remains good.

In our market report for London last week it was stated that copper sulphate was currently being quoted at £30 10s/ton. This should have read £80 10s/ton.

MANCHESTER Activity in most sections of the Manchester market for light and heavy chemical products during the past week have been on a full scale in spite of holiday influences and in the home section existing commitments are being drawn against reasonably well by leading industrial consumers, with the potash and soda compounds, bleaching materials, plasticisers, and the non-ferrous metal products prominent. The shipping movement generally has been well maintained. In the tar products section a ready outlet is being found for carbolic and cresylic acids, pyridine, and naphthalene, and most of the light distillates.

SCOTLAND Trading conditions have returned to normal and overall business during the past week has been brisk. Both spot and contract requirements have been well demanded with quantities up to normal requirements, and involving a varied range of industrial chemicals. The seasonal quietness of the agricultural chemicals market continues and there is little change to report. Prices on the whole have shown little change.

Two Firms Link to Make Plastics Chemical Plant

UNDER a joint agreement, Matthew and Yates Ltd., fan engineers, Swinton, Manchester, and Turner and Brown Ltd., chemical plant engineers of Bolton are to manufacture under the trade name Turbro-Cyclone a wide range of plastics chemical plant and equipment in addition to their present range of p.v.c. fans.

Matthew and Yates have linked their 80 years experience in engineering with the expert technical knowledge in plastics fabrication of Turner and Brown, to produce what is described as the largest plastics chemical plant organisation in the U.K.

By this arrangement they now offer to consultants, architects, and contractors a unique design, technical and manufacturing group.

Commercial News

- **Howards and Sons Sales Up 25%**
- **Farbwerke Hoechst Offer Employees Shares**
- **Snia Viscosa Fix Date For Raising Capital**
- **Italian Mercury Concerns' Profits**

Borax (Holdings)

Group trading profits of Borax (Holdings) Ltd. for the quarter ending 30 June showed an increase over the same period last year, £1,239,117 as against £1,147,116. Net profit after tax also showed an increase at £818,204 (£759,304). For the nine months, net income amounted to £2,164,823 (£1,846,535). The interim report states that sales during June quarter and for the nine months show increases when compared with the similar periods of the preceding year.

Chemische Fabrik Schweizerhall

The Basle, Switzerland, chemical producer Chemische Fabrik Schweizerhall announces, after what it calls a "very satisfying financial year" in 1959, the payment of 8% dividend (same) plus bonus of 40 Swiss francs per share (same) on its capital of 2 million Swiss francs.

Chemie-Verwaltungs-AG

The West German chemical holding company Chemie-Verwaltungs-AG, of Frankfurt—who own 50% of Chemische Werke Hüls AG—have applied for the admission of DM122,400,000 of shares to stock markets in Dusseldorf, Berlin, Frankfurt, Hamburg and Munich.

Dominion Tar

Consolidated sales of Dominion Tar and Chemical Co. and subsidiaries for the six months ended 30 June, were $103,011,255 ($103,330,931). Consolidated net profit was $3,340,395, or 46 cents per common share ($4,539,970, or 64 cents). During the last five years, first-half earnings have varied between 31% and 43% of the total for the full year.

Drug Houses of Australia

Drug Houses of Australia raised its group profit in the year to 30 June, 1960, by £A63,278 to a new record of £A933,951 after providing £A699,875 (£A579,650) for tax and depreciation of £A213,163 (£189,560).

The dividend is repeated at 11¼%.

Farbwerke Hoechst AG

Farbwerke Hoechst AG, Frankfurt, are giving their 48,000 employees the opportunity of buying Hoechst shares at 250%, of face value, although the present stock market rate is 728% face value. The shares may be bought on the condition that they are not sold for at least another five years.

Gresham Group

Gresham Developments Ltd., Twickenham Road, Hanworth, Middx, and Lion Electronic Developments Ltd., Hanworth Trading Estate, Feltham, Middx, have been amalgamated to form a new company, Gresham-Lion Electronics Ltd., Gresham House, Twickenham Road, Hanworth (Feltham 2271). The directors are Mr. John P. Coleman, Mr. J. A. Clegg, and Dr. C. B. Speedy.

The reorganisation has been effected to eliminate overlapping interests and to facilitate closer co-operation between research, development, and production.

Howards and Sons

Directors of Howards and Sons anticipate that with extra productive capacity becoming available in both the subsidiaries and subject to trade continuing at the present level, results for the current year should be better than for the previous 12 months. Under the circumstances 14% is being paid for the 16 months ended April 30, 1960, equal to 10½% per annum, as announced on 13 July. The final dividend announced of 10% compares with a forecast of not less than 6%. A single payment of 4% was made for 1958.

Group net profits for the 16 months totalled £100,837, against £23,219 for 1958. Sales for the last 12 months were a record and over 25% above those of the previous 12 months. The improvement was made possible by increases in productivity as well as in plant capacity.

Capital development plans—see 'Project News', p. 313.

Monte Amiata

One of the two main mercury producers in the world, Monte Amiata, Società An. Mineraria, Rome, announce a net profit of Lire 218 million for 1959, after a loss over the previous year of L. 170 million. Another Italian mercury concern, Stabilimento Minerario del Siele, Rome, announce a 20% (10%) dividend for 1959. The company, which exploits the Piancastagnaio mercury deposits near Siena, recorded a net profit for the year of L. 359 million (L. 160 million).

Kaiser Aluminium

The Kaiser Aluminium and Chemical Corporation, U.S., announce a net profit of $11,740,000 or 62 cents per share, for the first half of 1960 ($13,220,000 and 72 cents). Sales totalled $214,260,000 ($221,310,000).

Freeport Sulphur Co.

The Freeport Sulphur Co., U.S., announces a net profit for the first half of 1960 of $6.450 million, or 86 cents/share, as compared with $6.87 million, or 91 cents/share, for the corresponding period of last year.

Powell Duffryn

Consolidated trading profits of Powell Duffryn Ltd. for the year ended 31 March were £2,044,732 (£1,720,230). Depreciation was £1,076,332 (£976,356). Tax takes £863,607 (£644,670), leaving consolidated net profit of £1,181,125 (£1,075,560). A dividend of 10% is recommended on ordinary, making 16%.

Snia Viscosa

The date on which the capital of the Italian synthetic fibre producer Snia Viscosa, of Milan, will be raised from 27.45 million to 40.03 million lire is 5 September. Snia Viscosa has also announced plans for extensive expansion of present capacities.

U.S. Borax

U.S. Borax and Chemical, the operating company of Borax (Holdings) Ltd., have decided to drop the words "and Chemical" from their title. The company will now officially be known as U.S. Borax.

INCREASE OF CAPITAL

REICHHOLD CHEMICALS LTD., Beckasite House, Edwards Lane, Speke, Liverpool 24. Increased by £350,000, beyond the registered capital of £1,150,000.

NEW COMPANIES

GLEAMY CHEMICALS LTD. Cap. £1,000. To manufacture and deal in bleaches, disinfectants, cleaners and other chemical products, etc. Directors: G. Falthorpe, J. W. Glendinning. Reg. office: 31 Market Lane, Dunston, Gateshead.

J. A. RADLEY (LABORATORIES) LTD. Cap. £100. Research workers in all manner of chemical, physical, industrial and constructional processes, etc. Directors: J. A. Radley and E. J. S. Beckley. Reg. office: 23a Queen Victoria Street, Reading.

HAYSTACK LTD. Cap. £2,000. To manufacture and deal in chemicals, gases, drugs, medicines, etc. First directors not named. Solicitors: Pickering and Pickering, Rugeley. Reg. Office: 10 Coppice Road, Rugeley, Staffs.

HALLIKAINEN INSTRUMENTS LTD. Cap. £100. Manufacturers of and dealers in analytical recording and measurement instruments, control equipment, etc. Director: L. C. Upsdell, C.A., Logshill House, Elmstead Lane, Chislehurst, Kent.

PLASTIC COATING RESEARCH CO. LTD. Cap. £1,000. Manufacturing, research, analytical, consulting and development chemists, etc. Directors: J. H. and A. J. Blakely. Reg. office: Liverpool House, 15/17 Eldon Street, London E.C.2.

IRRADION LTD. Cap. £100 in £1 shares. To foster research into the sterilisation, packing and preservation of pharmaceuticals, food and food products, feeding stuffs, etc. Secretary: Stanley H. Lucas, 6 Surrey Street, London W.C.2.

NEW PATENTS

By permission of the Controller, HM 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 21 September

Production of chloroprene. Distillers Co. Ltd. **848 598**

Separation of acidic gases from gaseous mixtures. Power-Gas Corp. **849 150**

Polymerisation of ethylene. Distillers Co. Ltd. **849 132**

Process for treating metal halides. Columbia-Southern Chemical Corp. **849 172**

Trialkylsiloxy monaryl silicon compounds. Farbenfabriken Bayer AG. **848 719**

Production of cycloaliphatic alcohols and ketones by oxidation of cyclo-aliphatic hydrocarbons. Badische Anilin- & Soda-Fabrik AG. **849 134**

Dehydrogenation of alicyclic alcohols. Engelhard Industries Inc. **849 135**

Elastomers. Goodrich Co., B. F. **849 136**

Phenothiazine derivatives and their preparation. Sterling Drug Inc. **849 137**

Copolymerisation of monoethyleneically unsaturated monomers in the presence of polyacrylonitrile. Stockholms Superfosfat Fabriks A.B. **848 606**

Water-soluble steroid compounds and a process for their manufacture. Schering AG. **848 515**

Halogeno-acyl-dyestuffs and their manufacture and use. Ciba Ltd. **848 742**

Process of producing a uranium dioxide material. United States Atomic Energy Commission. **848 609**

Process for preparing glycidyl ethers of phenols. Bataafsche Petroleum Maatschappij N.V., De. **849 036**

Method for the N-alkylation of cyclic amines. Farmochimica Cutolo-Calosi S.p.A. **849 037**

N-vinyl-3-morpholinone compounds and polymers thereof. Dow Chemical Co. **849 038**

Processes for the production of alkylboric acid esters and free alkylboric acids. Studiengesellschaft Kohle. **848 519**

Process for the manufacture of α-chloro-β-amino-carboxylic acid derivatives and α-chloro-β-amino-carboxylic acid derivatives. Hoffmann-La Roche & Co. AG, F. **848 611**

Method of removing acid gases from hydrogen-containing gases. Hesky, M. **848 613**

Acrylonitrile polymerisation. Du Pont De Nemours & Co., E. I. **848 614**

Graft copolymers of certain monomeric sulphonic acids on polyvinyl lactams and acrylonitrile polymer compositions obtainable therewith. Dow Chemical Co. **849 063**

Production of cyclohexanone. Badische Anilin- & Soda-Fabrik AG. **848 615**

Aluminium oxide and in the manufacture thereof. Du Pont De Nemours & Co., E. I. **849 051**

Steroids and the manufacture thereof. Upjohn Co. **848 749**

Process and apparatus for the production of hydrochloric acid from waste gases containing hydrogen chloride. Badische Anilin- & Soda-Fabrik AG. **849 055**

Interpolymers and compositions containing same. Du Pont De Nemours & Co., E.I. **849 066**

Organopolysiloxane compositions. Soc. Des Usines Chimiques Rhone-Poulenc. **849 069**

Antioxidant compositions and aqueous dispersions thereof. American Cyanamid Co. **848 773**

Preparation of anhydrite. National Lead Co. **848 617**

Hydrocarbon filtration. Permanent Filter Corp. **848 775**

Phosphorus-containing elastomers. Union Carbide Corp. **849 058**

Polymers. Union Carbide Corp. **849 059**

Steroids and the manufacture thereof. Upjohn Co. **849 071; 849 072**

Process for the removal of sulphuric acid from sulphonation products of alkyl aryls. Bataafsche Petroleum Maatschappij N.V., De. **849 183**

Isomerisation of paraffin hydrocarbons. Socony Mobil Oil Co. Inc. [Addition to 799 811.] **849 074**

Process for the production of aromatic diamines. Goodrich Tire & Rubber Co. **848 778**

Preparation of poly-thiuram disulphides. Shell Research Ltd. **849 199**

Styrene polymerisation process. Koppers Co. Inc. **848 620**

Sulphonamides. Ciba Ltd. **848 622**

Method for the synthesis of dicarbocyanine dyes. General Aniline & Film Corp. **849 185**

Water-soluble dyestuffs of the azoporphin series and their production. Badische Anilin- & Soda-Fabrik AG. **848 782**

Production of aniline. Farbenfabriken Bayer AG. **848 626**

Sulphonamides. Ciba Ltd. **848 627**

Manufacture of cellular polymeric materials. Imperial Chemical Industries Ltd. [Divided out of 848 910.] **848 911**

Purification of crude terephthalic acid. Badische Anilin- & Soda-Fabrik AG. **849 189**

Sulphonamide derivative and process for its manufacture. Ciba Ltd. **848 630**

Process of hydrogenating adiponitrile or aminocapronitrile. Stamicarbon N.V. **848 786**

Method of recovering pentaerythritol and alkaline formates. Montecatini Soc. Generale Per l'Industrie Mineraria E Chimica. **848 632**

Method of and an apparatus for continuous saponification of vinyl ester polymers. Kurashiki Rayon Kabushiki Kaisha. **848 787**

Preparation of detergent compositions. Unilever Ltd. **848 633**

Production of 2,3-dihydrofuranes. Badische Anilin- & Soda-Fabrik AG. **849 192**

Vinyl-substituted cyclohexane and the production of same. Chemische Werke Hüls AG. **848 637**

Process of polymerising compounds possessing a polymerisable double bond. Esso Research & Engineering Co. **848 638**

o-Divinylbenzenes. Du Pont De Nemours & Co., E. I. **848 652**

Detergents and disinfectants. Goldschmidt AG, T. [Addition to 836 956.] **848 654**

Polymeric organo-boron phosphorus containing compounds and methods of making same. United States Borax & Chemical Corp. **848 656**

Process for separating organic compounds. Bataafsche Petroleum Maatschappij N.V. **848 658**

Process for the production of ethers of highly polymeric formaldehyde. Badische Anilin- & Soda-Fabrik AG. **848 660**

Open to public inspection 28 September

Plutonium compounds. Dixon, J. S., Katz, J. J., and Orlemann, E. F. **849 651**

Reaction products of polymers and polyisocyanates or polyisothiocyanates. Dunlop Rubber Co. Ltd. **850 162**

Method of and means for the intimate mixing of two or more liquids. Loftus, C. W. **849 621**

Production of gas. Woodall-Duckham Construction Co. Ltd. **850 163**

Fertilisers. Fisons Ltd. **850 164**

Dichlorocyanuric acid and compositions containing same. Food Machinery & Chemical Corp. **849 907**

Polymerisation of alpha-unsaturated olefins. Union Carbide Corp., formerly Union Carbide & Carbon Corp. **849 553**

Production of chlorine dioxide. Tennants Consolidated Ltd. **849 816**

Method of bonding together bodies of polyamide resins. Ions Exchange & Chemical Corp. **849 451**

Hydroxy-pregnanes and process for their manufacture. Ciba Ltd. **849 558**

Magnetic ferrites. Steatit-Magnesia AG., and Steatit Research Corp. [Addition to 849 217.] **849 464**

Art of producing filamentary polyacrylonitrile. American Cyanamid Co. **849 465**

Process and apparatus for the manufacture of thermoplastic films. Farbwerke Hoechst AG. Vorm. Meister, Lucius & Brüning. **849 466**

Process for the manufacture of polysulphone resins. Compagnie de Saint-Gobain. **849 469**

Finely divided silica. Columbia-Southern Chemical Corp. **849 521**

Preparation of polymers. Goodrich Co., B. F. **849 823**

Polymers and the preparation thereof. Goodrich Co., B. F. **849 669**

Production of higher alcohols. Goodrich-Gulf Chemicals. **849 914**

S-triazine derivatives. Imperial Chemical Industries Ltd. **849 772**

Process for rendering surfaces of articles of thermoplastic materials more resistant to slipping. Farbenfabriken Bayer AG. **849 916**

Printing and dyeing compositions and method of treating textiles. Farbenfabriken Bayer AG. **849 921**

Production of gibberellic acid. Imperial Chemical Industries Ltd., Borrow, A., Jeffreys, E. G., and Nixon, I. S. **850 018**

Dehydrating apparatus. Chain Belt Co. **850 077**

Preparation of unsaturated cyclic urea derivatives. Rohm & Haas Co. **849 541**

Pharmaceutical compositions and process for preparing same. Pfizer & Co., Inc., C. **849 830**

Purification of lower aliphatic acids. Celanese Corp. of America. **850 176**

Devices for analysing gas mixtures by absorption of rays. Office National d'Etudes et de Recherches Aeronautiques O.N.E.R.A. **849 831**

Manufacture of polyformal materials. Hudson Foam Plastics Corp. **850 178**

Hydrocarbon conversion process. California Research Corp. **849 977**

Methods of and apparatus for bringing liquids into contact with granular materials. Permutit Co. Ltd. **849 979**

Method and apparatus for analysing a reactive gas. Standard Oil Co. **849 456**

Light-sensitive diazotype materials. Ozalid Co. Ltd., and France, R. H. **849 739**

Production of light highly voluminous silicate or silicon dioxide. Deutsche Gold- und Silber scheideanstalt vorm. Roessler. **850 187**

Hemicyanine dyestuffs. Ilford Ltd. **849 741**

Apparatus for removing suspended matter from a gas stream. Bamford, W. D., and Higham, J. B. **849 928**

Method and apparatus for catalyst activation. Phillips Petroleum Co. **849 929**

Chlorination of hydrocarbons in the gas phase. Badische Anilin- & Soda-Fabrik AG. **849 434**

Manufacture of polyurethane foams. Imperial Chemical Industries Ltd. **849 931**

Synthetic polymer films. Imperial Chemical Industries Ltd. **849 436**

Purification of silicon tetrahalides such as silicon tetrachloride. Aries Associates Inc. **849 932**

Dispensers for detergents. Surface Active Products Ltd. **849 438**

Thermal cracking of liquid hydrocarbons. Chemische Werke Hüls AG. **850 097**

Hydroxylation of steroids. Takeda Pharmaceutical Industries Ltd. **849 843**

Process of producing a tube of polytetrafluoroethylene resin or similar material. Resistoflex Corp. **849 503**

Phenyl-alkyne-diols and method for their production. Abildgaard, K. (trading as Lovens Kemiske Fabrik ved A. Kongsted). **850 106**

Heat treatment of silicon. General Electric Co. Ltd. **849 550**

Detergent compositions. Unilever Ltd. **849 747**

Production of vinyl-substituted pyridines. Distillers Co. Ltd. **850 114**

Purification of amylglucosidase and preparation of dextrose. Corn Products Co. **849 508 & 849 509**

Production of dyeable polymeric materials from polymers containing nitrile groups. Gevaert Photo-Producten N.V. [Addition to 786 960.] **850 116**

Disazo pigments. Imperial Chemical Industries Ltd. **849 376**

Process for the treatment of polymers of alpha-olefins. Sun Oil Co. **849 753**

Method of producing viscose. Boryniec, A., Sobolewski, M., Kraul, E., and Klekot, J. **849 415**

-Dialkyl-amino-propiophenones and their preparation. Temmler-Werke, Vereinigte Chemische Fabriken. **849 755**

Vitamin A compositions. Merck & Co. Inc. **849 787**

TRADE NOTES

Treatment of Aluminium

A new range of treatments for aluminium and aluminium alloys has been introduced by the Metal Finishing Division of the Pyrene Co. Ltd. They are: Bonderite 710 which can be used to treat a variety of subjects from small aluminium parts to continuous strip; Bonderite 701 converts the aluminium surface into an amorphous oxide-chromate which is integral with the metal and offers protection against corrosion; Bonderite 740, also an oxide-chromate treatment, which is a corrosion-resistant film in its own right but also provides a base for organic finishes; Aluma Etch 391, an aluminium etchant which prevents the conversion of sodium aluminate into sludge.

Latex Technical Service

Latex technical service facilities and a quality control laboratory are to be established at Rotterdam by Dow Chemical International in conjunction with the styrene-butadiene latex plant now under construction in the third petroleum harbour at Rotterdam.

B.D.H. Chemicals

Several chemicals have been added to the B.D.H. range: glyoxylic acid, best known in the Hopkins-Cole reaction for tryptophan; the optically inactive DL-glutamine; imino-diacetic acid and the disodium salt, the complex-forming properties of which make them suitable for the determination of total hardness in water; and also a range of high purity metals—antimony, arsenic, lead and tin—all of 99.999% purity. B.D.H. have also issued leaflets on 'The determination of free and combined residual chlorine in water' and 'Ester wax 1960', both tropical grade and as a histological embedding agent.

Wiggin H.-T. Alloys

Following a series of 15 exhibitions, Henry Wiggin and Co. Ltd., Thames House, Millbank, London S.W.1, are to stage their first exhibitions that will be devoted to Wiggin high-temperature alloys, including the Nimonic and Nimocast series, Inconel, Incoloy and Incoloy DS. To be held at the Grand Hotel, Sheffield, 20-22 September, and at More's Hotel, Glasgow, 27-29 September, they will demonstrate properties and applications of these alloys.

Sub-sieve Sizer

Kek Ltd., Palmerston Street, Manchester 12, U.K. agents for the Fisher sub-sieve sizer, state that owing to increased demand, they will in future carry stocks of the instrument, as well as spares, in Manchester; purchasers need no longer arrange shipment direct from the U.S.

Holdan Handling Plant

The range of plant manufactured by Holdan Engineers (London) Ltd., 119 Victoria Street, London S.W.1, an associate of W. C. Holmes and Co. Ltd., is described in a new booklet 'Holdan Materials Handling Plant'. Included in the range is the Holo-Flite processor, a screw conveyor for heating, cooling or drying, with hollow flights through which a heat transfer agent is circulated.

New I.C.I. Dairy Detergent

I.C.I. Dyestuffs Division have introduced a new detergent steriliser, Vantoc DP, for cleaning milking machines, pails, coolers, etc. Essential ingredient is a quaternary ammonium bactericide and the new product is produced as a water-soluble powder.

Electronic Control Units

Transistorised level control equipment which detects the presence of material at a probe or similar electrode inserted into a tank, container or other suitable vessel or pipeline is described in publication D22011-02 issued by Lancashire Dynamo Electronic Products Ltd., Rugeley, Staffs. From the same source comes publication D6111-01 describing an electronic process timer which provides single or multi-interval timing of industrial operations and processes.

Monel Mechanical Seals

Mechanical seals for pumps and other chemical industry equipment in Monel corrosion-resistant alloys are described in *Wiggin Nickel Alloys*, No. 57, copies of which can be obtained from Henry Wiggin and Co. Ltd., Thames House, Millbank, London S.W.1.

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Stainless Steel 750 gall. Cyl. Tanks.
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