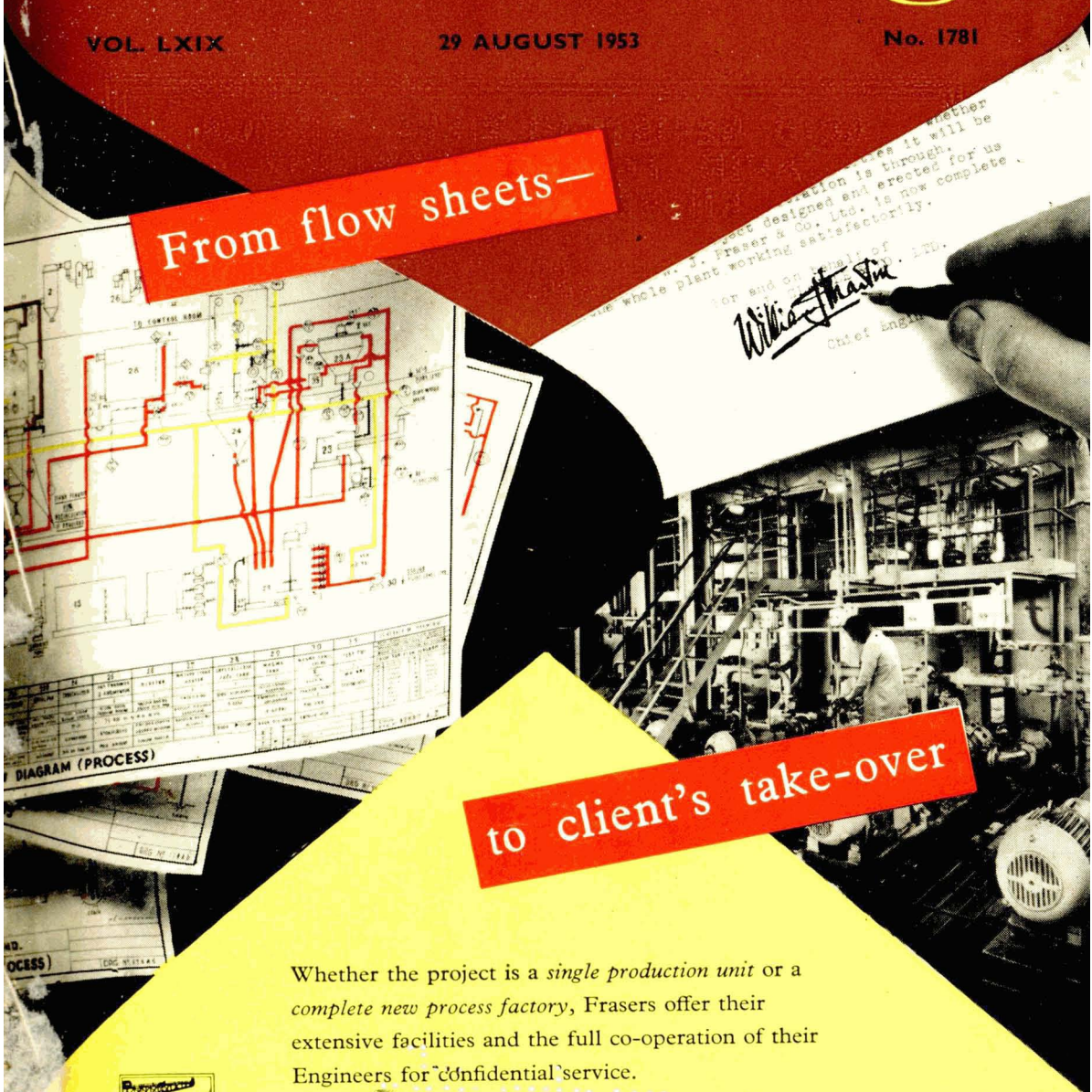
The Chemical Age

VOL. LXIX 29 AUGUST 1953 No. 1781



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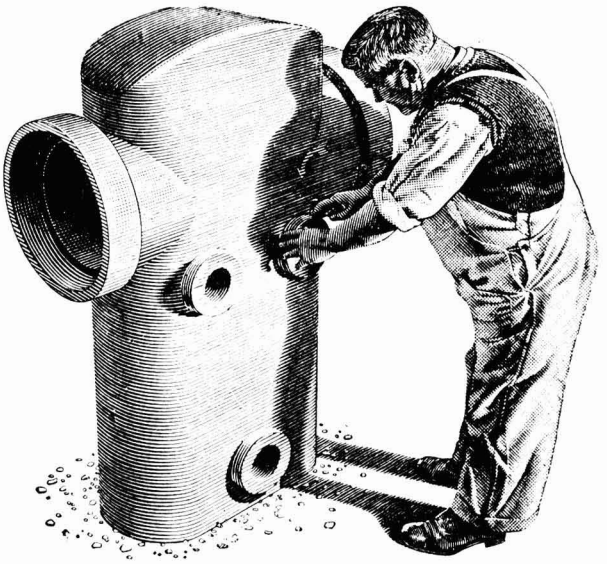

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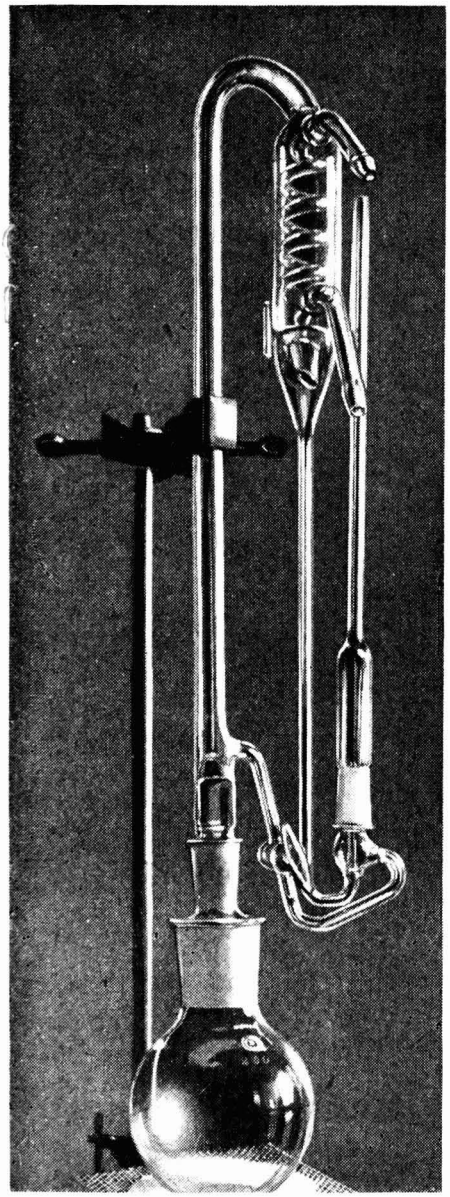

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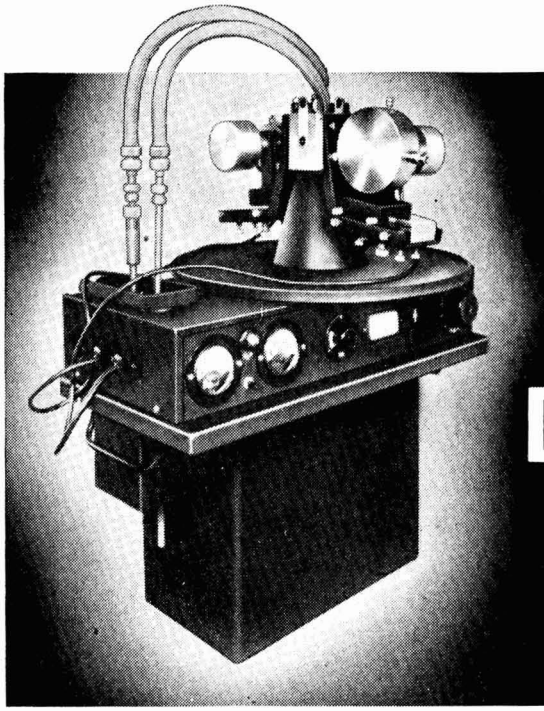

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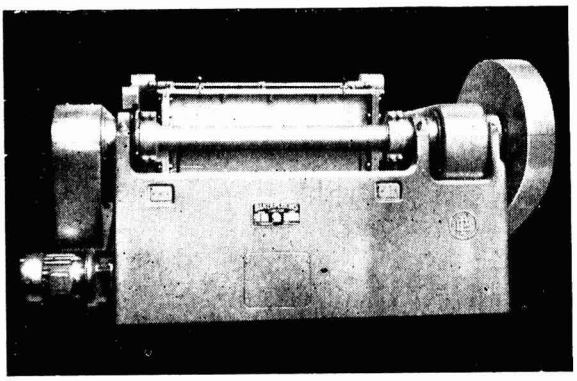

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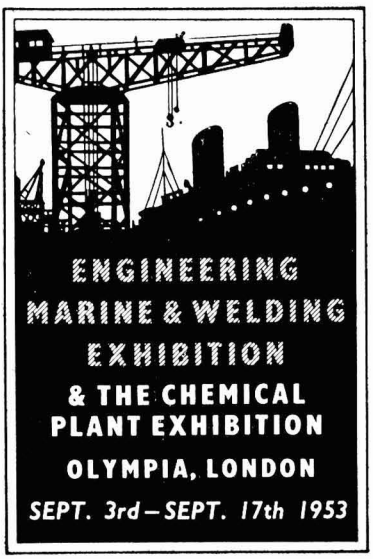
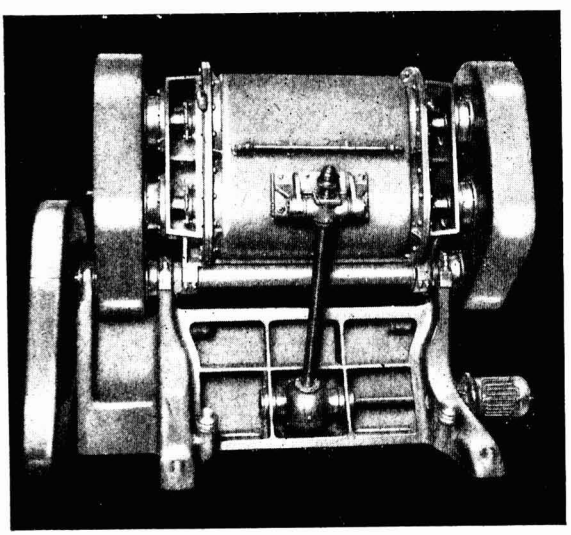


Below. Rear view of same machine tilted for emptying.



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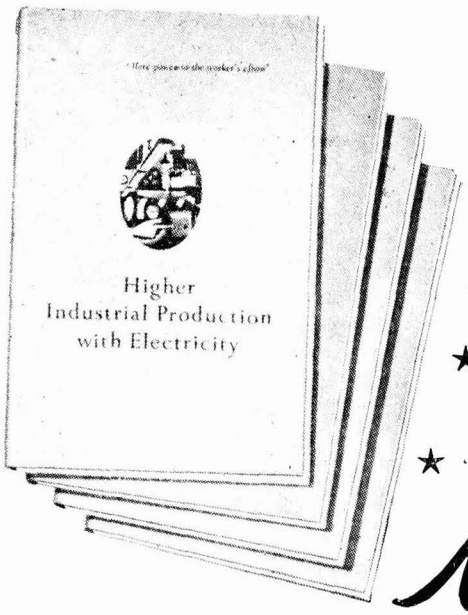

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The post-free price of each of the books is 9/- and copies can be obtained from the British Electrical Development Association, 2 Savoy Hill, London, W.C.2, or from your Electricity Board.

The Association has produced a film called "A Case for Handling" which illustrates by practical demonstration the vital part that improved materials handling can play in all industries. It runs for 32 minutes, and is available on free loan.

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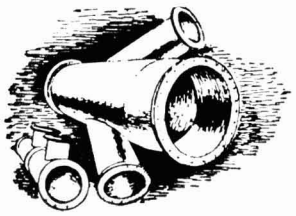

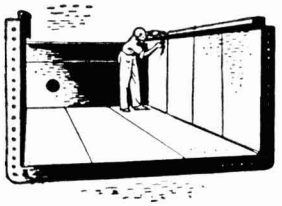

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OUR POINT OF VIEW

A Happy Augury

NOT since before the war has the British chemical plant industry staged an exhibition, and we can assume that next week's venture at the Olympia is a confident signal that most and perhaps all of the post-war handicaps of the industry have been overcome. Four years is far enough to look back to find a depressing pattern of delays, postponements, shortages, and overlapping controls. The 1949 Report of the Association of British Chemical Manufacturers gave a grim but objective picture of the situation then. 'There is a limit to the extent to which a chemical manufacturer can make do and mend . . . Great shortages (of stainless steel) have occurred in the past and it is not known whether adequate supplies will be available in the future . . . Equipment badly needed in the United Kingdom has gone to oversea competitors . . . While the general position is better, delivery dates of one to two years ahead are still common . . .' As recently as January this year the Heavy Chemicals Anglo-American Productivity Report said: 'In America today there is a greater percentage of *modern* chemical plant and equipment than in Britain, with the advantages of design, layout, superior materials handling and automatic control, which modern plants in either country today embody. *It is primarily to this* that we attribute the higher productivity of the American industry.'

Throughout the post-war period British chemical plant manufacturers have faced serious shortages of vital materials, with stainless steel—the most important corrosion-resisting metal—in the gravest position of all. These uncertainties have steadily faded during 1953 and today it can be said that raw material supplies are more assured than they have been since 1939 and the chemical plant industry can as a result meet customers' requirements, both at home and abroad, without costly delays between ordering and delivery. The true competence of the British chemical plant industry can at long last be displayed for its progressive growth and expanded technological range have so far been over-shadowed by these other difficulties. Both for makers and users of plant the exhibition in London can be regarded as the opening of a new period of opportunity. Many British firms can undertake the engineering of complete projects; if the evidence of this seems more abundant abroad than at home, that is the result of priorities for exports, a policy of questionable wisdom so far as chemical plant is concerned and one that has been considerably eased in the past year or two.

Perhaps the most notable installations of new plant at home have been those erected for the development of a British petrochemicals industry. This has called for much bigger plant units than this country has known before, and despite raw material difficulties British manufacturers have met the demands made upon them—with 130-ft. long distillation columns, huge storage containers for compressed gases, and uniquely large process vessels now to be seen at such places as Grangemouth, Shellhaven, the Isle of Grain, and Fawley. There has been plenty of praise for the scientific enterprise and ingenuity that have gone into the creation of this entirely new branch of chemical industry, but the contribution of the makers of the plant has been the very mainspring of achievement.

The British plant industry is entering its new period of opportunity at a time when plant technology is swiftly changing. The working conditions of many new chemical processes make increasingly

arduous demands upon the endurance of constructional materials. High temperature and high pressure on the one hand, or the sensitivity of biological products on the other, frequently require entirely new combinations of properties from plant structural materials, greater physisal strength allied with greater resistance to corrosion, or what might be called micro-inertia so far as trace corrosion is concerned. British plant manufacturers have steadily developed the use of new or relatively new materials in seeking to match the needs of new processes. Among the metals, tantalum and zirconium are being introduced; in the non-metallic class, carbon, graphite, plastics, and glass have made unique advances. Glass in particular is finding new functions in modern chemical industry; in a comparatively brief period it has travelled out of the laboratories and the glass-blower's shop to display a spectacular versatility in complex and large-scale plant systems. Those who assume that old industries are inevitably backward in technical development can find no evidence of this in the British glass industry—at a time when the new organic plastics are competing with glass in its traditional uses, heat-resistant glass has boldly entered new fields as a robust industrial material.

It is paradoxical that modern chemical plant should become more readily available when capital investment in industry can less easily be made. Theoretical economists may regard this as a simple case of cause and effect. This view is open to question. The past difficulties in raw materials for plant construction were mainly inevitable but partially created by the policy of exporting to equip foreign countries at the expense of not re-equipping our own export-winning factories. The present scarcity of investment capital is not entirely a naturally-caused and inevitable development. Partial easement is practicable for re-equipment or for new process installation in nationally vital factories—and what section of industry makes a greater contribution to our export trade per man-week and per ton of material used than the chemical industry? In the recent Report of the Advisory Council on Scientific Policy, expedited writing-off of capital facilities and special treatment for production projects deemed of outstanding value were suggested, even though the Council felt that fiscal policy fell outside its competence. Are we to find that capital is not available, or is too dear in price, *now* when the chemical industry at long last has the physical opportunity to modernise its plant facilities? Must high taxation of profits and high interest rates on capital keep elderly and less efficient plant running in Britain while new plant steadily enters factories overseas?

World Nuclear Energy Body

AT the conclusion of the International Conference of Atom Scientists held at Oslo recently, first steps were taken towards the formation of an international nuclear energy society, the meeting agreeing to form a small working committee to keep contact with interested nations and to do the preliminary work of formation.

Chief aims of the new organisation were set out by Dr. Gunnar Randers, of Norway, as follows:—

1. Standardisation of symbols, nomenclature and terminology used in nuclear energy work.
2. Publication of a journal with technical articles of general interest to atomic energy workers.
3. Arranging international meetings for the exchange of views.
4. Collection and circulation of information and other material on the subject.

Standard Metric Measures

THE Board of Trade has announced the introduction of two new standard metric measures of two and one half litres and 250 millilitres, the reason being that the Association of British Pharmaceutical Industry have advised their members to sell solids, liquid galenicals and pharmaceutical chemicals by metric weight and measure only. The standards have been approved by an Order in Council, dated 1 August, published as the Weights and Measures (Board of Trade Standards: 2½ Litres and 250 Millilitres) Order, 1953. Copies of the Order (S.I. 1953 No. 1200, by post 3½d.), can be obtained from HM Stationery Office, Kingsway, London, W.C.2, and branches.

Notes & Comments

The Fischer-Tropsch Process

RESEARCH and development work on the Fischer-Tropsch process of producing petrol, diesel and jet fuels, waxes and a wide range of chemical products from coal has been carried out by the Fuel Research Station at Greenwich for upwards of 18 years and, as might be expected, as a result of its own work and of its contact with research workers abroad the Station has available much valuable information on the process and its application in the chemical industry. It may not be generally known, however, that this information is freely available to those interested and can be obtained on application to the Director, Fuel Research Station, River Way, Blackwall Lane, S.E.15. In its original form, the process was used in nine German plants during the period 1939-45 and produced annually about 500,000 tons of liquefied gas, petrol, high-grade diesel oil and other products. Nowadays, interest in the process is world-wide and is not confined to countries without indigenous petroleum. In the USA, for example, both Government and industry have spent large sums on research and development work on the process, culminating in the construction by industry of a commercial plant at Brownsville, Texas, to produce 300,000 tons of high-grade petrol from natural gas a year, and the erection by the US Bureau of Mines of a 300 tons/year 'demonstration' plant at Louisiana, Missouri, based on coal as raw material.

The Major Cost

IN the operation of the Fischer-Tropsch process the major cost is that of making the synthesis gas, the required mixture of carbon monoxide and hydrogen, which, in turn, is largely dependent on the cost of the coal or other basic raw material. At the present price of coal relative to petroleum oil, the operation of the Fischer-Tropsch process to produce liquid fuels as main products is not commercially economic in this country or the USA. The work of the Bureau of Mines in the USA and of the Fuel Research Station in this country is, to a large extent, therefore, concerned with the possibility of future shortages of natural petroleum oil, either local or world-wide. No commercial Fischer-Tropsch plant has ever been erected in this country and, so far as we are aware, there are no plans for building one. Where very cheap coal is available, production of synthetic oil can compete with imported petroleum oil and at the present time a Fischer-Tropsch plant to produce annually about 200,000 tons of petrol, diesel oil and waxes from low-grade coal is in course of construction at Coalbrook, Orange Free State. Serious consideration has been given to the erection of a similar plant in Southern Rhodesia, where similar conditions prevail.

Chemical Engineering Advance

SINCE the Fischer-Tropsch process was first industrialised in Germany in 1936 it has undergone many improvements and modifications. On the chemical engineering side of the process the advances made have been considerable. The synthesis reaction is strongly exothermic (over 7,000 B.Th.U. per lb. of product made) and the output of the required products is highly dependent on efficient control of catalyst temperature by removal of the heat of reaction. In the original German plants this was achieved by using a fixed bed of catalyst granules packed into water-cooled tubes or into a vessel equipped with finned tubes carrying cooling water. In either case the catalyst temperature was controlled by regulating the steam pressure in the cooling system. The low rate of heat transfer obtained in such a system severely limited the permissible throughput of the reactors and the degree of conversion per pass. The fixed bed system has been improved since the war by the Ruhrchemie AG (the licensors of the original process) and the space-time yield increased to about five times that achieved in the original reactors.

The first stage of the South African plant is to be equipped with reactors of this type. By utilising the 'fluidised-solids' technique for the synthesis very much higher rates of heat transfer from the powdered catalyst to the cooling water can be obtained. Equipment now available at the Fuel Research Station includes a number of laboratory-scale units for catalyst development and testing, and for studying the effect of process conditions on catalyst performance and product quality. Those engaged on the task as a whole deserve hearty congratulations on the extent and value of the knowledge they have gained and now make freely available.

South African Venture

THE largest plant of its kind in the world is being erected for oil-from-coal production in South Africa. The Sasol (South African Coal, Oil, and Gas Corporation) project has already been voted £18,000,000 by the Union Government and many millions more are likely to be needed before completion. Although an American firm is mainly responsible for construction and erection, orders for machinery and plant have been placed with Britain, Belgium, France, Germany and Switzerland. Initial production is expected to take place at about the end of 1954. Two separate plants—one with a circulating catalyst, the other with a fixed-bed catalyst—will yield the three main grades of oil, petrol, diesel and fuel oils. Output of petrol will be some 60,000,000 gal. a year; that of diesel oil, nearly 5,000,000 gal., with about 1,000,000 gal. of fuel oil. There will also be 5,000,000 gal. of by-products—tars, alcohols, aldehydes, ketones, and paraffin waxes—and also, of course, ammonia. A deposit of coal is being opened up to feed the Sasol plant. Some of the shafts have already been completed. The new colliery will produce about 7,500 tons a day on a 6-day week basis; the oil-from-coal plant, however, will work a 7-day week, and its power station alone will require 1,800 tons of coal per day. Chemical research on plant problems is already going on. Pilot plant investigations, using biological filtration methods, have shown that the phenol content in waste effluents can be reduced from 50 p.p.m. to 0.8 p.p.m.

British Industries Fair

READERS will recall that earlier this month we gave publicity to a statement issued by the Association of British Chemical Manufacturers regarding the decision not to organise a Chemical Section at the 1954 British Industries Fair, the sole object being to provide a breathing space in which to examine ways and means of organising a satisfactory and comprehensive display in future years. Whether this has caused a fluttering in the official dove-cotes we cannot say, but the fact remains that the organisers are more than redoubling their efforts to obtain the support of industry. Indeed, more than three times as many firms in general are being invited to take part in the London section of the 1954 BIF. than have ever been approached before. Letters of invitation to 30,000 manufacturers all over Britain are accompanied by specially prepared sales material giving them much more information about the Fair and what it has to offer than has ever been sent out previously. Moreover, more money than usual is to be spent on press advertising. There can be little doubt as to the value of the BIF. and we welcome this greater effort to gain the support of exhibitors.

Warning

AN unusual accident with nickel carbonyl in an American refinery may serve as a general warning in the petrochemical industry. Two men died and 30 others were taken to hospital. A so-called 'inert gas' was used to purge a vessel containing a nickel catalyst. This 'inert gas' contained 1 to 1.5 per cent of carbon monoxide. The catalyst was at a temperature of 100-105° Fahr. when the operation took place. Maintenance workmen were subsequently taken ill, but their symptoms were attributed to alcohol and aldehyde fumes. Nickel carbonyl was not suspected until the later stages of hospital treatment. The 'inert gas' used was produced by the combustion of natural gas. It has now been replaced by nitrogen.

Chemical Plant Manufacturers Praised

Tribute by the President of the Board of Trade

IN a special message to THE CHEMICAL AGE, the President of the Board of Trade writes as follows:—

I am glad that the Chemical Plant Exhibition is being held again this year with such strong support from British plant manufacturers. The British chemical industry has expanded considerably in the years since the Exhibition was last held and there have been great technical advances in a number of diverse fields.

The demands made on the plant makers have grown correspondingly more severe, and they have discharged their task with distinction despite the difficulties of the war and post-war years. They can handle the largest projects and can offer a very extensive range of products using modern constructional materials and fabricating techniques.

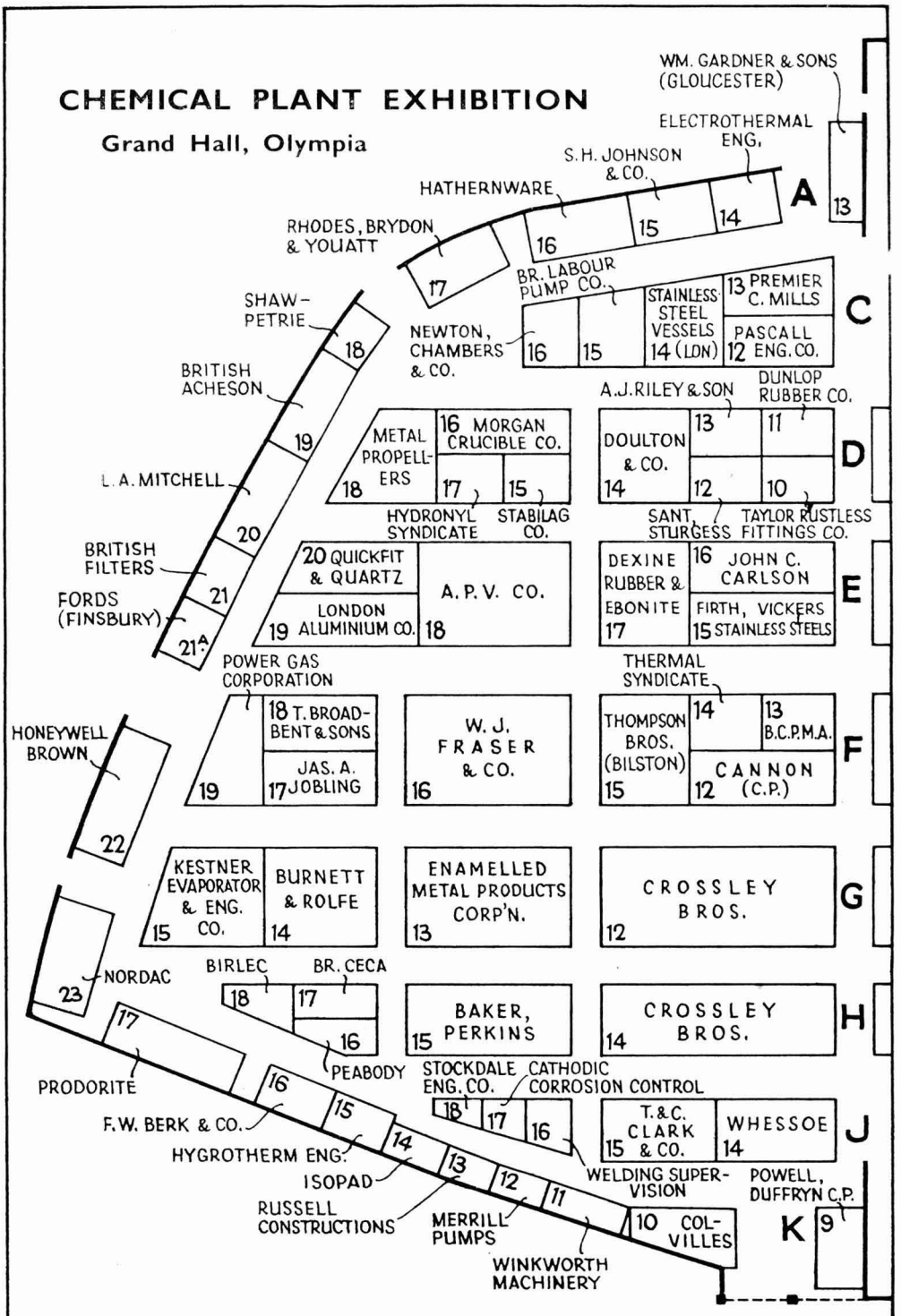
It is fitting, therefore, that they should now have this opportunity of displaying these products and drawing attention to their achievements.

The chemical plant industry has a very important role to play in the country's export effort. Its export achievements are already substantial and British chemical plant is to be found in most countries where chemicals are made. Britain's future depends a great deal on the achievements of industries such as this, which give scope for the exercise of technical skill and inventiveness and for whose products there is an expanding world demand.

Recent improvements in the availability of raw materials now enable the industry to offer attractive delivery dates and I am confident that a determined sales drive, in new markets as well as established ones, will lead to a marked and welcome increase in overseas orders.

PETER THORNEYCROFT,
President.

The Board of Trade,
Horse Guards Avenue,
Whitehall, S.W.1.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T. & C. CLARK & CO.
WHESSOE
F.W. BERK & CO.
HYGROTHERM ENG.
ISOPAD
WELDING SUPERVISION
POWELL, DUFFRYN C.P.
RUSSELL CONSTRUCTIONS
MERRILL PUMPS
COLVILLES
WINKWORTH MACHINERY
A
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The Chemical Plant Exhibition

THE Nineteenth Engineering, Marine and Welding Exhibition and the Chemical Plant Exhibition, occupying more than a quarter million square feet, will open at Olympia on Thursday, 3 September, and remain open from 10 a.m. to 8 p.m. every weekday until 17 September. For nearly fifty years the Engineering Exhibition has been held in alternate years, apart from interruptions caused by the two world wars, but this is the first chemical plant exhibition since 1936, and it is sponsored by the British Chemical Plant Manufacturers' Association. By strengthening the bond between the many visitors from overseas and the UK manufacturers, the exhibition will help to expand the exports of the British engineering industry—valued at over £1,000,000,000 annually—which are today assisting capital development in nearly every part of the world.

THE following description of exhibits makes no claims to completeness; it is intended to supplement the catalogue and not to supplant it. Our purpose is to draw the attention of the busy visitor to items which he might otherwise miss, providing him at the same time with interesting reading.

The A.P.V. Co. Ltd.

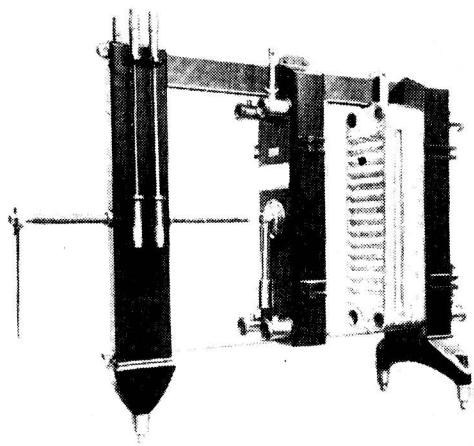
Stand No. 17, *Row E.*

Particular attention will be given on this stand to the A.P.V.-West Distillation Plate—a highly successful design developed by this company. Very high efficiencies and vapour velocities are claimed for the plate and various models will be shown illustrating different sizes and metals. A 30-ft. tower is to be exhibited which would contain 45 of them when complete—it forms half a unit in a Tar Acid Refinery Plant now under construction. A working model, operating with water and air, will demonstrate the principles of the plate.

Another model will illustrate a complete distillery for the production of rectified alcohol from molasses. This type of plant has also been applied to the manipulation of dates. A.P.V. are the only company to have erected a modern distillery operating on this raw material.

Outstanding among the standard items of equipment for which this company is well known is the Paraflow Type Heat Exchanger which is finding increasing application in the chemical industry. An example of this is to be shown and also one of their range of stainless steel reaction vessels, which are available with or without agitators.

A special display of A.P.V.-Cooper Stainless Steel Valves is included and also a range



A.P.V. Paraflow plate heat exchanger, Type HF

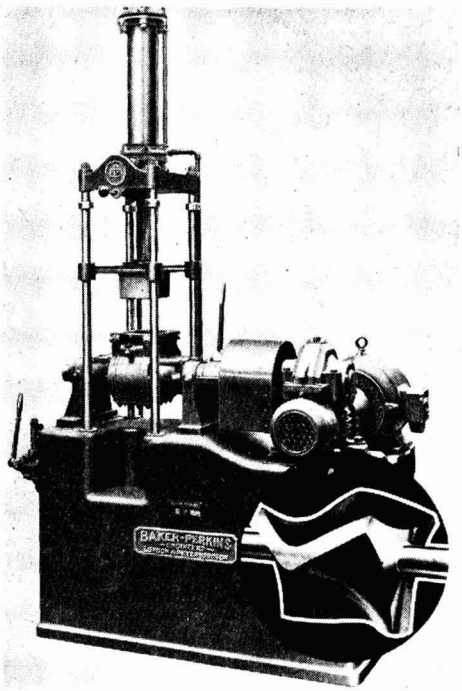
of stainless steel pipe fittings, both of which are stock lines available on short delivery terms.

Baker Perkins Ltd.

Stand No. 15, *Row H.*

This company are to feature a display of mixers representative of the well-known Universal range which embraces machines in 19 standard sizes from 1½ pints to 2,200 gal. per mixing and includes many types and classes, e.g. for mixing under vacuum and/or pressure, and with troughs jacketed and blades cored for steam water and brine circulation. By varying the design and set of the blades and the relative speeds at which they revolve the Universal principle has been adapted to a very wide variety of industrial purposes.

The main exhibit will be a Size 12, Type VI/H, Class BSCC heavy duty 'Universal' mixer which has been specially developed



Baker-Perkins Size 4, Type III, Class BSCC Mixer

for heavy mixing work, such as pigment or aqueous rubber dispersions, with a working capacity of 9 gal., particularly suitable for incorporation in plants for pilot scale production. It is powered by a 40 HP drive motor and fitted with '3-Wing' masticator blades, cored for steam or water circulation. For discharge purposes, the jacketed trough is arranged to tilt by hydraulic cylinder, operated from an independent pressure assembly. Although the trough is provided with a standard type of cover, the machine is so designed that it can be fitted instead with a compression cover or ram, should this feature be desired.

Another exhibit, the Size 4, Type III, Class BSCC heavy duty 'Universal' mixer, might be described as a small edition of the Size 12, as it is also for heavy duty mixing and incorporates similar design features, i.e. strengthened construction, '3-Wing' masticator blades and a pneumatically operated ram as a standard fitment. Its capacity in this design is 0.43 gal. and the main drive is from a 4 HP motor.

A number of other specialised and general purpose mixers will also be on show.

Henry Balfour & Co. Ltd.

Stand No. 13, *Row G.*

Various models of gas works plant will be on display, including a model of tower purifiers which are capable of handling 7,500,000 cu. ft. gas per day, a model of gas condensers and also of a static washer; and a small working model of the operating mechanism of a water gas unit.

Birlec Ltd.

Stand No. 18, *Row H.*

Birlec 'Lectrodryers' are simple, economical units for reducing the moisture content of air (particularly compressed air), oxygen, nitrogen, hydrogen, chlorine, carbon dioxide, hydrochloric acid, ozone, acetylene, phosphorus oxychloride, butane, ether, carbon tetrachloride, etc.

When required, extreme dryness is obtainable from 'Lectrodryers' and a dewpoint of minus 70° is obtainable (H_2O content 1.5 parts per million). Relative humidities can be maintained at 5-10 per cent. Operating pressures range up to 4,500 psi.

Three of the four 'Lectrodryer' units to be shown are dual adsorbers, comprising two beds of activated alumina, one of which is on drying duty while the other is being reactivated. The two manually operated units are for the drying of air, one at 100 psi. for the drying out of refrigerator tubing and the other at 60 psi. for the filling of a supersonic wind tunnel. The third dual adsorber is a small, fully automatic unit complete with a circulating fan to maintain 35 per cent RH conditions in a store room of 1,750 cu. ft. volume. This standard unit has been developed in particular for strongrooms, muniment stores and similar areas.

A laboratory 'Lectrodryer' is also to be exhibited and this has a single bed of activated alumina with an embedded heating element for reactivation. This dryer is widely used for pilot plant or small scale production, and can be reactivated overnight.

British Acheson Electrodes Ltd.

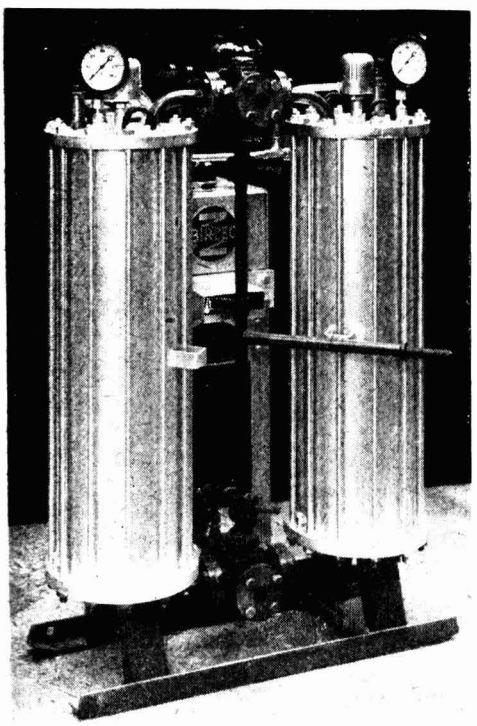
Stand No. 19, *Row A.*

This exhibit will consist of a selection of plant constructed in 'Karbate,' an impervious graphite suitable for temperatures up to 170°, and resistant to most corrosive gases and liquors used in chemical and allied industries. Graphite has an extremely high rate of heat transfer, approximate to that of aluminium, and is thus particularly suitable for heat exchange plant.

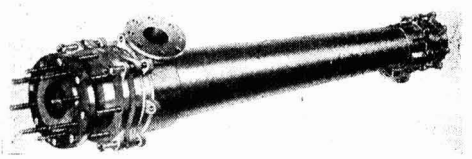
A cascade cooler will be shown, consisting of thirteen sections of 1½ in. Karbate pipe in 9 ft. lengths, mounted vertically on block ends; and an immersion type plate heater, mounted in the corner of a sectionised carbon-lined tank. These plate heaters, which have no cemented joints below the liquid level, are ideal for installation in pickling tanks and are available in a wide range of different styles to suit varying methods of installation.

The series 310 tube bundle heat exchanger is to be exhibited complete in shell, with a separate exhibit showing the internal Karbate tube bundle. The unit consists of 31 9 ft. tubes, tube plates and domes, so that the liquor is in contact with Karbate throughout. It is available with one, three or five passes on the tube side, and is capable of withstanding 50 psi. gas pressure, and 75 psi. hydrostatic pressure. The shell is fabricated from mild steel with a stainless steel baffle assembly.

A Karbate pump to be displayed has a Karbate body mounted on a stainless steel shaft. A unique mechanical seal is adopted, so that liquor is in contact only with Karbate. Pump sizes are available from 50 to 400 gal. per min., with up to 100 ft. head. Among other items will be a wide range of tubes, globe valves, pipe fittings, steam jets, etc.



BAC 150 Birlec ' Lectrodryer '



Karbate series 310 tube bundle heat exchanger

British Ceca Co. Ltd.

Stand No. 17, *Row H.*

The stand of this company, who are concerned both with chemical plant and products, will naturally be devoted mainly to the former. On show will be models of a solvent recovery plant and electrostatic precipitators, together with an illuminated wall diagram showing the cycle of operations of a typical ' Acticarbone ' solvent recovery plant.

There will also be samples of the activated carbon used in the recovery plant, activated earths, bentonites, kieselguhrs, pine tars, and refractory insulating bricks.

British Chemical Plant Manufacturers' Association

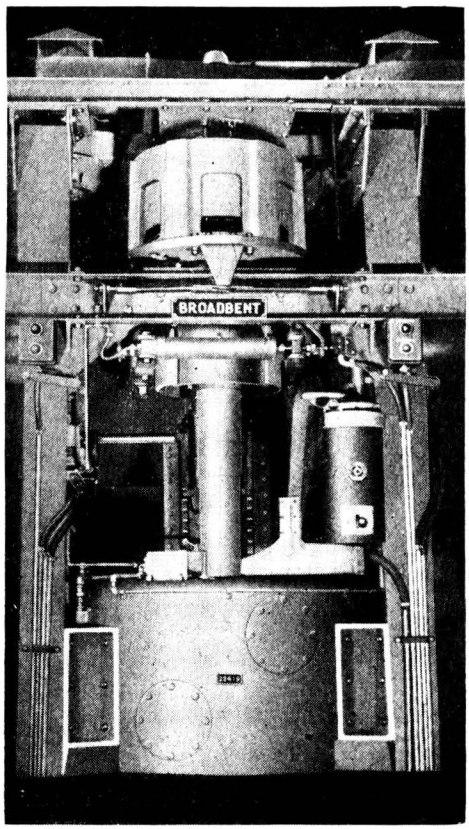
Stand No. 13, *Row F.*

The stand of the sponsoring body will take the form of an information bureau on the Chemical Plant Exhibition, the British chemical plant industry, and the Chemical Engineering Conference. It is hoped that visitors not sure of whom they should consult regarding their problems will visit this stand first and thereby save themselves any loss of time.

Thomas Broadbent & Sons Ltd.

Stand No. 18, *Row F.*

Of particular interest will be the new Broadbent sugar centrifugal, which combines reliability with labour-saving devices and quality control. The high-duty forced ventilated motor is built direct on to the main centrifugal spindle without an intermediate flexible coupling, and efficient braking giving reduced time cycles is electro-dynamic from full to half speed, controlled by a process timer, and air operated mechanical braking is then automatically applied to stop the machine.



The new Broadbent sugar centrifugal, with finger-tip controls

A power-operated gate type valve is specially designed to prevent sticking, and emergency hand gear is fitted to close the valve in the event of a power failure. The basket has received special attention and incorporates a discharge valve of revolutionary design. Hand control is unnecessary as this valve is an integral part of the basket and opens automatically when the plough is brought into operation and automatically closes when the plough is returned to the locked position. Power operated washing jets, automatically controlled by the process timer, are arranged to give an even wash over the total cake depth. This washing system dispenses with the normal practice of inserting perforated pipes, and leaves the basket interior absolutely clear.

The 30 in. Type 80 inclined ploughing centrifugal to be exhibited has been successfully applied for batch treatment and can be operated semi-continuously as feeding, separating and discharging are all carried out with the machine running. Manual work is reduced to a minimum as the contents of the basket are discharged by a ploughing gear. When used for freely filtering materials, such as sodium sulphite and nitro-cotton, a perforated basket is used, and an imperforated basket is used for slurries that do not freely filter. For processing solids which settle out easily under centrifugal force, a skimmer attachment is used and the machine adapted to work on the continuous feed principle, spilling the liquid over the lip and resulting in a very high output.

The 21 in. diameter perforated basket of the Type 86 bolted-down centrifugal is manufactured of EDP stainless steel, and this machine has been specially designed for manufacture in suitable corrosion resisting materials to cover a wide range of chemical applications.

The drive is by vee belt from a vertical flange mounted motor combined with an automatic centrifugal clutch pulley, and the self-balancing cover is electrically and mechanically interlocked to safeguard the operator. It is impossible to open the cover while the basket is revolving.

Cannon (CP) Ltd.

Stand No. 12, *Row F.*

'Cannon' chemical plant is made of the best quality cast iron and lined with hard grey acid-resisting glass enamel the most impervious surface of its type in the trade. The design and workmanship embodied in 'Cannon' productions are the result of over a century's experience in this particular field, and satisfy the most exacting requirements of all branches of the chemical industry.

Included in the equipment on view will be the following items of plant: a 50-gal. distillation plant complete with a 15 sq. ft. enamelled sectional type condenser, a 25-gal. enamelled receiver, enamelled pipes and valves; a 250-gal. cast iron enamelled steam jacketed mixing vessel; a 500-gal. cast iron enamelled inner pan; various capacities of open top cast iron enamelled steam jacketed pans, both shallow and deep type; various types of cast iron enamelled agitators; and a variety of cast iron enamelled laboratory equipment.

John C. Carlson Ltd.

Stand No. 16, *Row E.*

Principal exhibits will be a wide range of sheet filters, which are available in many

sizes and types of construction, including stainless steel. These range from small EK Laboratory units designed for the small scale clarification or sterilisation of toxins, injection solutions, plasmas, etc., to the larger 40 cm. and 60 cm. units which are widely used for the filtration of beer, vinegar, varnishes, water, etc., and which are so readily adaptable, by the addition of spacer frames, for dealing with suspensions containing relatively high concentrations of solids such as plating solutions.

Carlson sheet filters are also suitable for air sterilisation and are used for ampoule filling rooms, etc. Another feature will be a number of alluvial filters and cylinder filters of various sizes and types.

The filtering materials for use in conjunction with the different types of filters will also be exhibited. These Carlson filtering materials—sterilising sheets, clarifying sheets and loose asbestos materials—are the perfect complement to the Carlson filters and are manufactured in a very modern plant. Particular attention is drawn to the Carlson 'EK' and 'EKS' sterilising grades which are used throughout the world in hospital research laboratories and chemical institutes where an absolutely sterile filtrate is desired.

Further items on view will include a bottle soaking and washing machine, filling machines, a range of unique tincture presses incorporating several novel features, and a number of stainless steel taps and connections.

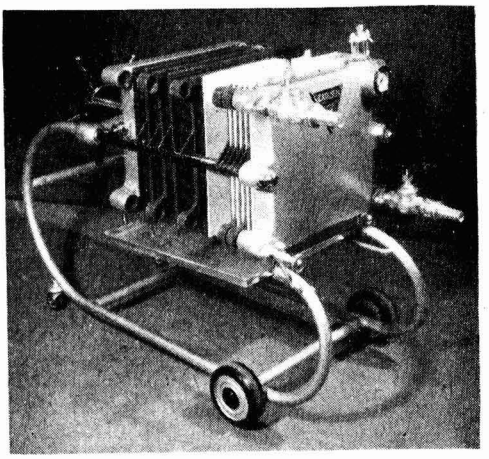
T. & C. Clark & Co. Ltd.

Stand No. 15, *Row J.*

Wherever it is desirable to avoid metallic contact Clark's vitreous-enamelled chemical plant should prove of great value, and the various standard patterns of plant to be displayed on this stand may be interchanged to conform to most individual requirements.

Vitreous enamel lined cast iron plant is available in sizes from a few gallons to 1,000 gal., and glass enamel lined one piece tanks in mild steel in capacities up to 4,000 gal. Open top patterns are available in capacities up to 1,000 gal.

Some idea of the resistance to chemical attack of these linings may be given by the following figures: samples immersed in a boiling 10 per cent solution of HCl for one month gave a loss of 0.36 mg. per sq. cm., after the initial loss during the first 48 hours—due to atmospheric contamination of the enamel—had been discounted.



The Carlson Aristan 'Princess' filter for laboratory and pilot plant work

Colvilles Ltd.

Stand No. 10, *Row K.*

'Colclad' steels provide a selection of less expensive corrosion-resisting materials for the fabrication of plant and equipment. Four types of stainless steel cladding, and Monel or nickel cladding are normally available. 'Colclad' is readily gas cut or hot

A 12 ft. 6 in. spun end in 'Colclad,' spun by Messrs. G. A. Harvey & Co., from a blank supplied by Colvilles, Ltd.

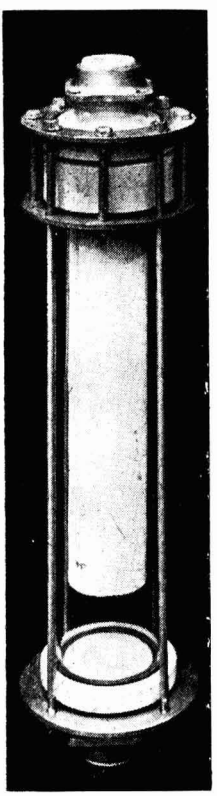
formed; the illustration shows a large hot spun end, weighing 5¾ tons, which was spun by G. A. Harvey & Co. (London), Ltd., from a blank made up of four plates each 8 ft. 1 in. square by 1¾ in. thick, and welded together prior to spinning.

Doulton & Co. Ltd.

Stand No. 14, *Row D.*

The ever-increasing number of applications of industrial ceramics in the chemical and allied industries in recent years is reflected in the exhibits to be shown on this stand.

In addition to a number of representative items from the standard range of acid-proof chemical laboratory porcelain, chemical stoneware, and porous ceramics for filtration, diffusion and electrolytic processes, there will be several special exhibits.



Doulton pipe-line ceramic filter element

There will be a demonstration of a pipe-line filter unit embodying porous ceramic filter elements, 1½ in. 'fixed-flange,' chemical stoneware piping and a diaphragm pump. The arrangement of piping in this demonstration is a condensed version of that employed in practice for batch filtrations but for convenience sake the liquor is being recirculated.

The fixed-flange method of coupling overcomes certain disadvantages associated with both spigot and socket and conical-flanged pipes. Special features of the improved method are these:

(a) There is no change of section in the stoneware which might lead to weakness.

(b) It enables pipes to be cut from random lengths and ground exactly after firing. Lengths can be cut and flanges fixed on site if required.

(c) The outer circumference of the pipe is grooved at the end to grip the jointing composition and, owing to the saw-tooth configuration of the inner surface of the metal flange, the greater the pull upon the bolts, the greater the grip upon the pipe.

The porous ceramic materials used for the filter elements have, like stoneware, the advantages of chemical inertness, rigidity and mechanical strength, with excellent stability at high temperatures. They are used not only with water and other non-corrosive fluids but also with highly corrosive liquids and gases at both normal and elevated temperatures. These elements are available in a wide variety of fine, medium and coarse grades.

Another new demonstration will be of air-lift agitation. A single 10 in. by 2 in. grade G5 porous ceramic element produces agitation of a liquid with increased mixing efficiency by means of an air-lift, using approximately 12 cu. ft. of free air per minute at low pressure. The arrangement shown is extremely simple and can readily be incorporated in existing plant. The same principle can be applied to transfer liquid from one vessel to another.

A chemical stoneware supply-line for the air guards against corrosive conditions and prevents contamination of the liquor.

A representative selection of other chemical stoneware products manufactured by Doulton & Co., Ltd., will also be on show.

Dunlop Rubber Co. Ltd.

Stands No. 9 & 11, *Row D.*

Dunlop will feature a moving display of V-belts; a disc-coupling model in the complete range of eight sizes; a barrel-coupling demonstration model; and a range of anti-vibration mountings.

Among the hoses will be patterns for deck washing; piston cooling; bilge pump; and oxyacetylene. Also featured in 60-ft. lengths, will be the wire-braided high pressure hose used for coal cutting appliances, coke oven rams and wherever air or water is under high pressure.

There will also be two large processing vessels of intricate design each lined with a different type of material. A range of moulded and machined ebonite articles; Nerflex utensils, jugs, buckets and ladles; and gloves, gauntlets and aprons for use with chemicals will also be shown.

Electrothermal Engineering Ltd.
Stand No. 14, *Row A.*

Standard aluminium housed and all-flexible electric heating mantles, including aluminium housed units of 100 litre and 200 litre capacity will be shown in operation, together with electric heating equipment specially made for vessels of all shapes and sizes, mixing vessels, pans, fractionating columns, and for the conversion of steam heated chemical plant to electric heating.

Flexible and elastic heating tapes for temperatures of 400° and above are to be exhibited, including what is claimed as the only tape in existence for heating surfaces with double curvature.

Flexible armoured heaters for temperatures up to 800° for use on metal tubes, cylinders, pipes, catalyst tubes, etc.; ERS (Electrothermal Rubber Sheeting), insulated in natural rubber, PVC, neoprene, silicone rubber, and other materials for temperatures up to 250° available in sizes up to 6 ft. wide and any length, suitable for use immersed in liquids; and miniature thermostats and control gear for use with chemical plant and apparatus will be on show, together with electric heating equipment for every kind of vessel used in the laboratory, including extraction and Kjeldahl apparatus.

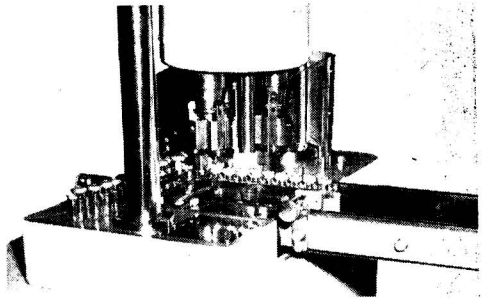
Enamelled Metal Products Corporation (1933) Ltd.
Stand No. 13, *Row G.*

This company produces in Scotland the well-known Pfaudler glass-lined chemical equipment. There will be displayed a complete glass-lined distillation unit, comprising jacketed reaction kettle, condensers, receivers and connecting pipe all constructed in glass-lined steel. In addition various small items of glass-lined plant, such as valves and piping, are to be shown, and a 500-gal. stainless steel reaction kettle for high pressure work.

Fords (Finsbury) Ltd.
Stand No. 21*a*, *Row A.*

A comprehensive range of vial-capping machinery will include fully-automatic cap-making presses, making vial caps from continuous strip aluminium of up to 0.3 mm. gauge. These presses have outputs of up to 15,000 caps per hour, and require no attention during running.

For applying the caps to the vials of penicillin, streptomycin, etc., Fords will be showing a fully-automatic cap-applier, which



A close-up of Fords vial-cap spinner

feeds aluminium caps down from a hopper holding a six-hour supply, through an electronically-controlled chute, on to the vials. The output of the cap-applier being exhibited at Olympia is 8,000 vials per hour, and is readily adjustable for vials of any size or diameter. Other cap-appliers in the Fords range are available for lower outputs.

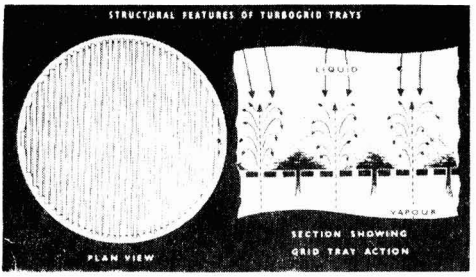
Also on show will be a Fords 3-head spinner, for automatically spinning the applied caps permanently on to the vials. The 3-head spinner has an output of 8,000 vials per hour, and others are available for smaller hourly outputs. In operation the spinner is connected to the cap-applier by a short length of conveyor, so that the whole process of cap-applying and spinning is performed together.

W. J. Fraser & Co. Ltd.
Stand No. 16, *Row F.*

This stand will be mainly concerned with two rather different aspects of chemical engineering, viz.: the contracting and engineering of complete chemical projects all over the world, and the design and fabrication of specialised plant items.

This second group of activities will be illustrated by a number of pictures, diagrams and models. One of the most interesting of these is the working display of a section of a Shell Patent Turbogrid Distillation Tray. The Turbogrid Tray is made under licence by Frasers and is replacing the bubble-cap tray in many distillation applications.

In certain processes, particularly those in which liquid load is high, as in de-ethanisers, de-propanisers, stabilisers and absorbers, or where column height is limited, this new, vapour-liquid contacting tray has striking advantages over the bubble-cap type. For a similar separation efficiency per foot of column height, turbogrid trays can have up to 100 per cent more capacity than a well-



Structural features of W. J. Fraser & Co.'s Shell 'Turbogrid' tray

designed bubble-cap tray and as much as 80 per cent less pressure drop per tray.

In construction the tray consists merely of a flat grating extending uniformly over the entire column cross-section. The rectangular struts are of dimensions and number appropriate to the application and so designed that the flow of liquid is turbulent (hence the name), with good vapour-liquid contact. Separation is equivalent to that in a bubble-tray, yet the simple shape and greatly reduced flow resistance give the tray much greater capacity and much less pressure drop.

The more complex field of large scale contracting and engineering is felt by Frasers to be too big a subject for normal exhibition methods. They will be showing a specially made colour film inside the stand office, part of which is to be equipped as a cinema. The film will show the various stages of design, fabrication, erection, etc., in the progress of some typical Fraser projects.

Frasers will also be showing a large mural of the Anglo-Iranian Autofining Plant at Llandarcy, together with a working diagram of the process, with different coloured liquids showing the main flow lines.

Wm. Gardner & Sons (Gloucester) Ltd.

Stand No. 13, *Row A.*

Among the plant to be exhibited is the latest design of Gardner standard pattern 'Rapid' sifter mixer. This machine has now been entirely re-designed to give increased facilities for cleaning, by making the internal agitator, as well as the brush and sieve, completely removable without disturbing any of the drives. The general design of the machine has been completely altered in order to get a self-contained unit.

Also to be exhibited is a laboratory-size mixer of generally similar construction to the machine mentioned above, embodying the same principles of access for easy cleaning.

A further machine of an entirely different design for the mixing of dry powders and granular materials is the double cone blender, specially developed for handling materials which are not easily mixed by the standard trough-type mixer, with internal agitators. The machine consists of a specially designed double-conical drum, and the mixing is achieved by the rotation of this drum on an axis at right angles to the conical portions. Owing to the fact that there are no internal agitators, the machine is very easy to clean and, on the smaller sizes, the drum may be made in halves so that one half can be removed completely.

In addition, an improved design of paste mixer will be on show. The model is a self-contained unit with inbuilt motor drive and is arranged for tipping, for emptying purposes. The machine is fitted with a safety cover interlocked with the motors, which prevents access to the agitators when the machine is mixing, but allows for the cover to be opened and the agitators to run when the machine is tipped for discharging.

Hathernware Ltd.

Stand No. 16, *Row A.*

The centre of the stand will consist of a fabricated mild steel tank lined with buff stoneware tiles set in acid-resisting cement, on a base of acid-proof stoneware floor tiles.

A stoneware centrifugal pump draws liquor from the tank, the head obtained providing motive power for a stoneware ejector which induces suction through a stoneware tower. This ejector is of the swirl-type completely armoured and is capable of handling a large volume of fumes. A smaller armoured ejector, actuated by liquor drawn from the tank by another stoneware pump, demonstrates maintaining suction on a stoneware vacuum filter, the bottom portion of which is encased in welded steel for protection. Pipe lines for the pumps and ejectors are of armoured stoneware.

The stoneware tower, approximately 12 in. inside diameter and 7 ft. high, is a small edition of an absorption column which can be made in stoneware up to approximately 5 ft. inside diameter. The sections of the stoneware tower have cone flanges, the faces of which are ground to give an air-tight seal without the use of any jointing material.

Different sizes of tower packing rings and

berl saddles will be shown, and other exhibits include a sectionalised screw-down valve showing the stoneware lining; an opened-up stoneware pump with a series of impellers; a hand-operated diaphragm-type stoneware pump; and a roller mill with porcelain grinding jars in operation.

Honeywell-Brown Ltd.

Stand No. 22, *Row A.*

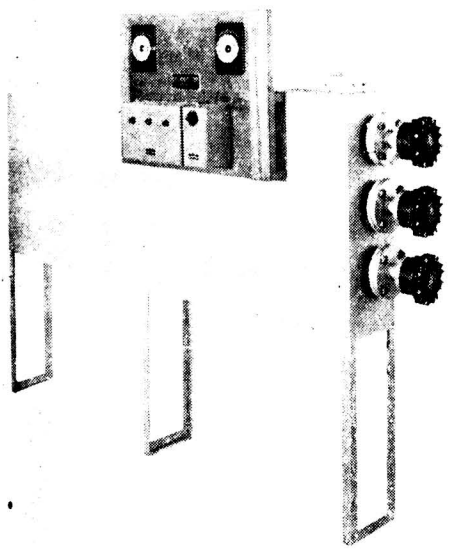
The instruments to be shown are designed to meet the increasing demands for closer process control which are being made by so many branches of industry. In addition to the well-known Brown ElectroniK potentiometers and Protectoglo combustion safeguard systems, certain newly developed instruments will be on view. These include the new system of Honeywell electronic modulating control, and the Brown differential converter diaphragm-type pneumatic-flow transmitters and associated conventional and miniature receivers.

Hygrotherm Engineering Ltd.

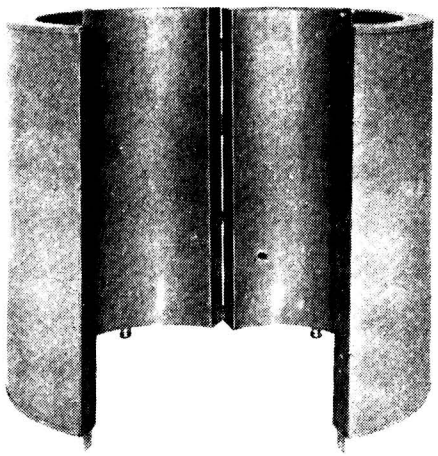
Stand No. 15, *Row K.*

A small electrically heated high temperature heating unit in action will be the feature of this exhibit. The unit is similar to one recently supplied to Sweden.

It has a heat input of 18-kilowatts and provides a high temperature heat source to a small jacketed vessel which has 10-25 gal.



The Hygrotherm high-temperature unit recently supplied to Sweden



The Isopad 'Isodrum' heater

capacity for the manufacture of alkyd resins, or such products as require a reaction temperature approaching 300°.

The purpose of this unit is to illustrate the advantages of 'liquid heat,' which brings into the field of high temperature heating a new method of heat transfer which offers to the chemical engineering field a simple and effective means of heating up to temperatures of 350°.

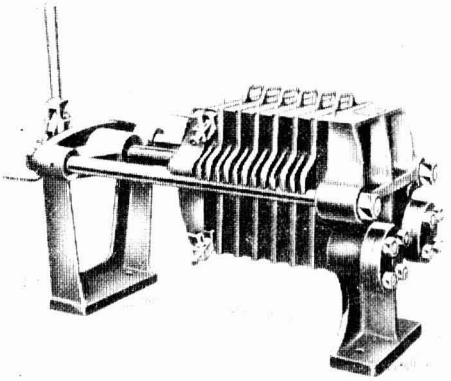
The liquids used have formed the subject of research over a number of years, and the last four years have been used to develop suitable systems in which they can be employed. The basic principle of the heat transfer systems is the circulation of liquid at controlled flow rates in a closed system, the heating being by means of oil, gas or electricity. The properties of the liquids used are such that they do not require any special provision for preheating at low temperatures, and they can equally well be used as cooling media as for heating.

A new liquid is being developed at the moment with improved characteristics, being more hydrolysis-resistant and suitable for operating at temperatures in excess of 350°; the exact top limit is not yet known, but it is anticipated that within about six months this new liquid will be available for use in heat transfer systems.

Isopad Ltd.

Stand No. 14, *Row K.*

Special electric surface heaters, which are used for heating and heat compensation of a great variety of vessels and plant, will be



A Johnson laboratory filter

displayed. The exhibits include an Isomantle used for the heating of a sulphonating pot of 20 gal. capacity, and an Isodrum heater.

This electric drum heater is made in two hinged sections which are mounted on ball casters so that the heater can easily be placed around the drum. Various standard sizes are available for drums from 25-55 gal. capacity.

Isotapes, completely flexible and fully insulated electric heating tapes, are extensively used for pipe tracing and a variety of other duties. For the heating of large tanks, Isopanels are provided, which are wrapped around the vessels and then covered by thermal insulation and metal sheets for protection. Several other types of Isomantles will be shown, including special heaters for valves and instruments.

James A. Jobling & Co. Ltd.

Stand No. 17, *Row F.*

Samples of their extensive range of visible-flow glass pipe-line and chemical plant are to be exhibited by this company. To demonstrate the adaptability of their standard units, a climbing film evaporator capable of being used for production or demonstration purposes will be exhibited.

A glass covered electric immersion heater is the basis of a water still which is capable of producing pyrogen-free water.

A new unit—a visible-flow sink-trap—will be of interest to all laboratories where corrosive liquids have to be handled. Another item will be a new type of glass valve capable of withstanding a pressure of 50 psi

S. H. Johnson & Co. Ltd.

Stand No. 15, *Row A.*

Owing to the size and weights of their normal products this company's exhibits will consist mainly of small scale and laboratory models. On show will be small filter presses constructed in different materials: cast iron, stainless steel gunmetal, ebonite; and different types of timber. There will be a diaphragm pump on show and an electrically-operated hydraulic screw bush mechanism for closing filter presses. The laboratory exhibit will include a hydraulic squeezing press, a pneumatic laboratory filter and an enclosed type of filter for spiritous extractions.

There will be a wide range of filter cloths and papers exhibited, including examples made up from synthetic materials.

Kestner Evaporator & Engineering Co. Ltd.

Stand No. 15, *Row G.*

The Kestner stand will show their wide range of chemical plant manufacture in two general sections. Firstly, there will be models and photographs of their larger plant, such as evaporators, spray driers, Thermo-Venturi flash driers, high temperature oil-heated plant, pickling plant, acid recovery plant, etc.

The second section will comprise those smaller items which can conveniently be shown on a stand, such as fans, pumps, stirrers, gas-scrubbing equipment, piping and fittings, etc.

Special emphasis will be laid on the variety of materials in which Kestner's can supply chemical plant, including stainless steel, silicon iron, lead, and plastics such as Keebush, rigid PVC polythene and Fluon.

London Aluminium Co. Ltd.

Stand No. 19, *Row E.*

The principal exhibit on this stand will be a sedimentation vessel fabricated throughout in aluminium of 99.8 per cent purity, the size being 7 ft. 6 in. dia. by 20 ft. long including tapered base, welded throughout by the Aircomatic and Argon Arc processes. The weight of the vessel is approximately 4 tons.

Apart from this, there will be a model acetic acid recovery plant, in which acid of 20-25 per cent concentration passes through a column, where the acid is extracted by solvent and fed to the main distillation column. Here crude glacial acetic acid is produced as a bottom product and purified

to 99.8 per cent minimum by re-distillation. The efficiency of acetic acid recovery is 99.5 per cent, with the exceptionally low solvent loss of 0.005 lb. per pound of glacial acetic acid produced. The plant is virtually all fabricated in copper with only one stainless steel column, and the storage vessels of some 100 tons capacity are fabricated throughout in aluminium of 99.8 per cent purity.

Merrill Pumps Ltd.

Stand No. 12, *Row K.*

The special feature of the Merrill pump is that the mechanical parts are completely isolated from the corrosive fluids handled by the tube diaphragm unit, which houses suction and delivery valve boxes of simple and cheap construction.

The tube diaphragm unit is built into the pumping line and is, in effect, the pump. It is contained in a cast iron pulsation jacket unit which both protects it and provides an annular space around it. This annular space forms part of an enclosed hydraulic system in which positive suction and pressure strokes are transmitted by the movement of a piston pump.

12.5 gal./min. and 25 gal./min. capacity pumps have been in production since the company was formed in 1949. 100 gal./min. capacity pumps are now coming into regular production and a working pump of this size will be shown on the stand.

Metal Propellers Ltd.

Stand No. 18, *Row D.*

The exhibit will include a batch distillation unit built up from standard stainless steel components comprising gas heating jacket, still, sectional fractionating column, multitubular condenser, column top with reflux divider, and receivers; it is suitable for 50 psi. or full vacuum working. The simplified and standardised design of this plant has been newly developed by this company and it permits the maximum flexibility of use combined with economy and speed of fabrication.

There will also be working exhibits of the two 'Spotton' patented reflux dividers; No. 1, 10-150 gal./hr. input, and No. 2, 100-1,000 gal./hr. This unique apparatus meets the long outstanding need for a simple and efficient device to control the reflux ratio for batch stills. Dividers are constructed in stainless steel, mild steel, Monel, nickel or copper.

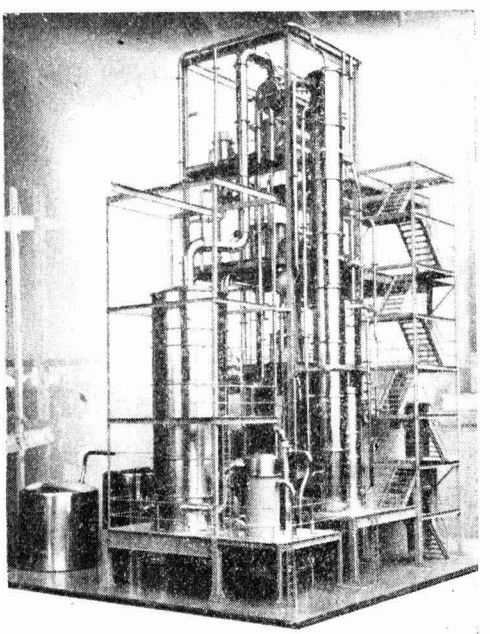
Another exhibit will be examples of bubble cap and riser assemblies in stainless steel for Glitsch 'Truss-Type' bubble trays, for which this company is sole British licensee and manufacturer. The Glitsch design offers lightweight construction combined with high efficiency and the greatest flexibility of use.

L. A. Mitchell Ltd.

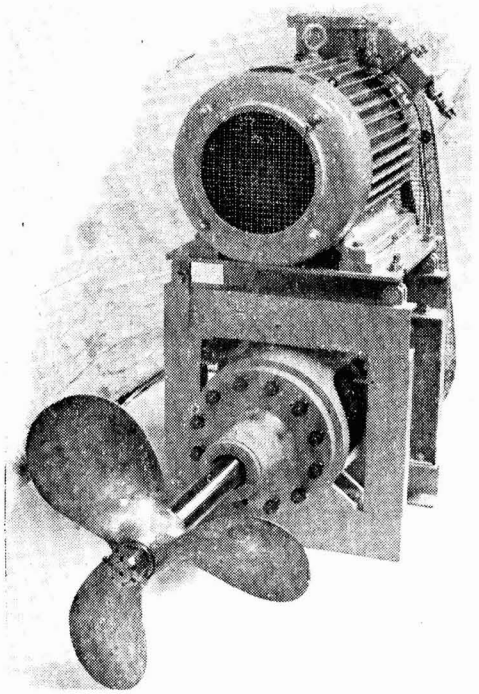
Stand No. 20, *Row A.*

Representative specimens of speciality chemical equipment will be on view. The industrial field will be represented by a small re-circulation hot-air drying cabinet arranged for electric heating, and suitable for pilot plant and small scale drying of products such as pharmaceuticals, fine chemicals, plastics, etc., on trays. A larger industrial unit arranged for steam heating will also be shown, in which the drying trays are supported on a portable truck. There will be a small-scale film drum dryer, as used in laboratories, to represent the wide range of designs of industrial film dryers which can be supplied.

Fluid mixing will be illustrated by a range of laboratory variable speed control stirrers and larger portable types for industrial use. A special feature will be one of a range of



A model of an acetic acid recovery plant constructed by the London Aluminium Company



Mitchell side-entry stirrer

large side-entry mixers, as used on large containers for blending and general agitation work. The machines are designed with generously spaced bearings ensuring complete rigidity and vibrationless operation and incorporate substantial glands which are designed for pressure grease lubrication. The agitator shafts and bearing assembly are so designed that the shaft can be 'jacked' forward laterally to effect a temporary seal behind the gland housing so that the gland can be dismantled and re-packed with the mixer in position without the necessity of emptying the tank. This, of course, is an essential requirement on agitating equipment fitted to tanks of such large capacity. The unit illustrated is fitted with special flameproof electrical equipment to meet the requirements of the petroleum industry.

Typical examples of the Mitchell corrosion-resisting chemical stoneware pumps will be on view, including diaphragm pumps, self-priming rotary pumps and centrifugal pumps for larger capacities, including a cut away specimen showing the details of design. A series of photographs and drawings will illustrate large items of industrial plant, including complete chemical process plant.

The Morgan Crucible Co. Ltd.

Stand No. 16, *Row D.*

The largest portion of the stand will be devoted to a display of 'Carbinert' impervious carbon and graphite and 'Carblox' refractories and chemical resisting tiles.

'Carbinert' is being utilised in industry in a variety of applications, particularly in heat exchange equipment handling corrosive fluids. Such equipment includes bundle-type heat exchangers, cascade coolers, plate heaters, and bayonet heaters. An interesting feature of this part of the stand is that some of these items of equipment will be shown in operation.

A tube-bundle heat exchanger is used where it is desirable to employ an external heat exchange unit. The robust 'Carbinert' components are enclosed in a steel shell, and the unit is available in various sizes up to a maximum of 44 tubes, $1\frac{1}{4}$ in o.d., $\frac{7}{8}$ in. i.d., 6 ft. long, bonded into $15\frac{3}{4}$ in. diameter end plates.

Cascade coolers are available in four types: single, double, triple and quadruple, and are used for cooling both corrosive liquids and gases. Plate heaters are used for small tanks and containers, and can be made in various sizes up to 3 ft. $10\frac{1}{2}$ in. long by $10\frac{1}{2}$ in. wide by 4 in. thick.

Bayonet heaters are flanged 'Carbinert' tubes blanked at one end which form a compact steam heating unit capable of withstanding an internal steam pressure of 40 psi. They are available in sizes from 1 ft. to 6 ft. in length and $1\frac{1}{2}$ in. to 4 in. bore. Other exhibits will show how 'Carbinert' is being used over a wide range in the chemical, process, textile and other industries.

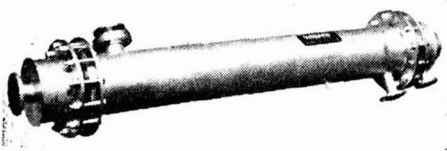
'Carblox' chemical tank linings combine high chemical inertness with excellent resistance to abrasion. A selection from the wide range of bricks and tiles available will be shown. The display of 'Carblox' corrugated hearth blocks and standard shapes for blast furnaces will also be of special interest.

Newton, Chambers & Co. Ltd.

Stand No. 16, *Row C.*

Among the exhibits on this stand will be a model of a 250 tons per day capacity continuous tar distillation plant with needle tube pipe still, and a model of gasworks purifiers of the tower type of 10,000,000 cu. ft. per day capacity, complete with 'Goliath' crane.

Other items will include examples of fuel



A 24-ft. single-pass heat exchanger in 'Carbinet'

economy equipment (needle tube elements in heat resisting iron), and examples of 'Lithcote' acid-resisting linings.

Photographs, drawings and descriptive literature of chemical plant and by-product plant for gasworks and coke ovens including gas purifiers, condensers, washers and scrubbers, benzole recovery and refining plant, gasholders, concentrated gas liquor and dephenolation plant, fractionating columns and petroleum refining plant, storage tanks and processing vessels in mild steel and cast iron, will also be displayed.

Nordac Ltd.

Stand No. 23, Row A.

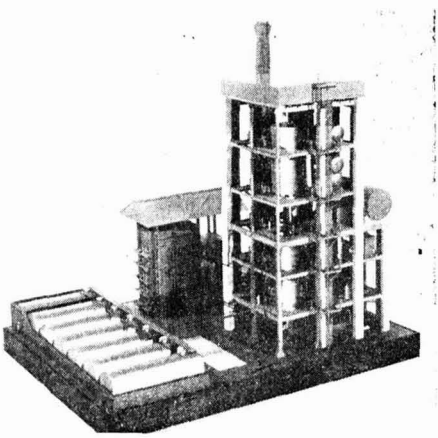
This company specialises in the manufacture of chemical plant and apparatus for processes using corrosive liquors. Principal exhibits on the stand will comprise a rubber and tile-lined pickling tank with a fume extraction plant, in which the solution is heated and agitated by submerged combustion, and a small unit constructed in glass giving a full view of submerged combustion.

Swindin submerged combustion has been developed to overcome the difficult problem of heating and evaporating corrosive solutions. The simplicity of construction and instantaneous heat transfer are among the many advantages of this method. The hot products of combustion from the gas or oil burner are released beneath the liquor surface in the evaporator and in bubbling through the liquor the heat transfer is so complete that the gases, initially at 1,400-1,600°, leave at a temperature less than 2° above that of the liquid.

Careful burner design enables gaseous fuels to be burnt with only 10 per cent excess air and oil fuels with only 50 per cent excess air. In this manner the products of combustion are kept small enough in volume to be used in a second effect tubular pre-evaporator in which 50 per cent of the gross heat input is recovered as pre-evaporation. An efficiency of 85 per cent to 90 per cent of the gross heat input is obtained in the evaporation with an overall co-efficient of performance of 1.25 to 1.30 when a pre-evaporator is used.

A Noristaltic pump will be operating in conjunction with the pickling tank. This pump was developed in order to handle hot boiling spent pickle with its deposits of iron oxide and dirt to be treated in spent pickle recovery plants. A pump for this purpose must be self-priming, robust, glandless and absolutely acid resisting, capable of running for long periods and requiring practically no maintenance.

The ordinary rubber diaphragm pumps perform this duty, but they are large, cumbersome and expensive to install and operate slowly. Mechanically operated diaphragm pumps are usually smaller in capacity and handle liquids at moderate pressures.



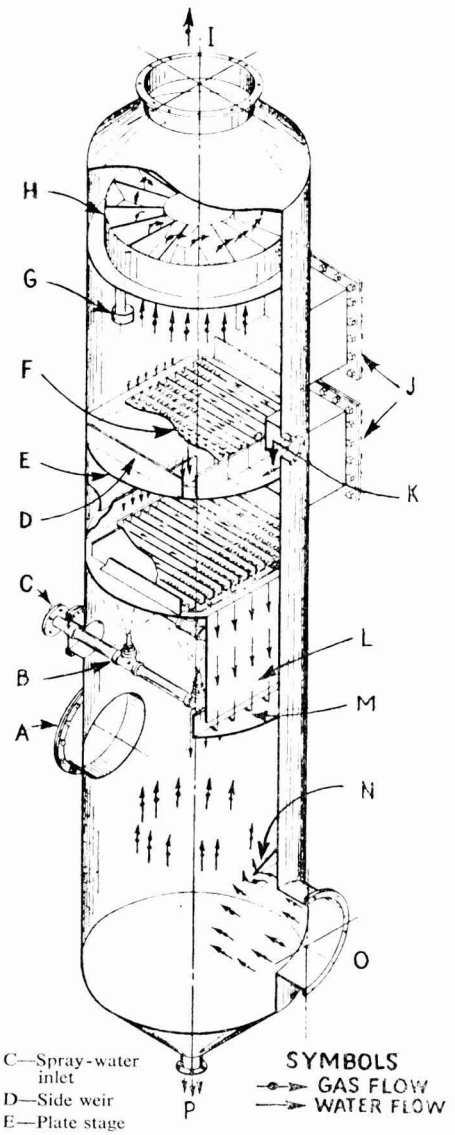
A Newton Chambers tar distillation plant, capacity 250 tons per day

Also on the stand will be three mild steel vessels: one lined with homogeneously applied chemical lead, one with Vulcoferran which is a flexible ebonite lining suitable for high temperature and vacuum conditions, and one with butyl compound which has a high resistance to oxidising solutions.

Peabody Ltd.

Stand No. 16, Row H.

Peabody gas scrubbers will be represented by one of the small stainless steel pilot plant scrubbers used for site testing. This unit will contain a transparent section showing the Peabody impingement plate in action. Other impingement plates, which form the



Isometric of Peabody gas-scrubber

basis of all Peabody scrubbers, coolers and absorbers, will be on view.

An oil burner and a combined gas and oil burner will illustrate the types of Peabody combustion equipment supplied to power stations and petroleum refineries. A model of a blast furnace gas burner, a gas electric igniter and other ancillary combustion equipment will be shown.

A Peabody oil or gas fired air heater, used for the production of high temperature air for drying, liquor concentration and other processes, will be illustrated by a cut-away model. There will also be a graphic panel showing fuel, air and product flows, demonstrating the way in which automatic control can be applied to drying processes using a Peabody air heater.

Powell Duffryn Carbon Products Ltd.

Stand No. 9, Row K.

Heat transfer equipment, and absorption and distillation equipment are to be the two major exhibits on this stand.

The heat transfer exhibit will consist of a standard 50 sq. ft. heat exchanger unit complete with headers and gaskets, arranged in exploded form so that details of each component part are visible. A further application of the graphite heat exchanger will be shown when using the heat exchanger for evaporation. Two standard units will be mounted in a steel framework to give a 100 sq. ft. evaporator, coupled to a carbon-lined steel separator. The heat exchanger in its various standard forms is being used for heating, cooling, condensing and evaporation of corrosive fluids.

The absorption and distillation exhibit will include a 1 ft. square carbon tower, composed of a bottom support section, complete with gas inlet and liquid outlet connections, several intermediate sections containing the packing, and a top section with gas outlet and liquid inlet connections complete with distributor system. External to the tower will be a further exhibit consisting of several layers of carbon paragrid packing and distributor system with water circulating to demonstrate the liquid flow characteristics with this type of packing. This equipment has been successfully used for the absorption of corrosive gases and gives the advantage of low pressure drop and efficient wetting of the packing at low liquid rates.

The Power-Gas Corporation Ltd.

Stand No. 19, *Row F.*

The principal display will consist of photographs of a wide variety of installations and equipment supplied to the chemical, gas, iron and steel, fatty oil and petroleum oil industries and will be supported by a model of a hydraulic controller, power cabinet and valve such as The Power-Gas Corporation regularly install with their gas plants which operate on cyclic processes. In addition a working diagrammatic model of a Wiggins dry seal gasholder will be shown. There will also be a small Rosenblad spiral plate heat exchanger and a number of Meehanite castings, one of which will have been machined to show the excellent machining qualities.

The latest development in solvent oil extraction for oilseeds and other oleaginous material will be illustrated by a semi-working model of the 'Rosedowns' rotary continuous extractor. This model will be exhibited as part of a relief diagrammatic flowsheet of a complete plant, so that the visitor can follow the operation of the extractor and its auxiliary equipment for the recovery of the solvent from the oil and the residual meal.

An Argon-arc welding set for pipe fabrication on chemical plant will be shown as well as a specimen of a welded pipe joint which has been tested to destruction. Samples of crystals produced by the Krystal process will be available for inspection and a selection of 'Rosedowns' hydraulic leathers.

The whole exhibit will be supported by a series of flow diagrams and brochures describing the many and varied products of the companies.

Prodorite Ltd.

Stand No. 17, *Row K.*

This well known firm of acid proofing specialists will show a comprehensive range of products and constructions of special interest to all users of acid and corrosive liquors.

The exhibits include a complete range of chemical-resisting cements and bricks and tiles for the construction of tanks, floors and drainage systems, and examples of tanks, piping, fume extraction ducts, etc., fabricated from polythene, PVC and other plastic materials.

In addition, various types of protective coatings for steel and concrete are shown, as well as a range of flooring materials capable of withstanding the heaviest traffic and mechanical erosion.

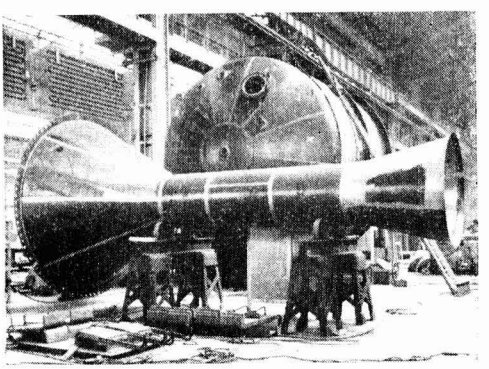
Quickfit & Quartz Ltd.

Stand No. 20, *Row E.*

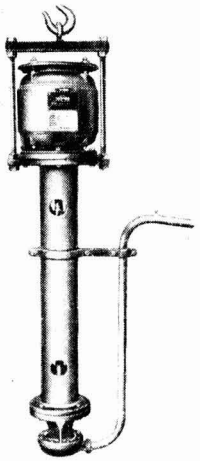
Principal exhibit on the 'Quickfit' stand will be a large, all-glass vacuum still, using steam as the heating medium. This still, which will be demonstrated in operation, illustrates some of the more important advantages of the 'Quickfit' range of plant for the unit operation of distillation. It includes multiple heat exchangers using steam at 50 psi. to provide reboil heat, packed column sections and total condenser, reflux control and vacuum offtake system.

A second exhibit demonstrates some of the characteristics of column packings, with regard to their capacity to operate under various vapour and liquid loadings without flooding. This type of equipment, in which visual examination of column contents is possible, provides a valuable instructional and research tool for use in fields where inter-phase contact—either liquid/vapour or liquid/liquid—is of interest.

For reaction and distillation work outside the temperature range in which steam heating is effective, a series of electrically-heated plant units are available. One such plant, fitted with the recently developed gas-purged heating mantle, will be on show. This plant provides for reaction under total reflux, with stirring, gas-bleed and temperature measurement, followed by distillation under atmospheric or reduced pressure, and



Nickel crystallisers in course of construction at the works of The Power-Gas Corporation



A ¾-in. vertical Mopump made by Rhodes, Brydon & Youatt Ltd.

the heating equipment is temperature-controlled and nitrogen-purged.

Smaller individual items exhibited will include an all-gas safety valve, a hinged flap non-return valve, special stopcocks for pressure operation and a heat exchanger designed to remove exothermal heat from reaction vessels.

Rhodes, Brydon & Youatt Ltd.

Stand No. 17, *Row A.*

A prominent feature of this stand will be the 'C.P.' range of Mopumps, specially designed to meet the exacting demands of the chemical process engineer. Of the horizontal, single stage, centrifugal type, the 'C.P.' Mopump is made with 2 in., 3 in., 4 in. or 6 in. inlet bore. Three types are available, suitable for 35, 55 and 90 ft. total head at 1,450 rpm. or 150-200 ft. total head at 2,900 rpm.

All are built to withstand a maximum static pressure of 100 psi., and are suitable for operating temperatures up to 150°. While performance figures are given for water, the pumps are designed to handle liquids of up to 1,000 centistokes kinematic viscosity (i.e. approximately 4,000 secs. Redwood No. 1 or 4,700 secs. Saybolt Universal), although it will be appreciated that a considerable reduction in performance is inevitable when dealing with high viscosity liquids.

Particular attention has been paid to interchangeability of parts, and the twelve sizes of pump body can be accommodated on only two sizes of bearing assembly and shaft.

Also on show will be a ¾ in. vertical Mopump for the transfer of molten liquids at high temperatures, such as molten caustic soda at 500°. It is arranged to be slung from above the tank, following the falling liquid level, and thus extracting only the top portion of the liquid, leaving scale, slurry, etc., at the bottom. Capacity 10 gal. per minute at 3-4 ft. head.

Russell Constructions Ltd.

Stand No. 13, *Row K.*

Perhaps the most widely used among the products of this company is the Finex Stand Model sieving and straining machine. This compact and mobile unit has found great favour in the food and chemical industries on account of its very high efficiency and capacity for sieving and straining through ultra fine meshes.

The Finex Variable Speed machine is a more highly elaborated version of the Stand Model in that it incorporates a torque converter affording speed variations between 1,000 and 3,000 rpm. since it has been found that the greatest sieving and straining outputs occur at highly critical vibration speeds. For the sieving of difficult powders or the straining of highly viscous liquids (such as heavy paints) this machine is unique.

The Russell Cascade Sieve provides means for the bulk sieving of materials such as flour where continuous automatic evacuation of reject material is called for. In this machine, under the influence of gyratory vibration the material passes in a spiral course over three annular screens (nylon mesh is usually fitted) the whole being enclosed in a dust-tight container.

George Scott & Son (London) Ltd.

Stand No. 13, *Row G.*

Among the exhibits on this stand will be a pilot spray dryer, with rotary and pressure sprays, gas heated. It is constructed in polished stainless steel, complete with high efficiency dust recovery unit.

The Scott patent forced circulation heater, with all contact in polished stainless, is designed for continuous heating of heat sensitive liquids to temperatures up to 135°. It is fitted with automatic temperature control.

Other pieces of apparatus will include a vacuum drying stove with stainless steel contact parts, and cavity shelf heating plates, operating up to 29.5 in. Hg. vacuum; a vertical stirrer pan vacuum dryer in stainless steel

with steam heated hot plate and jacketed shell; a model of a De Smet continuous extraction plant for vegetable oil seeds and similar oil bearing materials; and a model of a Scott patent evaporating plant for general purposes.

Shaw-Petrie Ltd.

Stand No. 18, *Row A.*

On this stand will be found a display of fabricated pipework and forged seamless butt welding fittings manufactured by Shaw-Petrie Limited and their associate company, Clyde Tube Forgings Limited.

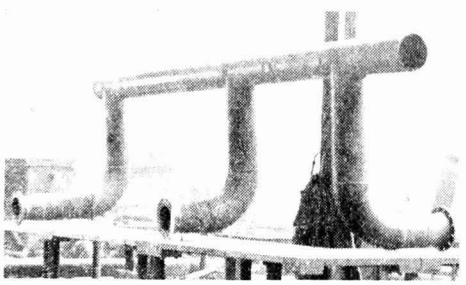
Shaw-Petrie Limited are experienced pipework engineers and are specialists in the fabrication and erection of mild steel, alloy steel and non-ferrous metal piping for the chemical, gas and petroleum industries. Pipework up to 30 in. diameter is fabricated when using normal cold and fire bends and up to 24 in. diameter when using butt welding fittings.

The exhibits on this stand will include pipe assemblies fabricated in mild steel, copper, aluminium, stainless steel and Monel metal, with welding fittings to match, together with pressure vessels and heat exchanger coils, and a range of welding fittings and welding test pieces.

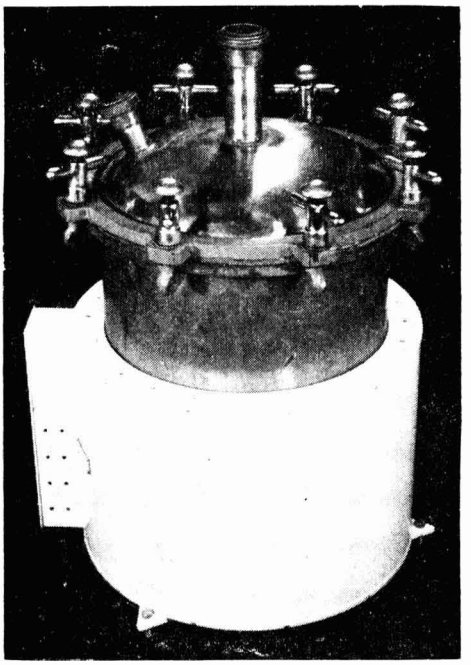
The Stabilag Co. Ltd.

Stand No. 15, *Row D.*

Displayed on this stand will be a wide range of moulded and uniformly heated high and low temperature electric jackets and control equipment, covering many laboratory and industrial applications. These will include a synthetic resin pilot plant, heated and controlled by Stabilag jackets; a rubber-lined rectangular tank with a Stabilag heater as a lamination, for heating low temperature corrosive materials; and a range of laboratory scale heating jackets, complete with temperature control equipment and distillation glassware.



An example of work carried out by Shaw-Petrie Ltd.: a 12-in. bore mild steel pipe assembly with three 90° elbows, three 12 in. by 10 in. concentric reducers and three 10-in. bore welding neck flanges



A typical Stabilag plant-heating unit

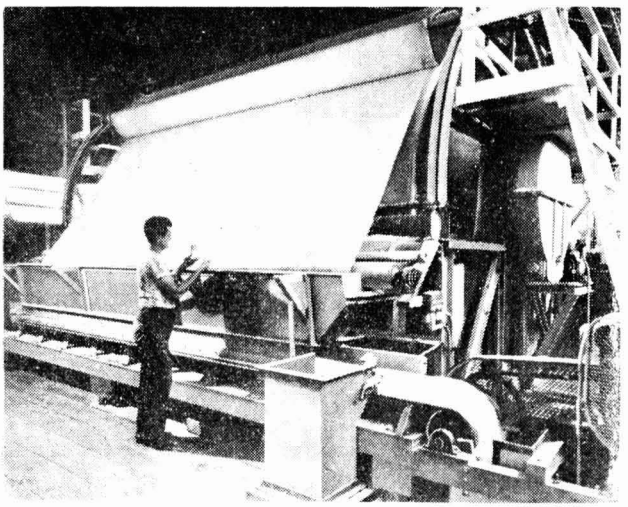
A high temperature distillation plant for use in highly inflammable areas will also be on show. This plant will be nitrogen gas purged; it is an approved system, and complies with the Factories Safety Regulations.

A range of heated piping, using various types of electric heating tapes and pipe jackets; a drum heater, thermostatically controlled for the warming and heating of greases, heavy oils, waxes, paints, resins, tar, varnishes, plastics, and gelatinous materials, up to the temperature of 205°; and a Stabilag jacketed stainless steel tilting pan, designed for use in the food industry, will also be exhibited.

Stainless Steel Vessels (London) Ltd.

Stand No. 14, *Row C.*

The principal exhibit on this stand is to be the 'Aeratone' therapeutic bath. This is a machine which combines air, massage, warmth and water, and provides for the



The 'Feinc' string discharge filter, now made in this country by Stockdale Engineering Co. Ltd.

application of a vibrating hydraulic massage, variable in strength at will, to all parts of the immersed human body simultaneously at a comfortable temperature and under conditions of complete comfort and relaxation.

The bath is recommended for such stubborn complaints as muscular rheumatism, fibrositis, arthritis, sciatica, lumbago, muscular strains and varicose ulcers.

Stockdale Engineering Co. Ltd.

Stand No. 18, *Row J.*

Messrs. Stockdale Engineering, Ltd., will be exhibiting a running model of the 'Feinc' string discharge rotary vacuum filter for the first time in this country. It has long been well known in the United States, and has been supplied in small numbers to individual firms in the UK as a direct purchase from the USA.

It is now being made by Stockdale at their Poynton works, and the type that they will be showing is a stainless steel model of 10 sq. ft. filtration area. The string discharge principle, which is the main feature of the 'Feinc' filter, is able to remove the cake from the drum in one continuous sheet, leaving the filter cloth remarkably clean. It will carry out any filtration operation normally regarded as the exclusive domain of the knife discharge filter, and it is claimed by the makers that it will carry out filtration for which knife discharge is unsuitable.

The model being exhibited is one of a number which is made by Stockdale's for lending out to interested chemical engineers; thus it will be possible, for a small rental, for any concern to operate a 'Feinc' string discharge filter in their own works under operating conditions.

The Thermal Syndicate Ltd.

Stand No. 14, *Row F.*

Exhibits on this stand will be devoted to 'Vitreosil' pure fused silica industrial equipment, including all-silica burners for combustion and hydrogen 'S' bend coolers, absorption vessels and tower sections, for the manufacture of pure acids; distillation units for the production of very pure acids for pharmaceutical purposes; and other 'Vitreosil' evaporation and distillation apparatus.

Other articles exhibited will be pyrometer tubes and acid-proof immersion heaters, and special high-temperature refractories for temperatures up to 1,900°.

Thompson Brothers (Bilston) Ltd.

Stand No. 15, *Row F.*

The articles to be shown on this stand give some indication of the range of plant in stainless steel manufactured by Thompsons. A powder wagon, consisting of a rectangular box with the bottom shaped to form a hopper, will be one of the exhibits. Through the hopper portion is fitted a screw for discharging, and the whole is mounted on four wheels.

A 500 gal. kettle is fabricated in 18/8Ti stainless steel, with a turbo-agitator, and a flameproof motor with 4-speed gearbox. A 150 gal. mixer is made in stainless steel with a mild steel jacket. It is fitted with an

anchor stirrer, fixed baffles and a hinged lid, and the drive is from a 12 HP motor through worm reduction gears.

A section of a bubble cap column 4 ft. in diameter and 12 ft. long will show a tray fitted with 20 bubble caps, and three specially shaped coils. There are 10 trays in this section and the complete column is 43 ft. long.

Another interesting exhibit will be a calandria 10 ft. 7 in. in diameter and 6 ft. deep, fitted with 1,156 tubes, each 2½ in. outside diam.

Whessoe Ltd.

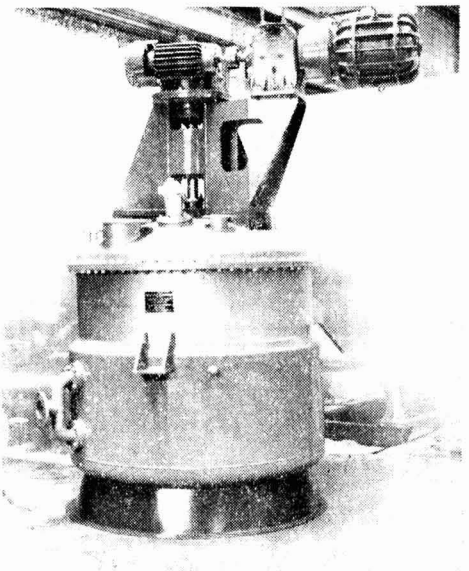
Stand No. 14, *Row J.*

One section of the stand will illustrate the special abilities of the company in steel-plate construction. Emphasis will be placed on steel structures built for the petroleum refining industry, with which Whessoe has always had an intimate connection. These structures will include the first British built catalytic cracker which was erected at Shell's Stanlow refinery. An additional item of interest in this section will be a model of two overhead spirit storage tanks, a new design developed for the rapid filling of road tank wagons.

Of special interest to fuel gas engineers is the section of the Whessoe stand devoted to the specialised field of gas cleaning. The entire process is reviewed as unit operations—condensers, detarrers, scrubbers and purifiers—and as integrated sequences performing the complete process. Also illustrated are high and low pressure gasholders.

An exhibit of particular appeal will be an actual heat exchanger specially sectioned to show individual constructional features. The entire range of heat exchangers manufactured by the company will also be demonstrated by diagrams and photographs.

Advanced forms of storage tank construction will be shown, including Horton floating roofs, Hortondomes, Horton Vapor-spheres and spherical storage vessels. A range of special tank fittings, designed to render inflammable liquids safer in storage will also be displayed. These are associated with vapour conservation applications and will include the latest Shand & Jurs relief valve and automatic tank gauges for the accurate measurement of liquid levels by readings at tank side or pump house.



A Thompson 500-gal. stainless steel kettle

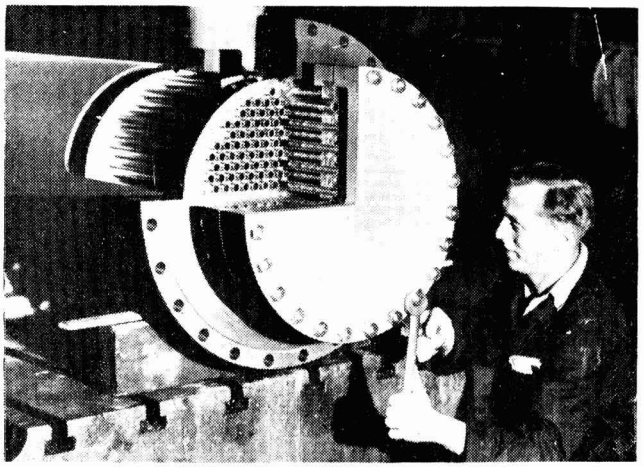
Winkworth Machinery Ltd.

Stand No. 11, *Row K.*

Due to the limited stand space available, small-scale machines of three types will be on show. The 'Double Z' bladed incorporator will be exhibited in three sizes: 1 quart, stainless steel jacketed; 2 gal. stainless steel jacketed vacuum; and 8 gal. stainless steel heavy duty.

A horizontal 'U' trough ribbon-blade mixer with a 3.3 cu. ft. capacity will also be displayed, together with a 2 gal. double-paddle or overarm mixer.

NOT all the chemical engineering companies are concentrated in the chemical plant section of the Exhibition—twenty-five manufacturers of chemical plant who have regularly exhibited in the Engineering Exhibition are retaining their customary places there—and altogether, throughout the various halls, there are many stands of great interest to the chemical engineer. Our description of what is to be seen must be necessarily brief, and in many cases arbitrary, and what follows is intended only as an indication of the diversity of the exhibits in the National Hall, the Empire Hall, and the rest of the Grand Hall.



Finishing off a sectioned high duty liquid to liquid floating-head type heat exchanger for display on the Whessoe stand

S. Brannan & Sons Ltd.
Stand No. 24, *Outer Row, Gallery, Grand Hall.*

The emphasis in this exhibit will be on mercury-in-steel thermometers, and particularly those intended for marine uses. A complete range of thermometers to Admiralty Schedule 55 will also be on show and among many others will be bi-metallic thermometers, meteorological and refrigerator models, hygrometers, and maximum and minimum thermometers, exemplifying the wide range of instruments manufactured by this company.

British Electrical Development Association
Stand No. 47, *Inner Row, Gallery, Grand Hall.*

This stand will be devoted to illustration of the general applications of photoelectric cells, including counting, batch-counting, sorting and colour-sorting. Other uses, such as the guarding of edge guides, colour-matching and detection of flaws in bottle sorting, will be dealt with, and the series of productivity books published by the Association will also be on show.

British Engineers' Association
Stand No. 2, *Row H, Grand Hall.*

Unlike that of manufacturers, the task of a trade association at an exhibition is to demonstrate services which, by comparison with the products shown, are abstract. On the British Engineers' Association's stand, which is shared by the British Electrical and Allied Manufacturers' Association, will be recalled the underlying purpose of engineering production—to aid mankind.

A centre-piece will serve as a reminder of man's basic needs—food, clothing, warmth, shelter and transport. Associated therewith will be shown continuously a film strip—'Engineering in the Service of Mankind.'

British Oxygen Co. Ltd.
Stand No. 1, *Row W, Empire Hall.*

The recently introduced 'Argonaut' welding process will be the main feature: it has great scope for all position welding on heavy gauge aluminium plate and light alloys in the shipbuilding industry, and it can also be used on stainless steel and copper base alloys.

'Argonaut' is a manual welding process using an inert gas shielded arc but with a consumable electrode and automatic regulation. No flux is required and good quality welds, free from slag and inclusions, are produced. By employing multipass techniques there is no practical thickness limit as in practice very few passes are required due to the large amount of filler metal which is deposited at one time. The equipment will be demonstrated.

The new Argonarc spot welding equipment will also be shown and demonstrated. This equipment is suitable for spot welding stainless and bright mild steels. Access to one side of the joint only is required and materials up to 1/16 in. may be joined to any greater thickness or sections of any shape.

The British Rubber Development Board
Stand No. 27, *Inner Row, Gallery, National Hall.*

Natural rubber is now being put to a very wide range of uses in general and marine

engineering and in chemical plant. The use of anti-vibration mountings is one important example of the value of rubber in this sphere and this type of mounting is becoming general practice in design.

Anti-vibration problems will be one aspect of rubber dealt with on the BRDB stand, but in addition the following uses will be shown in sample form or pictorially: latex foam and rubberised hair for upholstery in transport, rubber and ebonite lined tanks, chlorinated rubber paints, rubber lined pipes and pumps, latex/cement compositions, ebonite pipes, belting and hose of all kinds, water lubricated bearings, rubber fenders and mooring buoys, hydraulic brake tubing, safety footwear and pneumatic tyres for trains. Other developments will also be exhibited.

Dallow Lambert & Co. Ltd.

Stand No. 12, Centre Row, Gallery, National Hall.

The stand will display exhibits representative of the wide range of equipment designed and manufactured for dust control in industry. Equipment is available for foundry work such as fettling, knockouts, and sand handling; for pattern shop and sawmill work; and shipbuilding, welding, metal spraying, and polishing shops.

Unit dust collectors are represented by the wet type (patent 'Multi-swirl' for explosive dusts), and the dry type 'Dustmaster' and 'Drytex'.

The 'Dustmaster' is a new type of unit dust collector embodying entirely new principles and will be a special feature at the Exhibition. This model is made in three main series: the DM.50, DM.100, and DM.150; and the elasticity of the range is such that practically any type of dust or granular material, up to a capacity of 2,000 cu. ft. of air per minute, can be handled.

Davey, Paxman & Co. Ltd.

Stand No. 12, Row E, & Stand No. 10, Row F, Grand Hall.

Providing the most efficient method of extracting solids from liquids, the Paxman rotary vacuum filter consists primarily of a drum, divided into a number of self-contained vacuum and pressure-type cells and covered with a suitable filtering medium. The cells are an integral part of the drum and communicate with ports in a valve head which is divided into three sections giving control of the suction and blow-back air.

The slurry to be filtered is pumped into a trough in which the drum, partially submerged, rotates at a speed of about one r.p.m. By the application of a vacuum to the cells, the slurry is drawn against the filtering medium, the solids remaining on the periphery of the drum, while the liquid passes through the medium into the cells and, via the valve head, into the filtrate receiver tank.

For normal requirements, Paxman filters are usually manufactured in mild steel or cast iron construction. Where it is necessary to treat corrosive slurries, the filters can be rubber-covered where in contact with processed materials or built in stainless steel throughout.

These filters will be represented by a sectioned scale model of a standard 150 sq. ft. filter.

Department of Scientific & Industrial Research

Stand No. 29, Outer Row, Gallery, Grand Hall.

The main exhibit by the Fuel Research Station will be a small experimental plant employing a liquid-phase technique for carrying out and controlling the Fischer-Tropsch reaction. The gas mixture is passed through a suspension of powdered iron catalyst in molten wax maintained at 265° and a pressure of 20 atm. The products are recovered by cooling the exit gas stream. Models illustrating other methods of working this process, with fixed and fluidised beds of catalyst, will also be shown.

A group of six exhibits by the Mechanical Engineering Research Laboratory will include equipment for the dynamic calibration of fatigue testing machines, a high temperature complex creep stress extensometer, remote indicating torque measuring apparatus and equipment developed for the study of fretting corrosion.

Exhibits dealing with extrusion research will include an extrusion press and 'fatigue' and 'creep' specimens made from extruded alloy.

Recent research work on brittle fracture in iron and iron alloys, carried out in the Metallurgy Division of NPL, will be on show. Mild steel is usually considered to be a ductile material but it has long been known that under certain conditions it behaves in a very brittle manner and sudden catastrophic failures of structures, such as welded bridges and ships, have occurred.

Very pure iron and iron alloys are being used, and the work is demonstrating that certain elements such as oxygen, carbon, nitrogen and phosphorus exert a considerable effect on the ductility of iron even when present in amounts of a few hundredths of one per cent. On the other hand, most metallic alloying elements may have, in the presence of carbon, oxygen, etc., a comparatively small effect even if present in amounts up to 5 per cent.

An improved exhaust arrangement for foundry pedestal grinders will be shown in operation to illustrate part of the work of the BCIRA Foundry Atmospheres Committee.

Other exhibits will include a pneumatic clamp for use in the shell moulding process and details of the measurement and significance of the flowability of moulding sands. A moisture tester and a permeability tester will illustrate work in progress on the properties of moulding sands. These are both experimental items of equipment.

Elcontrol Ltd.

Stand No. 12, Inner Row, Gallery, Grand Hall.

Among the important new additions to the range of equipment to be seen on this stand will be a proximity switch, CR2. This is designed as an industrial unit, and consists of a capacity-operated relay coupled to an electrode. When the capacity in the electrode circuit is increased by the approach of any liquid or solid, such as oil, solvents, refrigerants, grain, coal, etc., the relay becomes de-energised and the switch operates alarms or controls. The unit may be set for any pre-determined level, and is designed for use under arduous conditions.

Also of interest is the Elcontrol FSP photoelectric equipment for furnace safeguarding. A photocell and amplifier are mounted in a viewing head which detects the light of the flame and actuates a relay which controls fuel input to the furnace. Flame failure causes the relay to be de-energised, and the burner motor is then shut down, or the fuel valve closed.

Erskine, Heap & Co. Ltd.

Stand No. 34, Outer Row, Gallery, Grand Hall.

A wide range of switchgear and motor control gear will be exhibited on this stand. A complete 11 kV, 150 mVA rupturing capacity unit is on view, together with a 11 kV, 250 mVA circuit breaker fitted with patented arc control device. Of particular interest also is the MB unit which is a metal-clad vertical isolation unit which, in the 400-volt range, is ASTA tested to BSS. 116/1937 at 25 mVA, and in the 3,300-volts range, tested to 50 mVA with overrating tests at 75 mVA.

Also on view are all types of air break starters, both hand-operated and push-button control, oil immersed motor control gear of the star delta, stator and rotor, and auto-transformer types, knife switches, fuses, isolating switches, ammeters and voltmeters, and all accessories required on switchboards such as indicating lamps.

Evershed & Vignoles Ltd.

Stand No. 5, Row Q, National Hall.

The instruments displayed on this stand will include a 'Dionic' meter for measuring steam purity by the electrical conductivity method. A representative sample of steam is condensed and the meter measures its electrical conductivity which is proportional to the quantity of inorganic salts and gases dissolved in the steam. The conductivity tube, indicators and recorders are almost identical with the well-known 'Dionic' water purity meter, but in the interests of economy this particular meter is arranged to operate with a much smaller water flow.

The Evershed-Straub degassing condenser removes non-condensable gases such as ammonia, carbon dioxide and hydrogen sulphide from steam or water so that a gas-free sample may be used for conductivity determination by 'Dionic' methods.

These gases, while comparatively innocuous in the superheaters and turbines, increase the conductivity reading and so mask the effect due to the presence of any inorganic salts. By removing the gases, readings on the 'Dionic' meter relate solely to the salt content. The water tube unit of the 'Dionic' water purity meter and the Evershed-Straub degassing condenser are usually supplied mounted together in a steel cabinet which can be mounted on skids for easy transit when required.

The 'Dionic' boiler concentration meter is exactly similar to the 'Dionic' steam purity meter except that it has a range up to 5,000 conductivity units equivalent to a concentration of 3,000 parts of dissolved salts per million. It is normally used with an Evershed cooler. A number of other instruments will also be on show.

G. A. Harvey & Co. (London) Ltd.
Stand No. 7, Row M, National Hall.

Various types of specially designed plant in welded stainless steel, Monel, nickel, clad and mild steels are made in the heavy construction and fusion-welding shops of Messrs. Harveys.

The work in which this section of the factory specialises ranges from the smallest high pressure autoclaves for 3,000 lb. working pressure, up to fractionating columns weighing 220 tons, and gas oil separators made from 3 in. thick mild steel plate 4 ft. 6 in. in diameter and 170 ft. long. Although the fusion-welding shop is planned specially for the fabrication of pressure vessels of all sizes, general production is also undertaken from plate varying from 5/15 in. thick to 6 in. thick, including for example, turbine casings weighing 28 tons, heavy fabricated press members, engine frames, and cement dryng kilns.

Johnson, Matthey & Co. Ltd.
Stand No. 4, Row U, Empire Hall.

The company's display will comprise three main sections, dealing with low temperature silver brazing alloys, materials and components for resistance welding, and chemical plant.

Demonstrations of the low temperature brazing technique will be given throughout the exhibition, and the resistance welding section of the stand includes an information panel which, upon the selection of the metals to be welded, indicates the most suitable electrode material and the quality of the weld obtained as compared with that of mild steel to mild steel.

Several examples of silver and silver-lined plant will be on show, together with noble metal catalysts in various forms.

K.D.G. Instruments Ltd.
Stand No. 20, Outer Row, Gallery, Grand Hall.

Prominent on this stand will be a new contents controller. A feature of this instrument is the fact that it is based on the same system as the continuous-reading tank contents gauge, and also that the control unit is completely independent of the dial, and in no way relies on the correct functioning of the dial.

Also introduced at the Exhibition will be a completely new range of pressure, differential and liquid level switches which cover, in various models, from 0.1 in. of water up to 6,000 psi. The feature of most of these switches, with the exception of the very low pressures, is the fact that the whole of the diaphragms and Bourdon tubes are hard soldered—thus giving a very long and stable life.

Mond Nickel Co. Ltd.
Stand No. 2, Row G, Grand Hall.

The Mond exhibit will be devoted almost entirely to spheroidal graphite cast iron and this will be the first time a comprehensive display of castings in this new material has been shown at a public exhibition.

SG iron is produced by a process, patented by Mond, whereby the graphite is present in the form of spheroids instead of flakes. It has the good qualities of ordinary grey iron —ease of casting, machinability to a good finish, rigidity, resistance to wear and corrosion—and also very largely eliminates the brittleness which has hitherto restricted the usefulness of grey iron castings.

Monsanto Chemicals Ltd.
Stand No. 14, Centre Row, Galley, National Hall.

The Monsanto exhibit will feature a number of chemicals with important applications in engineering and allied processes.

'Silester O' will be displayed as a bonding agent in investment casting by the lost wax process, in precision piece moulds, in the manufacture of permanent ceramic moulds and in rammed monolithic linings for high frequency furnaces; also as a resilient bond for *in situ* refractory linings subject to heavy vibration.

'Silester A' will be featured as a bonding agent for refractories and for other applications similar to those of 'Silester O.'

The efficiency of 'Aroclor 1248' as a non-inflammable fluid will be demonstrated, as will also the applications of aryl silicates and 'Aroclors' as heat transfer media.

Another display will feature the many applications of sodium benzoate in corrosion inhibition.

Rockweld Ltd.
Stand No. 3, Row U, Empire Hall.

Many new types of electrodes are being shown of which several deserve special mention.

The 'Mixend 55,' a new 55 per cent nickel alloy electrode, is designed especially for the welding of the new semi-ductile cast iron of the spheroidal graphite type.

'Chromolac 1A' is one of a series of new electrodes designed specifically for the weld-

ing of 1 per cent chrome and ½ per cent moly steels.

The 'Silvac' electrode is for use on mild steel fabrication where surface appearance is of primary importance.

Saunders Valve Co. Ltd.

Stand No. 9, Inner Row, Gallery, Grand Hall.

Examples of the new ebonite valve, with body, bonnet and handwheel of uniform specification, will be shown. As with all Saunders diaphragm valves, the three simple units, body, bonnet assembly and diaphragm are interchangeable with units of different specifications.

A bare shaft model of a 1 in. four-stage pump will also be on view, outstanding features of which are the complete elimination of a high stage impeller. The impellers are of contra-flow type, whereby the thrust load of two stages is hydraulically balanced.

Sharples Centrifuges Ltd.

Stand No. 5, Row D, Grand Hall.

The Sharples 'Vaporseal' clarifier incorporates the special Sharples vapour-sealed discharge covers which enable cellulose lacquers and other finishes containing inflammable solvents to be safely clarified while retaining the easily handled features of the Sharples open-type clarifier.

Sharples laboratory super-centrifuges will be shown, one with electric motor and the other with turbine drive, suitable for either steam or compressed air. The motor driven machines operate at 23,000 rpm., generating a centrifugal force of over 13,000 G, while turbine driven machines run at speeds up to 50,000 rpm., at which a force of 62,000 G is produced.

The Sharples 'Super-D-Canter' is a solid basket centrifugal for handling continuously any suspension of fine crystals or amorphous solids in a liquid. The action is entirely continuous and automatic requiring no periodical cleaning and no control after the initial adjustments have been made.

Sigmund Pumps Ltd.

Stand No. 2, Row EE, Empire Hall.

Two new types of pumps will be announced at the exhibition, and details are not yet available, but apart from these there is a display representing a comprehensive range of centrifugal pumps.

Chemical and process pumps on view will be typical examples of a branch of hydraulic engineering in which the Sigmund organisation plays a leading part, and a feature of the exhibit is a scale model of one of the three distillation units at the Cardon refinery of the Shell Company of Venezuela. Sigmund process pumps, proved in the first distillation unit, were specified for the second and again for the third, resulting in a 30,000 HP installation of Sigmund pumps in this refinery.

United Steel Companies Ltd.

Stand No. 11, Row C, Grand Hall.

The stand will be of a prestige nature, taking the form of a reception centre to provide amenities for discussions with visitors.

In accordance with the established practice of the company, a full staff of technical representatives will be in attendance throughout the period of the Exhibition to deal with all inquiries.

Henry Wiggins & Co., Ltd.

Stand No. 2, Row G, Grand Hall.

This stand will be mainly devoted to the introduction of 'Corronel B', a nickel-molybdenum alloy of a well-established type now produced in wrought form in this country for the first time. Models portraying examples of chemical plant as made in Monel, nickel or Inconel will be shown.

With the new nickel-molybdenum alloy, their well known high-nickel alloys used primarily for corrosion resistance and the Nimonic series of alloys used primarily for heat resistance, this company is in a position to provide suitable materials for practically the entire range of chemical and engineering requirements.

Williams & James (Engineers) Ltd.

Stand No. 6, Row B, Grand Hall.

Among the displays on this stand will be a display unit introducing the 'W. & J. Pneumerstat.' This is an instrument combining the duties of a pressure reducing valve, flow control valve and bubbler chamber.

A selection from the range of automatic air compressor plants designed for the instrument industry, including the 'Oil-Free' compressor introduced at the previous Exhibition; a three-stage compressor plant for 2,000 psi. (available for pressures up to 6,000 psi.); and 'W & J' pressure reducing valves, pressure relief valves and other pneumatic accessories, will also be on show.

Chemical Engineering: A Retrospect

Developments since the last Exhibition

SEVENTEEN years: such indeed is the interval between the last Chemical Plant Exhibition, held in the same year as the Chemical Engineering Congress of the World Power Conference, and the approaching exhibition and conference at Olympia. What are the advances which have taken place in chemical engineering since 1936? Certainly the changes, both technical and professional, have been so numerous that it is not too easy to distinguish a main stream of propulsion along which the whole subject has been advanced.

Nor is it possible to discern a complete revolution in outlook such as took place in the previous 17 years. Thus, a glance at the technical literature of 1936 does not produce so much surprise in a student as would the pages of 1919. In fact many of the topics under discussion then are under discussion today; the titles are often similar—and sometimes the subject matter, too. But, even if allowance is made for the fact that every generation dramatises its own period to some extent, it must be conceded that there has been very significant progress in the chemical engineering world.

A Great Growth

On the one hand the years since 1936 have seen a great growth in the profession, both in numbers and in prestige in the technical world. In 1936 the University of London was about to institute a degree in the subject, some ten years before Birmingham and Cambridge, but even then some way behind Manchester and Glasgow — as these institutions were quick to point out at that time. In the same year the Institution of Chemical Engineers held its 11th examination for Associate Membership, and passed two candidates. Last year there were chemical engineering courses in almost every centre of technical training, and the Institution passed 41 candidates at its examination. Also, the McNab medallist of that earlier trial of strength had become the Chairman of the Board of Examiners at the later one!

On the other hand in the technical field, the advances have been equally impressive. And yet, possibly because chemical engineering is ambivalent, being part science and part technology, the changes of these past years have been of very different kinds. In the first place it cannot be claimed that any new fundamental concept has been developed. The diffusional approach to the transfer of matter between different phases had already been made by 1936, and the two-film theory of mass and energy transfer was being applied to unit operations. The esoteric language of the chemical engineer spread rapidly, and friction factors, volatilities, H.E.T.P.'s, plate efficiencies, film coefficients and the rest of them were commonplaces of speech. But upon these foundations have been built up enormous efforts directed towards the amplification and implementation of principles.

Dashed Hopes

In the main this advance has been such as to bring about a significant change in our attitude towards these principles, as will be suggested later. Of course, there have been notable non-starters, or cases where early hopes have been dashed. Who, for example, must not confess to being in exactly the same frame of mind as the contributor to the chemical engineering section of the Reports on Progress in Applied Chemistry—both in 1945 when he hailed the flood of technical information which would undoubtedly result from the release of details of the Atomic Energy project, and again in 1946 when the flood had not materialised? However, the next 17 years may yet see some change in that respect.

A second glance over the literature of these past years also reveals an interesting phenomenon which might be described as taking three steps forward and one back. This best describes the fashion in which a new development is firstly followed by a rush of application in every suitable branch of the industry, and rather later by a more protracted and thoughtful analysis of the principles involved. In applied chemistry and chemical engineering at least, it seems that development divides after germination, the root leading to continued research and the shoot to more immediately productive ends. That these two members then proceed to nourish one another and live as one is an

obvious fact, and does not require a trip to America to reveal it. However, the importance of co-ordination between these members and their joint development in an industrial climate is the important lesson to be learned from the years under review.

Some splendid examples of this kind of pattern may be traced in the progress in unit operations since 1936. In the case of distillation, for example, we can observe the movement of the subject along three paths at least. The most firmly marked is that which explores the methods by means of which the solutions for the number of theoretical contacts at various reflux conditions may be found. Thus Smoker (1938), Jenny (1940), Gilliland (1940 and 1941), Crossley or Bonilla (1942) and Underwood (1944) are but a few of the names connected with this work. In continual support and extension of this work is the search for the equilbrium data for more and more systems.

At the same time, other workers were, and still are, concerned with unearthing the true behaviour of the bubble-cap plate, a device whose practical use pre-dates all modern theoretical approaches to distillation. In 1938 Rumford, and Peary and Baker were showing the importance of entrainment to plate efficiencies, and in 1940 Dummett *et al.* and Bergmann were giving attention to the liquid flow on the plate. Also, there was a move back to simple fundamentals in the investigations of the mass transfer aspects of the wetted wall column, as witness the work of Storrow, Westhover, Johnstone and Pigford in the recent years.

Fundamental Distillation Methods

Finally 1936-1953 has witnessed a rapid developement of fundamentally different methods of distillation. For instance, in 1937 Fawcett obtained a patent on the use of high vacuum and short vapour paths—the method called molecular distillation. Writing on this subject two years later, Detwiller and Markley were able to list 160 references on the same subject. Also, methods of distillation in which the separation factor is given some specially enhanced value by the introdution of an entrainer have found a variety of applications such as extractive and azeotropic distillation.

A similar advance has occurred in the related fields of solvent extraction and gas absorption, and, to some extent, leaching. There is a broad similarity between all these operations and distillation, both theoretically and in the apparatus used. Of this group, absorption had the sounder theoretical start, and leaching the longer history of application. It was Donald who, in 1937, cleared up the background to continuous leaching in theoretical cells or stages, but it is only during the last two or three years that Piret and his co-workers have tackled the problem of the rate at which a solute may be leached from an insoluble matrix, and so attain an equilibrium distribution.

Counter-Current Principles

On the other hand, distillation, gas absorption and solvent extraction have moved continuously, and somewhat in concert, with a certain effect on each other. The ideas of continuous counter-current extraction in a series of perfect steps were developed in distillation and have found ready application in the other operations. The notions of film transfer of matter originating in gas absorption brought a new slant to distillation and solvent extraction. Again, the use of packed columns, etc., in absorption and extraction has accelerated interest in the problems of wetting, distribution, loading and flooding, together with their effects on stage efficiency. So, the progress in solvent extraction since Hunter and Nash's paper at the congress of 1936 has been rapid because of the ready acceptance of the earlier methods and outlooks of distillation and absorption into the newer field. At the same time, extraction has brought new experience to bear on the older operations.

In some branches of study progress has been more in the nature of a broad strengthening of the position rather than a deep penetration along a particular approach. Heat transfer and fluid flow have had this sort of history since 1936. Thus the relationship of these phenomena to each other has been amply demonstrated (vide Norman 1949), and the development of more precise methods for the prediction and calculation of operating conditions has been continuous. Such practical items as Generaux's generalised solution for the economic pipe diameter (1937), Gardner's examination of the true temperature difference in a heat exchanger (1941) and Hottel's work on the radiant heat exchange all belong to this period.

But perhaps the greatest single effect has been the impetus resulting from the develop-

ment of fluidisation methods. The special conditions of the bed of solids 'expanded' by the frictional forces of a fluid flowing through it called for a vigorous extension of the theory of fluid flow and heat transfer within a 'fixed' bed. Accordingly, the nature of the fluid-solid interface has been approached afresh, and some older ideas possessing the strength of dogma are still being tested. Comolet, in 1949, for example, produced a streamline flow in long, narrow tubes at Reynolds Criteria of 75,000, and the extension of modified flow theory to phase mixtures has continued.

Mixing & Agitation

A similar picture of a general (if rather more limited) advance is to be seen in the case of mixing and agitation, which after all is closely allied to fluid flow. The work of the thirties and forties was directed towards the provision of some basis of correlation upon which the traditional mixing actions could be compared, their capacity scaled, and their power requirements assessed. While this has been brought measurably nearer, the development of fluidised bed techniques, and sonic vibrations as means of agitation have both introduced fresh features.

In even greater contrast are the range of practical application and the fundamental advances made in grinding. Since Farrant's review of the subject in 1940, many attempts have been made to investigate the crushing strength of solids, the power efficiency of such crushing, and the relationship between these in any given grinder. However, the results of these efforts are not yet applicable to industrial machines, the design and operation of which remains largely unchanged. Here at any rate is a particular instance of an attack on the fundamentals of a difficult and long established practice.

In the important process of drying there has been a constant interest in the mass- and heat-transfer aspects of the hot-air cycle, and particularly in the movement of moisture within the drying mass. There have also been attempts at representing the operation of complicated dryers such as the rotary, drum or through-circulation types by reference to these same fundamentals. At the same time some specialised techniques have been developed, in which the heating is applied in such a form that these diffusional problems are somewhat reduced; as for example, freeze drying, infrared and high-frequency drying. Neither must one overlook the tremendous advances produced in those powerful supporters of unit operational chemical engineering, instrumentation and materials of construction.

In this brief review, then, it is possible to confirm the general pattern of advance, more vigorous in some directions than in others, but with a noticeable tendency for progress in one unit operation to assist in the problems of the remainder. In conclusion, what can we claim as the motif of these years between the Chemical Plant Exhibitions? Perhaps above all it is true to say that they fell in that period of chemical engineering development which will come to be known as the phase of the unit operation. The labours that have been directed towards the elucidation of these basic steps have in turn almost led to their obsolescence. More and more it is being appreciated that unit operations are almost all the same at heart—despite their diversity of application in the chemical industry—and that they are linked through analogues of mass and energy transfer. It has already been suggested that the piecemeal 'operational' kind of thinking has had its day, and it is possible that this year's Exhibition and Conference will mark the growth of a new outlook.

Visitors from Gold Coast

THE Gold Coast Government is to send to Canada in September an important delegation of ministers and members of the National Committee for the Volta River Project. The party will inspect installations for the production of power and aluminium, to assist them in their work in connection with the Volta project. Leaving Accra by air on 9 September, they will pass through London and reach Montreal on 12 September. They will spend several days visiting plants belonging to the Aluminium Company of Canada, both in operation and under construction. On 21 September, it is hoped, they may visit Ottawa.

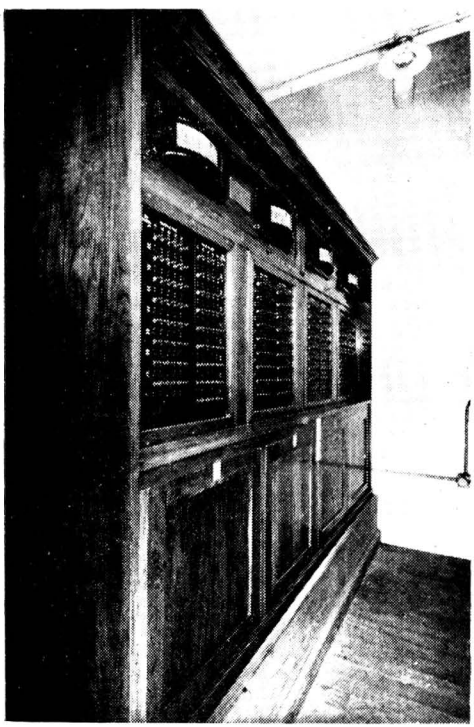
On 23 September, the party will return to the United Kingdom for a further six days, when it is hoped that they may be shown various aspects of British aluminium production, and one of the large-scale projects being carried out under the supervision of Sir William Halcrow & Partners.

Process Monitoring by Graphic Panels & Automatic Scanners

by LEO WALTER, A.M.I.Mech.E., M.Inst.F.

THE use of graphic panels, which provide a simplified flow sheet of a manufacturing process, and have miniature instruments directly inserted in the graph at locations where the actual measurement takes place at a remote point in the plant, has not become very widespread, partly because of the novelty and the conservative outlook of potential users, partly because the merits of improvements made during the last few years have not fully been realised.

One of the recent developments in connection with graphic control panels is the use of automatic scanning instruments. Manually operated scanning switchboards have been in use in industry for many years;



Courtesy of Elliott Brothers (London), Ltd.

A conventional switchboard for 655 temperature measurements in a large grain silo

and multi-point temperature scanning installations, for example, range from a few instruments to over 600 instruments serving measuring points widely scattered in processing or other plant. The development of fully automatic scanning equipment makes it now possible to search a plant for faults by simply pressing a button.

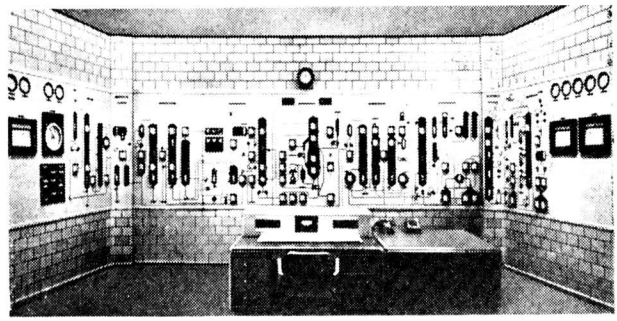
Among other developments of graphic panels, the semi-graphic types prove very helpful in cases where a new expansion would greatly overtax the capability of even skilled plant operators to identify each instrument.

To draw a clear demarcation line between applications where a graphic panel or desk is preferable to a conventional control board would be impracticable, but the latest improvements in design make it likely that the use of graphic panels will increase for complex large scale processes, especially of a chemical nature. It is certainly tempting for the chief plant operating engineer to sit in a swivel chair and make all his observations and necessary manual adjustments without leaving his seat. All essential instruments and adjustable controllers, keyed by the graph, are thus brought to his attention in a clear and orderly way.

Ease of maintenance is another point in favour of modern graphic control panels, because most instruments are standardised and spare parts are interchangeable. Nevertheless, a graphic panel is—contrary to some misleading conclusions—very far from being the ideal tool for complete plant robotisation. For a long time to come the operating engineer will have to play a most essential part in direction of automatic control of large complex processes. Although process monitoring has been improved and made automatic; interlocking has been introduced to a larger extent for graphic panels; and annunciator and alarm systems have been developed to produce greatest safety in operation, in the end everything still depends on the efficiency of the human brain.

In a paper read by Albert F. Sperry, of

Courtesy of Panellit, Inc., Chicago.



A graphic panel, with instruments set into the flow diagram at appropriate points

Panellit Inc., the following statements, heartily endorsed by the writer of this survey, have been made regarding the psychological angle of use of monitoring devices in graphic control instrumentation.

'There is a practical limit to the extent to which truly automatic control has been able to go. This limitation seems strange to many of us who have been accustomed to expect near miracles from the modern machine. It is not imposed by the machine itself but by the sheer complexity and the volume of information that it must first convert to usable messages and then store away in such a manner as to be readily available when needed for comparison with other information.

'This business of storing away information and "remembering" it until it is needed is one of the very difficult things for a machine to do, particularly when the amount of information becomes large and very involved. No machine that has ever been built can receive this information and retain it with a fraction of the efficiency with which it can be done by the human brain. The recent developments in transistors have led us to expect that more and more compact memory devices might be available in the near future. But even using these advanced techniques, a machine with a memory equivalent to the human brain would probably be bigger than New York's Radio City.

'It seems quite clear that the human operator will play a very essential part in the automatic control of large processes for a long time to come. The best evidence that this tendency is generally accepted by industry lies in the amount of attention that has been given to the modern central control panelboard, the most effective way of presenting information regarding a process to an operator.'

Unfortunately, the human brain has some very serious drawbacks which must be understood clearly in order to use it most effectively. It can store up and remember tremendous masses of information over long periods of time, but it can become confused very easily when it is required to translate this information into intelligent response at a very high speed. In this respect the machine is better. With the aid of modern electronic devices it can perform such operations as are within its capabilities at almost limitless speeds.

Undoubtedly we are approaching the time when the means for storing and sorting out information will be simplified and understood so well that the machine will take over more and more of the duties of the brain. There is not much question that automatic operation will continue to replace manual operation to an ever-increasing extent, and in ten to twenty years we may see complete plants operated automatically or remotely just as we have the automatic pumping station or electric sub-station of today.

This survey concerns itself with the means for placing before the human operator large masses of information of the type that is usually associated with very complex processes and machines. It does not deal with the obvious presentations of recorded and indicated measurements of the type that have been used in industry for many years, and which we refer to in this paper as conventional instrumentation.

Basic to the concept of process monitoring is the fact that most of the information gathered by the instruments associated with continuous processes is of no practical use to the operator, except during periods of disturbance or actual danger. The actual hour by hour, minute to minute control of even a very complex process under 'normal' operations, involves the supervision of a

relatively few significant variables. The automatic controllers and the inherent stability of the process keep the bulk of the quantities in proper relationship, most of the time.

Unfortunately imbalance disturbances and abnormalities occur at the most unexpected times, and when they do occur the operator may need a great deal of detailed information about one small section of the process to give him the data upon which he can base the corrective action required to return the process to equilibrium.

The function of a well-designed automatic process monitoring system is, therefore, to enable the operator to concentrate in a relaxed manner on the entire system during normal periods, and to call his attention to any detailed abnormalities as soon as they are detected so that he can transfer his attention temporarily to the part of the process being disturbed. In addition to this it may have secondary functions, such as data recording as a basis for long term research and study, cost accounting, etc., but its primary function is in its role of extending the scope of a single operator to ever larger and more continuous processes.

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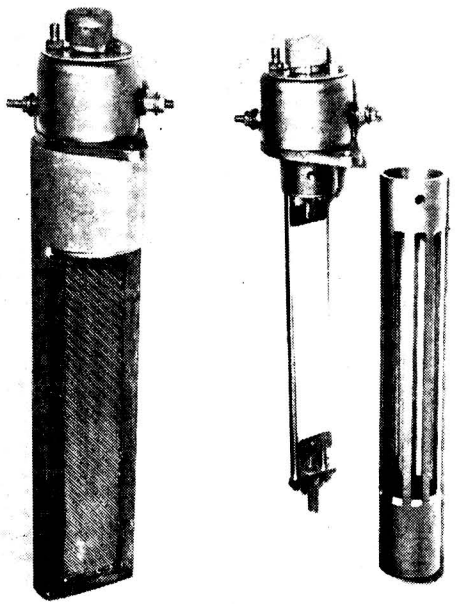
New Controllers

Temperature & Humidity Elements

A SYSTEM by which accurate control of temperature within 0.2°, and of humidity within 0.5 per cent, may be maintained is a great advance on conventional methods. The Tem-Con system, manufactured by P.A.M. Ltd., of Guildford, attains this accuracy without high cost, difficult maintenance or fragility of apparatus.



The sensitive element has an electrical loading of only 0.00005 amps, and a movement of 0.000002 in. is sufficient to actuate the relay, without arcing. When the contacts are closed, the small low-voltage current is amplified by a simple electronic circuit to operate a relay mounted on the amplifier chassis. Control from several points at different temperatures may be accomplished by a multiple circuit unit.

Two new elements which have recently been developed are a radiation element and a humidity element. The former is designed specifically for the control of moving hot surfaces such as rolls.

The sensitive element consists of a flat strip of high expansion metallic foil suspended by its ends in a casing which exposes one side of the strip to the radiation, and yet protects it from draughts and other radiation. In suitable conditions control within 2.5° is obtainable.

The humidity element is of the hydroscopic type, and a short piece of specially selected Hygro material is the operative member. The suspension of the material is unaffected by temperature change, and mechanical protection with adequate ventilation is provided by a slotted metal sheath. The control will operate at 95 per cent RH at 44° and also in conditions of dryness such as 10 per cent RH.

The new elements: left, for radiation control; and right, for humidity control

USA Metal Consumption

Higher Tonnage of Copper & Antimony Used in May

THE statistics given below relate to metal consumption and production in the United States of America during the month of May and are supplied by the Bureau of Mines, US Department of the Interior.

Consumption of refined copper in May was 4 per cent higher than in April, thus establishing a new record monthly rate since the end of World War II for the second successive month. Imports, except for December, 1952, were the highest in the post-World War II period. In addition to regular sources, refined copper was received in May from the Belgian Congo, and the Union of South Africa. Total mine production and smelter output from domestic primary materials in May were virtually unchanged from April, indicating a small decrease on a daily average basis. Refinery output from both domestic and foreign primary sources rose in May; the total was 6 per cent above April. Production of refined copper from scrap continued in May at the high level of March and April. Stocks of refined copper in producers' hands continued at the low level at the end of April, but those of blister and of materials in process of refining increased 6 per cent.

Prices for domestic electrolytic copper ranged from 29.75 to 30 cents a lb. and foreign copper, except for Chilean, was at that approximate level. Chilean copper continued to be quoted at the equivalent of about 36¼ cents a lb., delivered Connecticut Valley. Early in the month it was announced that copper trading was to be resumed on the London Metal Exchange on 5 August following a recess of 14 years. Members of the Commodity Exchange, New York, approved a new copper futures contract for resumption of trading 1 June, following a lapse of two years.

Record Antimony Production

Smelter production of antimony in May was the highest recorded so far in 1953, totalling 877 short tons, as compared with 860 short tons in April. Industrial consumption increased 17 per cent over the 1,050 tons consumed in the previous month, amounting to 1,225 short tons. Of the total quantity consumed, 62 per cent was used in the manufacture of metal products and 38 per cent in the manufacture of non-metal products.

Stocks held by producers and smelters on 31 May decreased 19 per cent from the 2,984 tons reported on hand on 1 May and were the smallest yet reported for 1953. Stocks held by industrial consumers and dealers at the end of May continued virtually unchanged at 3,921 short tons as compared with 3,839 tons at the beginning of the month. Imports decreased 18 per cent in May, amounting to only 858 short tons, compared with 1,044 tons in April. Of total imports, 76 per cent was in the form of ore and concentrates 16 per cent in the form of metal and 8 per cent in the form of oxide. Exports of ore and metal continued negligible, while exports of antimony salts and compounds (gross weight) totalled five tons, valued at $3,543.

Domestic Tin Consumption

Domestic consumption of tin was virtually unchanged in May. Tin used in that month totalled 7,560 long tons (4,990 of primary, 2,180 of secondary, and 390 in imported tin-base alloys). In April, 7,680 long tons of tin were consumed (5,190 of primary, 2,280 of secondary, and 210 in imported tin-base alloys).

Tin stocks held by the Government (RFC) and industry—comprising pig tin, tin in ore, raw materials in process, and other, but excluding the strategic stockpile and metal afloat *en route* to the USA—decreased from 47,720 long tons on 1 May to 42,560 on 31 May. Industrial stocks of pig tin in the USA decreased 170 long tons and totalled 11,460 tons at the end of the month. Imports of metallic tin were 7,230 long tons in April (6,690 in March). Receipts of ore in terms of contained metal amounted to 1,915 long tons in April (4,570 in March).

In May the Government-owned smelter at Texas City, Texas, produced 3,060 long tons of 3-Star tin from concentrates (3,750 in April). In May 40 tons of 3-Star were re-melted and up-graded. The average price of tin in the New York open market was $0.97 a lb. in May compared with $1.01 in April. The

RFC selling price of tin metal was unchanged at $1.215 a lb. throughout May.

Production of zinc oxide continued to decline during May to 14,846 short tons, 15 per cent below the April output, and was at the lowest monthly rate since September, 1952. Total stocks at producers' plants, although still relatively high, declined 5 per cent below inventories on hand at the end of April.

Output of American process zinc oxide declined 25 per cent and was almost entirely responsble for the 18 per cent decrease in total production of lead-free zinc oxide. Leaded zinc oxide output was 6 per cent below the April total. Over-all shipments of zinc oxide were 16,246 tons, or 6 per cent less than during April. Shipments of lead-free oxide were also 6 per cent below last month and leaded zinc oxide declined 4 per cent.

Production of copper sulphate in June was 2 per cent less than in May, but on a daily average basis was 2 per cent greater. Shipments rose 6 per cent and, except for March, were at the highest level of the year. Stocks dropped 13 per cent and, at the June rate of shipments, were sufficient for less than a month's requirements. Foreign trade data for June are not available. There were no imports in May. Exports of 3,817 tons in May were 12 per cent less than April, but remained high in relation to earlier months of the year.

Chemical Engineering Conference

7-11 September, 1953

THE Conference will be held at Olympia at the time of the Engineering, Marine and Welding Exhibition and the Chemical Plant Exhibition. No tickets will be issued, the Conference being open to all visitors to the Exhibition.

Monday, 7 September

2.30 p.m. 'Carbon and Graphite as Materials of Construction for Chemical Plant,' by A. W. Morrison, B.Sc., B. W. Freedman, B.Eng.(Sydney) and P. G. R. Haines, A.M.I.Chem.E. (Powell Duffryn Carbon Products Limited).

4.0 p.m. 'Tantalum and Zirconium—Production and Properties,' by G. L. Miller, Ph.D., B.Sc., A.R.I.C., M.I.Chem.E. (Murex Limited).

Tuesday, 8 September

2.30 p.m. 'Developments in the Production of Chlorine with special reference to Mercury Cells,' by L. R. Thomas, B.Sc., A.M.I.Chem.E. (Monsanto Chemicals Limited).

3.45 p.m. 'Recent Advances in Milk Processing Plant,' by J. E. F. Renton, B.Sc., A.R.I.C. (George Scott & Son (London) Ltd.).

Wednesday, 9 September

3.0 p.m. A Discussion on British Chemical Engineering in the light of recently published reports, to be opened by Sir Harold Hartley, K.C.V.O., C.B.E., M.C., D.C.L., F.R.S. and J. Grange Moore, M.A.

The reports in question will be the OEEC Report on 'Chemical Apparatus in the USA' and the Anglo American Council on Productivity Report on 'Heavy Chemicals.' Mr. J. Grange Moore was leader of the AACP team which produced the latter report.

Thursday, 10 September

2.20 p.m. 'Recent Developments in Evaporation with particular reference to Heat Sensitive Liquids,' by B. N. Reavell, B.Sc., A.C.G.I., M.I.Mech.E., M.I.Chem.E. (Kestner Evaporator & Engineering Co., Ltd.).

4.0 p.m. 'Recent Advances in Distillation,' by G. A. Dummett, M.A., A.M.I.Chem.E., P. V. Clifton, D.Phil., A.R.I.C. (the A.P.V. Company, Limited).

Friday, 11 September

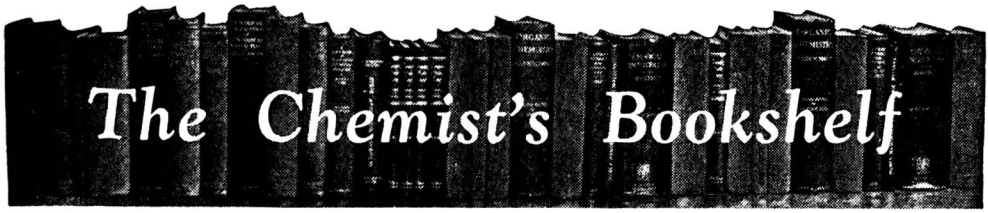
2.30 p.m. 'The Production of Formaldehyde from Methanol by the Silver Catalyst Process,' by K. Nickels, B.Sc., A.R.I.C., M.I.Chem.E. (Burnett & Rolfe Limited).

3.30 p.m. 'Recent Developments in the Application of Plastics to Chemical Plant,' by Verney Evans, M.Sc., A.R.I.C. (Prodorite Limited).

The Conference is organised by the Institution of Chemical Engineers and the Chemical Engineering Group of the Society of Chemical Industry.

Survey of Uranium Mines

With the object of inspecting uranium mines, eleven USA Congressmen, members of the USA Joint Atomic Energy Committee, are flying to South Africa later this month.



A SPECTROPHOTOMETRIC ATLAS OF THE $^2\Sigma^+$-$^2\Pi$ TRANSITION OF OH. US National Bureau of Standards. Circular 541. Washington, 1953. 20c.

With the development of sensitive photoelectric multiplier tubes it has become feasible to use direct-recording of spectra, in the form of intensity against wavelength, in conjunction with high-resolution spectrometry between 1800 and 7000 A. There is a growing interest in scanning high-resolution instruments, and it is possible that they will be widely used in coming years, both as research tools and in industrial applications.

For laboratories where the emphasis in spectroscopic research is primarily on photographic measurement of wavelength, the various charts of atomic spectra, and the collection of molecular spectra published by Pearse and Gaydon, have been of great value. But there is not at present available a comprehensive collection of either atomic or molecular spectra in which the data are presented in the form of an intensity curve as received from a densitometer or recording spectrometer.

This spectrum of OH has been prepared by the NBS as a trial to determine whether a demand for such data exists. The spectrum was obtained from the hot gases above a hydrogen-oxygen flame, and the $^2\Sigma^+$-$^2\Pi$ electronic transition from 2610-3520 A. is given.

The detail is sufficient to resolve lines as close together as 0.1 A., and the rotational and vibrational numbers are marked above each spectrum. An intensity scale is placed on each page to show the relative intensity of the lines compared with the intense Q_2 head of the 0,0 transition.

It seems that this is a venture which could prove of great value to research workers: the data are presented in a clear and comprehensive way, and there is an important note of warning on the effect of excitation conditions on the OH spectrum. The price of the circular should recommend it to everybody.—B.I.

STARCH ITS SOURCES, PRODUCTION AND USES. By C. A. Brautlecht. Reinhold Publishing Corporation, New York. 1953. Pp. 408. 80s.

This treatise on starch is not intended as a guide to its manufacture, although one chapter is devoted to manufacturing processes. It does describe, however, the general properties of starch, the various kinds as obtained from potatoes, corn, tapioca, wheat, rice, sago, arrowroot and other sources. The applications of starches are dealt with under the headings, laundry, paper, textile and starch for adhesives.

Separate chapters are devoted to dextrin, glucose and caramel, and methods of starch analysis. The final chapter, by a separate author. Owen A. Moe, deals concisely with the physical and chemical characteristics of starch.

In all, the book comprises 21 chapters, each of which has its own selected bibliography. There is much data in tabular form, as well as in the actual text, covering many items such as production, stance, if the acidity of a used oil is high power requirements, etc. Although the main emphasis here is on starch as produced in the United States, a considerable amount of data is given concerning the industry in other countries.

This book will be of value to all who are concerned with starch as a special product. It is not likely to be in great demand by other chemists and chemical engineers, except as a source of reference.—E.J.C.

Chemicals in Overseas Trade

The UK Trade and Navigation Accounts for the month of July, just issued, show that exports of chemicals, drugs, dyes and colours for the month were valued at a total of £11,875,815, as compared with £10,358,662 for July, 1952.

HOME

Laboratory Fire

When a flask cracked in a retort at the Wellcome Laboratory Research Foundation, Park Langley, Beckenham, methylated spirit caught fire and a woman was overcome by fumes.

More Rubber Consumed

Statistics published by the International Rubber Study Group show that rubber production for June was 135,000 long tons and exceeded consumption by 10,000 tons, whereas for the same month last year production was 5,000 tons less but was 15,000 tons in excess of consumption. For the first half of the current year production at 827,500 tons was 80,000 tons down on the same period of last year, but consumption at 792,500 tons showed a rise of 57,500 tons.

Sugar Allocations

The Ministry of Food has announced that permits for sugar, syrup and treacle for manufacturing purposes which apply to the eight-week period beginning 6 September will continue to be valid for one and one-fifth times the quantity stated on them. Permits on form PSM. 2 (a) issued by Food Offices, which would normally expire on 5 September, will have their validity extended for a further eight weeks and will be worth one and one-fifth times the quantity stated on them.

Engineers' Refresher Course

The Ministry of Fuel and Power is holding a refresher course for works and plant engineers at Brasenose College, Oxford, from Monday, 21 September, to Friday, 25 September. The opening address will be given by Rear Admiral Sir Sydney Frew, chief fuel engineer, Ministry of Fuel and Power, at 2.30 p.m. on the Monday, and the closing session will begin at 11.15 a.m. on the Friday. Lectures by experts will be supplemented by discussion. The fee for the course will be £2 10s. Accommodation will be available at the College for £4 extra. All inquiries should be sent to the Secretary, Fuel Education Joint Advisory Committee, Ministry of Fuel and Power, Southern Region, Whiteknights, Earley, Reading.

New Anthracite Colliery

A proposal to sink a new £6,000,000 colliery ten miles north-east of Swansea has been announced by the South Western Coal Board. The purpose is to exploit a virgin area of anthracite, with workable reserves of 134,000,000 tons. The shaft sinking will take two to three years. Production will begin in 1958 and it is planned to produce 750,000 tons a year by 1961.

Rayon Research

Started nearly three years ago, the £1,000,000 research station of the British Rayon Research Association at Moss Nook, Wythenshawe, Manchester, will begin its work at the end of August. Thousands of pounds' worth of machinery is being moved from the Association's Urmston premises to the Manchester garden estate. By the new year the station will be fully occupied.

Oil Works Fire

With dozens of oil drums exploding round them, firemen from Salford, Manchester and Lancashire County brigades waded through blazing oil recently to fight Salford's biggest fire in years, at the Imperial Oil Works of Germ Lubricants, Ltd., Bloom Street, Salford. Half the works were well alight an hour after the outbreak began and between 25 and 30 people were evacuated from houses in the neighbourhood as the blaze drove back the firemen.

Analytical Chemists

A joint meeting of the North of England Section and the Microchemistry Group of the Society of Public Analysts and Other Analytical Chemists with the Liverpool and the North Western Sections of the Royal Institute of Chemistry will be held at Southport on Saturday, 26 September. The previous day there will be a visit to Simpson's Gold Thread Works, Preston, at 2 p.m., and on the Saturday morning there will be visits to Victoria Colliery, Standish, nr. Wigan, and Southport Gas Works, at 10 a.m. The meeting will be held at Southport Town Hall at 2.30 p.m., when there will be a symposium on 'The Training and Education of Microchemists.'

OVERSEAS

Tin Conference

The reconvening of the international conference on tin is to be supported by Malaya and Singapore. The conference was adjourned in November, 1950, after disagreement on the establishment of an international control agreement.

Rumania's Oil Output

Crude oil production in Rumania in 1953 will total 9,400,000 tons, as against 8,600,000 tons in 1936, the peak pre-war figure, according to a statement made by the Prime Minister, Mr. Ghearghe Gheorghiu-Dej. He added that the annual production rate would be 11,000,000 tons by 1955.

Synthetic Rubber Setback

Swollen inventories and shrinking demand are stated in a message from Washington to be forcing the Reconstruction Finance Corporation to curtail its synthetic rubber production. The Corporation has decided to close the largest of the 13 copolymer plants now producing general purpose synthetic rubber.

Canadian Anhydrous Ammonia

Plans for increased production of anhydrous ammonia at Sarnia, Ont., have been announced by Mr. N. R. Crawford, president of Dow Chemicals of Canada, Limited. Mr. Crawford's statement indicates that substantial expansion of present plant facilities is planned to meet increasing demands for ammonia for the production of heavy chemicals, paper, fertiliser, explosives and for metallurgical purposes.

Uranium Recovery in South Africa

South Africa's third uranium recovery plant, at the Blyvooruitzicht gold mine, near Carltonville, on the Far West Rand, which was officially opened recently, is the latest addition to a project estimated to cost £40,000,000. At the end of 1950 the first four South African mines—Blyvooruitzicht, Daggafontein, West Rand Consolidated and Western Reefs—undertook to become uranium producers. Three of them are now in production, and the fourth will start producing soon.

Malayan Tin Output

Total output of tin in Malaya during July was 4,705 tons, compared with 4,262 tons in June. This represents production of tin concentrates in terms of metal converted at 75.5 per cent.

Price Reduction

The Texas Division of the Monsanto Chemical Company has announced a reduction in the tankcar price of acrylonitrile from 43 cents to 36 cents a lb. with a corresponding reduction in other loads.

Manganese Ore in British Guiana

An official report of the Geological Survey Department, recently published, states that important quantities of manganese ore have been found in the North West District of British Guiana. The ore is reported to be spread over a wide area in sedimentary rocks which outcrop in certain areas and dip steeply under increasing layers of sterile formation in others.

Australian Uranium

Mr. Thomas Playford, Premier of South Australia, has announced that the British Ministry of Supply and the USA Export-Import Bank are to back a scheme to develop South Australia's uranium resources. They will provide A£2,318,000 (£1,852,000 sterling) towards A£3,096,000 (£2,472,000 sterling) which the South Australian Government plan to spend this year.

Norwegian Seaweed Survey

Norway's seaweed resources have been mapped by the Institute of Seaweed Research after a round-the-coast survey lasting two years. Now that the quantity and density of various types of seaweed have been checked, the different categories will be chemically analysed by the Technological University College at Trondheim. Helped by these studies, it is hoped to develop considerably Norway's seaweed processing industry. Since the war four factories in Norway have processed seaweed for making alginates used chiefly in the food and textile industries.

Publications & Announcements

FOR use on structural metal work, a new general purpose anti-corrosive paint has been developed by Tretol Ltd., 12-14 North End Road, London, N.W.11. This is Tretolastic anti-corrosive paint which, the manufacturers claim, is based on a special combination of synthetic resins that provide the maximum degree of protection against atmospheric corrosion. It is stated to be free-flowing and can also be sprayed without difficulty. The paint is made in 12 colours, also black and white and special rust-inhibitive primers are available where required.

* * *

EXTREMELY well produced, several of the numerous illustrations being in colour, a brochure recently published by the Broken Hill Associated Smelters Pty., Ltd., Collins House, Melbourne, Australia, gives interesting descriptions of the company's activities in the production of refined lead, silver gold, cadmium, copper by-products, antimonial lead and sulphuric acid. A diagrammatic flow-sheet shows in colour the sequence of the many operations involved in the production of refined metals from the raw concentrates and another inset shows—again in colour — the variety of products resulting from the treatment of Broken Hill lead concentrates.

* * *

WHILE hundreds of new books and journals dealing with British research appear in our libraries daily, it is something of a paradox that much of our most scholarly writing is never published. In this country the university thesis exists in typescript only, and, once accepted, often becomes just an unrecorded archive. The thesis, prepared for a higher degree, is written by someone who has graduated in a field of learning and has subsequently carried out research with the finest facilities and under the direction of experienced scholars. It comprises approved results of undoubted importance which ought to be known. There is no doubt about the demand for this knowledge, and in many countries publication is the rule. At the present time, however, there is no likelihood of a change of practice in the British Isles. The need for a union list has been recognised for many years and now, with the publication by Aslib of the first volume of the *Index to Theses Accepted for Higher Degrees in the Universities of Great Britain and Ireland*, there exists the first part of what is to be an annual national bibliography. Volume 1 covers the period 1950-51, and the editor, Mr. P. D. Record, M.A., F.L.A., has listed some 2,200 theses. All subjects have been covered and each entry contains the title of the thesis, the author's name and university and a note indicating availability to the public. The work, obtainable from Aslib, 4 Palace Gate, London, W.8, costs 25s., plus 6d. postage.

* * *

AN entirely new machine has been added to the range of productions of Higgs Motors, Limited, Witton, Birmingham, 6. This is a worm-spur gear unit with an output torque of 100 lb. ft. at speeds as low as 1 rpm. The ball-bearing motor complies with B.S. 170: 1939 and is of the drip-proof pattern. The gearbox houses both primary worm reduction and secondary spur reduction and is constructed in one piece to eliminate oil leakage. Deep circular spigots, oil flingers and caps of special design ensure an oil-tight unit. Filling, level and drain plugs are provided. The gears, carried between ball bearings, are completely enclosed and run in oil.

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A NEW 'Buyers' Guide to Plastics Materials' has been published by the British Plastics Federation to help home and overseas buyers generally. Although not exhaustive, this 44-page octave booklet, bound in a clear white cover with green lettering, is claimed to cover all the more important plastics materials produced in Great Britain. An interesting feature is that the actual cover is laminated with a thin sheet of cellulose acetate—a plastics usage which ensures that the cover will keep permanently clean and withstand considerable hard-handling without deterioration. Each of the 17 sections has a note of the more important uses of the material concerned, the names and addresses of the member-firms supplying it, and the trade names used. All are indexed separately for easy reference. The guide is obtainable from the British Plastics Federation, 47-48 Piccadilly, London, W.1, price 2s., post free (on application from trade representatives).

• PERSONAL •

MR. FRANK SPICER has been appointed general manager of Rushtons (Leeds) Limited.

MR. E. W. HOLMES, F.R.I.C., who for the past 34 years has been employed as chemist by John W. Leitch & Company, Ltd., Milnsbridge, Huddersfield, is shortly retiring and to mark the occasion an interesting ceremony recently took place at the offices when, on behalf of the company, Dr. A. E. Everest, managing director, presented Mr. Holmes with a Parker Knoll fireside chair. He expressed appreciation of Mr. Holmes' faithful services over a long period and wished both Mr. and Mrs. Holmes many years of good health. Mr. Holmes suitably replied.

Wellcome Pharmaceutical Research Fellowships, of an annual value of £350 each, have been awarded to MR. JOHN THOMAS, Wigan, and MR. GEORGE L. WILLEY, Knaresborough, for a second year in each case. Mr. Thomas will continue in the Department of Pharmacy of the University of Manchester, his study of the chemical synthesis and biological activity, particularly bactericidal action, of a new series of quaternary ammonium compounds. Mr. Willey will continue his research at the University of Leeds on the possibility of selectivity of action of nicotine-like stimulant compounds.

MR. L. KING, who recently retired from the Anglo-Iranian Oil Company after about 30 years' service, was appointed chief chemist in Abadan at a time when the chemical department was being organised to cope with expansion and when new refinery methods were being evolved. He returned to the United Kingdom in 1927 and after a short period at the head office was appointed chief chemist at Llandarcy. In 1930 he was transferred to the research station at Sunbury as chief development chemist. He joined the refineries department two years later, being concerned with technical administration and the co-ordination of refinery operations. In 1940 he was seconded to the petroleum warfare department and later, on returning to head office, was in charge of the company's lubricating oil manufacturing project.

The late ALDERMAN THOMAS SARSON, formerly assistant managing director of the Stanton Ironworks Company, left £45,234.

MR. F. P. WEBSTER, a director of London Aluminium Company, Ltd., has been appointed managing director of the company. He is also managing director of Midland Metal Spinning Company, Ltd., and joint managing director of South Western Industrial and Water Corporation.

The following have been elected to the Council of the Institute of Metal Finishing for 1953/54:—*President*, J. W. CUTHBERTSON, D.Sc., F.I.M., A.M.I.E.E.; *immediate past president*, H. SILMAN, B.Sc.(Lond.), F.R.I.C., M.I.Chem.E., F.I.M.; *vice-presidents*, S. G. CLARKE, D.Sc., Ph.D., A.R.I.C., G. E. GARDAM, Ph.D., A.R.C.S., F.R.I.C., F.I.M., R. A. F. HAMMOND, B.Sc., A.R.C.S., F.R.I.C., T. P. HOAR, M.A., Ph.D.(Cantab.), B.Sc.(Lond.), F.R.I.C., F.I.M., F. MASON, M.I.E.E., M.Inst.M., R. W. NICOL, E. A. OLLARD, A.R.C.S., F.R.I.C., F.I.M., C. WHARRAD; *hon. secretary*, S. WERNICK, Ph.D., M.Sc., F.R.I.C. F.I.M.; *hon. treasurer*, F. L. JAMES; *members of Council*, W. F. B. BAKER, A.M.I.E.E., H. CANN, L. B. HUNT, M.Sc., PhD., A.R.C.S., F.R.I.C., L. MABLE, J. W. PERRING, J. M. SPRAGUE, M.Sc., F.R.I.C., N. A. TOPE, A.I.M., A.M.I.P.E., A.C.T.(B'ham.), A. W. WALLBANK, B.Sc., F.R.I.C., I. T. WATKINS; *ex-officio members of Council*, Chairman of London Branch: E. L. MASEK; Chairman of Midland Branch: J. M. SPRAGUE, M.Sc., F.R.I.C.; Chairman of Sheffield & North-East Branch: R. W. NICOL; Chairman of North-West Branch: B. J. JONES; Chairman of Scottish Branch: H. C. FAIRLIE, B.Sc.; Chairman of Organic Finishing Group: A. A. B. HARVEY, M.Sc., A.R.I.C.

Obituary

MR. A. E. BOND, who has died, was deputy chairman of the British Benzol and Coal Distillation Company, Ltd., and managing director of J. C. Abbot & Company, Ltd.

The death has occurred of MR. ALEXAN-

DER HADDEN, managing director of Imperial Chemical Insurance Limited. He had served the company and its predecessors from the age of 21. Beginning as a clerk dealing with marine insurance in the offices of Nobel Explosives Company, he eventually took charge of the central insurance department which was formed when the explosives merger took place, involving many companies. This department became Nobel Insurance Limited in 1926 and, later, Imperial Chemical Insurance Limited. Mr. Hadden was the insurance company's first manager and became managing director in 1936.

THE CHEMICAL AGE regrets to announce the death of MR. P. BLUNDELL BOYCOTT, formerly manager of this journal, which occurred at the Hammersmith General Hospital on Thursday of last week after a short illness.

Mr. Boycott served in the Royal Fusiliers during the first World War, and he was subsequently engaged in the insurance field before embarking on a career in advertising. He eventually became advertising manager of *The Rubber Age*. In 1939 he joined THE CHEMICAL AGE as London representative, took on additional duties during the early war years and in 1943 was appointed manager and publisher of the journal.

Mr. Boycott, who had quite recently gone into retirement, was 64 years of age.

With regret we record the death, which occurred on 23 August, of DR. COLIN CAMPBELL, Dean of the Faculty of Science in the University of Manchester. Dr. Campbell, who was 65, had been a prominent member of the university's chemistry department for nearly 40 years. He went to the university from William Hulme's Grammar School with a Cartwright entrance scholarship and graduated with First Class Honours in Chemistry in 1909. On his immediate appointment as Schunck research assistant to Professor H. B. Dixon he worked on explosions in gases and all his main research work continued in that field, in which he became internationally recognised. He gained his D.Sc. in 1921. An elegant piece of his experimental work deserving particular mention was his demonstration with A. C. Finch in 1925 that a gaseous explosion in a tube travels in a spiral. During the 1914-18 war he was one of Dixon's team of inspectors of explosives in the north-west region under the Ministry of Munitions. In 1925 he was appointed senior lecturer at the university and in 1934 assistant director of the chemical laboratories, an appointment which enabled him to exercise his characteristic influence in the advising of students and in the organisation of the department. He exercised corresponding influence on the board of the Faculty of Science and was appointed Dean in 1952.

Canadian Chemical Sales

GROSS factory selling value of products turned out in Canada in 1951 by establishments engaged mainly in the manufacture of such products as synthetic rubber, charcoal, wood alcohol, boiler compounds, sweeping compounds, matches, insecticides, disinfectants, dry colours, pigments, fireworks, anti-freeze, synthetic rubber, and similar products amounted to $131,543,000, as compared with $100,209,000 the year before, according to the Bureau's annual report on the miscellaneous chemical industry. There were 219 plants in the industry compared with 208, in 1950, employing 9,737 persons compared with 7,024 with salary and wage payments of $26,971,513 compared with $18,059,979.

Total production of synthetic rubber from all industries in 1951 amounted to 139,578,000 lb., valued at $34,648,000, as compared with 135,521,000 lb. at $25,413,000 in 1950; 15,083 tons of charcoal at $772,830 as compared with 15,989 tons at $698,849; disinfectants and deodorants at $1,454,000 compared with $1,088,000; insecticides and poisons at $5,362,000 compared with $5,501,000; 317,230,182 books of matches valued at $1,238,702 compared with 318,586,787 at $943,083; 675,775 cases of matches at $2,991,962 compared with 671,398 cases at $2,712,792; sweeping compounds at $569,000 compared with $460,000; 4,571,406 gal. of anti-freeze preparations at $12,059,611 compared with 4,701,787 at $10,844,689.

German Potash Output

A message from Hanover states that Burbach Kaliwerke AG produced 160,000 tons of potash from January until the end of July, an increase of 26,000 tons compared with the total for the same period last year.

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

ALPA PLASTICS, LTD. (formerly Alpa Plastic Arts, Ltd.), London, W. (M., 29/8/53.) 20 July, charge, to Friends' Provident & Century Life Office securing £5,000 with a premium payable in certain events; charged on 137 Blenheim Crescent, Kensington, with fixed plant, machinery, etc. *Nil. 11 March, 1953.

Satisfaction

LANCASHIRE TAR DISTILLERS, LTD. (S., 29/8/53.) Satisfaction 18 July of Trust Deed registered 24 January, 1951, to the extent of £12,043.

Company News

A. T. McAuslan & Co.

A. T. McAuslan & Co., chemical merchants and drysalters, at 62 Robertson Street, Glasgow, have been dissolved on the retirement of Mr. A. O. B. Dick. Mr. Alistair T. McAuslan will continue to carry on the business on his own account at the above address and under the same name.

British Match Corporation

In the annual report of the British Match Corporation, the chairman, Mr. H. K. M. Kindersley, answers criticisms made earlier in the year by the Monopolies Commission that the Corporation's profits had been high and that there was little or no competition in the match-making industry. Mr. Kindersley says: 'The rates of profit in the match industry in this country since the war are not high compared with those earned by industry in general and we do not accept as valid the grounds on which that allegation is made. There is nothing whatever to prevent competitors, at home or abroad, from making matches and selling them in this country. If our costs, prices and profits had been too high, others would have come into the market.'

Beecham Group

A first interim dividend of 17 per cent has been declared by the directors of the Beecham Group on the deferred shares on account of the year ending 31 March, 1954. This is the same as the first interim dividend paid in respect of the previous year when there was a second interim of 19 per cent and a final dividend of 4 per cent to make a total of 40 per cent.

Whitfield Chemicals & Colours Ltd.

At an extraordinary meeting of Whitfield Chemicals and Colours Ltd., held in Manchester on 31 July, the following extraordinary resolution was passed: 'That it has been proved to the satisfaction of this meeting that the company cannot by reason of its liabilities continue its business, and that it is advisable to wind up the same, and accordingly that the company be wound up voluntarily, and that Ronald Frederick Bendall, of 31 Lloyd Street, Manchester, 2, be and he is hereby appointed, Liquidator for the purposes of such winding-up.'

Manchester Oil Refinery Ltd.

At the recently held adjourned annual meeting of Manchester Oil Refinery Limited it was decided to change the company's name to Manchester Oil Refinery (Holdings) Limited. The report and accounts were adopted without opposition. Mr. M. A. Colefax, who presided, referred to the retention of consultants to advise on the introduction of a system of standard costing and budgetary control and submitted that at present there was no case for the appointment of a shareholders' committee. He added that a final decision on the appointment of a new chairman should not be long delayed.

British Chemical Prices

LONDON.—There has been a fair volume of activity on the industrial chemicals market during the past week, most sections reported a satisfactory demand for the period. Home trade prices are little changed and the undertone remains steady. The demand for chemicals for export has not shown any marked expansion although there is an increasing volume of inquiry in circulation. The coal tar products market is without special feature, both prices and conditions remaining steady.

MANCHESTER.—From the point of view of inquiry and actual new business fairly active conditions have been reported in the home-trade section of the Manchester chemical market during the past week, while a fair movement of supplies on export account has continued. The textile and allied industries, in particular, are taking steady deliveries, and specifications are flowing in satisfactorily from several other leading outlets. Prices generally are maintained. In the fertiliser market there is a good demand for the higher grades of basic slag, with a fair trade in sulphate of ammonia and one or two other lines.

GLASGOW.—Continued improvement in general business can be reported, and there is every indication that increasing business will continue and the improving conditions be maintained.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 1 ton, £88. 80% pure, 10 tons, £92 ; commercial glacial 10 tons, £94 ; delivered buyers' premises in returnable barrels ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £138 per ton.

Acetone.—Small lots : 5 gal. drums, £143 per ton ; 10 gal. drums, £125 per ton. In 40/50 gal. drums less than 1 ton, £105 per ton ; 1 to 9 tons, £104 per ton ; 10 to 49 tons, to £103 per ton ; 50 tons and over, £102 per ton.

Alcohol BSS, Butyl.—£161 per ton in 10-ton lots.

Alcohol, Diacetone.—Small lots : 5 gal. drums, £162 per ton ; 10 gal. drums, £172 per ton. In 40/45 gal. drums ; less than 1 ton, £142 per ton ; 1 to 9 tons, £141 per ton ; 10 to 50 tons, £140 per ton ; 50 to 100 tons, £139 per ton ; 100 tons and over, £138 per ton.

Alcohol, Ethyl.—300,000 gal. lots, d/d., 2s. 11d. per proof gallon ; 100,000 and less than 200,000 gal. lots, d/d, 3s. per proof gallon.

Allyl Alcohol.—Less than 40 gals., 3s. 10½d. per lb. ; 40 gal., 3s. 6½d. per lb. ; 2 to 5 40 gal. drums, 3s. 4½d. per lb. ; 1 ton and over, 3s. 2½d. per lb.

Alum.—Ground, £25 per ton, f.o.r. MANCHESTER : Ground, £25.

Aluminium Sulphate.—Ex works, £14 15s. per ton d/d. MANCHESTER : £14 10s. to £15.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—2 cwt. non-returnable drums ; 1 ton lots £58 per ton.

Ammonium Chloride. — Grey galvanising, £31 5s. per ton, in casks, ex wharf. Fine white 98%, £25 to £27 per ton. See also Salammoniac.

Ammonium Nitrate.—D/d, £18 to £20 per ton.

Ammonium Persulphate. — MANCHESTER : £6 5s. per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £93 and £91 10s. per ton.

Antimony Sulphide.—Golden, d/d in 5-cwt. lots as to grade, etc., 2s. 2d. to 2s. 8d. per lb. Crimson, 3s. 4½d. to 4s. 5½d. per lb.

Arsenic.—Per ton, £59 5s. nominal, ex store.

Barium Carbonate.—Precip., d/d ; 2-ton lots, £35 5s. per ton, bag packing.

Barium Chloride.—£42 15s. per ton in 2-ton lots.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £38 per ton d/d ; 2-ton lots, £38 5s. per ton d/d.

Bleaching Powder.—£21 per ton in casks (1 ton lots).

Borax.—Per ton for ton lots, in free 140-lb. bags, carriage paid: Anhydrous, £59 10s.; in 1-cwt. bags; commercial, granular, £39 10s.; crystal, £42; powder, £43; extra fine powder, £44; B.P., granular, £48 10s.; crystal, £51; powder, £52; extra fine powder £53.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granular, £68; crystal, £76; powder, £73 10s.; extra fine powder, £75 10s.; B.P., granular, £81; crystal, £88; powder, £85 10s.; extra fine powder, £87 10s.

Butyl Acetate BSS.—£173 per ton, in 20-ton lots.

***sec.*-Butyl Alcohol.**—5 gal. drums £159; 40 gal. drums: less than 1 ton £124 per ton; 1 to 10 tons £123 per ton; 10 tons and over £122 per ton; 100 tons and over £120 per ton.

***tert.*-Butyl Alcohol.**—5 gal. drums £195 10s. per ton; 40/45 gal. drums: less than 1 ton £175 10s. per ton; 1 to 5 tons £174 10s. per ton; 5 to 10 tons, £173 10s.; 10 tons and over £172 10s.

Calcium Chloride.—70/72% solid £12 10s. per ton.

Chlorine, Liquid.—£32 per ton d/d in 16/17-cwt. drums (3-drum lots).

Chromic Acid.—2s. 0¼d. to 2s. 0¾d. per lb., less 2½%, d/d U.K.

Citric Acid.—1-cwt. lots, 205s. cwt.; 5-cwt. lots, 200s. cwt.

Cobalt Oxide.—Black, delivered, 13s. per lb.

Copper Carbonate.—MANCHESTER: 2s. 4d. per lb.

Copper Sulphate.—£74 per ton f.o.b., less 2% in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £10 2s.

Ethyl Acetate.—20 tons and upwards, d/d, £151 per ton.

Formaldehyde.—£37 5s. per ton in casks, d/d.

Formic Acid.—85%, £82 10s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G., £14 7s. 6d. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hydrochloric Acid.—Spot, 11s. to 15s. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—27.5% wt. £124 10s. per ton. 35% wt. £153 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 16s. 4d. per lb. in 28 lb. lots.

Iodoform.—25s. 10d. per lb. in 28 lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight £122 per ton; dark tech., 44 per cent by weight £74 per ton ex works 1-ton lots; dark chemical quality 44 per cent by weight £102 per ton, ex works; usual container terms.

Lead Acetate.—White: About £136 10s. per ton.

Lead Nitrate.—About £116 per ton.

Lead, Red.—Basis prices per ton. Genuine dry red lead, £126 15s.; orange lead, £138 15s. Ground in oil: red, £153; orange, £165.

Lead, White.—Basis prices: Dry English, in 5-cwt. casks, £144 10s. per ton. Ground in oil: English, under 2 tons, £165 5s.

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

Litharge.—£126 15s. per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex works, £22 to £24.

Magnesium Carbonate.—Light, commercial, d/d, 2-ton lots, £84 10s. per ton, under 2 tons, £87 15s. per ton.

Magnesium Chloride.—Solid (ex wharf), £16 per ton.

Magnesium Oxide.—Light, commercial, d/d, under 1-ton lots, £245 per ton.

Magnesium Sulphate.—£15 to £16 per ton.

Mercuric Chloride.—20s. 6d. per lb. in 28 lb. lots; smaller quantities dearer.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 5s. 4½d. per gal.; pyridinised 64° O.P. 100 gal., 5s. 6½d. per gal.

Methyl Ethyl Ketone.—10-ton lots, £141 per ton del.

Methy *iso*Butyl Ketone.—10 tons and over £162 per ton.

Nickel Sulphate.—D/d, buyers U.K. £154 per ton. Nominal.

Nitric Acid.—£35 to £40 per ton, ex-works.

Oxalic Acid.—Home manufacture, in 5-cwt. casks, £138 per ton, carriage paid.

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £87 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.

Potash, Caustic.—Solid, £98 per ton for 1-ton lots ; Liquid, £37 15s.

Potassium Bichromate.—Crystals and granular, 11⅝d. per lb. ; ground, 1s. ⅝d. per lb., standard quantities.

Potassium Carbonate.—Calcined, 96/98%, £96 per ton for 1-ton lots, ex store.

Potassium Chloride.—Industrial, 96%, 6-ton lots, £20 to £22 per ton.

Potassium Iodide.—B.P., 14s. 10d. per lb. in 28-lb. lots ; 14s. 4d. in cwt. lots.

Potassium Nitrate.—Small granular crystals, 81s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 9½d. per lb. for 1-cwt. lots ; for 3 cwt. and upwards, 1s. 8½d. per lb. ; technical, £8 11s. 6d. per cwt. ; for 5 cwt. lots.

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

Salammoniac.—Dog-tooth crystals, £70 per ton ; medium, £67 10s. per ton ; fine white crystals, £21 10s. to £22 10s. per ton, in casks.

Salicylic Acid. — MANCHESTER : Technical 2s. 7d. per lb. d/d.

Soda Ash.—58% ex depôt or d/d, London station, £9 10s. to £14 10s. per ton.

Soda, Caustic.—Solid 76/77% ; spot, £25 to £27 per ton d/d. (4 ton lots).

Sodium Acetate.—£85 to £91 per ton d/d.

Sodium Bicarbonate.—Refined, spot, £13 10s. to £15 10s. per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 9¾d. per lb. ; anhydrous, 11¼d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite.—Powder, 60/62%, £40 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£87 to £95 per ton.

Sodium Cyanide.—100% basis, 9¾d. to 10¾d. per lb.

Sodium Fluoride.—D/d, £4 10s. per cwt.

Sodium Hyposulphite.—Pea crystals £28 a ton ; commercial, 1-ton lots, £26 per ton carriage paid.

Sodium Iodide.—B.P., 16s. 4d. per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £123 ton.

Sodium Metasilicate.—£22 15s. per ton, d/d U.K. in ton lots.

Sodium Nitrate.—Chilean Industrial, over 98% 6-ton lots, d/d station, £27 10s. per ton.

Sodium Nitrite.—£31 per ton (4-ton lots).

Sodium Percarbonate.—12½% available oxygen, £8 2s. 10½d. per cwt. in 1-cwt. drums.

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £37 10s., anhydrous, £78 10s. ; tri-sodium, crystalline, £39 10s., anhydrous, £75 10s.

Sodium Prussiate.—1s. to 1s. 1d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber's Salt).—£8 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER : £7 per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot, £30 17s. 6d. per ton, d/d, in drums ; broken, £31 12s. 6d. per ton, d/d, in drums.

Sodium Sulphite.—Anhydrous, £59 per ton ; pea crystals, £37 12s. 6d. per ton d/d station in kegs ; commercial, £23 7s. 6d. per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £22 16s. 6d. to £25 6s. according to fineness.

Tartaric Acid.—Per cwt. : 10 cwt. or more, £10 10s.

Titanium Oxide.—Standard grade comm., with rutile structure £143 per ton ; standard grade comm., £130 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d : white seal, £92 10s. ; green seal, £91 10s. ; red seal, £90.

Rubber Chemicals

Antimony Sulphide.—Golden, 2s. 3¼d. to 3s. 1½d. per lb. Crimson, 3s. 4¼d. to 4s. 5¼d. per lb.

Carbon Bisulphide.—£60 to £65 per ton, according to quality.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—Ton lots, £74 10s. per ton.

India-rubber Substitutes.—White, 1s. 6¾d. to 1s. 10¼d. per lb. ; dark, 1s. 4½d. to 1s. 8½d. per lb.

Lithopone.—30%, £50 per ton.

Mineral Black.—£7 10s. to £10 per ton.

Sulphur Chloride.—British, £55 per ton.

Vegetable Lamp Black.—£64 8s. per ton in 2-ton lots.

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

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, £16 10s.

Compound Fertilisers.—Per ton in 6 ton lots, d/d farmer's nearest station, I.C.I. Special No. 1 £27 9s.

'Nitro-Chalk.'—£12 9s. 6d. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots, d/d nearest station, July to September, £26 5s. per ton.

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals., ex-works, 90's, 4s. 10¾d. ; pure, 5s. 2d. ; nitration grade, 4s. 11½d.

Carbolic Acid.—Crystals, 1s. 4d. to 1s. 6¼d. per lb. Crude, 60's, 8s. MANCHESTER : Crystals, 1s. 4½d. to 1s. 6¼d. per lb., d/d crude, 8s. naked, at works.

Creosote.—Home trade, 1s. to 1s. 4d. per gal., according to quality, f.o.r. maker's works. MANCHESTER : 1s. to 1s. 8d. per gal.

Cresylic Acid.—Pale 99/99½%, 5s. 8d. per gal. ; 99.5/100%, 5s. 10d. American, duty free, for export, 5s. to 5s. 8d. naked at works.

Naphtha.—Solvent, 90/160°, 4s. 10d. per gal. for 1000-gal. lots ; heavy, 90/190°, 4s. 3½d. per gal. for 1000-gal. lots, d/d. Drums extra : higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in sellers' bags, £14 12s. to £22 per ton, according to m.p. ; hot pressed, £28 per ton in bulk ex-works ; purified crystals, £53 per ton.

Pitch.—Medium, soft, home trade, 160s. per ton f.o.r. suppliers' works ; export trade, 230s. per ton f.o.b. suppliers port.

Pyridine.—90/160°, 32s. 6d. to 35s. per gal. MANCHESTER : 42s. 6d. to 45s. per gal.

Toluol.—Pure, 5s. 7d. ; 90's, 4s. 10d. per gal., d/d. MANCHESTER : Pure, 5s. 3d. per gal. naked.

Xylol.—For 1000-gal. lots, 5s. 8d. to 5s. 10d. per gal., according to grade, d/d.

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***m*-Cresol** 98/100%.—3s. 9d. per lb. d/d.

***o*-Cresol** 30/31° C.—1s. 4d. per lb. d/d.

***p*-Cresol** 34/35° C.—3s. 9d. per lb. d/d.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—88/89°C., 1s. 11d. per lb.

Dinitrotoluene.—S.P. 15° C., 1s. 11½d. per lb. ; S.P. 26° C., 1s. 3d. per lb. S.P. 33°C., 1s. 1½d. per lb. ; S.P. 66/68°C., 1s. 9d. per lb.

***p*-Nitraniline.**—4s. 5½d. per lb.

Nitrobenzene.—Spot, 9¼d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—2s. per lb.

***o*-Toluidine.**—1s. 7d. per lb., in 8/10-cwt. drums, drums extra.

***p*-Toluidine.**—5s. 6d. per lb., in casks.

***m*-Xylidine Acetate.**—4s. 5d. per lb., 100%.

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Chemical & Allied Stocks & Shares

THE upward trend in stock markets gained further strength in August, both in the industrial and gilt-edged sections. There was no marked increase in demand, but with little selling in evidence, markets tended to respond strongly. Because there are few sellers, dealers are none too well supplied with stock, and should demand increase, prices could advance substantially, though competition from new issues is a factor which will probably tend to keep markets in check. Apart from the first of the big steel issues, which has been promised in the early autumn, some important issues by industrial companies are also expected in the next few months. Sentiment has been helped considerably by the absence of any marked reaction by New York markets, which, it has been feared, might slump heavily following the Korean 'cease fire' because of the prospect of problems for industry when rearmament work tails off. Nevertheless, no big reduction in rearmament is expected in the near future, though the trend in international events has to be awaited. The rise in industrial shares has been helped by wider recognition that dividends of most companies could be maintained even if there were a sharp fall in profits in the future. Ever since the end of the war many companies have kept dividends at very conservative levels, but now there is a tendency to pay out in dividends a slightly larger percentage of profits.

Chemical and kindred shares have not participated to any extent in the rise in markets. Sentiment has been affected by the I.C.I. warning of the difficult conditions in export markets, and moreover, annual statements by company chairmen indicate that profit margins have narrowed for some sections of the chemical industry in the home market as well. Nevertheless, there is general confidence that the I.C.I. dividend for the year will be kept at 13 per cent. I.C.I. ordinary units have changed hands around 44s. 4½d., Albright & Wilson 5s. shares kept firm at 16s. 6d., while Laporte 5s. shares were 11s. 7½d. and British Chrome Chemicals 5s. shares 16s. Elsewhere, Reichhold Chemical 5s. shares improved to 6s., Fisons at 39s. responded to hopes that the year's dividend may be raised to 12 per cent, while British Glues & Chemicals 4s. shares became firmer at 9s. 6d. Borax Consolidated deferred units were in demand and have moved up to 35s. 1½d. at the time of writing. Coalite & Chemical 2s. shares changed hands around 2s. 1¼d. Hardman & Holden 5s. units were 18s. 9d., Brotherton 10s. shares 22s. 6d. and Greeff-Chemicals were dealt in around 15s. 3d. In other directions, William Blythe 3s. shares were quoted at 11s. 10½d.

The 4s. units of the Distillers Company moved up to 17s. 1½d. on the exceptional strength shown by the accounts and the chairman's statement of better demand for industrial alcohol and the group's chemical products in the current year. United Molasses rose to 30s. 7½d., Turner & Newall were 55s. 9d. and Unilever have strengthened to 50s. Plastics shares became firmer, with British Xylonite at 26s., British Industrial Plastics 2s. shares 4s. 1½d., and Bakelite 10s. shares 18s. 7½d. In other directions, Triplex Glass 10s. ordinary units strengthened to 22s. 6d. following publication of the results. Rayons were good with textiles generally, Courtaulds moving up to 46s. 1½d. and British Celanese to 27s. 7½d. Elsewhere, Boots Drug 5s. units at 21s. were firm, but Glaxo 10s. units at 39s. 6d. have not held best levels. Powell Duffryn were 27s. 9d., awaiting the results, and Staveley 73s. 9d. Guest Keen changed hands around 50s. 3d. Paint shares have been a little firmer, and following the chairman's annual statement, Pinchin Johnson rallied to 33s. Oils attracted a good deal of attention. Anglo-Iranian advanced strongly on the latest developments in Persia, but later at 147s. 6d. lost part of the rise. Shell were 87s. and Burmah Oil 53s. 9d.

Changes of Address

Owing to expansion of their business, Leda Chemicals Limited, Wharf Road, Ponders End, are removing on 1 September to their new site at Eley Estate, Angel Road Edmonton, London, N.18 (Tel.: Edmonton 6322/3/4; telegrams: Ledakem, London).

The head office of Athole G. Allen (Stockton), Ltd., has now returned to Stockton-on-Tees Chemical Works, Bowesfield Lane, Stockton-on-Tees, Co. Durham (Tel.: Stockton-on-Tees 6375). Sales matters will continue to be dealt with by Athole G. Allen (London), Ltd., Princes Wharf, 135 Grosvenor Road, Westminster, London, S.W.1.

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive, or a woman aged* 18-59 *inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order*, 1952.

ENGINEER required by Chemical Engineering firm in Westminster District of London. Qualifications required are: age about 30; B.Sc. or equivalent; good knowledge of physics and thermodynamics desirable; good mathematics; understanding of chemistry desirable; practical works' experience of assistance; understanding of general office procedure and technical sales an advantage. The position offers excellent opportunities to a man having these qualifications coupled with a keen business outlook. Write stating age, qualification, salary required to **BOX NO. C.A. 3252, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

GOLD COAST LOCAL CIVIL SERVICE

A vacancy exists for a **CHEMIST-ASSAYER** in the Local Civil Service of the Gold Coast. Candidates must possess an Honours degree in Chemistry with (a) Certificate from University of having reached good standard in pratical inorganic Chemistry; two year course of post-graduate training at Imperial College of Science and Technology *or* (b) at least two year's post-graduate experience in silicate analysis and assaying. Duties will be to take charge of the Geological Survey Chemical Laboratory; assay ore of all kinds; carry out silicate analyses of rocks and minerals; participate in research of inter-relation of rocks and Geochemistry.

Appointment is on contract for two tours in first instance with consolidated salary in the scale of £1,090-£1,950 per annum. Gratuity at rate of £37 10s. for each three months service. Outfit allowance of £60 if initial salary is below £1,530, £30 if above. Income tax at low local rates. Quarters provided, when available, at rental of £60-£90 per annum. Free first class passages. Leave at rate of 7 days for each completed month of resident service.

Apply in writing to the **DIRECTOR OF RECRUITMENT, COLONIAL OFFICE, GREAT SMITH STREET, LONDON, S.W.1,** giving briefly age, qualifications and experience. Mention the reference number CDE.105/13/06.

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DEVELOPMENT Department of Heavy Chemical Manufacturer (largely inorganic) has the following vacancies for **CHEMICAL ENGINEERS**:

(*a*) **CHEMICAL ENGINEER,** qualified, some experience desirable; age preferably 24-28. Salary dependent on qualifications and experience, but not less than £600.

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Replies, which will be treated in strict confidence, to **BOX No. C.A. 3248, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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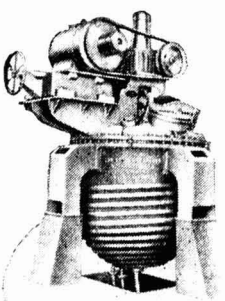

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