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SCALING-UP CHEMICAL PLANT
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INDEX TO ADVERTISERS

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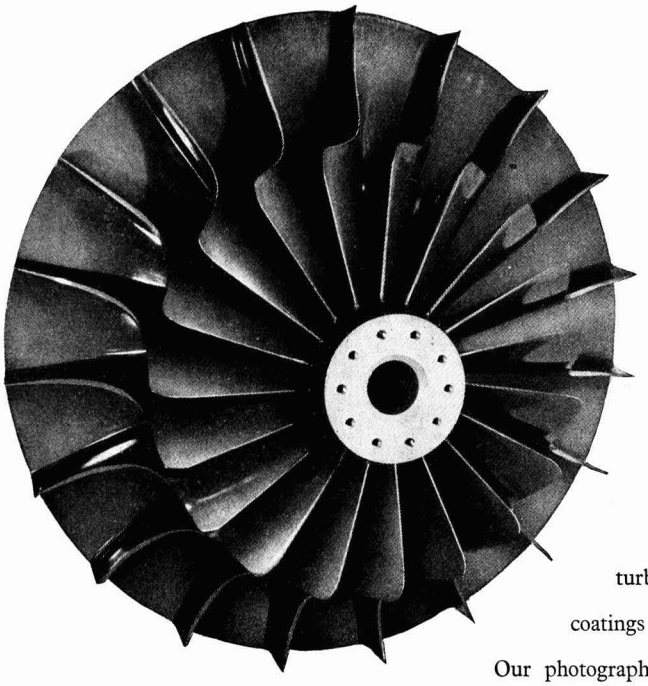

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CHEMICAL AGE

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RADIATION HAZARDS

RECENT DISCUSSIONS on the hazards of testing of nuclear weapons have in the main involved the dispersal of radioactive strontium into the environment. Radioactive strontium, especially the isotope strontium-90, is produced in fair amounts in nuclear fission. It is considered to be the most dangerous of all fission products and as a result of atom bomb tests can now be detected in the soil, and in plant and animal material.

Strontium, an alkaline earth metal, is chemically similar and widely distributed with calcium in nature. Natural sources of calcium in the diet all contain strontium in quantities of 0.1 per cent to 1 per cent. Human bone contains 70 to 170 p.p.m. of ash. However, calcium is absorbed twice as readily as strontium by the body and is excreted twice as readily by the human kidney.

Removal of strontium from bone presents great difficulties since bone has a great affinity for calcium and its analogues, i.e., strontium. The most favourable conditions for removal of strontium are immediately following the administration of strontium, when it is still in circulation in the blood or held loosely by bone, but as time passes the element is held much more tenaciously.

The question that is concerning the world is 'What are the consequences of the H-bomb tests likely to be?' and 'How is the hazard from a given amount of strontium-90 in bone to be assessed?' At the end of April the Atomic Scientists' Association, which has as its president Professor H. S. W. Massey, F.R.S., Quain professor of physics, University College, London, and 20 vice-presidents, who include Sir John Cockcroft and Professor J. Rotblat, considered whether there is such a thing as a safe dose of strontium-90 in the human body. At the same time it must be remembered that every addition to this threshold dose increases the risk of malignant disease developing. The association's report pointed out that the main difficulty is that the relationship between damage produced and amount of radiation is not known. If there is a threshold dose below which cancer cannot be induced then, states the report, 'it can reasonably be inferred that the small amount of strontium-90 which will accumulate in bone from current H-bomb tests would not result in any harm.' On the other hand, if there is a linear relationship between amount of strontium-90 in the body and risk of developing a bone tumour and if other points assumed by the atomic scientists radiation hazards committee (composed of Professor J. Rotblat, Dr. J. W. Boag, Professor A. Haddow, Dr. W. M. Levitt, Professor L. S. Penrose, Professor P. A. Sheppard, etc.) are made, then 'the number of bone sarcomas from one nominal high-yield nuclear test may amount to 20,000 all over the world.' The test referred to is of the 1954 Bikini type with a fission-yield equivalent of 20 megatons.

According to the *Lancet* (1957, 1, 1029), if this view is correct, the committee's figures may be an underestimate, since they did not allow for the radiation dose in children before or after birth.

Existence of a linear relationship has not yet been determined. If it is then every H-bomb test by causing an increase of the content of strontium-90 in bone will increase the frequency of bone lesions.

An investigator of considerable note, Dr. J. F. Loutit, has recently said that the small amount of quantitative evidence of the carcinogenic properties of radio-strontium suggests that the relationship is not linear and that there is some form of threshold or effective latent period. According to Loutit, in the present state of scientific knowledge, the linear relationship sets the limit and indicates the worst possible conditions and he recommends that it would be prudent to go easy on atomic tests until the real facts are ascertained.

Radioactive fallout from nuclear testing at present and the risk to the health of the world's population, according to Dr. Willard F. Libby, commissioner of the US Atomic Energy Commission, is at present small. Dr. Libby has based his views on a comparison between cosmic rays and the radiation from strontium-90, with its radioactive daughter, yttrium-90, which emits active β rays, Ionisation density along the track of these rays is very similar to that generated by the mu-mesons of cosmic rays and their disintegration electrons. It is quite widely held that radiations of the same ionisation density have very similar biological effects for the same energy absorbed. There is, however, no certainty that the effects of external radiation like cosmic rays are a valid standard for assessing what a radioactive substance fixed in the body can do.

Yet another eminent scientific worker—Dr. E. B. Lewis, professor of biology at the California Institute of Technology—claims that there is no threshold dose of radiation, below which health is unharmed. Lewis has shown that the incidence of leukæmia is directly related to the amount of radiation to which people are exposed. His work has been based on a study of leukæmia in four groups—survivors of atomic bomb radiation in Japan, patients treated with heavy doses of radiation for the disease ankylosing spondylitis, children irradiated as infants for thymic enlargement, and radiologists.

He has found much the same direct relationship between the dose of radiation received and the probability of contracting leukæmia in all groups.

This then was the known background when Lord Cherwell spoke in the House of Lords on 8 May and defended the Government's intention to carry out the present series of tests in the Pacific. Leading medical authorities in this country believe that the continuation of test explosions increases the chances of causing serious harm to a great many people living, as well as future generations. Lord Cherwell's dismissal of views held by the radiation hazards committee have, therefore, not unnaturally perturbed many. Whatever one feels about the political necessity of carrying out tests of nuclear and thermo-nuclear weapons, it is deplorable that a scientist of Lord Cherwell's standing should dismiss in the manner that he has the considered views of so many experts in atomic and medical science.

It would be equally wrong if an atmosphere of alarm were to be created. Now that the British test explosions in the Pacific are nearing completion, the UK Government should give a strong lead in calling a halt to further tests until more is known about the effects of radiation. The UK should also press with urgency for the setting up of an international radiation hazards committee. Until that committee issues a report the three Powers involved, United States of America, Soviet Russia and the UK should by agreement refrain from making further test explosions.

SCALING-UP CHEMICAL PLANT

PAPERS given at the symposium on the scaling up of chemical plant and processes (page 925) indicate the unforeseen difficulties which may arise when a new chemical process is transferred from the laboratory to the pilot plant. Further problems can arise when the process is transferred from the pilot plant to full-scale working. So often a change in scale can give rise to unexpected physical or chemical results.

Because of difficulties in scaling up from laboratory to pilot plant, many new processes fall by the wayside, but as emphasised by Mr. R. Edgeworth Johnstone and Professor M. W. Thring possibly many potentially valuable processes have been abandoned at the pilot stage. Nevertheless, because of some reverse scale effect the process might well right itself automatically in a larger plant.

Construction of a model of the full scale apparatus is now recommended whenever possible. This applies particularly to large furnaces, and furnace models appear to be widely used to predict the effects of variations in shape or changes in operating conditions.

Because scale-up study may show no scale effects, it is deemed feasible to omit the pilot plant stage and proceed direct to the full scale from the laboratory procedure.

The need today appears to be for more data on the performance of small- and large-scale equipment under corresponding conditions. Thus greater accuracy would be possible from scale-up principles and rules. Evidently, too, some improvement in empirical power function relationship between dimensional groups is required. More accurate and reliable extrapolation would then be possible.

The view undoubtedly holds good that given a sufficient demand for the output, the plant on the largest possible scale with its inherently lower unit costs of production is by far the most attractive proposition economically.

DETERMINING FUNGICIDE RESIDUES

A MICRO METHOD for determination of tetramethyl thiuram disulphide and dimethyldithiocarbamate spray residues on apples is reported in the *New Zealand Journal of Science and Technology* (1957, **38**, No. 5, (March) 425). The method is based on acid decomposition, steam distillation of dimethylamine with excess alkali, and formation of cupric dimethyldithiocarbamate, which is determined colorimetrically. It is claimed by the investigators Barr *et al.* that the method will detect 0.1 p.p.m. of fungicide.

Highest residues were obtained from fruit that had received summer oil sprays between the thiram or ferbam applications (thiram and ferbam are common names for tetramethyl thiuram disulphide and ferric dimethyldithiocarbamate). Recovery results for thiram were 71 per cent to 80 per cent. (It does not appear that recovery figures for thiram have been published previously.) The figure for ferbam, 69 per cent, compares favourably with that of 60 per cent previously reported by Lowen. Results with ziram were not as satisfactory as the values for this compound varied.

The authors remark on the interesting finding that when determinations are made for residues after both thiram and dithiocarbamate sprays, this analytical method does not differentiate between the two fungicides, as the thiram decomposes to give dimethylamine without addition of a reducing agent. In such instances, if the determined value for the total residue lies between the tolerance of thiram of 3 p.p.m. and the tolerance for dithiocarbamate of 7 p.p.m., interpretation of results requires care.

It is reassuring to note that the residues of thiram, ferbam and ziram when determined on apples that had received different applications of different strengths did not exceed the tolerance limits.

SCALING-UP CHEMICAL PLANT

Keynote of Two-Day Symposium 'From Test Tube to Commercial Plant'

IN the scaling-up of chemical plant and processes, the ideal should be to scale-up from the test tube to commercial plant in one step and thereby cut out the expensive pilot plant stage. That this is not normally possible underlined the importance of the two-day symposium on various aspects of scaling-up which was held at Church House, Westminster, London SW1, on 28 and 29 May.

Thirteen papers were presented and these are summarised below. Delegates present numbered nearly 600 and the symposium was opened by Mr. E. le Q. Herbert, managing director of the Shell Refining and Marketing Co. Ltd., who was introduced by Mr. Julian M. Leonard, president, Society of Chemical Industry.

The symposium was sponsored by the Dutch Chemical Group and the Dutch section for Chemical Technology (Het Koninklijk Instituut van Ingenieurs and de Koninklijke Nederlandse Chemische Vereniging), the SCI chemical engineering group, and the Institution of Chemical Engineers.

After welcoming the delegates, Mr. Herbert recalled the meeting in 1954 on oxidation processes that was held in Amsterdam. He then said that the problem of scaling-up was of particular importance in chemical engineering since all new processes passed through a laboratory stage. In the exceptional case, it was possible to pass from bench-scale to full-scale in one jump, but more generally it was necessary to pass through the intermediate stage of pilot scale investigation.

Since this was expensive and time consuming, it would always be—in fact had to be—the ambition to scale up from the test tube of the commercial plant in one step. This was not normally possible at the moment. What Mr. Herbert thought was wanted was to be able to extrapolate further and with more confidence.

He then reviewed the subject matter of the papers to be given. These are obtainable from the Institution of Chemical Engineers, 16 Belgrave Square, London SW1, price 30s post free.

Scaling-up Problems

In the introductory paper, Mr. R. Edgeworth Johnstone, Assistant Director of Ordnance Factories (Explosives), and Professor M. W. Thring, Professor of Fuel Technology and Chemical Engineering University of Sheffield, considered the problems of scaling-up of physical and chemical processes. They referred to the value of the Principal of Similiarity in evaluating deviations and two methods of deriving similarity criteria—dimensional analysis and differential equations. These workers preferred the last-named method. Comparison of models and prototypes could be made under conditions that were not strictly similar by extrapolation by means of a power law relation, it was stated. It was pointed out, however, that where a mixed régime existed, reliable predictions of scaled-up performance might be impossible.

It is suggested in this paper that in the field of model theory applied to chemical engineering, more data on actual performance of small- and large-scale equipment under corresponding conditions is required. Some improvement on the empirical power function relationship between dimensionless groups is also needed.

Professor K. G. Denbigh, Professor of Chemical Technology, Edinburgh, gave a paper on 'The scaling-up of reactors from a knowledge of kinetics. It is the kinetic factors which determine whether the best yield of a reaction may be obtained by batchwise operation, or by use of a tubular reactor, or by a set of continuously stirred tank reactors. The author said that in complex reactions, such as are frequently met in the production of organic chemicals, one or other of the above-named types of operation would usually produce the highest yield. This high yield might be still further improved upon by using controlled sequence of temperatures. Where there were important economic factors, the process should be 'tailor-made' to the particular type of reaction kinetics, for this, said Professor Denbigh, was a necessary part of the scaling-up procedure.

'Economic aspects of scaling-up chemical plants' were dealt with by Mr. R. G. Dickerson, of the engineering division, The Distillers Co. Ltd. Commenting on the desirability of economy in chemical plants, Mr. Dickerson then continued with a statement on the principles of the economics of increased dimensions. Limitations in practice regarding these were noted. Examples of the correlation of cost to size for individual units were given together with some of the underlying explanations. The examples chosen were: storage tanks (horizontal cylindrical, mild steel); and it was demonstrated that it was cheaper to use a large tank rather than a number of small tanks of the same combined capacity; steam boilers (economic type), where the average exponent can be taken as 0.655 for the boiler and 0.535 for the boiler with auxiliaries; heat exchanger, where the exponent from the curve over the whole range can be taken as 0.62; pumps (centrifugal types) can have flow rate and velocity head varied widely with only small changes in size of impeller working within the same basic standard size casing, thus meeting varying conditions of output with no significant change in cost.

Consideration was given to the effect of scaling-up a complete plant with estimates of capital and production costs for a plant at three different scales of output.

Reference was made by Mr. Dickerson to Chilton's views on empirical scaling-up. This US investigator has concluded that the Six-Tenths Rule applies to complete plants, i.e. an exponent of 0.6 in a comparison formula. The author agreed with Chilton's conclusions as far as chemical plant of small to medium size, and that it was completely logical to accept and use an exponent of 0.6 when estimating another size of complete plant which was within this range. As the effect of multiplication of units was often considerable, Mr. Dickerson suggested that it was well worth the time taken to go over the process comparing technical data with costs for individual groups of items and assessing whether each group could be increased in output by increased dimensions or by multiplication of units. From experience he recommended that if true and basic information was not available when scaling-up the costs of a small commercial plant to one quite considerably larger, an exponent of about 0.72 could be used with confidence that would provide relative costs with a fair degree of accuracy.

Rotating Disc Contactors

From Koninklijke Shell Laboratorium, Amsterdam, (NV de Bataafsche Petroleum Maatschappij) came Dr. G. H. Reman, to talk on 'Influence of design variables on capacity and efficiency of rotating disc containers.' For the rotating disc contactor Dr. Reman said that the necessary data were generally based upon test results obtained in small laboratory apparatus with the liquid system concerned. A very sound knowledge was required of the effect of scaling-up upon capacity and efficiency.

The author showed that, besides the properties of the liquid system, the energy input per unit of contactor volume was the main variable determining the capacity of the contactor and for stable operation of the apparatus, the ratio of the flow rates of the dispersed and continuous phases (to some extent, another factor influencing the capacity) had to lie in a certain range. Also an important variable from the aspect of efficiency is the energy input per unit of contactor volume. It affects both the mass transfer rate and the mixing of liquid between the compartments.

Dr. Ir. J. G. Van de Vusse, also from Koninklijke Shell Laboratorium, considered 'Problems encountered in stirred slurry reactors.' He said that in processes

carried out in a liquid and a solid phase, the type of the reactor and the conditions of stirring in the reactor could have a far-reaching effect on the conversion and the rate of transfer of the process concerned. Results from small-scale model tests, together with reliable scaling-up rules, would provide the necessary data for the design of large-scale reactors. In this paper, the author discussed the aspects of slurry reactor operation and dealt with the rules for scaling-up in each case. Points to be borne in mind were: conditions under which all particles were just suspended; rate of heat and mass transfer; prevention of clogging of filters inside the reactor in cases where the solid had to be retained in the vessel in a continuously-operated process; and, conditions of immediate mixing of feed streams with reactor contents in order to prevent side reactions developing.

'Model tests with cyclones' by A. L. de Gelder, M.Sc., Central Laboratory, Staatsmijnen in Limburg, Geleen, were reported. Investigations were carried out in order to determine whether information on an industrial cyclone might be obtained from model tests, or from full-scale experiments carried out under conditions that could not be realised in the model. The results obtained showed that it was frequently impossible to satisfy the model laws, which was a condition necessary for obtaining the data needed. The author reported, however, that the necessary information could be derived from calculations. This method of calculation was given and explained.

Solvent Extraction

Development of processes designed to recover uranium and plutonium from irradiated reactor fuel elements has involved several problems of scaling-up solvent extraction equipment. B. F. Warner of the UK Atomic Energy Authority, R. and D. Branch, Windscale Works, Windscale, speaking on 'The scaling-up of solvent extraction processes for irradiated nuclear fuels', described the approach made to problems of scaling-up the packed columns and mixed-settlers used in atomic energy processes. He reported that scaling-up of the packed columns with any degree of accuracy was difficult and required considerable effort. Recent work had, however, led to a greater understanding of the problem. Scaling-up mixer-settlers of the Windscale design had been found to be fairly simple and satisfactory techniques available eliminated the need for pilot plant trials.

Mr. P. J. Hoftyzer, central laboratory, Staatsmijnen, Netherlands, dealt with the performance of technical apparatus for gas absorption. Scaling-up problems were illustrated by a discussion of the packed column. Dimensional analysis, it was stated, showed that undistorted models could not be obtained if the diameter of the packing particles was changed. The experimental data obtained recently therefore was obtained with full-size packing materials.

One method of scaling-up was to change the overall dimensions of the absorption apparatus. This affected the liquid distribution over the packing which the author considered might have an important influence on the absorption effect.

As an example, Mr. Hoftyzer discussed the absorption of carbon dioxide by water in a packed column. His final conclusion was that for this process in some cases the absorption effect in a technical column amounted to only 25 per cent of that predicted on the basis of semi-technical experiments. A more accurate prediction was not possible as long as further data on the liquid distribution in both cases was lacking.

A joint paper by Messrs. M. J. Hagger, E. A. Jones and D. C. F. Pratt, of the chemical engineering section, Courtaulds Ltd., gave 'Scale-up experience in the removal of hydrogen sulphide from exhaust gases from a viscose factory.' Special problems were created by the very large volumes of air to be treated and the low concentrations of hydrogen sulphide. Pressure losses had to be minimised and costs kept low, particularly since the process was carried out to avoid atmospheric pollution, rather than to recover sulphur.

Ferrox Process

The process used by Courtaulds was the Ferrox process, i.e. wet scrubbing with an alkaline suspension of hydrated ferric oxide. The main reaction is $2H_2S + O_2 \rightarrow 2H_2O + 2S$, but there are many side reactions. In the Courtaulds process, hydrogen sulphide is absorbed in a spray chamber from which the spent liquor passes to a tank where most of the oxidation occurs under the influence of the catalyst (alkaline liquor containing a suspension of hydrated ferric oxide). Air is bubbled through this tank to provide the oxygen required and also to maintain the catalyst in suspension and cause the elemental sulphur which forms to float to the surface. Alkalinity of the liquor is due to sodium carbonate and bicarbonate. The liquor also contains thiosulphate, sulphate, polysulphides, sulphite, and other sulphur compounds.

Laboratory experiments were carried out to elucidate the chemistry of the process. It was found that substantially all the oxidation took place in the regeneration tank. If the tank was large a less active catalyst could be used without significantly affecting the absorption. With excessive oxidation side reactions were found to increase and the alkali usage became greater.

Good Absorption

The investigations indicated that to obtain good absorption in the scrubbing chamber the following were required: Large liquor surface area per net volume; high alkalinity (preferably caustic soda); and low content of dissolved salts in the liquor. To obtain economic regeneration in the tank: low alkalinity; low degree of aeration; high catalyst content; and high oxygen transfer rate were required.

Pilot plant was then built around a two ft. square scrubbing tower. As a result of this plant which had vertical spray-type towers (under these conditions it was found that the hydrogen sulphide removal was similar to that obtained when the packing was present, while the pressure drop imposed on the air was lower), it was decided, to develop spray chambers rather than packed towers. An important factor also was the reduced resistance to the air stream.

The authors reported on their experiences with the prototype full-scale vertical tower and included running data. As an estimate of the cost of operating this unit showed that the biggest single item was the cost of liquor circulation, the horizontal scrubbing unit was conceived. The idea was to save the power required to lift the liquor to the sprays in the vertical tower. Although the horizontal unit appeared to have several advantages, the disadvantage was that there would be difficulty in obtaining a reliable indication of the performance of a full-scale unit. The building of a unit equivalent in throughput to three of the vertical towers was decided upon without further small-scale experiments. This plant, Hagger *et al.* report, has been operating for eight months.

Under normal liquor flow conditions outlet concentration of hydrogen sulphide is stated to be 13 p.p.m., giving a coefficient of 3.2 lb. mol./hr. cu. ft. atm. When the liquor flow was increased to 9,200 gal./min., the outlet concentration of hydrogen sulphide was reduced to 5 to 10 parts per million, giving a value of $K_1 = 4.2$ lb. mol./hr. cu. ft. atm. Approximately 0.4 mol. caustic soda have been used per mol. of hydrogen sulphide removed. This is greater than in the vertical tower, but it is stated that it is not clear why this is so. Pressure drop over the length of the chamber excluding eliminator plates is quoted as 0.3 in. H_2O. Pressure drop across the spray eliminators is normally 0.2 in. H_2O, but fouling of the plates can cause this to rise.

Overall Scale Range

'The effect of scale on air-separation plant design' was reported by P. M. Schuftan and J. Forrest, of British Oxygen Engineering Ltd. They stated that the performance and type of compression and cold-producing machines and of heat and mass-transfer equipment is determined by the scale of the plant, and an operating cycle has to be so chosen as to enable the use of efficient and economic plant components which can be made available. They concluded that an overall scale range between 20 and 5,000 kw./unit was involved and the effect of scale on the design of air separation plants depended on particular size range. Scaling-up problems according to these workers were mainly set by mechanical engineering problems and economic considerations rather than by chemical engineering difficulties.

Mr. N. P. Bacon, of the research and development department, the United Steel Companies Ltd., considered 'Experiments with furnace models.'

From the British Petroleum Co. Ltd., Mr. F. W. B. Porter and Mr. C. V. Rollinson, reported 'The development of a new process (autofining) for the catalytic desulphurisation of petroleum distillates.' In a well-illustrated paper, the authors

describe the initial laboratory studies to the final design and construction of a large scale unit. An intermediate step included operations on a pilot plant scale of between 100 to 300 barrels per day capacity. The autofining process, as finally developed, is a process for the catalytic desulphurisation of petroleum distillates at moderate pressures and temperatures, in which the sulphur compounds are preferentially attacked and converted into non-substituted molecules by the action of hydrogen, and in which the hydrogen required is provided by dehydrogenation of part of the feedstock itself. Sulphur is removed as hydrogen sulphide, which can easily be separated from the other reactants.

A catalyst of mixed cobalt and molybdenum on oxides of alumina is stated to be preferable. With lighter feedstocks (straight-run naphthas and kerosines), regeneration is required at intervals over 1,000 hours. With heavier feedstocks (diesel oils) the intervals are reduced to 200 to 400 hours.

Product recovery from autofining is very high, it is stated, the major loss being due to removal of sulphur. Any losses due to small gas-make and deposition of carbon on the catalyst are usually less than 0.1 per cent. Main difficulties encountered in small-scale operations of this nature were recycling the gases at constant rate without disproportionate losses. A small gas-booster was therefore designed. Process variables studied on the units included temperature, pressure, space velocity or feed rate, gas recycle rate, hours on stream, feedstock, and catalyst. From these it was possible to lay down a set of process conditions under which the majority of feedstock could be economically desulphurised.

No Scaling-up Problems

Results of pilot plant work showed that the desulphurisation obtained and the quality of the products were in complete accord with the small-scale work and no scaling-up problems were apparent. In particular, the catalyst retained practically all its original activity after 34 regenerations.

The main chemical engineering problems shown up by the pilot plant studies were the very high corrosion rates of mild steel equipment such as transfer lines, reactor vessel, heat exchanger tubes etc. at temperatures over 500° F. At 800° F. corrosion rates were as high as 0.15 in. per year. Carry-over of corrosion products from pipestill and corrosion lines into reactor vessel caused cementing together of the particles of catalyst and very low heat transfer coefficients were achieved in the various items of heat exchanger equipment.

Last paper in the symposium was by D. A. Dahlstrom (The Eimco Corporation, Illinois, US) and D. B. Purchas, (L. H. Manderstam and Partners Ltd., London) on 'Scale-up methods for continuous filtration equipment.' The aim of the paper was to describe scale-up methods which were of general application to continuous filtration equipment. Reference was made to the two or more following rates in any continuous filter application:

(1) filter cake formation rate,
(2) filter cake dewatering rate,
(3) filter cake washing rate, or
(4) filter cake thermal drying rate.

In this paper, the authors develop a correlating method for each rate by a theoretical approach, but supported by actual plant later. The slowest rate generally determines the size of the full-scale equipment, but for accurate scale-up, all applicable rates have to be investigated, they state. Examples were included by the authors to show how the correlating methods might be used to scale-up filtration data in order to obtain a plant of maximum economic size.

Factors in scale-up from cake formation rate are considered to be particle size distribution, particle size characteristics, cake homogeneity, solids orientation in the filter cake, feed solids concentration, and pressure drop.

In scale-up from cake dewatering rate these factors required the greatest attention: cake dewatering time, pressure drop both during cake formation and cake dewatering, gas flow-rate through the cake, filtrate viscosity (which is sensitive to temperature changes), and cake thickness. The following eight were either constant or where they varied were best treated as parameters: specific permeability of the cake, cake-cracking tendencies, surface properties of the solids, particle size distribution of the solids, concentration of solids in feed slurry, homogeneity of the cake, filter medium, and type and hydraulic design of the filter.

Two factors determined the scale-up from cake washing rates. The first was the quantity of wash liquor required to obtain a cake of acceptable purity; the second was the rate at which the wash liquor can flow through the cake.

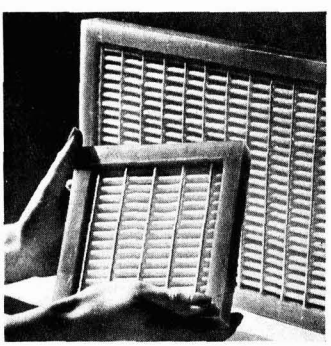
For scale-up for thermal drying rate, the authors advised that an excess capacity of 15 to 25 per cent should be allowed in sizing the equipment. It was rarely economic, they stated also, to operate the units at vacua higher than 6 in. Hg., 3 in. Hg. being the optimum for many coarser materials.

Reinforcements to Bakelite Resins Extend Anti-Corrosion Uses

USERS of Bakelite polyester and epoxide resins, by employing reinforcements other than glass fibres or fabrics, are now extending the range of these materials to meet unusual or more stringent requirements, particularly in the corrosion field. Among the reinforcements now being employed are, metal rod, Dynel acrylic fabric and Terylene polyester fabric. Metal rod, for example, is used for reinforcing the frames of washable filters made from Bakelite polyester resin and woven polythene fabric. Here a flexible grade of polyester is used to ensure that the filter makes an air-tight seal in the housing.

In conjunction with epoxide resins, Dynel acrylic fabric enables a laminate to be produced which will withstand acid and alkaline conditions. A typical use is in the fabrication of small tanks in which coiled coil filament for electric light bulbs are processed. The coils are shaped on iron wire formers which are then dissolved out with acid; after this the coils are washed with strong alkali. This means that the processing tank has to withstand both acid and alkaline conditions alternately.

Terylene reinforcements for polyester and epoxide resins are employed for trough ducting and containers used in the pharmaceutical and food processing industries where glass contamination would constitute a major hazard. In large applications, or in other cases where the cost factor rules out the use of Terylene for the whole unit, it is accepted practice to build up a composite laminate using glass reinforcements for the bulk of the laminate and Terylene in the surfaces which come into contact with the materials being handled.



Frames for this filter were made by Eaton Williams (Millbank) Ltd. from reinforced Bakelite polyester resin, giving them strength and resistance to corrosion, while allowing flexibility to ensure an airtight seal in their housings. Filter is made from woven polythene.

Corday-Morgan Medal for 1956

The Chemical Society announces that applications or recommendations for the Corday-Morgan Medal and Prize for 1956 must be received not later than 31 December 1957.

This award, consisting of a silver medal and a monetary prize of 200 guineas, is made annually to the chemist of either sex and of British nationality who, in the judgment of the council of the Chemical Society, has published during the year in question, the most meritorious contribution to experimental chemistry, and who has not, at the date of publication, attained the age of 36 years.

Copies of the rules governing the award may be obtained from the general secretary of the society, Burlington House, London W1.

DR. ARNOLD WOLF, A.R.I.C., chairman and managing director of Victor Wolf Ltd., glycerine manufacturers, who died on 13 February last, has left £8,260 net in his will.

★ ALEMBIC has been able to verify rumours that the Montecatini organisation of Italy plan to build a factory in the US for the manufacture of chemicals. No decision has yet been taken on site or on the products to be manufactured. Among possibilities now being studied are, a Montecatini branch; a plant operated by a joint Italo/US company; or a reciprocal arrangement that would involve a US company coming to Italy and producing there.

A number of US cities have offered sites, a fact which will enable the company to make a choice. It is understood that when plans have crystallised, an approach will be made to have the company's shares quoted on Wall Street.

★ A £10,000 order for glass pipeline and fittings is said to represent the largest consignment of glass pipeline shipped from this country. Special containers have had to be obtained for its transit and when assembled it will measure 1¼ miles in length.

The pipeline is required for the Polymer Corporation at Sarnia and the order was placed with QVF Ltd., who style themselves 'chemical engineers in glass', by the Meade Laboratories, Richmond Hill, Ontario. QVF, previously at Stone, Staffs, have acquired larger premises at Duke Street, Fenton, Stoke-on-Trent, to cope with their export trade.

★ A FEW JUDICIOUS inquiries by Alembic have elicited the information that the isocyanate plant of ICI dyestuffs division, referred to in CHEMICAL AGE, last week, page 881, is now in operation. The company's annual survey also mentioned the new Waunarlwydd titanium plant; the first unit of the sheet rolling equipment plus the electric furnaces is now operating and part of the plant for the finishing of titanium rod has been started up.

Construction at the new Slough resin plant of the paints division is almost complete and some of the plant is stated to be in use.

★ HINT that important new products for the chemical industry may be produced in the process of tar distillation was given by Mr. J. B. Lane, joint managing director of Lancashire Tar Distillers Ltd., Cadishead, during a works visit on 22 May. He told a party of gas engineers 'We are beginning to scratch at the surface of the chemical trade and we can see important new developments in this field'.

The Cadishead distillery, the largest of the seven operated by the company, processes 500 tons of crude tar a day, compared with 100 tons 10 years ago when a development scheme was started which has so far cost more than £1½ million. Further developments are planned.

Main operations at Cadishead are: 1, primary distillation of crude tar into close boiling fractions and pitch; 2, extraction of crude tar acids (phenol and its homologues); 3, recovery of naphthalene from one fraction after tar acid removal; 4, recovery of benzene, xylene and solvents from the lower boiling fractions; 5, blending of oils to sales specifications and preparation of road tars and coal tar fuels. Phthalic grade naphthalene with 78°C crystallising point is made here.

Until a serious fire last year, the benzole refinery had a four million gall. per year capacity; there was also a pure pyridine plant. Both are now back in partial production.

★ FOR THOSE who like statistics, four members of the Crosfield chemical sales department have, in the past eight years, between them visited 57 different countries. In terms of actual visits (some markets having been called on more than once) this gives a total of 81, or over 20 visits per person. If further statistics are of interest, a recent tour of 27,000 miles, involving business stops of any time up to a week, was conducted at an average continuous speed of 18 m.p.h.—a commendable performance by both visitor and the world's air lines.

The value of perambulatory activity such as this is reflected by the increasing export sales of Crosfield silicates, detergents, silica gel and catalysts. Alembic learns that exports currently represent some 15 per cent of the total Crosfield chemical sales.

★ THE SITING of atomic power stations usually excites local opposition, particularly from those who have their roots in the neighbourhood. This is understandable, but most of it can be overcome if the residents know in advance what is planned. The outcry that arose when the Bradwell-on-Sea site was selected has now died down, but would not have been so vociferous if the authorities had been more diplomatic in their approach to residents.

That experience seems to have been taken to heart, for the Atomic Energy Authority is taking great pains to explain in advance its plans for the research site planned at Winfrith Heath, Dorset, as an extension to the Harwell establishment. A Bill is to be promoted by the Government with the object of extinguishing 'commoners' rights' over land there. These rights date back to a document of 1771 but apply only to the owners and occupiers of certain properties and have been little exercised for many years.

The Bill will be presented in the present session to avoid holding up the authority's research and development programme. It is stated that existing footpaths and roads will not be closed.

★ WHERE does the money go—2? On 4 May, Alembic gave details of how F. W. Berk and Co. spend their money. This week the spotlight is on Monsanto Chemicals. Total income from sales, dividends and interest in 1956 was £14,166,890. Out of that 65.2 per cent went on raw materials, fuel supplies, etc.; 18.6 per cent on wages, salaries, national insurance, pensions, etc.; 4.1 per cent on depreciation and obsolescence; and 1.2 per cent as interest on loan stock.

Of the remaining 10.9 per cent, 5 per cent went on income and profits taxes; 3 per cent on payment of dividends; 0.3 per cent on items not applicable to the year; and 2.6 per cent was retained in the business.

★ ONE MAN'S idea of the ultimate in automation. A huge electronic machine, provided with a series of hoppers containing bundles of fibre, chips, or synthetics, pigments or solvents, into which will merely be fed a card punched to indicate requirements in the way of weight, strength, colour, weave and so on. Out of the other end would emerge the desired fabric.

That reference to automation was made by Sir Harry Jephcott, F.R.I.C., D.Sc., chairman of the DSIR national council, when he spoke at the recent annual dinner of the Textile Institute. But by the time the textile industry will have reached that stage, everyone will be dressed in space suits made from some standardised material, possibly applied by a spray gun to a collapsible former, shaped to one's dimensions and the only variations will be whether the oxygen flask is in the left hip pocket or the right!

★ ALEMBIC has referred recently to the enterprising efforts of a research association to put itself across to potential members who seemed unaware of its existence. This particular problem underlines a basic need for better public relations in the chemical and allied industries that is not confined to the research associations.

Sir Miles Thomas, Monsanto chairman, touched on some of the aspects involved when he spoke recently on 'Industrial advertising' at a meeting of the Incorporated Advertising Managers' Association. 'There is', he said, 'now urgent need to improve our means of making known between one industry and another new inventions, new techniques, new materials and new concepts of blending manpower and machine power in a general drive for increased production at lower cost with more economical use of manpower resources'.

He urges that industrial advertising should be direct and simple. The business man hasn't much time for reading. So give him just enough to incite him to write for more information.

Alembic

EXPLOSION SUPPRESSION IN CHEMICAL PLANT

Benefits of Wartime RAE Work

A GREAT deal of knowledge on the mechanism of explosions was gained during the war and work done at the Royal Aircraft Establishment yielded information which has since been applied to the solving of the serious problems in materials handling that are presented by the risk of explosion existing in many industries, particularly in the operating of chemical plant.

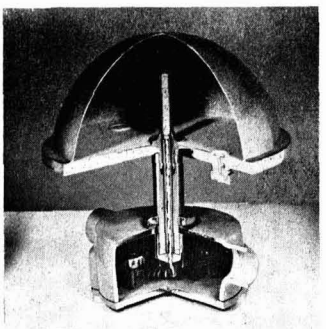
During the early stages of the research work into the chemistry of explosions oscillograph records indicate that there was a short time interval between the ignition of a vapour/air mixture and the development of the maximum explosive force. It was shown that pressure rose in a one gallon vessel so that it reached 0.5 p.s.i.g. in five milliseconds, 1.5 p.s.i.g. in 10 milliseconds and 90 p.s.i.g. in just over 40 milliseconds. It seemed therefore that if equipment could be devised which could detect and suppress an explosion within 10 to 15 milliseconds it would be possible to reduce considerably the danger to life and property presented by the hazard of explosion.

After the last war a British company (Graviner Manufacturing Co. Ltd., Gosport), which has been prominent in the protection of aircraft from fire for more than 20 years, carried on research and development directed at devising efficient methods of using the particular characteristics of the early stages of an industrial explosion to trigger off devices for suppressing it, and for safeguarding the rest of the plant.

£10,000 Saved

Among users of Graviner equipment are F. W. Berk and Co. who have installed the system in a plant at London Colney which is concerned with pneumatic handling of finely divided sulphur. Initial cost of installation was £180 and to date it is said that property valued at about £10,000 has been saved.

The mechanisms of many types of industrial explosion were found to reveal that for a single point source of ignition the time taken to reach a given pressure follows approximately a cube law. A flame which starts as a tiny sphere expands at a constant rate, moving outward as the sphere grows at about 10 feet per second. The pressure at any time is proportional to the sphere's volume, or to the cube of its radius. The maximum pressure reached depends on the initial pressure in the vessel, and the maximum pressure is reached when the flame has filled the vessel. The larger the vessel the longer is the time taken to reach any given pressure. An explosion commencing at one atmosphere will develop in certain conditions a maximum pressure of about 110 p.s.i.g. At double the commencing pressure, two atmospheres, the explosion would develop under similar conditions a maximum pressure of 220 p.s.i.g. And so on.



Hemispherical suppressor in section

The behaviour of an explosive mixture in a duct or tube is different, not conforming to a cube law. Pressures in these conditions can rise rapidly and result in detonations which achieve final pressures of several thousand pounds per square inch.

Despite the different developments of an explosion according to the type of vessel or duct in which it takes place the initial increase of pressure is comparatively low. Provided that there is a time-lag of not more than 10 to 15 milliseconds before dangerous pressures build up it is now possible to suppress an explosion by the use of modern protective devices.

The principal methods of providing protection against any explosive mixture, whether of finely divided materials or of gaseous mixture are five in number. They are suppression, venting, advance inerting, isolation and automatic plant shutdown. Any one or more of these functions can be brought into operation by the operation of a detector, the heart of the protective system.

An explosion detector consists of a cylindrical chamber connected to the vessel being monitored, from the inside of which it is separated by a snap action diaphragm with a supplementary rubber diaphragm. A small bleed hole in the snap action diaphragm connects the interior of the cylindrical chamber of the detector with the space lying between the snap action diaphragm and the rubber diaphragm.

Slow changes of pressure, likely to take place during normal operation of the plant, allow the consequent differences in pressure between the chambers of the detector to equalise through the bleed hole. If, however, there is a rapid change of pressure the bleed hole is insufficient to accommodate it. The diaphragm snaps over and closes two electrical contacts which bring into action the various protective devices controlled by an electrical circuit. As the pressure wave from an explosion travels at about one foot per millisecond a detector sited so that it is not more than five feet from the source of a possible explosion would be alerted within five milliseconds of the inception of an explosion. Ample time would be left for the protective devices to operate before the explosion achieved dangerous pressures.

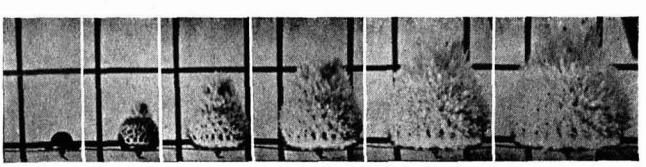
Suppression of an explosion can be achieved by the use of equipment to extinguish the flame partly by chemical action and lowering the temperature, and partly by inerting any unburnt explosive mixture. The hemispherical suppressor is designed to eject the suppressant at a much higher speed than that of the expanding flame front. Explosive methods are therefore used, a detonator being incorporated in the suppressor mechanism.

Electrically Fired

The suppressor consists of a hemisphere containing the suppressant and an electrically fired detonator. Within one millisecond of the operation of the detector the detonator shatters the hemispherical chamber and hurls out the suppressant in the form of tiny droplets which vaporise as they move towards the seat of the explosion at 200 feet per second—a much higher speed than that of the expanding flame front. Suppressants can also be applied by using high-rate, metal discharge bottles in which the suppressant is stored at a pressure of 250 p.s.i.g.

It is important that pressures should be relieved as quickly as possible, particularly in conditions such as those which exist in ducts, where rapid pressure rises can take place. Venting can be achieved by means of detonator-operated rapid action release catches which release circular discs.

A particularly interesting vent is the glass bursting disc which is built into the equipment being protected and which is made of armourplate-glass capable of standing up to normal operational pressures. A shielded detonator is located at the centre of the disc and about a quarter inch away from its surface. The closing of the contacts of the detector results in the immediate shattering of the bursting

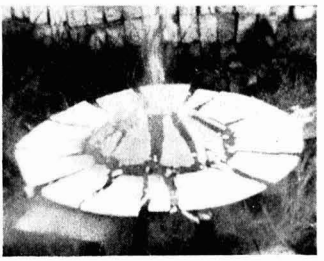


Photographs taken at one millisecond intervals of 800 c.c. suppressor bursting on detonation to discharge suppressant on incipient explosion

disc, and the consequent relief of pressure.

It is often desirable to inert immediately parts of the plant if an explosion should commence anywhere in the system. This can be achieved by hemispherical suppressors or high-rate discharge bottles actuated by the detector. High speed isolation valves can be incorporated to isolate any part of the plant in which there is incipient danger of an explosion. An electrical power unit provides the supply for firing the detonators.

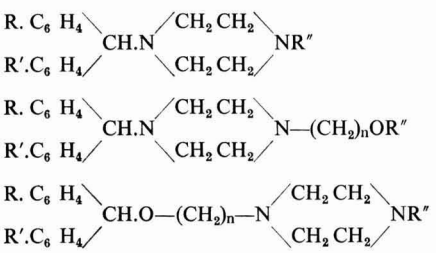
To achieve high speed operation of the various circuits, direct current is used. A transformer steps down the a.c. power and a rectifier converts it to d.c. which maintains a continuous charge on a condenser, which discharges through the detonators immediately the detector points close. Standby dry batteries ensure that the equipment is alert even in the event of a mains failure. Relay contacts are included in the electrical system to shut down immediately such parts of the plant as valves, fans, pumps or heating equipment. If necessary the entire plant can be automatically shut down in this way. The electrical circuits are continuously monitored in such a way that warning is given of any electrical failure that might occur if the wiring was accidentally severed.



'Armourplate' glass bursting disc at moment of detonation to provide vents

NEW PIPERAZINE DERIVATIVES

PREPARATION and properties of a series of new piperazine derivatives, of the general formula:



where R and R′ are in the ortho, meta or para position are reported by Morren *et al.* in *Industrie Chimique Belge*, 1957, **22**, No. 4, 409. R and R′ may be H, Cl, Br, CH_3, C_4H_9, OCH_3, OC_5H_{11}, etc. R″ may be H, alkyl, benzyl, cycloalkyl, substituted or nonsubstituted.

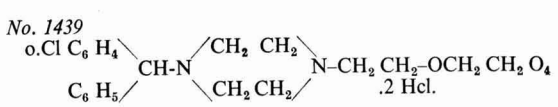
Recent work indicated that monoquaternary compounds of the type 1-benzhydryl-4-alkyl-piperazine provoked atropine-like properties in compounds substituted in the ortho or meta positions in one of the phenol groups.

The authors of this investigation, deeming that these substituted piperazines might have valuable anti-ulcer properties, had the new non-quaternary piperazine derivatives screened, and it is reported that certain of the compounds show considerable anti-ulcer activity experimentally.

Compounds 1439, 1474 and 1499 have been examined pharmacologically and the results will be published by the pharmacodynamics laboratory of Union Chemique Belge.

Chemically the compounds are as follows:

No. 1439



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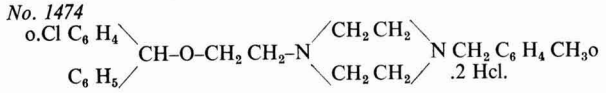
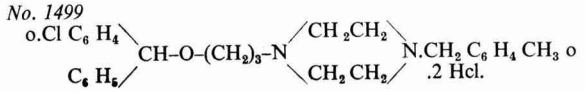


No. 1499



BOC's New Plant at Grangemouth

A NEW FACTORY at Grangetown, Middlesbrough, is being built by British Oxygen Gases Ltd. at an estimated cost of £1¾ million.

The new plant, which is being constructed by British Oxygen Engineering Ltd., will produce compressed and liquid oxygen, and liquid and tonnage nitrogen (to be fed, after purification, by pipeline to Imperial Chemical Industries' factory at Wilton). At a later date a plant capable of producing 200 tons of gaseous oxygen per day will also come into operation. Other industrial gases manufactured by the company will also be distributed from Grangetown.

Activities of the British Oxygen factory at Billingham have been transferred to the new site, which comprises 20 acres. The Billingham factory, where oxygen was compressed from evaporated liquid, has been in operation since 1923. This factory was responsible for about one-third of the total sales of compressed oxygen in the company's north-east district. Other industrial gases were also distributed.

A number of senior personnel from the company's Chester-le-Street factory have been transferred to the new building, and additional local labour has been recruited.

Rapid Mineral Analysis Demonstrated

A METHOD for the rapid identification of minerals was demonstrated at the Conversazione held at the Royal Society on 23 May. A specimen of the mineral is polished using a lead lap lined with diamond, its reflectivity is measured and the Vickers hardness determined using a Vickers 136° pyramid.

From the combination of these two values it is said to be possible to identify the mineral with a good degree of certainty The method is quick and it is claimed that by using it in conjunction with other easily observed properties such as colour, anisotropism and reflection pleochroism most minerals can be identified without recourse to spectrographic or X-ray methods. The method was developed by the Atomic Energy Division, Geological Survey of Great Britain, for the identification of uranium minerals.

Another stand at the Conversazione demonstrated the effect of gibberellic acid on the growth of plants (see CHEMICAL AGE, 12 January, p. 85). Less common metals used in the atomic power industry were shown with samples supplied by Atomic Energy Authority, Murex, Imperial Chemical Industries and Accles and Pollock.

Casein Preservative

Investigations have been carried out at the Printing, Packaging and Allied Trades Research Association to find a preservative that would prevent odour being formed by micro-organisms in a casein coating. Ethyl p-hydroxybenzoate has been found to prevent deterioration of this coating mixture.

OCCA Conference Discusses Catalytic Processes

Value of Academic Research Realised

SUBJECT of the technical sessions of the Oil and Colour Chemists' Association biennial conference held at Torquay from 21 to 25 May was 'Catalytic processes relating to the surface coating industries'.

All the papers aroused considerable discussion and in fact, further time could have been devoted to this, possibly by utilising one of the evenings.

On the evening of 24 May, the conference dinner and dance was held. The toast of the Association was moved by Mr. E. V. Schmid, president of FATIPEC and the Swiss Association of Paint and Varnish Chemists. He complimented the president of OCCA, Mr. C. W. A. Mundy, and staff on the organisation of the conference and very high standard of the lectures. He said he had learned a great deal. Mr. Mundy, the retiring president, thanked Mr. Schmid, and remarked that FATIPEC had postponed its own conference until September in order not to conflict with that of OCCA. Mr. Mundy then thanked the council and officers of OCCA for their support over the past two years. In particular, he expressed his appreciation to Mr. Gay, convenor of the conference, the lecturers and the chairmen of the sessions Mr. T. E. Johnson, Mr. N. H. Seymour and Dr. S. H. Bell.

Toast of Torquay

The president designate, Mr. N. A. Bennett, proposed the toast of the Borough of Torquay. He mentioned the connection of the area with the paint trade. Ochres were obtained from the Brixham district, and also barytes and a number of other earths. The Torbay area was the favourite testing area for marine plant.

Toast of 'The Guests' was proposed by Mr. L. O. Kekwick and Mrs. L. A. Jordan, wife of the director of the Paint Research Station replied. M. Basse responded for overseas visitors.

The subject matter of the conference covered a broad field, and an effort, on the whole successful, was made to partition the lectures based on academic work, and those having a more industrial appeal. The lively discussions which followed after each lecture made it obvious that industrial chemists, even the 'practical polymerisers' as one so aptly described himself, are acutely aware of the importance of academic research, even though there was some criticism of the fact that it is often governed by the need of providing theses for Ph.D. students rather than concentrating on fertile development.

Preprints of all the lectures except one were provided. These serve a useful purpose in providing a background to the technical sessions, although where they have not been read at least once, some difficulty might have been experienced in following the subject matter. The first lecturer was Professor D. D. Eley, of Nottingham University, who considered the cationic polymerisation of vinyl ethers. He developed the subject historically, pointing out that as the ether group increased the electron density in the double bond (by mesomeric effect), these monomers were not susceptible to free radical or anionic catalysis, but could be polymerised cationically. Dr. Eley reviewed the kinetics of polymerisation, and discussed work with boron fluoride trietherate, and with iodine.

In a most stimulating lecture, Professor C. E. H. Bawn, of Liverpool University, indicated the nature of the breakdown of hydroperoxides, of importance in the peroxidation of linoleic and linolenic esters, and the effect of the cobalt and manganese ions in effecting their decomposition by a redox mechanism. This process is also used in the cold curing polyesters, where methyl ethyl ketone peroxide is used together with a cobalt salt. Professor Bawn said that decomposition of peroxides such as benzoyl peroxide followed a slightly different mechanism, which, however, could be powerfully affected by any solvent present. Dimethyl aniline would catalyse the decomposition of benzoyl peroxide by electron transfer, thus accelerating polymerisation of any polymerisable monomer which might be present.

Dr. D. F. Rushman, of the Paint Research Station, considered reaction rates in varnish technology, pointing out that the effect of a catalyst was to provide a path which would offer the lowest energy barrier for the transfer from the initial to the final state. He considered simple exchange reactions, indicating that transesterification in the absence of a catalyst was a comparatively slow reaction, but that the acidolysis of a triglyceride by a fatty acid was about 100 times as fast between 200°C and 300°C. Thus free acid assisted in catalysing a trans-esterification.

Anthraquinone, because of its tendency to abstract hydrogen from the active methylene group of a linoleate molecule, catalysed the dimerisation of methyl linoleate. The free radical character was spread over three different carbon atoms in the linoleate, and thus if reversal of the hydrogen transfer occurred some of the regenerated molecules would be the conjugated isomer.

Ionising radiations in polymer chemistry were dealt with by Professor F. S. Dainton, of Leeds University (no preprint available). He said that radiation was of great interest in the production of graft copolymers since any monomer could be added to an active centre in an existing polymer, and a new side chain started. A tertiary carbon atom was a particularly easy source for producing an active centre for this purpose.

Mr. C. T. Morley Smith, of Nuodex Ltd., reviewed the chemistry of drier catalysis. He reported that the metal salts used have the general characteristic of existing in two-valency states, the higher being the less stable. Naphthenic acids had been very widely used. There were slight differences in drying efficiency of metallic driers depending on the acid.

Driers from the point of view of litho varnishes, with particular reference to acids such as citric and phosphoric acids which tend to de-activate the driers, were discussed by Mr. R. R. Coupe, PATRA.

Dr. G. C. Bond, of the University of Hull, explained the reactions of hydrocarbon radicals on metal surfaces. Hydrocarbon radicals, he said, were formed as intermediates on the surface of the catalyst. Kinetic and isotopic methods had been employed to elucidate the reaction mechanisms.

On a slightly different field, Mr. H. F. Clay, of The Cromford Colour Co. Ltd., described some remarkable work in the examination of titanium dioxide for photochemical properties. It had been shown that there was no suggestion of any direct photochemical decomposition of titanium to the trivalent state, but that titanium dioxide acted as a photocatalyst only.

The final paper, by Mr. F. E. Hixon, of the Shell Chemical Co., reviewed the manufacture of paint and lacquer solvents from petroleum. The lecture was descriptive of industrial processes, although it did indicate the close co-operation between the surface coating and refinery industries.

Present Position of Niobium

A BROKERS' study of niobium which is being circulated to shareholders of Nigerian tin-mining companies indicates that since the US ceased stockpiling this metal, major producers have been left with a certain amount of unsold material. However, prospects are considered good as supplies are now assured for all foreseeable requirements.

Previously the US Government's bonus stimulated development of new and existing deposits, but discouraged steel makers by virtue of the excessively high price of the metal—£2,200 per ton in 1952-55. Price today is about £570 per ton. The new nuclear projects have stimulated more interest in the metal recently.

The Dounreay fast breeder reactor, described in CA, 18 May, p. 831, has niobium metal containers for sheathing the several hundred fuel elements, because of the outstanding strength of the metal at high temperatures with good resistance to the liquid sodium used to remove the heat from the reactor core.

About 2,000 tons of columbite are produced in Nigeria and of this total the Amalgamated Tin Company produced about 573 tons of concentrates in 1955-56.

BS FOR LAB GLASSWARE WILL BE REVISED TO NEW ISO STANDARDS

PROGRESS is reported towards international standardisation of laboratory glassware as a result of the recent meeting in London (at British Standards House, 2 Park Street, London W1, 6 to 10 May) of a committee of the International Organisation for Standardisation (ISO). Nearly 40 delegates and observers represented standards organisations and industry from Australia, Belgium, France, Germany, Netherlands, the UK and the US as well as several international organisations interested in laboratory apparatus.

Chairman for the meeting was Mr. Stanley J. Davies, chairman and managing director of A. Gallenkamp and Co. Ltd., and the leader of the UK delegation was Mr. P. H. Bigg of the National Physical Laboratory. Three members from the US were present, the first time that country has taken an active part in the work of this ISO committee.

As a result of the meeting six drafts will now be sent forward through the normal ISO procedure for approval as ISO recommendations. These concern interchangeable conical ground glass joints; methods of thermal shock tests for laboratory glassware; burettes, and the principles of construction and adjustment of volumetric glassware, of hydrometers, and of liquid-in-glass laboratory thermometers.

Compromise

In each case the agreement reached represents a compromise between the standard practices, dimensions and other requirements laid down in the participating countries. The alterations that will be necessary to bring British practice into line with these agreed drafts—although less substantial than those needed in certain other countries—will cause some temporary inconvenience to manufacturers and users, but in the opinion of the British delegation such inconvenience will be greatly outweighed by the advantages resulting from international standardisation.

These points are particularly relevant to the draft on conical joints. At previous meetings it had been found possible to work out a compromise on the lengths, diameters and tolerances for these joints which was acceptable to the European manufacturing countries, although it involved changes from BS572 and other existing national standards. At this fifth meeting the US delegation was strongly urged to accept the compromise, and action on the draft is being delayed for a period of six months in the hope that further consultation in the US will make this possible. Even if it should not prove completely acceptable, the existence of only two standards in the world (one American and one European) would be a considerable advance on the existing situation, and most of the joints would in practice be interchangeable since the remaining differences mainly concern the length of the joint and not its diameter or taper.

The meeting also approved, subject to some additional revision, six further drafts on hydrometers and thermometers. Progress was made in discussions of methods of test for the chemical durability of laboratory glass and glassware and on volumetric flasks. It was decided to start work on spherical ground glass joints, glass stopcocks, adjustable range thermometers, calorimeter thermometers and methods of use for volumetric glassware. Working groups will discuss these subjects in the first instance by post and it is expected that further meetings of these groups may be arranged in the spring of next year.

Hints on ICI Expansion at Widnes

ADDRESSING employees at the Pilkington-Sullivan plants of Imperial Chemical Industries, Widnes, Mr. D. H. Carter, joint managing director of general chemicals division hinted that the works, already making a wide variety of products, would be engaged on new lines before long.

Why was it, he asked, that ICI had so many long service employees? This was in contrast to the American way of life which was for employees to change rapidly from job to job. He did not think the worker's heart could be in the job if he was constantly changing.

The Lostock works, which house brine plant supplying many works, are being extended and modernised at a cost running into millions of pounds.

In Parliament

Voluntary Scheme Agreed for Toxic Chemicals in Agriculture

A SCHEME for the voluntary notification to Ministers by manufacturers and distributors when they propose to introduce new toxic chemicals in agriculture or to develop new uses of existing products has been agreed between representatives of the industry and the advisory committee on poisonous substances used in agriculture and food storage. This scheme has been approved by the Minister of Agriculture and the Secretary of State for Scotland.

This was stated by Mr. D. Heathcoat Amory, Minister of Agriculture, in the House of Commons last week. A recommendation to this effect had been made by the Working Party on Toxic Chemicals in Agriculture. Mr. Amory expressed appreciation of the co-operation given by the associations representing industry and of the contribution made by Sir Solly Zuckerman, and his working party, and the advisory committee.

MP Says Compound Fertiliser Makers Get 50% Rake-off

The Minister of Agriculture was asked in Parliament last week to compel merchants to disclose the charge made for mixing and bagging compound fertilisers for sale, particularly 'as inquiries show that there is a very wide variation in the rake-off of manufacturers—in some cases it is higher than 50 per cent.'

Mr. J. B. Godber, Joint Parliamentary Secretary, said the Minister had no power to compel merchants to make such disclosures. He was surprised at the figure quoted and said that 50 per cent seemed extremely high. In any event, farmers could buy straight fertiliser, which would be a check against any monoplastic tendencies.

1,600 DSIR Studentships Expected in Coming Year

DSIR research studentships now current total 981, of which 404 were new awards made in the present academic year. This was stated by Mr. H. Nicholls, Parliamentary Secretary, Ministry of Works, last week. In the coming academic year, it is expected that about 1,600 studentships would be current, of which 915 would be new awards, including 200 of the newly introduced advance course studentships. In addition special awards were sometimes given to institutions where individuals were working on particular projects.

The increase was partly due to DSIR having taken over responsibility for certain awards from the Ministry of Education and local authorities. Number of awards for future years was being considered. He added that the vote for 1956-57 was for £340,000 and for 1957-58, £445,500.

Application for Drawback

THE BOARD OF TRADE give notice that they are considering an application for drawback of duty in respect of the undermentioned imported materials and exported goods:

Imported α-ethylbutyric acid used in the manufacture of carbromal and acetylcarbromal.

Imported *iso*-valeric acid used in the manufacture of bromvaletone.

Any representations which interested parties may wish to make should be sent in writing to: The Board of Trade, tariff division, Horse Guards Avenue, London SW1, not later than 14 June 1957.

Printing Technologists' AGM

Draft rules were approved at the first annual meeting of the Association of Printing Technologists held recently at 11 Bedford Row, London WC1. After the formal business, members saw the first showing in this country of the film 'This is Color' produced by Interchemical Corportion, US, and presented by Ault and Wiborg Ltd.

Ashdowns Open New Plastics Factory at St. Helens

Mendip Chemical Engineering Acquired

SHARE capital of Mendip Chemical Engineering Ltd., Feltham Road, Ashford, Middlesex, has been purchased by the Pilkington Group, with effect from 1 May. This was announced on 22 May when Ashdowns Ltd., a subsidiary of Pilkington Brothers Ltd., opened a 120,000 sq. ft. plastics factory at Eccleston, St. Helens, Lancs.

Mendip Chemical Engineering has been built up over the past three years by J. C. Newson and W. T. Nunn, who will continue with the company in their previous capacities. Mr. Newson told the CHEMICAL AGE: 'We have made bigger advances than the US in the application of reinforced laminates to the atomic energy industry. Reinforced laminates have the same qualities as stainless steel in that they are easily decontaminated and are chemically resistant, and their production will help to relieve the burden on production of stainless steel.' He added that Mendip would continue to design and manufacture prototypes and production quantities would be handled by Ashdowns.

Ashdowns' new factory, claimed to be one of the most modern and best equipped factories of its type in the country, contains more than £250,000 worth of equipment. This includes £100,000 worth of new plant acquired in the past 12 months.

Reorganisation

Its opening marks a complete reorganisation of the company's production policy. In recent years the company has widened the scope of its activities from time to time by undertaking the manufacture of synthetic resin bonded laminates, fibreglass reinforced plastics mouldings and sheets, and thermoplastic sheet fabrications. So important have these new activities become that it was recently decided to withdraw from compression and injection moulding of powders to concentrate more fully on the latest developments in the industry.

The new factory has been laid out on the lines of modern works practice. Production has been streamlined in all sections and a free flow has been allowed from the raw materials store to despatch.

Considerable research and development is carried out by the company. Each of the four production sections has its own development group with the latest laboratory facilities. Investigations are carried out into new materials, products and techniques and the test laboratories are at the disposal of the company's customers.

Raw materials and finished goods are examined in the physical test laboratory against the relevant specifications for their electrical and mechanical properties. This laboratory is so arranged that mechanical test equipment is on one side of the room and electrical test equipment on the other side. A full range of equipment has been installed to deal with all standard physical properties normally measured for the materials with which Ashdowns are concerned. The laboratory is equipped with one of the few 1,000 megacycle test sets in this country.

The firm's thermoplastics and synthetic resin-bonded laminates (Ashlam) development laboratories have a common area devoted to presses. The thermoplastics section investigates the properties of materials such as Perspex, p.v.c., polystyrene, and polythene, all of which may be used by the company's fabricating section. The Ashlam section is concerned with the development of new materials for use in the laminated type of product. This includes the small scale preparation of resins and the investigation of their use with fibrous reinforcements of all types when laminated at high pressure.

The chemical test laboratory has been set up in order to test raw materials and finished goods from a chemical, or physico-chemical, point of view. Work done in this laboratory supplements that carried out in the physical test section.

A resin laboratory has been set up to investigate the properties of the many types of resins now available. In general, investigation in this laboratory is limited to the field of low pressure thermosetting resins. The resins are evaluated from the point of view of their behaviour under the actions of heat, light, weathering, etc.

Uniformity of test results is gained by preparing test samples in a room which is temperature controlled in winter and summer. This ensures that test samples are always dimensionally correct.

The new factory project was designed and the construction controlled by Ashdowns Ltd. engineering staff. Work began in July 1955, with the bulk excavation of some 30,000 tons of hillside to the south of the old premises.

New Chemical and Allied Plant in Hand by Simon-Carves Group

FROM the coke oven department of Simon Carves Ltd. comes news that the flue gas-washing plant on the Fulham-Simon Carves ammonia system at North Wilford power station which has been under preliminary test, is now being put into full service. Results of this method of reducing atmospheric pollution by sulphur oxide are expected to be of major significance.

This department has recently received orders from India for a calcining plant to prepare limestone for blast furnaces for the Tata steelworks extensions at Jamshedpur and for two effluent treatment plants on the bacteriological system for the Indian Iron and Steel Co. at Hirapur. The first effluent treatment plant of this type is being successfully operated at the National Coal Board's Coedely plant.

The chemical plant department has about a dozen sulphuric acid and other chemical plants in various stages of design or erection in the UK, South Africa, Australia, New Zealand and India.

In India, Simon-Carves have been appointed main contractors for a polythene plant to be set up by the ICI subsidiary, Alkali and Chemical Corporation of India at Rishra. This project will cost over a million pounds.

In this country ICI have ordered oxidation units for the two kilns of the Billingham plant built in the 1930's which produces sulphuric acid and cement clinker from anhydrite. The new units will replace older equipment and will modernise the acid-making section, so bringing these in line with the new anhydrite plants at Billingham and Widnes, constructed by Simon-Carves several years ago. Laporte Titanium have also ordered a sulphuric acid plant to produce 175 tons a day at Stallingborough.

A recent order for the precipitator division is from Australian Titan Products at Burnie who have ordered a calciner flue-gas cleaning plant and an acid mist precipitator. Precipitors of this type have also been ordered by British Titan Products Co. at Grimsby. Orders for six detarrers have been received from the coke oven department for the Durgapur steelworks, India, and a detarrer is to be installed for Canadian-Brazilian Services in Rio de Janeiro.

Chemical Engineering Wiltons Ltd. have now completed the concentrated ammonia liquor plant at Manvers Main for the National Coal Board.

Erection of the 300-ton tar distillation plant of Dutch Shale Mines is well advanced and all materials have been delivered. Another tar distillation plant (100-ton) is ready for erection at the ISCOR works at Pretoria, South Africa. This company have also ordered another distillation plant for their works at Vanderbijl Park.

Lancashire Tar Distillers at Preston and Scottish Tar Distillers at Falkirk are also having tar distillation plants erected by Simon-Carves.

Satisfactory progress is reported by Huntington Heberlein and Co. Ltd., a Simon-Carves associate company, with regard to the ICI's acid concentration plant at Gomia in India. This company is also to send an engineer to Pakistan to supervise the Government's acid concentration plant.

WILL

MRS. LOUISE ALICE BAKER, of 1 Palmeira Court, Palmeira Square, Hove, widow of Richard Charles Baker, founder of Borax Consolidated Ltd., who died on 22 December last, left £493,913 7s 7d gross, £487,397 8s 4d net value. (Duty paid £318,960.)

Soviet Chemists Publish Work on Polymerising Isobutylene

'POLYMERISATION of isobutylene in the presence of aluminum triethyl and $TiCl_4$' is the subject of a contribution by Toptschiew, Krenzel, Bogomolowa and Goldfarb in the Reports of the Soviet Academy of Sciences (111, 212-24, 1956).

The isobutylene was prepared by dehydration of isobutanol in the presence of activated alumina. It was meticulously dried and was completely free of oxygen (including combined oxygen). The titanium tetrachloride was of technical grade. The aluminium triethyl was prepared from 99.99 per cent aluminium and technical grade ethyl bromide:

$$2\,Al + 3\,C_2H_5Br \rightarrow Al(C_2H_5)_2Br +$$

$$Al(C_2H_5)Br_2 \xrightarrow{3Na} Al(C_2H_5)_3 + 3\,NaBr + Al$$

The product was distilled over at 110-115° C. and 2-3 mm. Hg. pressure and was used as a 15-18 per cent kerosene solution. It was extremely susceptible to CO_2, oxygen and water. The equipment comprised a nitrogen purifying system, a drying system for the isobutylene and the reaction vessel proper, which was equipped with stirrer and reflux condenser.

The experimental procedure was first to introduce isooctane which was used as a polymerisation solvent, then to evacuate air and scour with purified nitrogen. Next the calculated quantity of aluminium triethyl and $TiCl_4$ (in weak isobutane stream) was added, the molar proportion between the two being 1:2. The quantity of catalyst was such that the isooctane solution contained 1 per cent aluminium triethyl.

Isobutylene was then introduced at the chosen rate. Polymerisation took 3 hours and the reaction temperature was maintained constant to ±2° C. at a point chosen in the range −25 to +75° C. When polymerisation was completed, methanol was added and the reaction mixture washed in a separating funnel with 10 per cent soda solution and water. It was then dried and the isooctane distilled off (finally under vacuum).

The polymers obtained were liquid or rubber-like products either colourless or faintly yellow. About 80 per cent of the isobutylene present entered into reaction and in some experiments the yield of polymer was up to 95 per cent of converted monomer. Molecular weights lay between 7,000 and 10,000. Experiment showed that at relatively high temperatures, dimers and trimers were formed in addition to polymeric products.

It was found that polymerisation occurred at quite low concentrations of $TiCl_4$. For instance a polymer of molecular weight 5,000-6,000 was obtained using a catalyst consisting of aluminium triethyl and $TiCl_4$ in a molar proportion of 16:1 at 0° C.

Report on National Physical Laboratory

THE EFFECT of four different heat treatments on titanium rich alloys of titanium, aluminium and oxygen have been studied at the National Physical Laboratory says the report for 1956 and a short paper on the results has been accepted by the Institute of Metals. Tensile and slow bend tests have shown in each case the marked effect of oxygen in increasing the tensile strength and reducing the ductility of the alloys.

The possibilities of niobium alloys are being investigated. Measurements have been made of the physical properties of the alloys of niobium with the elements which are nearest to it in the periodic table, molybdenum, zirconium and palladium.

As a result of work carried out by the chemistry section in connection with the British Iron and Steel Research Association physico-chemical methods of analysis subcommittee a proposed British Standard method using an ion exchange technique, for the determination of boron in steel has been put forward.

Work has also been done on a colorimetric method for phosphorus. It is said that this method would be of value in high-alloyed steels where there are difficulties in the standard gravimetric method.

Work has continued on the relative merits of the boiling point of sulphur and the freezing point of zinc as a primary fixed point. A reproducibility of ±0.002°C has been proved for sulphur. Measurements indicate that the zinc point has better reproducibilty.

As reported last year (see CHEMICAL AGE, 9 June 1956, p. 1280) the NPL tests inhalers used by midwives for the administration of trichloroethylene. During the past year about 2,800 inhalers have been tested and of these 4 per cent have been rejected. A refractometer has been developed in which the fringe pattern is projected on to a screen for easy and rapid reading. This equipment has been copied by inhaler manufacturers.

Dunlop Plan Expansion of Fortiflex Capacity

DEMAND for Fortiflex produces made by the Dunlop Rubber Co., is said to exceed supply and expansion plans are in hand. About 95 per cent of these lines are produced for industrial purposes; domestic lines include coal hods.

Fortiflex is a chemical compound of natural rubber with the type of synthetic resin used for a number of years in the production of rigid mouldings. As yet colour cannot be introduced, but a line of special paints has been prepared. Fortiflex products for industrial use include pickling crates to contain a solution of hydrochloric acid, mechanical handling equipment etc.

Bowen Award for Paper on Measurement

THE BOWEN PRIZE was awarded by the Society of Instrument Technology on 28 May to A. M. Godridge, R. Jackson and J. J. Thurlow for a paper on 'The industrial measurement of gas temperatures.' After the presentation, which was made by Mr. G. A. Whipple, president, the Scientific Instrument Manufacturers of Great Britain Ltd., Sir Harold Hartley, the new president, addressed the Society on 'The contribution of measurement to discovery.'

Sir Harold said: 'It seemed to me appropriate to try to review for you the contribution which some of your forerunners, the great instrument designers of the past, have made to the progress of knowledge.'

Beginning with the early astronomers, Sir Harold traced the part that measurement has played in the development of science. He discussed the great names in the history of chemistry, Black, Cavendish, Lavoisier, Gay-Lussac and Priestley, and showed how by precise measurement they were able to discover or prove their theories.

Use of Coulometer in Microgram Ranges

ELECTROCHEMISTRY was the subject of the 58th ordinary meeting of the physical methods group, Society for Analytical Chemistry, held on 21 May at Burlington House, London W1. Dr. J. E. Page, section chairman presided.

A paper on 'Coulometric titrations with an integrated current source,' by Dr. L. E. Smythe (Australian Atomic Energy Commission) was presented by Mr. G. W. C. Milner (UK, AEA, Harwell). The advantages of a direct reading coulometer were illustrated and it was stated that the precision and accuracy attainable for a variety of estimations indicated the possibilities of the equipment for the analysis of constituents in the microgram and milligram ranges.

Mr. A. W. Gardener, also from Harwell, demonstrated a pulse polarograph, an electronic polarograph of high sensitivity and resolving power giving both normal and derivative polarograms.

Cure for Lungworm Produced by ICI

A CURE for 'husk' or lungworm in cattle is claimed to have been discovered by research workers in the pharmaceuticals division of Imperial Chemical Industries. Known as Helmox, this chemical (cyanacethydrazide) forces the worms to move up the windpipe of the animal to be swallowed and destroyed.

In Britain it is estimated that the disease costs the farmer more than £3 million a year. Cost to farmers in Europe and North America is also high.

Cost of treatment is said to be low. For animals of 5 cwt. or over a full treatment would cost as little as 14s 3d. To treat a 75 lb. lamb, value say £12, would cost only 1s 10½d.

Overseas News

ITALIAN CHEMICAL INDUSTRY REPORTS SLACKENING OF EXPANSION RATE

TOTAL output of the Italian chemical industry in 1956 was valued at almost 400 milliard lire, representing more than 11 per cent of the output of all Italian processing industries. The figure was 9 per cent higher than 1955 output, which was 16.3 per cent above that for 1954.

Chief reasons for this slackening of the progress rate is due, states our Italian correspondent, to greater competition from other countries and a price standstill in certain sections that was accompanied by higher costs and increased taxes.

At the recent annual meeting of the Italian Chemical Association (Aschimici) it was stated that the petrochemical industry was expanding rapidly, particularly in the polymerisation of olefines. Output of plastics materials in 1956 totalled about 115,000 tons, 15 per cent more than in 1955. Production of paints and varnishes amounted to 100,000 tons, an increase of 10 per cent. Difficult times were reported by pharmaceutical manufacturers.

Imports of chemical products were 26.22 per cent up on 1955, while exports increased by only 9.91 per cent. As a result Italy's adverse balance so far as chemicals are concerned increased from 17 milliard lire in 1955 to 35 milliard.

Fertiliser Factory Planned for Angola

Plans to produce 40,000 tons of ammonia a year for conversion into fertilisers are being considered by the Companhia Fabril Comercial do Ultramar in Angola. The project envisages a factory costing £4 to £6 million.

African Titanium Project

The Anglo-American Corporation is undertaking the development of a £1,500,000 project for the production of titanium on a large scale at Umgababa, on the south coast of Natal. Small-scale extraction of titanium has been carried out there by another company, it is reported.

Swedish Pharmaceuticals Trade Expected to Expand

Although the Swedish chemicals industry has expanded faster than Swedish industry generally since the war, progress during the past five years has been slower than in most other European countries. Increased production of inorganic chemicals has covered domestic demand. In the case of organic chemicals, plastics and pharmaceuticals, exports have been increased appreciably. This trade has been largely based on sulphite spirit as a raw material; there is no petrochemicals industry in Sweden.

Without foreign capital, Swedish chemical industry will not be able to keep pace with rapid progress abroad, particularly in the field of organic chemicals. Appreciable expansion is expected in the pharmaceuticals industry following recent intensification of research and experimental work. This is stated in the recent report to the Swedish Minister of Commerce, presented by a committee of experts.

Polythene and Ethylene Derivatives Plant

The Carbide Chemicals Co. division of Union Carbide, Canada Ltd., have announced that their fully-integrated $25 million petrochemicals and polythene plant in Montreal East is now on stream.

Construction is now under way on a $4 million addition to the polythene unit. When the new addition is completed late this year, the plant's capacity for polythene will reach 30 million pounds a year.

The Montreal East plant is designed to convert gases from neighbouring oil refineries into polythene, ethylene oxide, ethylene glycol and a wide range of ethylene oxide derivatives including ethanolamines, glycol ethers and polyglycols.

Malayan Imports 1956

Imports from the UK of manufactured fertilisers have decreased from M$4.1 million in 1955 to M$1.1 million in 1956. Imports of fertilisers from West Germany and Belgium show an increase over 1955 figures, namely, M$4.4 million (M$1.1 million) and M$6.1 million (M$5.1 million) respectively. West Germany also increased her exports of chemical products to Malaya—M$2.1 million from M$1.9 million in 1955. Japan increased her exports of scientific apparatus to Malaya—M.$2.4 million as against M$1.4 million in the previous year.

China also increased her exports of chemical products to Japan.

Jordan's Plans for Phosphate Industry Expansion

In 1956, Jordan produced over 200,000 tons of rock phosphate. It is stated that this industry would benefit by the proposed deep-water port at Aqaba and the construction of a fast, all-weather road from Amman to Aqaba since a quick and cheap export route to markets of the east would be provided. The port development scheme includes the provision of storage and mechanical handling facilities for phosphate.

The Jordan Government has continued its efforts to raise capital in the other Arab States for the establishment of a potash plant to exploit the mineral resources of the Dead Sea. The capital of the Arab Potash Company is JD1 million, half of which was subscribed by the Government and half by other Arab Governments. However, much more capital is required to carry out the scheme. At present, the scheme is in the exploratory stage.

US Chemical Consultants

The 16th edition of *Consulting Services*, 1957, published by the Association of Consulting Chemists and Chemical Engineers Inc., 50 East 41st Street, New York 17, NY, US, has been revised and streamlined. It offers guidance for profitable conduct of business in all branches of industry and contains directions for finding the right consultant to solve problems of manufacture, process improvements, research and development, plant designs and analytical and testing work in all its modern aspects. Copies are obtainable from the association, $1 per copy.

Austrian Chemical Industry Output in 1956

The gross value of output of the Austrian chemical industry in 1956 was about 6,800 million schillings—an increase of 10 per cent over 1955. Detergents and soap output showed a rise of about 14 per cent, pharmaceuticals 6.4 per cent, staple fibres 8 per cent, lacquers and dyes 8.5 per cent. The outstanding rise in output was that of plastics products which showed an increase of 48 per cent. Rubber goods and matches, however, showed a decline.

Chemical exports from Austria in 1956 amounted to 1,570 million schillings, 23.6 per cent more than in 1955. There was, however, an increase of 15.1 per cent in imports, which were valued at 3,200 million schillings.

Laboratory Chemicals Sought

Forty-two items of laboratory chemicals to an estimated value of B Frs2 million are required in the Belgian Congo. Copies of the specification may be purchased from the Ministry of Colonies, Services des Approvisionnements, 1 rue de la Régence, Brussels, price B Frs50. Tender number is 110/36/722/57 and closing date for tender is 21 August.

Finland's Increased Use of Formalin

An increase in the consumption of formalin in Finland is reported. Capacity of the only company producing formalin, Enso-Gutzeit Oy, is therefore to be trebled from 1,500 tons to 4,500 tons a year. Orders for the necessary plant and equipment are, according to reports, to be placed in Finland.

New US Testing Procedures

Two new testing procedures for the chemical engineering field have been pub-

lished by the American Institute of Chemical Engineers. The newly issued procedures cover the field of absorbers and heat exchangers and are the result of an industry-institute committee working for the past several years to try to determine standard procedures for conducting and interpreting performance tests on condensers and absorbers. The procedures are available price $1 00 each from the Institute at 25 West 45 Street, New York 36.

Polystyrene Plant for New South Wales

It is reported that Colonial Sugar Refining Chemicals Pty., under agreement with Dow Chemical of the US is to build a £A500,000 polystyrene plant in New South Wales. The company has exclusive production rights to a number of polystyrene plastics materials.

Sixty per cent of the shares of the CRS company are owned by the company, the remainder being held by the Distillers Co. Ltd.

New Bacteriostatic Gum

A new polymer 'gum,' now being made by Glyco Products Co. Inc., Empire State Building, New York, is claimed to be unique because it is not subject to bacterial or enzymatic decomposition and prevents other components from decomposing and losing strength and developing bad odours.

The gum is water-white, practically odourless and has a melting range of 59-80°C. It is said to dissolve in cold water, in all proportions to give non-viscous, neutral clear solutions. It is soluble in methyl and ethyl alcohols, ethyl acetate, methylethylketone, chloroform, methylene chloride and hot glycerine. It is insoluble in aromatic and non-polar solvents.

Solutions of this gum, called DMHF, deposit films and coatings that are claimed to be resistant to benzene, ether, carbon tetrachloride, trichloroethylene, gasoline, oils, fats etc. They may be removed by water or alcohol. These protective coatings may be used for lining pipes, drums carrying the above non-solvents.

UK representatives are Rex Campbell and Co. Ltd., 7 Idol Lane, London EC3.

New Ceramic-like Material as Hard as Steel

A new basic material described as essentially a ceramic has been developed by Corning Glass Work, US. It is produced, the company states, by addition of 'nucleating agents' to glass and heat-treating it. No information is available on the agents. The resulting product is said to be a hard crystalline heat-resistant material which, it is claimed, is harder than steel, as light as aluminium and able to withstand temperatures up to 1,300 degrees.

Trade name given to the new material is Pyoceram. It can be mass-produced in any form in which glass is made and in various colours. It is also claimed that Pyroceram can be manufactured by pressing or spinning or by any of the normal glass-making processes, and also cast like metal.

According to Corning Glass Works, Pyroceram can be coated with a metal and used as an electrical conductor, that the expansion co-efficient may be varied, and that it can be produced highly resistant either to acid or alkali. The company, in fact, describe it as the most important development ever made in glass research.

Potential applications for the product are likely to be very varied. Initially, Pyroceram will be used for defence missiles, e.g., to toughen the noses of guided missiles.

'Synthetic Fibres Have Only a Marginal Importance'

Output last year of Snia Viscosa, producers of man-made and synthetic fibres, Milan, totalled a record 251 million lb. of fibres, 16 per cent higher than in 1955. Net profit totalled L 2,026 million (L 2,018 million). Mr. F. Marinotti, chairman, at the annual meeting said the common market proposals favoured the group once it was able to acquire at world prices the raw materials, such as sulphur which the Italian industry was at present forced to buy at double the price paid by its foreign competitors.

He said that synthetic fibres had but a marginal importance, but felt that Rilsan, the only polyamide fibre of vegetable origin, would gain in importance.

Monsanto Sell Rights of All to Lever

Trademark rights and the manufacturing formula for All, the synthetic detergent made by Monsanto Chemical Co. of the US, have been sold to Lever Bros., who have also been granted a marketing franchise. Terms of the arrangement have not been announced.

Monsanto say that they will continue to manufacture the All products, but Lever Bros. have assumed all marketing responsibilities.

Lever Bros. are not now marketing a controlled suds detergent in the US.

Burmese Imports of Textile Chemicals

Chemicals for weaving, dyeing and printing that can now be imported into Burma under Open General Licence L comprise anti-frothing agents, turkey red oil, sodium naphthalene trisulphonic acid, sulphonated sperm/pins/minerals, oil and alcohol, ethylene oxide, vinyl acetate polymer, wetting agents, sodium nitro benzene sulphonate, diethyl tartrate, discharge and resisting agent, solubilising agents, water repellent finishing agents and cationic softening agents.

Devon Palmer's New Plant in Calgary Area

Shell Oil and Devon Palmer Oils have announced that following final 'unitisation' at Okotoks plans will now go ahead for building a sulphur extraction plant. This plant is to have a capacity of 300 tons of sulphur a day with 15 m. cubic feet per day of gas residue for sale in the Calgary area. Devon Palmer will be operating the plant.

NBS Standard Samples

More than 500 different standard samples of chemicals, ores, ceramics and metals are listed in 'Standard Samples and Reference Standards' (circular 552) issued by the US National Bureau of Standards. Summarised tables on anallses indicate the type of standards of composition available. Copies are available from the Superintendent of Documents, Government Printing Office, Washington 26, DC.

UK Chemical Firms Urged to Take Part in New York Fair

BRITISH chemical and allied firms are being urged to take part in the 28th Exposition of Chemical Industries, to be held in the New York Colliseum from 2 to 6 December. The Exhibitions and Fairs Branch, Board of Trade, believe the exhibition would give an 'outstanding opportunity to reach American industry provided that it was tackled in the right way'.

Little business appears to be done at the exposition, but it seems most likely that business comes later if a particular item is reported on favourably. It is stated that there would be little point in displaying a line that was not of outstanding merit; main exhibits should also be new to the US market. If a line is new, working demonstrations should be given, if possible, and a technical expert should be in attendance.

At the last exposition in December 1955, 500 exhibitors occupied about six acres of floor space. There were more than 35,000 visitors. Apart from one Canadian firm, there were no foreign exhibitors.

Purpose of the exposition is to acquaint chemists, engineers and industrial managements with the latest developments in chemical substances, products of chemical processing and processing equipment, laboratory instruments and equipment.

At the 1955 show, there were 262 categories of exhibits, ranging from abrasives to X-ray equipment and including air conditioning equipment and flooring materials. In effect, it covered the production of chemicals, the entire range of chemical processing and the use of chemicals in many manufacturing industries, including foodstuffs, petroleum products, textiles, plastics and pharmaceuticals.

UK firms interested can obtain further details from the International Exposition Co., 480 Lexington Avenue, New York, 17, US.

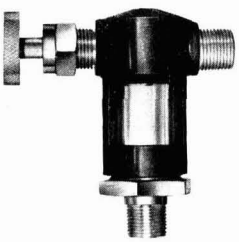
EQUIPMENT REVIEW

Chemical Plant : Laboratory Apparatus Safety and Anti-Corrosion Products

ADJUSTABLE SIGHT FEED INDICATOR

A NEW model LM15 sight feed indicator, available from Liquid Systems Ltd., Union Road, Croydon, provides flexibility of liquid flow and permits control of the amount of liquid being used. Of the double-window type, with drilled outlet nozzle, the size of the liquid stream can be observed from either side.

Fine control of the amount discharged is made possible by a porthole type of



Sight feed indicator

regulator and the fine thread of the needle valve. The indicator is designed for rigid pipe or flexible hose connection on the inlet and with a range of outlet adaptors.

With an all gun-metal body and toughened sight glass, the body is finished crinkle-black with chromium-plated adaptors and screws. Height of the body is 2½ in. and diameter of the body cylinder is 1¼ in.

DISSOLVED OXYGEN RECORDER

THE NEW dissolved gas-phase transfer type dissolved oxygen recorder produced by Cambridge Instrument Co. Ltd., 13 Grosvenor Place, London SW1, employs a unique electro-chemical method of detection. It is capable of measuring concentrations of less than 0.01 p.p.m. Because chemical tests which are affected by many substances present in trace quantities are particularly difficult to apply satisfactorily, the most important requirement of the recorder is an accurate zero of high stability. Simple provision is made in the instrument for checking this without recourse to chemical or other external tests.

Because of the increased use of chemicals for the removal of residual oxygen from boiler feed water, the readings of the recorder are specific for oxygen and unaffected by any other substance likely to be present.

The equipment consists of an analyser unit, electronic recorder, control panel, mains unit, flow regulator and water cooler.

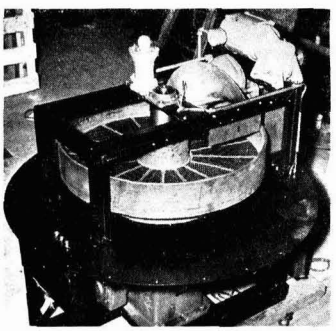
HORIZONTAL ROTARY FILTER

FEINC horizontal rotary vacuum filters are now being made by Stockdale Engineering Ltd., chemical engineers, Poynton, Cheshire, under licence from Filtration Engineers Inc., Newark, New Jersey, US. The filters are produced in a standard range of sizes from 3 ft. to 12 ft. diameter, with special sizes to specification.

Models up to 8 ft. are fitted with a centrally mounted variable speed drive which is installed in the base of the frame and eliminates the need for separate foundations. The larger models use a conventional spur gear with roller chain drive, which has a ball type main bearing with a replaceable hardened race.

The filter is said to have a high dewatering capacity, large cake capacity and a good cake washing that makes it suitable for continuous filtration of free-settling or free-filtering materials such as coarse crystalline substances and fibrous pulps.

All filtering and washing operations are visible and readily controlled. Hourly



FEinc horizontal rotary filter

output per sq. ft. surface is said to be high and cake thicknesses up to 4 in., or more in special cases, can be handled.

PRESSURISED FIRE EXTINGUISHERS

A NEW pressurised fire extinguisher of the vaporising liquid type has been developed by the Pyrene Co. Ltd., 9 Grosvenor Gardens, London SW1. Outstanding feature is a special squeeze-grip release valve that facilitates one hand operation, enables the extinguisher to be used to the maximum advantage, and provides what is claimed to be perfect on-off control of the discharge of fire-fighting liquid.

Other features of the new extinguisher are a special locking device which gives added security against accidental discharge and vibration, and a small pressure gauge which allows the pressure within the container to be checked instantly at any time. This gauge also simplifies the process of recharging.

The extinguisher is supplied charged with one quart of either Pyrene fire extinguisher liquid or chlorobromomethane (CB). Both these liquids form a heavy, dry, cohering blanket of fire-smothering vapour immediately they reach a temperature of 200°F or more. These liquids are non-damaging to materials or mechanism and do not readily deteriorate or freeze. Both are said to be effective against all fire outbreaks involving motor vehicles, and small petrol, paraffin or alcohol fires. They may also be used against outbreaks involving electrical apparatus.

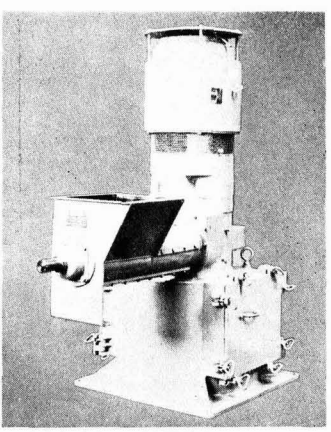
NEW SIZE REDUCTION EQUIPMENT

A NEW RANGE of size reduction equipment now being made by George Scott and Son (London) Ltd., Durie Foundry, Leven, Fife, is said to effect savings in time, equipment and man-hours. It is claimed that the Scott-Re Rietz will handle wet or moist materials and that drying operations can be eliminated. This machine can also be used for crushing, grinding, pulverising, pulping, shredding, triturating and de-fibreising.

An alloy or stainless steel rotor is surrounded by a perforated screen and the material is introduced at the top of the shaft above the rotor. Centrifugal force throws the material out against the screen and the material is shattered by a combination of attrition, chiefly, and hammers that rotate in the horizontal plane.

The primary product passes through the screen and out through the main discharge. The secondary product remains inside the screen and is discharged through another outlet.

A Scott-Rietz prebreaker is available for preliminary size reduction of larger pieces of material. It can be fitted as an integral part of the machine or can be operated as a separate unit.



Vertical disintegrator fitted with integral pre-breaker feeder

Quickfit & Quartz counter current liquid/liquid extractor

LIQUID/LIQUID EXTRACTION MACHINE

TO OVERCOME some of the limitations in separating dilute solutions of complex materials by partition chromatography, a multi-stage liquid/liquid extractor has been developed in the US. It is made in this country by Quickfit and Quartz Ltd., Stone, Staffs, in either automatic or semi-automatic types carrying up to 200 tubes of 25 ml. phase capacity.

The materials to be separated divide between two immiscible solvents and the extractor is said to give larger amounts of product in a form from which they can be analysed directly by standard methods. Apart from its application to general analytical problems, the method is of particular use in the fields of natural products, antibiotics and pharmaceuticals.

Each tube is interchangeable, facilitating dimantling and cleaning of the glassware. A stopper enables sampling of both phases to be carried out in every tube. If necessary, the tubes can be closed with a plastics cap and/or cotton wool.

The chassis comprises duralumin rod and stove-enamelled castings. Tubes are attached by special spring clips. An automatic pick-up provides continuous feeding of the light phase, which can be recycled through the entire bank of tubes as many times as necessary.

In the semi-automatic types, 'agitation' and 'settling' are performed mechanically, controlled by electric time switches. The successive 'decant' and 'transfer' movements, both of short duration, are performed manually. In the fully-automatic models, all four operations are mechanised and follow each other continuously. Both models can be used with an automatic fraction collector.

Sizes available are 50, 100, 150 and 200 tubes in both the automatic and semi-automatic drive.

HIGH DENSITY POLYTHENE CONTAINERS

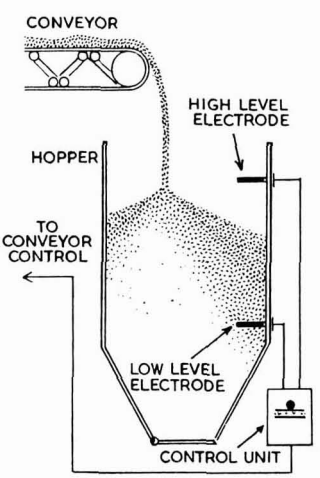
A VAPOUR pressure type thermometer in plastics, is now being marketed by Tool Treatments (Chemicals) Ltd., Colliery Road, Birmingham Road, West Bromwich, for use where steam, acids or other corrosive acids are likely to shorten the efficiency life of a thermometer. The new model has a 4 in. easy-to-read dial housed in a Bakelite case with screw-on-front. The p.v.c.-coated 6 ft. capillary and bulb makes the product robust. The thermometer, which can be wall mounted, has a range from 30° to 150°F and sells at £6 13s ex-works.

This firm is also introducing a new 5-gal. stacking bin in polythene, with an inside diameter of 13 in. and depth of 14 in. It is suitable for the handling of certain corrosive substances. Price is 29s 3d, with lid 7s 9d. extra. Other new products are: a high density rigid polythene stacking bin with a capacity of 10 gal. Inside diameter is 15 in. and depth 17 in. Price is 48s 9d. A 2½ gal. bucket in the same material is priced at 21s 8d.

The firm states that this is the first time that products of this type have been produced in rigid high density polythene. It is claimed they can be sterilised in boiling water as the softening point of rigid polythene is 116°C with a melting point of 130°C and a low temperature brittle point of −70°C.

LEVEL CONTROLS FOR SOLIDS

MAKERS OF electronic level control equipment for conductive liquids such as water, acids etc., Elcontrol Ltd., 10 Wyndham Place, London W1, are now producing a range of level controls for use with free-flowing solids and non-conductive liquids. The new range of controls is said to provide automatic and instantaneous signalling or switching at predetermined high and low levels wherever any reasonably free-flowing solids or powders are being handled.



Schematic diagram showing control of conveyor in relation to level in hopper

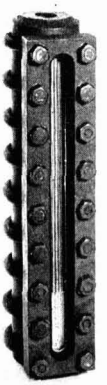
Among substances that may be controlled in this way are chemical products, ores, fertilisers, bulk pharmaceuticals, industrial oils, pulverised fuel, flue ash, etc. They can be used for controlling the filling or emptying of bulk containers, hoppers, silos; for monitoring the level of materials in conveyors and chutes; and for controlling quantitative mixing by monitoring the feed hoppers.

Each complete proximity switch basically consists of a control unit embodying a circuit operating a relay, together with an electrode of either rod or plate type that is inserted into the vessel at the desired control level.

Three standard types of Elcontrol switches are available: CR2, to provide operations at a single level, having a lead length of not more than 6 ft. between unit and electrode; CR3, available with either plate or probe type electrodes for heavy or light duty, operates at a single level, and its cable run may be up to 100 ft. (this model is more sensitive than CR2); CR4, a double level control, otherwise similar to CR3.

LARGE CHAMBER LEVEL GAUGES BY KLINGER

TO OVERCOME the difficulty of obtaining an accurate reading with a normal type level gauge of the surface level of a liquid such as butane which boils at atmospheric temperature, Richard Klinger Ltd., Klingerit Works, Sidcup, Kent, have developed the Klinger 'O' type large chamber level gauge. This provides a greatly increased surface area for the liquid behind the sight glass. Should boiling and ebullition occur, the contrast between the liquid and the vapour space shown by the reflex glass is clearly visible without any surging. The gauge is also suitable for use with thick viscous fluids.



O-type large chamber level gauge by Richard Klinger Ltd.

The gauge body is machined from a 3 in. o.d. by 2 in. bore heavy gauge seamless steel tube with welded end plates that can be tapped for any required pipe connections. The borosilicate reflex glasses are clamped in position by forged steel cover plates and specially shaped U-bolts. The gauges are said to be capable of withstanding a hydraulic test pressure of 1,800 p.s.i. and have a pressure rating of 600 lb., i.e. 820 p.s.i. at the

maximum temperature of 660°F, or 1,200 p.s.i. at 100°F.

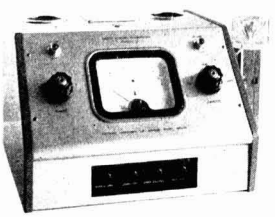
A non-frosting extension of Perspex is fixed to the front of the glass for fluids which have temperatures below the freezing point of water.

Double-plate or Thru-vision level gauges, type 'OT' can be supplied with a large chambered centre-piece of similar dimensions. These gauges are fitted with large flat plate glasses and cover plates on opposite sides of the 3 in. diameter centre column and provide clear vision right through the gauge.

DIRECT READING EIL FLUORIMETER

LATEST addition to the electro-chemical range of EIL instruments is the model 27 direct reading fluorimeter. Developed by Electronic Instruments Ltd., Lower Mortlake Road, Richmond, Surrey, in conjunction with Boots Pure Drug Co. Ltd., it has a discrimination of two parts in 10^{10}.

This new instrument first measures the fluorescence of the standard by photo-



Model 27 direct reading fluorimeter

electric means and then that of the sample. Measurement of the fluorescence is displayed as a direct reading on a meter, eliminating the operator's individual judgement. Once the simple standardising procedure has been completed, several samples can be checked each minute, since they can be run-through without removing the cuvette each time.

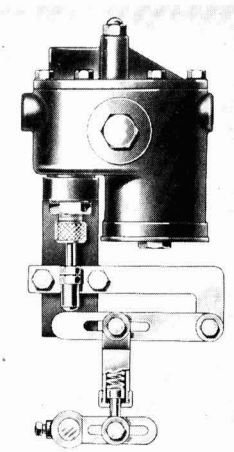
As fluorescence of the sample is shown as a meter reading, the effects of decay, which occurs in a number of fluorescent materials on exposure to ultra-violet light, can easily be followed as a changing meter reading.

Most extensive use of fluorimetry at present is in the determination of the vitamins B_1 (aneurin) and B_2 (riboflavin). It is also used in the analysis of aureomycin, quinine, acriflavine, adrenalin, aluminium and boron. Many other substances are suitable for this method of analysis.

FISHER BALL FLOAT PILOT VALVE

THE NEW Fisher ball float pilot type 779K is designed for use with ball float type liquid level controllers. Made by Fisher Governor Co. Ltd., Airport Works, Maidstone Road, Rochester, Kent, it is also said to be suitable for operating in conjunction with any measuring device capable of displacing a pusher rod.

It can operate on compressed air, non-corrosive gas or clean water at any pres-



Exterior view of type 779K pilot with linkage mechanism

sure between 20 and 75 p.s.i. No auxiliary regulating device is needed to reduce the operating medium to the right pressure, as the pilot acts as a reducing valve. The pilot is used for the remote control of a diaphragm motor valve which controls the flow to or from the vessel.

Among advantages claimed are the following: the pilot always delivers a given pressure to the diaphragm for a given level position; intermittent bleed needs only a minimum volume of operating medium; it is easily changed from direct acting to reverse acting; liquid level may be raised or lowered by adjusting the pilot valve stem.

THREE NEW HYDROVANE COMPRESSORS

A RANGE OF hydrovane compressors up to 600 c.f.m. has been developed by Whittaker Hall and Co. Ltd., Radcliffe, Manchester, in collaboration with Alfred Bullows and Sons Ltd. They comprise 600 c.f.m. hydrovane No. 18022, designed primarily as a stationary unit direct-coupled to a flanged motor; a 210 c.f.m., No. 17970, with self-contained radiator and fan; and a 65 c.f.m., No. 17297, mounted on an air receiver.

These models are air cooled and self-contained and, being flange connected to the motors, do not need further alignment after mounting. The larger compressors comprise two stages of compression, each with its own pressure lubrication and cooling system acting also as the sealing medium. There are no circulating pumps or valves and being designed as a complete unit, they are free from external pipework or accessories.

ELECTROLYTIC POLISHER FOR METALLOGRAPHY

FOR THE preparation of metallographic specimens prior to etching and examination under the microscope, Nash and Thompson Ltd., Oakcroft Road, Chessington, Surrey, have introduced an electrolytic polisher. Based on work carried out mainly by Jacquet and Rocquet, it consists essentially of the electrolytic removal of the surface structure of the metal specimen. Electrolytes suitable for most of the common metals and their alloys have been developed.

The instrument consists of a control cabinet and a free standing magnetic stirrer assembly. Either one or two magnetic stirrers can be connected to the front of the cabinet and the speed of stirring is regulated by a control knob. Each stirrer will take a standard 1,000 ml. beaker, one containing the electrolyte and the other water for washing the specimen immediately after polishing.

BORE MEASURING EQUIPMENT

A NEW multi-bore set, introduced to enable accurate control of bore sizes, is now being manufactured by British Indicators Ltd., Sutton Road, St. Albans, Herts. The set comprises a gauging head, with three interchangeable stem members, each complete with measuring shoe.

The use of this set is said to enable bore diameters between $\frac{1}{2}$ in. and 2 in. to be accurately measured. Interchanging of the stems is a simple matter. The instrument, based on the unit construction method employed by the company on its complete range of bore gauges, has been designed to provide a relatively cheap form of mechanical bore measuring equipment.

HYDRAULIC INDUSTRIAL LOADER

A NEW SMALL loading shovel for bulk handling in limited spaces, the Weatherill hydraulic 'S' type industrial loader, has been introduced by F. E. Weatherill Ltd., Tewin Road, Welwyn Garden City, Herts. This minature loading shovel, designed for use in small spaces, has a width of 4 ft. 6 in. (137 cm) with a wheel base of 4 ft. 9 in. (145 cm).

It can be operated under a ceiling of 6 ft. 3 in. (190 cm) and has the advantage of a good forward reach, with a discharge height that enables it to load tippers and other trucks. Lifting capacity is 10 cwt. A range of scoops is available to handle a wide variety of materials including salt, phosphate and other fertilisers, china clay, coal and coke, oxide, glass, pitch, sugar etc.

An offset seating arrangement is provided and with the single boom arrangement avoids the necessity of seating the driver between moving parts. The loader, fitted with a 3-cylinder diesel engine, is now in quantity production.

Weatherill small industrial loader

UK Chemical Exports & Imports in April

EXPORTS

		QUANTITY		VALUE	
		April 1956	April 1957	April 1956	April 1957
INORGANIC					
Acids	Cwt.	15,765	16,916	51,525	59,561
Copper sulphate	Tons	7,007	3,861	807,488	338,144
Sodium hydroxide	Cwt.	370,974	537,617	524,026	608,146
Sodium carbonate	,,	356,973	401,213	219,399	279,394
Aluminium oxide	Tons	1,483	884	46,602	39,208
Aluminium sulphate	,,	2,933	2,492	41,883	35,823
Other aluminium cpds.	,,	287	250	8,795	12,730
Ammonia	Cwt.	7,965	6,410	30,638	23,178
Ammonium cpds. (not fertilisers or bromide)	Tons	1,533	1,879	61,045	72,534
Arsenical compounds	,,	460	263	33,948	19,564
Bismuth compounds	Lb.	19,143	24,798	16,965	21,538
Bleaching powder	Cwt.	30,420	14,114	49,417	23,562
Hydrosulphite	,,	5,066	9,969	39,068	77,783
Other bleaching materials	,,	8,352	8,668	35,404	44,216
Calcium compounds	,,	34,147	22,839	71,495	45,929
Carbon blacks	,,	26,819	54,494	97,812	195,768
Cobalt compounds	,,	1,150	1,314	54,198	48,103
Iron oxides (chemically manufactured)	,,	7,579	10,244	26,293	32,215
Lead compounds	,,	4,314	3,914	30,756	27,164
Magnesium cpds. (nes)	Tons	1,424	761	63,634	52,404
Nickel salts	Cwt.	6,335	8,363	59,173	94,293
Potassium cpds. (not fertilisers or bromides)	,,	7,124	4,333	56,132	42,551
Sodium bicarbonate	,,	54,964	71,571	51,263	63,368
Sodium phosphates	,,	4,812	7,440	25,588	36,661
Sodium silicate	,,	38,376	27,527	33,456	27,759
Other sodium cpds.	,,	135,603	148,654	337,009	362,844
Tin oxide	,,	538	721	21,130	26,712
Zinc Oxide	Tons	400	333	32,834	30,834
Other inorganics (nes)		—	—	381,655	411,627
ORGANIC					
Other than radioactive—					
Acids, anhydrides, salts & esters		—	—	125,909	128,338
Glycerine	Cwt.	6,011	3,293	65,921	33,065
Ethyl methyl, etc., alcohols and mixtures (nes)		—	—	114,121	93,911
Acetone	Cwt.	13,446	19,086	34,766	59,494
Citric acid	,,	2,565	3,101	24,845	30,306
Gases, compressed, liquid or solid (nes)		—	—	92,498	186,870
Phenol	Cwt.	8,277	8,148	50,442	52,263
Salicylates	Lb.	89,457	109,426	21,173	25,813
Sodium compounds	Cwt.	2,362	2,565	23,527	32,545
Sulphonamides, not prepared	Lb.	143,181	77,136	65,139	57,740
Dyestuffs intermediates	Cwt.	5,325	8,268	93,556	114,820
Organic compounds (nes)		—	—	972,920	1,353,224
Total elements & cpds.		—	—	**4,992,857**	**5,322,002**
Coal tar	Tons	19,101	8,818	155,394	96,282
Cresylic acid	Gall.	195,619	267,134	71,036	95,584
Benzol	,,	335,945	1,857	63,091	857
Creosote oil	,,	2,016,165	1,962,519	137,172	128,458
Other mineral & crude chems. from coal, petroleum & nat. gas	Cwt.	20,560	22,929	57,650	47,332
Pigment dyestuffs	,,	2,072	3,005	86,015	113,590
Other syn. dyestuffs & cpds.	,,	16,418	17,385	749,537	833,227
Synthetic org. pigments	Cwt.	2,136	1,911	65,409	79,732
Veg. & animal dyeing extracts	,,	358	419	12,650	7,034
Tanning extracts	,,	10.837	11,929	49,248	52,844
Pigments, paints & varnishes		—	—	1,816,434	2,029,284
Drugs, medicines, etc.		—	—	2,637,253	3,161,339
FERTILISERS & OTHERS					
Ammonium nitrate	Tons	282	11	9,362	309
Ammonium sulphate	,,	853	2,076	16,706	38,416
Phosphatic and potassic	,,	—	—	2,481	16,341
Other manufactured fertilisers		—	—	16,954	21,599
Explosives	,,	—	—	1,287,372	836,939
Insecticides, fungicides & rodenticides	Cwt.	22,823	25,357	298,404	360,030
Weedkillers	,,	12,424	19,306	112,133	149,521
Carbons, decolorising or activated	,,	9,866	7,705	36,267	32,117
Tetra-ethyl lead anti-knock compound	Gall.	390,587	469,962	825,142	1,020,936
Other chemicals (nes)		—	—	1,281,062	1,364,216
PLASTICS MATERIALS					
Phenol & cresol formaldehyde resins	Cwt.	4,755	6,411	39,955	43,916
Urea formaldehyde resins	,,	23,096	18,434	120,014	97,266
Vinyl resins, unplasticised	,,	15,362	21,018	152,339	191,186
Vinyl resins, plasticised	,,	8,199	10,733	108,082	144,717
Other vinyl resins	,,	13,573	17,940	163,989	213,257
Moulding powders	,,	23,357	38,187	369,675	552,499
Sheet, rod, tube, film & foil	,,	150,912	183,886	2,056,173	2,385,352

IMPORTS

		QUANTITY		VALUE	
		April 1956	April 1957	April 1956	April 1957
INORGANIC					
Acids	Cwt.	5,101	4,916	15,282	15,098
Abrasives, artificial—					
Aluminium oxide	Tons	2,676	2,484	152,064	146,780
Silicon carbide	,,	1,455	1,054	149,844	93,969
Arsenic trioxide	,,	249	420	9,645	12,309
Borax, refined	Cwt.	35,555	30,701	66,807	60,188
Calcium carbide	,,	89,026	61,997	162,793	109,521
Carbon black (channel)	,,	16,288	13,645	89,194	82,710
Other carbon blacks (not acetylene black)	,,	7,318	4,274	28,654	16,005
Cobalt oxides	,,	1,396	1,000	87,305	62,546
Iodine	Lb.	4,409	36,817	2,167	14,210
Mercury	,,	182,289	129,510	203,418	143,121
Sodium, calcium, potassium, lithium	Cwt.	8,315	3,592	78,367	28,339
Potassium carbonate	,,	9,230	10,943	29,777	36,416
Other potassium cpds. (not fertilisers)	,,	6,834	8,723	35,923	42,208
Selenium	Lb.	10,190	18,686	64,423	89,939
Silicon	Tons	441	549	67,968	86,168
Sodium chlorate	Cwt.	11,800	8,971	35,315	29,703
Sodium phosphate	,,	11,320	202	52,202	2,807
Other sodium cpds.	,,	38,576	28,015	156,557	102,634
Inorganic chemicals (nes)		—	—	236,210	317,644
ORGANIC					
Acids, anhydrides & their salts & esters		—	—	98,442	96,516
Glycerine	Cwt.	4,232	16,303	31,954	101,483
Menthol	Lb.	5,771	13,008	11,479	25,726
Naphtha, methyl alcohol & alcohol mixtures		—	—	131,598	266,101
Turpentine	Gall.	25,528	19,388	5,952	5,718
Glycol ethers & esters	Lb.	845,472	620,622	69,397	55,777
Sodium cpds.	Cwt.	7,049	10,496	81,085	132,102
Styrene (monomeric)	Gall.	191,921	12,517	100,513	6,441
Vinyl acetate (monomeric)	Tons	719	277	104,454	31,723
Dyestuffs intermediates	Cwt.	726	2,267	45,751	68,795
Organic cpds. (nes)		—	—	1,152,765	861,000
Syn. dyestuffs & cpds.	Cwt.	2,655	2,097	221,723	196,168
Dyeing extracts	,,	1,524	733	10,641	4,331
Tanning extracts	,,	80,225	77,970	303,322	256,047
Pigments, paints, etc.		—	—	141,758	165,425
Vitamins, their salts & esters	,,	—	—	137,792	75,716
Antibiotics		—	—	19,066	115,181
Alkaloids	,,	—	—	114,215	64,176
FERTILISERS & OTHERS					
Basic slag	Tons	3,875	5,561	30,322	44,260
Potassium chloride	Cwt.	1,029,388	653,585	823,845	551,992
Potassium sulphate	,,	10,840	7,424	11,154	7,910
Other fertilisers		—	—	611,680	142,767
Explosives	Cwt.	1,739	14	36,726	665
PLASTICS MATERIALS					
Vinyl resins	Cwt.	14,128	11,074	205,521	141,024
Other syn. resins	,,	11,146	25,647	169,571	350,915
Moulding powders	,,	2,391	3,629	43,828	57,416
Sheet, rod, tube, film & foil	,,	37,975	51,688	907,226	1,003,388

EXPORTS OF CHEMICALS TO PRINCIPAL MARKETS

	Jan./Apr. 1955	Jan./Apr. 1956	Jan./Apr. 1957
Nigeria	1,651,539	1,904,400	1,629,987
Union of South Africa	4,233,320	4,400,478	4,177,578
Rhodesia and Nyasaland	739,645	714,327	932,591
India	5,503,022	1,404,548	7,050,890
Pakistan	1,177,227	1,116,798	1,083,231
Singapore	1,296,246	1,451,177	1,511,250
Malaya	1,109,960	1,203,916	1,379,739
Hong Kong	1,203,792	1,093,638	1,515,006
Australia	6,613,603	6,061,397	6,510,152
New Zealand	2,642,808	2,198,793	2,315,789
Jamaica	756,328	910,275	840,950
Irish Republic	2,261,020	2,277,805	2,008,222
Finland	1,045,590	1,030,263	851,745
Sweden	2,078,862	2,097,640	2,556,911
Norway	1,267,600	1,229,405	1,414,250
Denmark	1,317,032	1,436,503	1,681,123
Poland	255,854	142,630	288,869
Western Germany	1,706,568	1,962,224	2,732,528
Netherlands	2,456,998	2,794,862	3,229,819
Belgium	1,773,573	1,746,284	2,269,637
France	2,630,362	2,117,680	3,494,167
Switzerland	948,725	1,093,697	1,161,243
Portugal	633,580	768,870	1,013,591
Italy	1,844,762	2,725,757	3,292,965
Turkey	418,371	768,574	380,981
Netherlands Antilles	1,271,269	842,353	1,061,117
Egypt	1,222,803	1,533,615	5,752
Iraq	755,458	887,743	1,067,856
Indonesia	906,244	1,020,316	1,140,100
China	894,741	165,790	595,036
Japan	382,025	572,074	752,410
United States of America	2,620,511	2,886,495	2,610,306
Argentine Republic	2,357,364	885,652	1,523,841
Other foreign countries	812,927	1,087,466	1,367,287

People in the NEWS

● MR. H. U. CUNNINGHAM, C.B.E., M.C., managing director, Scottish Agricultural Industries Ltd., will retire from the company on 30 September. MR. E. P. HUDSON, M.A., F.R.S.E., joint assistant managing director, has been appointed to succeed Mr. Cunningham on 1 October.

Mr. Cunningham, in 1919, joined J. and J. Cunningham Ltd., Edinburgh, one of the original five companies which merged to form Scottish Agricultural Industries Ltd., in 1928. He was appointed a director of SAI in 1929 and became managing director in 1947. Throughout the last war he was Fertiliser Controller with the Ministry of Supply and was awarded a C.B.E. in 1948.

Mr. Hudson, who won an Open (Major) Scholarship to King's College, Cambridge, in 1922, held the Harold Fry Research Studentship at King's College in 1925 and from 1925-1929 was a research worker at the Cavendish Laboratory of Experimental Physics, Cambridge. He

E. P. Hudson will succeed H. V. Cunningham as SAI managing director on 1 October

joined the technical staff of ICI Ltd. at Billingham in 1929, was appointed a director of SAI in 1934 and joint assistant managing director in 1947. A past-president of the Fertiliser Manufacturers' Association, and past-chairman of the Association of Chemical and Allied Employers, he is a member of the Standing Advisory Committee under the Fertiliser and Feeding Stuffs Act. Mr. Hudson is also a director of the Outward Bound Moray Sea School, Burghead.

● Nobel division of Imperial Chemical Industries is to establish a technical department, responsible to the development director DR. W. A. CALDWELL, on 15 June. Manager of the new department will be DR. A. G. SHORT, graduate of St. Andrews University who joined Nobel division in August 1939. MR. JOHN DE NORMANN has been appointed manager of the development department. Mr. Normann is at present on the staff of ICI (New York) Ltd.

● MR. ALLAN WHITEHEAD, chief chemist of the British Cotton and Wool Dyers' Association, is retiring from the board after 43 years' service with the company.

● MR. A. FRASER MCINTOSH (Thomas Harley Ltd.) has been elected president of the Industrial Pest Control Association for 1957/58. Other officers elected are vice-president, D. J. S. HARTT (May and Baker Ltd.); honorary treasurer, C. A. E. STUART-KREGOR (W. Edmonds and Co. Ltd.); honorary auditors, G. ARNOT (Shell Chemical Co. Ltd.) and S. EGLETON (Verminex Ltd.); executive committee, DR. E. R. GOODLIFFE (Ratsouris Ltd.); S. FARROW, London Fumigation Co. Ltd.), S. W. HEDGCOCK (Disinfestation Ltd.); I. A. MACKAY (ICI Ltd.); G. L. WINDRED (Plant Protection Ltd.); K. F. GOODWIN-BAILEY (ex-officio) (Cooper McDougall and Robertson Ltd. MR. W. A. WILLIAMS is secretary.

● MR. T. A. DRYDEN of T. Dryden Ltd., Landore, Swansea, has been elected chairman of the British Laboratory Ware Association for the coming year.

● DR. W. G. REID, works manager, ICI Grangemouth, has been promoted production director of ICI's pharmaceuticals division. The new works manager will be MR. GERALD R. UNDERWOOD who has been assistant works manager at Grangemouth since March 1955.

H. Bruce Williams, who as stated in CA, 18 May, p. 850, has been appointed manager of the Manchester technical sales office of Chemstrand Ltd.

● MR. W. F. KEMP, purchasing director of Kaylene (Chemicals) Ltd., manufacturers of pharmaceuticals and fine chemicals, London NW2, has been elected president of the Willesden East Rotary Club of Rotary International.

● MR. N. L. GOODCHILD has been appointed a director of British Benzol and Coal Distillation.

● MR. PHILIP BACHE, managing director of Geo. Salter and Co. Ltd., West Bromwich, spring and spring balance makers has been elected president of Birmingham Chamber of Commerce for 1957-58.

● At the first annual meeting of the Association of Printing Technologists held on 16 May the following council was elected: chairman, DR. G. L. RIDDELL, chairman - designate, DR. V. G. W. HARRISON; honorary secretary, G. C. WENSLEY, 21 Purcell Road, Greenford, Middlesex; honorary treasurer, A. KIRK; and G. S. ALLEN, R. F. BOWLES, H. M. CARTWRIGHT, D. R. CRESHAM, R. F. G. HOLNESS, J. B. HOLROYD, J. JARROLD, F. W. MACKENZIE.

● MR. GORDON RICHARDSON has been appointed a director of Head Wrightson and Co. Ltd., 20 Buckingham Gate, London SW1.

● DR. J. A. CLEGG and DR. HENRY ELLIOTT, senior lecturers in physics at the Imperial College of Science and Technology have been appointed to University readerships in physics, tenable at the college. DR. ROBERT LATHAM, senior physics lecturer, has been appointed to the University readership in high temperature physics, also tenable at the college.

Henry A. Arnold, who as stated last week, is president of the new Olin Mathieson International Corporation.

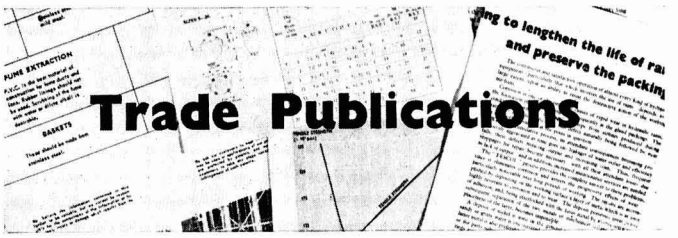
● MR. G. K. HAMPSHIRE, chairman of general chemicals division of Imperial Chemical Industries recently presented a new jewel for the Runcorn Council chairman's chain of office. Mr. Hampshire said that as the original chain was presented by Sir John Brunner (of Brunner Mond and Co.) 60 years ago, it was fitting that one of his successors should present the jewel.

● MAJOR W. R. BROWN, D.S.O., has been appointed chairman and managing director of the Power-Gas Corporation, Stockton-on-Tees, group of companies. He succeeds the late DR. N. E. RAMBUSH, whose death on 15 May was recorded in CHEMICAL AGE, last week, page 892. Major Brown is well known in the iron and steel industry for his work in connection with the design and construction of modern blast furnaces. He has been associated with the company for 30 years and joined the board in 1942, becoming vice-chairman last year.

Major Brown

Corrosive Chemicals Pump

In our review of the new pump developed by Crane Packing Ltd., Slough (CHEMICAL AGE, 18 May, p. 846), it was stated that as a metering unit, an accuracy of – 2 per cent had been consistently maintained in test runs. This should, of course, have read ±2 per cent.



Crosfield Chemicals

Heavy chemicals manufactured by Joseph Crosfield and Sons Ltd., Warrington, which since Persil was introduced in 1907 have been based largely on other uses of silicate, are the subject of 'Crosfield and Chemicals' an attractive booklet produced by the chemical sales department. Information covers uses, packages, technical data and advice on handling.

Visible Spectrophotometer and Vitamin A

Application of the visible spectrophotometer to the Carr-Price test for the estimation of Vitamin A is the subject of an article in *Spectrovision*, Spring 1957, published by Unicam Instruments Ltd., Cambridge.

Silicones for Mould Release

The use of ICI silicone mould release agents is described and illustrated in 'ICI Silicones for Mould Release' published by the Nobel Division, ICI Ltd., 25 Bothwell Street, Glasgow C2. These agents are said to have remarkable anti-sticking properties, giving excellent results in a variety of moulding processes, including metal casting, in the plastics industry and for rubber and glass release. Agents are available in the form of silicone oils, emulsions, resins and rubbers.

Commander Instruments

Publication 159/557 issued by George Kent Ltd., Luton, details new features of the pneumatic control array which will shortly be available throughout their Commander instrument range. The improvements cover the controlling unit, reducing valve, air relay and a new auto-manual-test-service panel.

Mono Oxygen Recorder

The Mono oxygen recorder developed by James Gordon and Co. Ltd., Dalston Gardens, Stanmore, Middlesex, on the same principles as their other Mono gas analysis recorders, is the subject of a new leaflet, No. 161.

E-Mil—Vogel Small Scale Apparatus

A catalogue of small scale apparatus, as described in 'Elementary practical organic chemistry, Part 1. Small scale preparations' by Arthur I. Vogel, head of the chemistry department, Woolwich Polytechnic, London SE18, has been published by H. J. Elliott Ltd., E-Mil Works, Treforest Industrial Estate, Pontypridd, Glam. The apparatus has been designed so that a student trained with their aid will be able to adapt himself to preparations on a macro scale. Most of the small scale apparatus is to a large extent a reproduction of macro apparatus. The modifications include the use of pear-shape vessels for small volumes, and the combination of two pieces of apparatus into one, for example, a distilling or Claisen flask and condenser, or a flask with a fractionating column.

Price List of Photographic Chemicals

Latest price list of photographic chemicals manufactured by May and Baker Ltd., Dagenham, Essex, is now available. All chemicals are now packed and priced in metric units and, to assist customers who may find it difficult to accustom themselves to ordering in these new packings, the list contains a table of equivalent weights and measures, metric and Imperial, and the price per kilogramme and the equivalent price per lb.

Propeller Fans

Two new publications from Woods of Colchester Ltd., Braiswick Works, Colchester, are 'Mark 1 Propeller Fans' (V1220) and 'Ancillary Equipment for Propeller Fans' (V3644).

Chemicals for Industry

Robinson Brothers Ltd., Ryders Green, West Bromwich, have published a revised edition of 'Chemicals for Industry.' The range of their chemicals, most of them in regular production, are covered and details include formulæ, specifications, flash points, storage stability, uses and recommendations on packages.

Viscous Material Handling

A brochure dealing with drum heaters for viscous material handling has been issued by Stabilag Co. Ltd., Mark Road, Hemel Hempstead. The Stabilag drum heater is produced in two sizes to fit a standard 15 or 45 gallon drum. When the drum is placed inside the heater, thermostatically controlled heat is applied, and after the necessary period of time has elapsed, the contents can, it is claimed, be removed without trouble. According to the brochure, a further heating of the drum will dry it and make it ready for re-use.

Silicone Publications

Midland Silicones Ltd., 19 Upper Brook Street, London W1 have issued an Index to Silicone Publications list of silicone notes published by the company, and of other publications of interest. It replaces the previous list issued in August 1955. The list covers general publications, electrical insulation, Dri-Sil silicone water-repellent products, Releasil silicone release agents, greases and compounds, fluids, organosilicon chemicals, Silastomer silicone rubber products, and resins, paints and other resinous products.

Dial Gauge Catalogue

Latest dial gauge catalogue published by Thomas Mercer Ltd., Eywood Road, St. Albans, illustrates new products introduced by the company in the past few weeks. Dial measuring equipment with readings varying from 0.01 in. to 0.00001 in. and from 0.1 mm. to 0.0005 mm. is produced by the company for the inspection of internal and external diameters, parallelism, ovality, depth, height and length.

New BDH Entries

New entries for the BDH catalogue issued by British Drug Houses Ltd., Laboratory chemicals group, Poole, cover aceto-acet-*o*-toluidide, an intermediate supplied as a pale pink crystalline powder, melting at 105-107°C; carbon tetrachloride for spectroscopy; fluoroacetamide; and sodium fluoroacetate.

Accelerators for Rubber

Details of the properties, use and application of the Monsanto range of accelerators for rubber are given in technical service bulletin No. 9A/1, Accelerators for Rubber, issued recently by Monsanto Chemicals Ltd., 10-18 Victoria Street, London SW1. Information is included on the materials more recently developed to meet the changing conditions of compounding and processing in the industry consequent on the introduction of synthetic rubber, reinforcing furnace black and sulphurless cures.

Synthetic Crystals

Hilger synthetic crystals are the subject of a new brochure published by Hilger and Watts Ltd., 98 St. Pancras Way, London N1. The brochure covers thallium-activiated sodium iodide (mounted and unmounted crystals), crystals for infra-red spectroscopy and crystal components for infra-red use. Crystals that have been grown experimentally or commercially include NaCl, KCl, KBr; CsBr, TlCl, AgCl, $NaNO_3$, NaI(Tl).

Portable Turbo-Reactor

The Moritz portable turbo-reactor is described in a new leaflet, No. 84A, issued by the Moritz Chemical Engineering Co. Ltd., 204 Earls Court Road, London SW5. The turbo-reactor, which can be mounted on channels, the side of a vessel or fixed to a wall with guide rod, is suitable for a number of uses including emulsions, dispersions, reaction needing intimate contact etc.

Wynn (Valves) Ltd.

In our reference to technical bulletin D4, issued by Wynn (Valves) Ltd., Granville Street, Birmingham 1 (CHEMICAL AGE, 18 May p. 844) it was stated that the firm's straight through diaphragm valves would be available shortly. These are, of course, in regular production; the publication will shortly be available.

Commercial News

Matthew Hall Report Contract Business Up—Profits Down

NET profit of Matthew Hall, chemical engineers etc., for 1956 was £107,376 (£141,710) after tax of £112,225 (£117,183). Dividend of 30 per cent (same) was paid on ordinary. During the year orders for a fertiliser plant for ICI were obtained and for a synthetic rubber plant for International Synthetic Rubber, which together are worth a total of about £6 million. The mechanical services division has also been busy. Contracts in progress and those awaiting agreement increased to £1.49 million (£749,326).

Mr. Bertram Baden, chairman, points out that customers are becoming increasingly aware of the fact that it is more efficient and economical to place all services with one firm. The company is participating in the nuclear power field with the design and installation of plant for the European Organisation of Nuclear Research at Geneva and fabrication work is also being carried out in this country and for a nuclear energy project in France.

British Benzol

Interim dividend of 5 per cent (same) is announced by British Benzol and Coal Distillation.

Coalite and Chemical

Net profit of Coalite and Chemical Products Ltd. for the year ended 31 March was £333,333 (£286,766). Final dividend of 9½ per cent (9 per cent) is declared on ordinary, making 12½ per cent (12 per cent). The company has applied to the Capital Issues Committee for permission to issue shares by way of rights, within the limits of the present authorised £2 million capital.

Lawes Chemical Co.

The directors of the Lawes Chemical Co. announce that of the 118,310 Ordinary 10s shares offered to shareholders at 15s each, 106,628 were accepted by way of rights. Applications were made for 70,751 excess shares. Allotment of the 11,682 shares available was: up to 40 shares in full; over, 40 shares. The allotment letters were posted on Tuesday last.

Stevenson and Howell

Group profit of Stevenson and Howell, manufacturing chemists, for 1956 was £99,248 (£128,619), before tax of £56,355 (£69,608). Dividend of 18 per cent (20 per cent) is declared. The decline in profits is attributed to lower turnover due to bad weather. Annual meeting will be held at Standard Works, Southwark Street, London SE, at noon on 18 June.

NEW COMPANIES

W. E. GILES AND SONS LTD. Capital £30,000. Pharmaceutical, analytical, manufacturing and general chemists etc. Directors: C. C. Giles 110-111 Commercial Road, Newport, Monmouthshire; and E. C. Giles.

SENSITISED COATINGS LTD. Capital £100. Manufacturers of and dealers in sensitised papers etc. Directors:— E. G. and E. D. Pettifor. Registered office: 39 Brighton Road, Croydon, Surrey.

SUPER CHEMICALS LTD. Cap. £1,000. Manufacturers of and dealers in chemicals and chemical compounds, etc. Subscribers: M. and D. Sudwarta. Reg. office: 8 Southampton Row WC1.

E. T. WEBB LTD. Capital £100. General consultants to manufacturers of soap, glycerine, detergents, oils greases, perfumes, oleaginous and saponaceous and like substances etc. Subscribers (each with one share):— Richard M. Lucas and Michael J. Judge. First directors: Edwin T. Webb and Alice M. Webb. Solicitors: Gouldens, 40-43 Chancery Lane, London WC2.

WRIGHT SCIENTIFIC LTD. Capital £1,000. To acquire the business of scientific glass-blower and scientific instrument makers carried on by Alfred G. Wright at 7 Cardigan Road, London NW6, as 'Wright Scientific' etc. Directors: A. G. and A. S. Wright.

RELEASE OF RECEIVER

WALTON CHEMICAL CO. LTD., Giltbrook, Notts. Mr. V. M. Frazer, 265-75 Martins Bank Buildings, Water Street, Liverpool, ceased to act as receiver and/or manager on 29 April.

INCREASE OF CAPITAL

HEMEL LABORATORIES LTD., 61 Portland Place, London W1. Increased by £1,900 beyond the registered capital of £100.

MORTGAGES & CHARGES

MELWOOD THERMOPLASTICS LTD., London EC, 26 April, mortgage to Midland Bank Ltd., securing all moneys due or to become due to the bank; charged on Melwood Thermoplastics factory, Ox Lane, Harpenden.

PHOTO-CHEMICAL CO. LTD., London W15 April, £1,000 debt to Associated British-Pathe Ltd.; general charge.

Ammonia Not Deoxidant Says CEA Chemist

IN THE REPORT of the Hydrazine Conference in last week's issue (p. 877) we quoted Mr. W. H. B. Fletcher (Central Electricity Authority) as saying that in his opinion 'hydrazine and ammonia are complementary deoxidants.' This should have read 'complementary reagents.'

As Mr. Fletcher has pointed out, ammonia is not a deoxidant but is used to provide a suitable *p*H.

Anti-Dumping Regulations

Regulations dealing with the computation of the cost of production of imported goods for the purposes of the Customs Duties (Dumping and Subsidies) Act, 1957, have been published by the Board of Trade. Entitled Customs Duties (Dumping and Subsidies) Regulations, SI 684/1957, they are available from HM Stationery Office, Kingsway, London WC2 and branches, price 3d., by post 5d.

Market Reports

HOME DEMAND CONTINUES STEADY

LONDON Home demand in most sections of the market has been steady with a good intake against contracts for the general run of heavy chemicals. There is also a fair volume of export enquiry in circulation. Although the price position shows no definite trend the undertone is firm. Copper sulphate continues in good call at the lower quotations reported last week while the prices of white lead and red lead have recovered by a rise of 50s and 55s per ton respectively as from 23 May.

The coal-tar products are mostly unchanged with a steady enquiry for creasote oil, cresylic acid and the light distillates.

MANCHESTER Price conditions on the Manchester market for heavy chemical products during the past week have maintained their firmness pretty well throughout the range and there seems to be little likelihood of any easiness developing in the near future. Contract deliveries to the textile and other industrial outlets in Lancashire are on a reasonably good scale and a fair number of both home and shipping enquiries continue in circulation. Except in one or two directions the movement of fertilisers is much quieter than it was a month or so ago. There is a steady demand for refined tar, creosote oil and cresylic and carbolic acids in the tar products market.

GLASGOW Business has been steady during the past week in the Scottish heavy chemical market, and from most sections of the industry demands have been normal. Prices have shown little or no alteration although the reported increase in transport charges will no doubt have their effect. There is still a good number of inquiries being received for the export market, with a fair volume of resultant business. In regard to agricultural chemicals, here again the demand continues to be favourable.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents),' which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 2s 6d including postage; annual subscription £6 6d.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

On sale from 3 July

Alpha-mercapto acids and salts thereof and compositions containing same. Monsanto Chemical Co. **722 024**

ACCEPTANCES

Open to public inspection 10 July

Manufacture of antibiotic product having specific action against pathogenic microbes of animal organisms. Industrie Prodotti Agricoli, IPA **778 622**

Fluid containers. Exactor Ltd., Guinness, A., Son and Co. (Dublin) Ltd., Somerfield, A., and Conway, E. A. **778 845**

Gelling agents and gelled hydrocarbons. Meyer, M. **778 804**

Cobaltiferous monoazo-dyestuffs. Ciba Ltd. **778 718**

Metal oxides. Cabot, G. L., Inc. **778 705**

Complex ester lubricants. Esso Research and Engineering Co. **778 691**

Process for producing silica sol. Wallace and Tiernan Inc. **778 695**

Water insoluble azo-dyestuffs pigments. Farbwerke Hoechst AG. (Addition to 768 832.) **778 806**

Heating of liquids. Ward, G. F. **778 776**

Production of wetting, emulsifying and washing agents. Ruhrchemie AG. **778 719**

High temperature combustion arrangements. Power Jets (Research and Development) Ltd. **778 611**

Controlling the course of metallurgical processes. Ma Planck Institut für Eisenforschung, E. V. **778 407**

Continuous extraction of animal glue. Armour and Co. **778 721**

Azocyclic compounds. Ciba Ltd. **778 808**

Column heads for fractionation columns. British Petroleum Co. Ltd., Riches, T., and Ward, P. C. **778 409**

Separating oil from minerals containing oil and water. Glinka, C. **778 723**

Synthetic linear condensation copolyesters. Chemstrand Corp. **778 410**

Water purification and supply systems. Imperial Chemical Industries Ltd. **778 724**

Preservation of fruit and other products. Monsanto Chemicals Ltd. **778 627**

Manufacture of hydrazine. Matholin Corp. **778 451**

Crystallised pure and anhydrous phosphoric acid. Fonte Electrique SA. **778 810**

Ink compositions. Kellogg, M. W., Co. **778 727**

Carboxy-phenyl sulphonamide derivative. Imperial Chemical Industries Ltd. **778 728**

Bringing liquids into contact with granular materials. Permutit Co. Ltd. **778 859**

Water soluble hypnotic compositions. Chemical Compounds Ltd. **778 730**

Sensitisers for photographic emulsions. Imperial Chemical Industries Ltd. **778 613**

Metal-working lubricants. Esso Research and Engineering Co. **778 812**

Processes of dyeing textile materials with inorganic metallic compounds. Crosland and Pickstone Ltd. **778 415**

Ethyl cellulose. Hercules Powder Co. **778 732**

Dichlorotrimethylene carbonate. Distillers Co. Ltd. **778 734**

Hydrogenation of asphalt hydrocarbonaceous oil. Nagynyomasu Kiserleti Intezet. **778 421**

Applying hard-facing metals. Union Carbide and Carbon Corp. **778 785**

Producing ammonium sulphate crystals. Otto, C. **778 737**

Carbamate monomers and homopolymers and co-polymers thereof. Kodak Ltd. **778 423**

Trisodium pyrophosphate hydrates. Chemische Fabrik Budenheim AG. **778 739**

Spiro [cycloalkane-1, 6'-(m-thiazane-4'-ones)]. Merrell, W. S., Co. **778 693**

Pyridinediol oxides and acetates thereof. Aktieselskabet Sadolin und Holmblad. **778 871**

Lubricating compositions. Esso Research and Engineering Co. **778 818**

Plasticised compositions. Distillers Co. Ltd. **778 872**

Removal of tar and wax deposits from oil and gas well equipment. Diamond Alkali Co. **778 819**

Cracking of heavy hydrocarbons. Houdry Process Corp. **778 821**

Preparation of finely divided solids and suspensions thereof. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **778 822**

Separation of hydrocarbons. British Petroleum Co. Ltd. **778 699** and **778 700**

3-(2-Hydroxyethyl)-indoles. Upjohn Co. **778 823**

Expanded plastic material. Imperial Chemical Industries Ltd. **778 880**

Fuel elements for nuclear reactors. United Kingdom Atomic Energy Authority. **778 881**

Apparatus for the production of high pressure liquid. Commercial Shearing and Stamping Co. **778 742**

Continuous process for the hydrolysis of organo-silanes. Soc. des Usines Chimiques Rhone-Poulenc. **778 435**

Plasticised high acetyl cellulose acetate compositions. Hercules Powder Co. **778 743**

Preparing aromatic diamines. Kodak Ltd. **778 437**

Method of and apparatus for utilisation of optical pyrometers for measuring temperature of metal bath during refining in a converter. Institut de Recherches de la Siderurgie. **778 638**

Apparatus for parenteral administration of liquids. Abbott Laboratories. **778 794**

Polyethylene and copolymers of ethylene. Du Pont de Nemours, E. I. and Co. **778 639**

Process for potassium sulphate, manganese chloride and/or manganese hydroxide. Makhtsavei Israel. **778 836**

Enrichment in P_2O_5 of phosphate rock containing calcium carbonate and for production of superphosphate from the enriched material. Israel, State of, and Perlmutter, S. **778 892**

Mixtures of diisocyanate-modified polyesters and fillers and method of making same. United States Rubber Co. **778 893**

Tar separators. Simon-Carves Ltd. (Otto, Dr. C., and Co.). **778 747**

Dehalogenation of organic compounds. Kellogg, M. W., Co. **778 748**

Alkaryl chloromethyl compounds. Continental Oil Co. **778 749**

Fluoro-olefines. Du Pont de Nemours, E. I., and Co. **778 750**

Purifying caprolactam. Stamicarbon NV. **778 751**

Incorporating water-soluble solids in lubricating greases. Shell Research Ltd. **778 468**

2-Chloroacrolein and derivatives thereof. Union Carbide and Carbon Corp. **778 899**

Conversion of retinene-phenolic material complexes to vitamin A. Eastman Kodak Co. **778 753**

Organosilanes. Midland Silicones Ltd. **778 755**

Low temperature air rectification. Ges. für Linde's Eismaschinen AG. **778 582**

Centrifugal machines for washing out starch from starch-containing materials. Starcosa Maschinen- und Apparatebau Ges. **778 507**

Organic compounds and compositions containing same. Soc. des Usines Chimiques Rhone-Poulenc. **778 759**

Condenser for condensing dust containing mixtures of magnesium vapour and permanent gas. Vereinigte Aluminium-Werke AG. **778 511**

Monochloro-derivatives of meta-xylene. Farbwerke Hoechst AG. **778 642**

Basic acetals. Geigy, J. R., AG. **778 514**

Determining the flowability of granular materials. Fischer, G., AG. **778 516**

Viscosity meters. Kalle, K. T. **778 519**

Compounds of the vitamin-A series. Badische Anilin- und Soda-Fabrik AG. **778 487**

Brominated styrene polymers. Badische Anilin- und Soda-Fabrik AG. **778 761**

Fungicides. Farbenfabriken Bayer AG. **778 762**

Separating solid and liquid components of a slurry. Du Pont de Nemours, E. I., and Co. **778 535**

Gas filters. Klöckner-Humboldt-Deutz AG. **778 537**

Halogenated derivatives of desoxybenzoins. Chimie et Atomistique. **778 645**

Device for sampling liquids, particularly blood. Goldberg, M. **778 546**

Cyclonic dust separators. Knecht, A. **778 548**

Nitrogen-rich wrought austenitic alloys. Ford Motor Co. Ltd. **778 597**

Ureas and salts thereof. Cilag Ltd. **778 647**

Acrylic acid. Canadian Industries Ltd., and Du Pont Co. of Canada Ltd. **778 493**

Vinyl ether derivatives. Soc. des Usines Chimiques Rhone-Poulenc. **778 495**

Vaporising dispenser for air treating gels. Airkem Inc. **778 600**

Metal soap-salt complexes and lubricating grease compositions containing them. Esso Research and Engineering Co. **778 567**

Recovering glutamic acid. International Minerals and Chemical Corp. **778 575**

Metal salts of carboxylic acids and compositions containing them. Esso Research and Engineering Co. **778 651**

Devices for connecting liquefied or compressed gas containers to equipment to which the gas is to be supplied. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. **778 610**

TRADE NOTES

Fibreglass Agency

Chemicals Trading Co. Ltd., 102 Bishopsgate, London EC2, have been appointed general agents for the UK by the Owens-Corning Fiberglass Corporation, New York, US, one of the oldest established producers of glass fibre.

UK Agents

Chemicals Trading Co., 102 Bishopsgate, London EC2, have been appointed general agents in the UK for Owens-Corning Fiberglas Corporation, New York.

Agents for Rilsan

Exclusive sales agency in the UK and certain Commonwealth countries for the new French plastic Rilsan, has been granted to Whiffen and Sons. It will be marketed in this country under the trade name Ralsin.

Some grades of the plastic are already held in stock in London, it is stated, and others can be delivered without 'undue' delay.

Eastman Chemical Products

Kingsley and Keith Ltd., 110/112 Victoria Street, London SW1, have been appointed exclusive distributors for Eastman Chemical Products Inc., US, which sells all the products of the Tennessee Eastman and Texas Eastman divisions of the Eastman Kodak Co. A wide range of aliphatic and aromatic chemicals are involved, including acids and anhydrides, alcohols, aldehydes, plasticisers, solvents and amines.

Changes of Address

Chemical Products Department, South Eastern Gas Board, are moving on 3 June to Corn Exchange Building, 52/57 Mark Lane, London EC3 (Royal 8066).

The chemical accounts office will be at this new address, but remittances should still be sent to 709 Old Kent Road, SE15.

Glycerine Ltd. moved on 31 May to Conway House, 8 Tudor Street, London, EC4 (Central 7474).

New Packing Section

T. Dryden Ltd., Landore, Swansea, South Wales, have had plans drawn up for building a chemical packing department at their premises at Landore.

FOR YOUR DIARY

TUESDAY 4 JUNE

Incorporated Plant Engineers—London: Royal Society of Arts, John Adam Street, Adelphi, Strand WC2, 6.30 p.m. 'The training of plant engineers' by J. Wilson.

Institute of Metal Finishing—Bristol: Formation of Bristol and South West Branch, Inaugural meeting, 12.30 p.m. luncheon, Grand Hotel, Bristol; 2.00 p.m. works visit to Bristol Aircraft Ltd.; 6.30 p.m. meeting at Grand Hotel, Bristol.

WEDNESDAY 5 JUNE

SAC—London: The Feathers, Tudor Street, off Bouverie Street, Fleet Street EC4, 6.30 p.m. London discussion meeting of the microchemistry group: 'The micro-determination of functional groups'.

THURSDAY 6 JUNE

CS—London: Rooms of the Chemical Society, Burlington House, Piccadilly W1, 7.30 p.m. 'The vapour pressure of anhydrous copper nitrate and its molecular weight in the vapour state' by C. C. Addison and B. J. Hathaway; 'Aromatic reactivity. Part III. The cleavage of aryltrymethylsilanes by bromine in acetic acid' by C. Eaborn and D. E. Webster; 'The kinetics of the oxidation of ethane by nitrous oxide' by R. Kenwright, A. B. Trenwith and P. L. Robinson.

Classified Advertisements

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