THE Chemical Age

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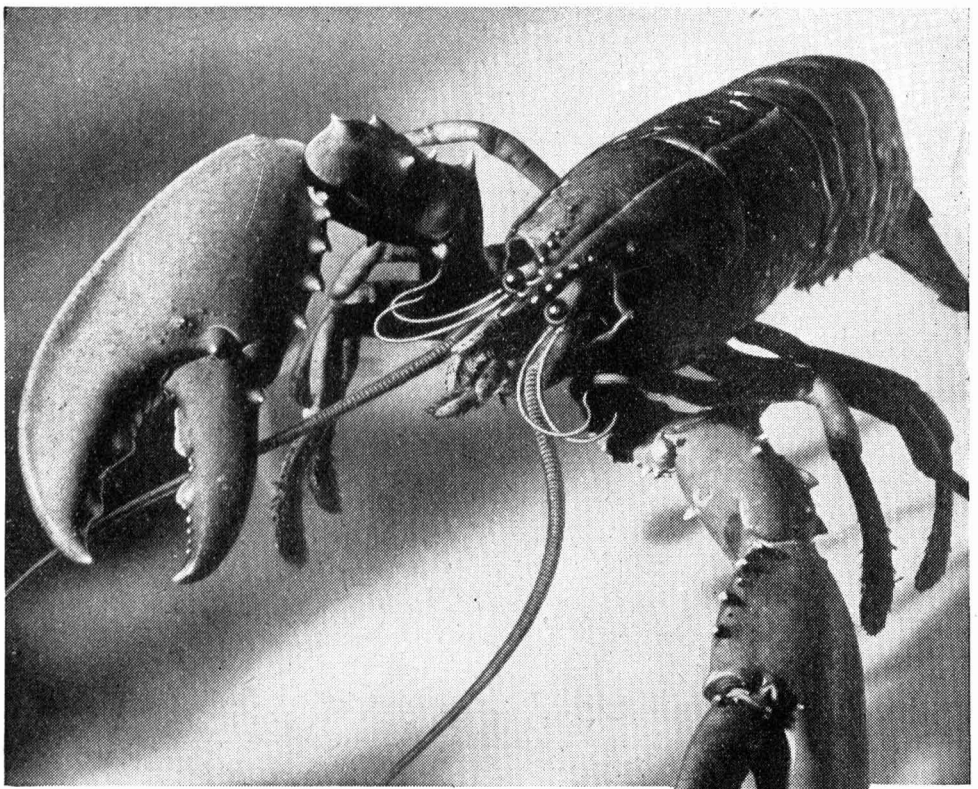

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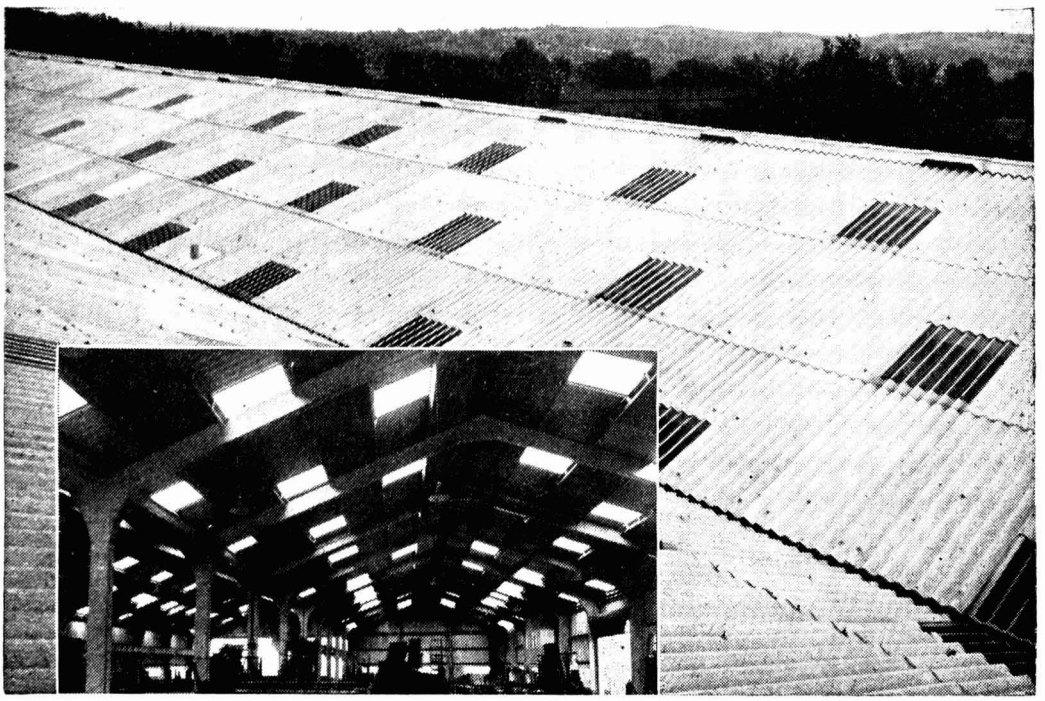

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AN ANNOUNCEMENT BY THE A.P.V. COMPANY LIMITED

OWING to the increasing volume of work and the widening scope of the activities of the Chemical Engineering Department, it has been decided to make this a completely separate Division of the Company with permanent headquarters in London. Here it will be in closer touch with the world of chemical engineering and its design facilities will be situated within easy reach of all concerned. The APV Chemical Engineering Division, as it is now to be known, will remain at its present Wandsworth address pending completion of alterations to new headquarters.

Removal details will be announced later but meanwhile, all communications should be addressed to:—

THE A.P.V. COMPANY LIMITED

Chemical Engineering Division

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Synthetic Fibres

RECENTLY we visited the Third National Men's Trade Fair, which was held this month at that notable Victorian building, the Albert Hall. Whether in fact the setting suited all the displayed modernity of masculine garb is perhaps irrelevant, but it is certainly true to say that many of the clothes exhibited were made from materials quite unknown when either the Hall or its neighbouring Memorial were built. Here on most stands was the 'latest', and even if some of the new ventures in colour and style were apt to shock innate sartorial conservatism, the increasing use of man-made or synthetic fibres made a more solid impression. We felt that novelties of fashion would be nine-days-wonders; but in sharp contrast, the new blends of natural and synthetic fibres seemed here to stay. Like many chemists, we are not particularly clothes-conscious. Red-staining drops of acid on trousers in student years killed much of our natural interest in personal wrappings. It is possible, therefore, that the things that struck a visiting chemist as very new were in fact not as new to textile trade inmates. That at any rate must serve as an excuse for unconscious naivety.

Imperial Chemical Industries was at the Fair—and not in single state, but with two separate stands and exhibits, one for the Ardil Fibre Department, another for the Terylene Council. Another 'chemical' stand was occupied by British Nylon Spinners. But these specific synthetic fibres were certainly not confined to their parent stands—they were to be found in garment form in perhaps a majority of the clothes manufacturers' exhibits. We found Terylene as pyjamas, suits, and shirts, and—in our view outstandingly—as flannel trousers in various Terylene-worsted mixtures; not long ago socks and ties in Terylene were infant curiosities. The rising output of this synthetic fibre is clearly being accompanied by rising interest among manufacturers of cloth and clothes.

Nylon was more expectedly in evidence —for its uses in clothes-making were appreciated when its production was extremely limited. Indeed, scarcity established nylon as much as its own virtues. We noticed an all-nylon dress-shirt and several sock manufacturers were exhibiting nylon 'stretch' socks. We have always felt that nylon shirts have so far been garments for wealthier people than average chemists so it was gratifying to see blends of nylon with cheaper fibres: a new fabric for shirts or pyjamas made from nylon, Ardil, and viscose; and shirts made to sell at a very moderate price

from rayon/nylon mixtures. Nylon waterproof garb for fishermen, and treated with silicones to make its chemical origin complete, was impressively demonstrated in the male fashion parade (an event we witnessed with amazed innocence for living masculine models were new factors in our chemical experience).

We felt a little saddened that nothing paid honour to the first sizeable contribution of chemists to clothes—the development of synthetic dyes. This seemed particularly paradoxical in a year when mauveine's centenary is being celebrated. So much emphasis upon the new chemical fibres, yet none on the far older chemicals that brought colour to the age-old natural fibres. Nor is the omission to be explained away by man's apathy towards colour in his clothes, for on stand after stand we were told that the prejudice against brighter colours is fast departing. If this is true, a small tribute to the first Perkin might have occupied an odd corner. However, this could have embarrassed the pioneers of the new synthetic fibres for giving these fibres widely ranging colours with dyes is still something of a problem, though good progress is obviously being made; Terylene ties now have far more colour and colour-pattern than when they first emerged. On this point we gathered from enquiries that the colour ranges of Terylene fabrics of all kinds are steadily expanding from their early limitations.

We spent much longer at this Fair than we had intended and came away with two complexes in contrast—an inferiority complex about our own shabby attire, especially the shapeless hat we had carried round guiltily from stand to stand, and a much increased superiority complex about chemistry. So far synthetic fibres in clothing textiles have merely been crawling in their infancy. Now they are walking and tomorrow they will be running. The spinners and the weavers (if we are not in ignorance mixing a technological metaphor) have learnt how to blend the new fibres with the old, and it is the blends that are going to break into markets on a large scale. It is true that in a conversation with a firm specializing in all-silk products we were told that silk in its own field must always hold its own, that silk cannot be blended with any other fibre without losing quality, that silk alone could give infinite range of colour —but we reflected that silk has always had its own price-limited market. Synthetic fibres by being blended with cheaper natural fibres are escaping from their cost restrictions, and new cloths and fabrics with improved qualities are entering moderately-priced fields. In another conversation we were told that the prices of these new blended cloths could be expected to fall. Their production had involved a good deal of investment in new machinery and at present there was some tendency to recover capital costs speedily. At the same time, of course, the output of the synthetic fibres themselves is increasing, and here, too, prices may tend to to fall.

Naurally at an exhibition of this kind the greater emphasis is placed upon the new. The small statistical share of synthetic fibres in the national trade for all fibres cannot be forgotten. A recent survey showed that only 1 per cent of retail sales of men's underwear could be scored by synthetic fibres—cotton and wool and wool mixtures held 99 per cent of winter sales. But for socks the synthetics had a much better story to be told—50 per cent of sales were for wool socks with nylon-spliced toes and heels, 14½ per cent for Terylene, 21 per cent for nylon. This survey was limited to fairly modern and progressive retail shops, and canot be regarded as representative of all national trade in men's wear, but even when allowances are made for this bias, the extent of masculine conversion to the new chemical fibres is remarkable. Recently issued figures for US synthetic fibre production also show how remarkably their uses are expanding. In seven years there has been a 32 per cent increase in the number of factories making synthetic fibres, and an 82 per cent increase in the value of products sold. But in the clothing world, except for the older semi-synthetic cellulose-based fibres, the invasion of synthetics has so far been confined to more expensive articles. What is now so much more apparent is that the invasion is widening, and widening at speed.

Notes & Comments

Silver Jubilee

THE first 'Freon' reached its 25th birthday last month, for it emerged from joint General Motors—Du Pont research in 1931, the result of a three-years' quest for a non-toxic and non-flammable refrigerant. Dichlorodifluoromethane or Freon-12 was the eventual product of an initial but futile interest in carbon tetrafluoride and a hunch from the periodic table that fluoro-organic compounds might offer the desired combination of stability, non-toxicity, and freedom from fire hazards. The first production batch showed a cost of $50 a pound, but Du Pont nevertheless offered it at $1 a pound, confident that further processing experience would speedily reduce costs. Such vastly speculative risks might not be taken nowadays, but it was then 1931, with much of the world slump still in sinister evidence. Today's cost for Freon-12 is about 25 cents a pound. The cost of freezing has suffered much less inflation than the cost of living!

All Requirements Covered

A RANGE of fluoro-organics is now manufactured, and about six of them cover all usual refrigeration temperature-range requirements. The market for Freons has been greatly enlarged in recent years by their use as propellents for aerosol packs—about a third of Du Pont's annual output already goes into that one field. Other uses, besides the long-established major use in refrigeration, are as fire-protectants in aircraft, solvents, and intermediates for manufacturing fluoro-organic polymers.

Politics, Trade & Commerce

TWO separate political events of last week must have their immediate and long-term impacts upon trading conditions. First, the new Macmillan prescriptions for dealing with the country's economic blood pressure. Again the Government has placed great reliance upon the old remedy of bank rate adjustment, but will another one per cent achieve what previous rises of (totally) two and half per cent have not? Bank rate ascents exert an immediately restraining effect upon borrowers (if they have survived the squeeze and still are borrowers!), but its effect upon the bulk of the country's spenders is slow and indirect. At the same time some of the more immediate effects handicap enterprises that instead need encouragement, *e.g.*, financing of exports or financing manufactures that reduce our need for imports. The country's ailment is spending more on imports than it earns, and the main cause of that spending is today's widely distributed weekly wealth in cash, the wages that (in most cases) rise with the cost of living.

Restraints Upon Inflation

THE additional Treasury prescriptions seem more likely to act as restraints upon inflation. The 'never-never' system of paying for goods as you earn has been severely tightened both for the man in the street and industry's directors. The cuts in milk and bread subsidies could do more harm than good; if they provoke further pressures for wage increases, it will be the pensioners and other fixed-income classes who are left to foot the final bill, and they above all are the 'innocents' of this inflationary age. A prominent Government-supporting newspaper described the Macmillan mixed bag of remedies as 'almost a good budget'. On the whole the treatment is much the same as before and the only change is that there is more of it—we must hope that it is fundamentally a treatment that can reach causes as well as symptoms.

Restrictive Practices Bill

THE other political event has been the publication of the Restrictive Trade Practices Bill. This has already been bulkily discussed by newspapers, and we do not propose to repeat what most readers will already have read. As many people expected,

the Bill is a moderated version of the Monopolies Commission's recommendations. The amount of moderation may be controversial but it will probably make a desirable reform about as generally palatable as reforms in their own time can ever be. It will check the worst abuses even if it does insufficient damage to less blatant forms of market exploitation. A point which has received inadequate attention in most press comment, however, is the proposed powers for individual manufacturers to take proceedings against traders 'who knowingly infringe resale price conditions, even if there is no contractual relationship'. Thus, while the Bill will make *collective* enforcement of resale prices illegal, it will greatly fortify a manufacturer's own powers to prevent price cutting. This may be just but it could prove to be a psychological blunder. When and if proceedings against traders are brought, public opinion is likely to be shocked. Public opinion generally favours the man who is ready to do something a little cheaper; however, many arguments—and there are many—support the case for fixed prices and fair margins, it would be better in our view if these were left, as before, to policy discussions between producers and sellers. The new Bill as a whole may become heavily discredited in the public mind by this single clause.

Service Department

British Oxygen Gases' New Building

AN important milestone in the history of British Oxygen Gases' Sales Technical Service Department was the opening on Monday, 20 February of a new building at Staples Corner, London NW2. The opening ceremony was performed by Sir Frederick Handley Page, chairman of Handley Page Ltd.

The Sales Technical Service Department was established in October 1935 with a total staff of 14, together with two students attending the welding school. At the present time 750 students are trained each year.

Before the official opening a chance was given for the press to see some of the work carried out in the new building. In the demonstration shop were shown examples of gas and electric welding and cutting processes.

The Argonarc welding process, in which a tungsten arc operates in an atmosphere of argon, was of great interest as being the only practicable means available for the welding of modern jet engines where no corrosive flux can be used.

Most impressive exhibit in the cutting shop was the MC 50 rig for heavy work which has its biggest use in scrap cutting where large sections of metal have to be reduced to furnace size. It is claimed to be capable of cutting steel up to 50 inches in thickness.

Another interesting demonstration was that of concrete lancing which is a method of breaking up concrete using a lance consisting of a steel tube packed with mild steel rods through which oxygen is passed. The end of the tube is raised to ignition temperature and the oxygen is then turned on, setting up a high temperature reaction which is sufficient to fuse the concrete and remove the material in the form of molten silica. The method is relatively silent and there is very little difficulty with extreme thicknesses.

Apart from the actual demonstrations there was a photographic display showing some of the contracts which have been carried out by British Oxygen Gases. The department also maintains a library of technical and instructional films and slides. These facilities have been offered to schools, technical societies and other bodies.

BP University Apprenticeships

BP have started a scheme to be known as University Apprenticeships under which the company will finance university fees and certain other expenses of selected young men wishing to become technologists. BP will also pay them a salary of £350 at the same time. The scheme is to attract more men to take honours degree courses in chemistry, physics, electronics, mechanical and chemical engineering. Apprentices accepted will be BP employees and will work at the company's centres during vacations to gain practical experience.

SLTC Manchester Group Meeting

Tinning & Metal Sequestration Discussed

A MEETING of the Manchester Group of the Society of Leather Trades' Chemists was held in the Reynolds Hall of the Manchester College of Technology on Saturday, 28 January, the chairman, Mr. G. Cooper presiding.

The first paper was by Dr. J. P. Danby and was entitled, 'Towards a Definition of Tanning'.

The paper opened with a discussion of the difficulty of arriving at a definition of the terms 'tanning' and 'leather', and pointed out that there was not necessarily always a correlation between a definition satisfying to a scientist and to a tanner. In a number of commercial leathers, some of the recognized criteria did not apply, and on the other hand, skins could be made to fulfil all the accepted criteria, but would not meet any tanners requirements.

Shrinkage Temperature

Of these criteria, those of shrinkage temperature, and resistance to enzyme attack, were dealt with in more detail. In the case of shrinkage temperature, the conditions of its determination were not always as straightforward as might be expected, and insufficient allowance was made by some workers for the effect of all the constituents of the system under investigation. In addition, the results had at times been too strictly interpreted with reference to cross-bonding to the exclusion of other factors.

The difficulties of assessing resistance to enzyme attack of tanned collagen were described, and a distinction drawn between the resistance of the protein against the enzyme, and the inactivation of the enzyme towards the protein; the failure to observe this distinction had led to erroneous conclusions in the past.

The contribution to the meeting by Mr. B. Hughes dealt with 'Metal Sequestration'.

Trace metal impurities often present in industrial processes could result in undesirable effects, such as off-colouring and precipitation. Free metallic ions present in solution could be converted into soluble complexes by the use of sequestering agents. Polyphosphates and amino carboxylic acids were the two most common groups of sequestrants.

Trivalent nitrogen and carboxyl groups present in ethylene diamine tetra-acetic acid enabled co-ordination compounds to be formed with metal ions, provided that the *p*H was within a range specified for the metal. The soluble complexes so formed were remarkably stable.

EDTA, although a highly efficient sequestering agent for iron under acid conditions, tended to lose its effectiveness as the *p*H was raised. Various other amino carboxylic acids containing hydroxyl groups could be used to overcome this disadvantage.

Many sole tanners were now finding that EDTA in the form of a sodium salt solution could be used to inactivate iron in tan liquors. The results of such an introduction were an improvement in the background colour of the leather and the removal of isolated iron stains.

Amino carboxylic acids might also be used to soften leaching water, 'kill' the iron in fish oils, prevent metals stimulating the growth of bacteria and maintain shades in dyeing with pale colours

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Canadian Detergent Plant

PLANS for building a $3,800,000 detergent alkylate plant in Sarnia, Ontario, are announced by Imperial Oil Ltd. The first of its kind in Canada, the plant will be Imperial Oil's first step into the petrochemical field since its chemical products department was set up late last year.

According to the company, the plant, which is scheduled for operation about the middle of 1957, will make Canada self-sufficient in detergent alkylate (dodecyl benzene), displacing imports worth about $2,500,000 a year.

It will have a rated capacity of 30,000,000 lb. yearly of detergent alkylate and smaller quantities of other alkyl aromatic compounds. Tripropylene and tetrapropylene will also be produced.

New Engineering Building

University College Launches Appeal

AN APPEAL to all sections of British industry for immediate help towards a £2,000,000 engineering building project was launched by University College London on 15 February. If the appeal is met in full, the College will be able to accommodate about 600 engineering students and will have an annual output of 200 graduate engineers, instead of 70 as at present.

Announcing plans for the new buildings, Lord Strang, chairman of the Engineering Appeal Committee, said, 'When we can erect the first stage of our projected building, as we hope to do in the near future, we shall within a very short period be able to increase our output of graduates in engineering by 50 per cent. I am happy to say that, towards that first stage, we have already received contributions from our friends in industry amounting to upwards of a quarter of a million pounds. We have good hope therefore of being able to make an early start.'

Written Appeal

In a written appeal to industrial firms, Lord Cohen, chairman of the College Committee, and Lord Strang state that graduate engineers are qualifying at a rate that falls far short of the national demand. Owing to inadequate accommodation and facilities, the College can accept only one of every nine applicants, and of these nine, at least seven are fully qualified and suitable for entry to the Engineering Department. Illustrative of this lack of facilities is the fact that the Engineering Departments, because of war damage, have since 1945 been no more than restored to their pre-1939 condition and are still housed in quarters which have hardly been extended for 30 years.

Under its development plans the College has acquired new sites adjoining the present Gower Street buildings. One site is immediately available for construction work estimated to cost £300,000, which is the first target of the appeal. As further funds become available two additional buildings, including a tower block of 12 storeys, will be added.

Since 1 January 1956 some 50 firms have promised to contribute to the appeal.

Two New British Standards

THE series of standards covering materials used in electroplating has been extended by the British Standards Institution by the issue of BS 2656 covering zinc anodes, zinc cyanide and zinc oxide for electroplating, and BS 2657 covering fluoroboric acid and metallic fluoroborates for electroplating.

The standard, BS 2656, specifies requirements for zinc anodes which are specifically of the purity of high purity zinc in accordance with BS 1003/4 'High purity zinc and zinc alloys for die casting', and lays down maximum impurities for zinc cyanides, zinc oxide and zinc anodes. Methods of test are also specified.

In BS 2657 the requirements for two grades of fluoroboric acid and for solutions of lead fluoroborate, tin fluoroborate and copper fluoroborate are specified. Grade 1 fluoroboric acid is intended for general electroplating purposes, grade 2 fluoroboric acid for the preparation of lead fluoroborate solution in the electrodeposition of lead, and in the preparation and maintenance of baths of copper fluoroborate for the electrodeposition of copper. Copies of these two documents are available from the British Standards Institution, Sales Branch, 2 Park Street, London W1, price 4s each.

Spring Meeting

THE Spring meeting of the Institute of Metals will be held in London from 10 to 13 April, 1956. Dr. Willis Jackson, F.R.S., director of research and education, Metropolitan-Vickers Electrical Co. Ltd., will open the meeting by presenting the Institute's May Lecture on 'Ferro-electrics—The Dielectric Analogue of Ferromagnetics'. On the following morning, 11 April, Major C. J. P. Ball, D.S.O., M.C., F.R.Ae.S., will deliver his presidential address.

The Metallurgical Engineering Committee has arranged an all-day symposium on 'The Final Forming and Shaping of Wrought Non-Ferrous Metals', and the recently formed Nuclear Energy Committee has arranged a discussion on materials for nuclear power engineering. There will also be discussions on the themes: 'Powder Metallurgy', 'Embrittlement and Fracture', 'Rolling Textures and Recrystallization', and 'Alloy Thermodynamics'. An informal conversazione and an exhibition of materials has been arranged.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

THE Economic Commission for Asia and the Far East (ECAFE), inaugurated by the Prime Minister of India in Bangalore, recommended steps being taken for the manufacture of iron without use of coking coal and the use of lignite in its place. The Commission in its current session is reviewing the work of the past year and suggesting steps with a view to a rapid industrialization of the countries of the Asian region. Discussing the importance of iron and steel for the development of the countries of the region, emphasis was laid on the manufacture of iron without coking coal in low shaft furnaces.

The possibility of setting-up iron and steel plants as a regional effort by two or more nations of the region, the exchange of raw materials, particularly iron ore, and the importance of economic and technical information were dealt with, as also was the role of minerals and atomic energy in industrialization. It may be added that an agreement has recently been signed whereby the United States would supply 6,000 tons of DDT to India.

* * *

The Chemical and Textile Standards Convention organized by the Indian Standards Institution was held in Bombay in early January. It was inaugurated by the Minister for Commerce and Industry, Government of India, who said that the scope of development of the chemical industry would be greater with the plans for producing more steel in the country. Encouragement would be given to coal-tar distillation and fertilizer plants. In the chemical session on 'Methods of Sampling and Analysis', the need for standards, methods in vogue and suggested modifications for methods were discussed.

Some aspects of the methods of sampling and analysis of marine salt, which forms the basis of the heavy chemical industries in South India, were detailed. Owing to the non-uniformity in heaping salt and owing to the washing away of magnesium chloride due to atmospheric moisture, the salt at the top of the heap is relatively purer than that at the bottom, as has been revealed through innumerable analyses by the Mettur Chemical & Industrial Corporation Ltd., Mettur Dam. A similar variation in the quality of the salt is to be observed in salt stored in jute bags. It has been recommended that modified procedures be drawn up for the sampling of salt.

Analytical work on engineering and allied materials involving reagents such as EDTA at the National Physical Laboratory has resulted in the suggestion that complexometric methods be used wherever feasible in the drawing up of referee methods of analysis by the Standards Institution, since the new chelatometric methods would lead to an increase in speed and accuracy. A case in point is the quick method of analysis of marine salt which has been worked out by the Central Salt Research Institute at Bhavnagar. The method consists of titrating a two to three per cent solution of the salt sample against a standard solution of EDTA (disodium ethylene diamine tetraacetate dihydrate) using murexide and erichrome black T as indicators. Titration with murexide gives the value for calcium while that with erichrome gives the combined value for calcium and magnesium.

In the session on 'Statistical Quality Control, in the Chemical and Textile Industries' papers were presented on the concept of quality control in the textile, soap and chemical industries. The control of quality in raw materials, intermediates and in the finished products in the alkali-chlorine industry such as caustic soda, liquid chlorine, bleaching powder and hydrochloric acids was detailed as in vogue at Mettur Chemicals and Industrial Corporation Ltd. The feed line should have 295 - 310 grains per litre as normal sodium chloride concentration and the sulphate in the brine should be limited by washing recovered salt. The caustic lye on standing for about 40 days shows a minimum salt content of 2.25 per cent whereas fused caustic has been found to deteriorate after nine days' stay. Bleaching powder having 28-32 per cent available chlorine is stable up to a 90 day period beyond which the chlorine content falls suddenly to about 26 per cent. Careful control during chlorination such as avoiding excessive formation of calcium chloride is maintained. It is hoped that statistical

quality control methods will be increasingly adopted by the Indian Chemical Industry for better and more increased production.

* * *

The first stable bleaching powder plant with a capacity of 18 tons per day, has now been commissioned into production at the Mettur Chemicals and Industrial Corporation Ltd., Mettur Dam, South India. The company has for over a decade been engaged in the manufacture of tropical grade bleaching powder with 25-27 per cent available chlorine. Although the product had found country-wide customer acceptance, the shelf life of the powder was admittedly short. So a product had to be found which would have a higher chlorine content and would keep better.

After investigations at the works, the production superintendent of the firm was deputed to Germany and the Continent to make an on-the spot survey of the problems and recommend a suitable process. The Rheinfelden process was selected, suitable machinery ordered, erected and commissioned with slight modifications. The principal factors for the poor stability of the bleaching powder have been found to be due to the presence of oxides of iron, cobalt and manganese derived from the lime used and water formed during the reaction of chlorine and lime persisting in the powder.

The new method uses lime produced from the limestone of Sankaridrug in which the oxides are present only in traces and effects the removal of water as the process progresses. In this specialized process now adopted, slaked lime is chlorinated in a horizontal cylinder provided with stirring paddles. The water formed during the reaction is continuously removed under vacuum so that the powder gets thoroughly dried. In this batch process coarse particles are screened off and iron particles are removed by magnetic separator. A typical analysis of the product is as follows:—

Available chlorine	35 to 37 per cent
Water	0.4 – 1.0 " "
Lime	26 – 27 " "

The powder is quite stable at the temperature range 80 to 100°C and keeps well under all climatic conditions over extended periods. The production can now meet the country's requirements of this essential chemical.

* * *

A new source of heavy water has been found in the bitterns according to a recent investigation (1). Heavy water of almost 100 per cent purity has become an important material as moderator—coolant for nuclear reactors. Its occurrence in natural waters is rather low, 0.0154 mol. per cent being the normal approximate abundance figure. A slightly higher figure of 0.0148 has been encountered in the waters of some glaciers, which may be due to solar evaporation of part of the ice, but no natural source of higher content of heavy water has till now been made known. In the course of an examination of such processes as distillation, absorption and evaporation, it has been found that solar evaporation of sea water in marine salt production should result in some enrichment of heavy water. In theoretical calculations it was found that this type of still evaporation which is going on at rather low temperature would, at least in the early stages, conform to a differential distillation at low pressures governed by Rayleigh's equation.

The low temperature conditions would establish similarity to vacuum distillation which is especially suitable for heavy water separation on account of higher volatility coefficient of this separation process at low temperature. The bitterns left after the removal of salt at Tata Chemicals Ltd., Mithapur, density 29.5° Bé , have been investigated at the Indian Institute of Science, Bangalore and after removal of salt, the D_2O content of this water has been determined by mass spectroscopic analysis at Harwell. An average value of 0.0208 mol. per cent D_2O has been obtained which finds agreement with theoretical calculations. Further enrichment of D_2O content in the distillate obtained from the evaporation of bitterns in a packed column of 680 mm. height and 30 mm. internal diameter and 4 mm. single-turn helical glass rings as packing material has yielded a value of 0.0257 mol. per cent D_2O. While further work is in progress, it has been pointed out that similar enrichment of heavy water as in bitterns may be found in sources such as the waters of the Dead Sea, hot springs and spent liquors from potassium salt mines. The theoretical aspects of the electrolytic method of heavy water preparation have received attention (2).

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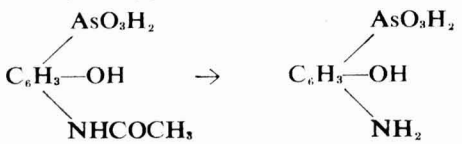
Crystallization of Sparingly Soluble Organic Acids

by **DR. M. A. PHILLIPS, F.R.I.C., A.M.I.Chem.E.**

ALTHOUGH it may be possible to crystallize small quantities of sparingly soluble acids in the laboratory, the amount of solvent needed is often far too great to make such a procedure practicable in the works where it is necessary to make as big a batch as possible. It may be taken that if the solubility of the acid is less than 10 per cent w/v in the boiling solvent, the straight crystallization method cannot be employed for large batches; this applies to such acids as acetarsone (3-acetamido-4-hydroxyphenyl arsonic acid), pyridine-3-carboxylic acid (nicotinic acid) and pyridine-4-carboxylic acid (*iso*nicotinic acid).

In the above and similar cases, neither water nor methanol nor ethanol can be used for large scale crystallizations but the following variation has been employed in these laboratories for many years with success and upscaling to the works scale (50 kg batches or more) is quite practicable.

The method, in principle, consists of addition of concentrated aqueous alkali to a hot, stirred suspension of the acid in ethanol; it is possible in this manner to obtain an acid solution with less than the equivalent amount of alkali since some of the free acid dissolves as such in the organic solvent. This has proved to be very convenient in the case of acids containing an easily hydrolysable group, such as acetarsone which, with hot aqueous alkali, is readily hydrolysed to 3-amino-4-hydroxyphenylarsonic acid:



If the full molar equivalent of alkali is added, the sodium salt will crystallize out on cooling and this may be filtered, washed with ethanol, dried, re-dissolved in water and precipitated with mineral acids; this has often proved to give pure arsonic acids of the above type as well as acids such as 4-nitro-2-hydroxyphenyl-arsonic acid and its isomerides.

However, ths solution obtained by addition of less than the molecular equivalent of caustic alkali to an alcoholic suspension may be treated with charcoal and filtered quite easily and, in order to obtain a crystalline product from it, it is raised nearly to the boiling point and at a temperature of some 5°C less than the solution boiling point, a dilute solution (10-15 per cent) of hydrochloric or sulphuric acid at the same temperature is added rapidly with stirring; on cooling, the acid separates as micro but well-defined crystals. The yield is often more than 95 per cent of the weight of the original acid taken.

Another method of dealing with sparingly soluble acids is to suspend them in hot water, add one molecular equivalent of sodium hydroxide and obtain a hot solution of some 30 per cent w/v of sodium salt; this, on addition of sodium chloride at the rate of about 20 g per 100 ml. of solution, will precipitate the crystalline sodium salt which may be filtered by suction, washed colourless with saturated sodium chloride and redissolved in water, sometimes requiring for this a little extra caustic alkali.

The solution may be treated with charcoal, filtered and precipitated at about 80-90°C with slight excess of hot mineral acids to give the free acid in a pure and water-white crystalline condition.

Three examples of this method follow. The first two concern the purification of acetarsone and the third describes a method for the purification of nicotinic and *iso*nicotinic acids.

Purification of acetarsone

(a) *Ethanol part-neutralization method*

The crude acid (275 g.) is suspended in 1.5 l. of boiling ethyl alcohol and sufficient of a 10 per cent w/v solution of sodium hydroxide is added to cause complete solution at the boiling point. About 330 ml. (82 per cent of the molar amount) is needed for this and the *p*H of the solution is about 5-6. The solution is boiled under reflux with 10 g. of good charcoal for one hour, filtered by suction and the charcoal washed with a little boiling water.

The clear filtrate and wash is held at 90° C and sufficient 15-16 per cent hydrochloric acid to give slight acidity to Congo red at the same temperature is added as rapidly as possible with vigorous agitation. Pure acetarsone separates, the mixture is chilled at about 5°C, the crystals filtered off by suction and washed free from acidity to Congo red with cold water and dried at about 70°C. The yield of pure acetarsone is about 260 g. or 90 per cent.

(b) *Sodium salt method*

The crude acid (275 g.) is suspended in 600 ml. of water at about 60°C. and 200 ml. of aqueous solution containing 42 g. of sodium hydroxide (1.05 molar equivalents; the excess is necessary for complete solution to reverse the partial hydrolysis of the sodium salt) is added and volume is made up to 1000 ml. with water. The mixture is heated to about 90-95°C. Sodium chloride (200 g.) is added with stirring and the mixture is set aside to cool overnight.

Next day, the magma of sodium salt is filtered by suction, filtered mother liquors being used repeatedly to clear the flask, and the thick cake being spread evenly on the filter. The magma is pressed out well and as much as possible of the yellow mother liquors are sucked through. The cake is then returned to the reaction flask, mashed therein with 250 ml of sold saturated sodium chloride brine and re-filtered. The cake of sodium salt is washed twice on the filter, each time with 100 ml. of cold brine.

The mother liquors and brine washes are reserved. The magma of sodium salt, after pressing down well, is dissolved in 2,500 ml. of boiling water using a little dilute caustic soda solution to reverse the hydrolysis and to obtain complete solution; 10 g. of good charcoal is added and the solution is boiled for 10 minutes and filtered by suction, washing the charcoal with two washes, each of 50 ml. of boiling water containing a little caustic alkali. The filtrate is heated to about 90°C and is precipitated by addition of slight excess of 15-16 per cent hydrochloric acid to give acidity to Congo-red. After cooling, the acetarsone is filtered by suction, washed with water and dried as above. The yield is about the same as by method (a).

Purification of nicotinic & isonicotinic acids

The crude acid (123 g.) is suspended in ethyl alcohol (500 ml.) and an aqueous solution containing 34 g. of sodium hydroxide is added with stirring at about 70°C. The solution is treated with 5 g. of charcoal for 30 minutes at the boiling point and is then filtered. The filtrate is held at about 70°C. while 20 per cent sulphuric acid is stirred in in amount sufficient to render the mixture just acid to Congo-red. After cooling, the precipitated acid is filtered off, washed with cold water and is then dried in a vacuum at about 50°C.; the return is 11 g. or 94 per cent of the original amount taken. The mp is 232-4°C.

Lubricant Study

A STUDY of the lubrication of dryer roller bearings used in pulp and paper mills is being carried out at the University of Maine for The Texas Company. The aim of the study is to determine the role of the lubricant in bearing failure, and paper manufacturers in the US and Canada are co-operating by supplying a variety of sizes of bearings which have been used in mills.

The programme is under the directorship of Professor H D. Watson. Standard lubricant research apparatus has been augmented for the study by unique test equipment specially designed and constructed.

Shawinigan Expansion

CONSTRUCTION will start in the early spring on a new Shawinigan Chemicals Ltd. plant at Shawinigan Falls for the production of caustic soda and chlorine, announces Mr. Victor G. Bartram, the president of the company. The plant is to be built on the 50-acre site on the bank of the St Maurice River in Shawinigan East on which the company also plans to build a sulphuric acid plant.

Shawinigan Chemicals and its associated companies are large consumers of caustic soda and chlorine and it is expected that a substantial amount of the new plant's output will be used by the company.

Copper in Foods

Revised Recommendations for Limits

REVISED recommendations for limits of copper in foods were published last week by the Ministry of Agriculture, Fisheries and Food in a revised report presented to the Food Standards Committee by their Metallic Contamination Sub-Committee.

An earlier report on this subject was published in August 1951. Since then the sub-committee have reviewed representations received from trade and other interests, and the revised report replaces the earlier report.

The sub-committee again point out that from the public health standpoint the presence in food of traces of copper is a less serious problem than in the case of lead and arsenic, since copper is essential in small quantities to both plant and animal life. Although there may be need to prescribe statutory limits for foods which are peculiarly liable to copper contamination, as has been done for edible gelatin and tomato ketchup, the sub-committee consider that it is unnecessary, in the absence on any new development, to give statutory effect to the limits now recommended for other foods. They suggest that the question of imposing comprehensive statutory limits should be kept under review.

General limits previously recommended are confirmed by the sub-committee. These limits are 2 ppm copper for beverages ready-to-drink and 20 ppm for other foods. The following special limits are now proposed in addition to those already recommended:— non-alcoholic beverages prepared from cider and concentrated soft drinks, 7 ppm; concentrates used in the manufacture of soft drinks, 20 ppm; yeast and yeast products, 60 ppm (on dry matter); solid pectin, 300 ppm.

The report is now being considered by the Ministers concerned. Any views on the recommendations will be considered if they are sent to the Assistant Secretary, Food Standards & Hygiene Division, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London SW1, to arrive not later than 31 March 1956. Copies of the revised report are obtainable from HMSO, York House, Kingsway, London WC2, or from any bookseller, price 6d plus postage.

ICI Worker Rewarded

MR. Griffiths Jones, a process worker at ICI's Hillhouse, Lancashire, works has been awarded £500 for a suggestion that has enabled production of nylon monofilament to be increased by 30 per cent.

The suggestion concerns the operation of nylon spin-melt kettles in which nylon chips are melted and extruded as filaments. Mr. Jones was originally awarded £15 by the factory award committee, the largest award they could make. The Plastics Division board then made the further award of £500, a sum calculated from the savings possible to the company over the next three years.

At the end of that time the spinning process involved will almost certainly be replaced by a new one and if the savings made are greater than foreseen, a further award may be made.

This award is the largest ever made in the Plastics Division, and only one other award in another division—that for the Alkali Division's Mighty Mouse—has been as large.

Mr. Jones was awarded the George Medal and ICI Bravery Medal during the war when he was working at the Ministry of Supply factory operated by General Chemicals Division at Randle.

Accountancy Conference

BRITAIN's first conference on management accountancy will be held at Bournemouth from 15 to 17 March under the joint organization of the British Institute of Management and the British Productivity Council. The purpose of the conference will be to enable accountants to become better acquainted with the type of information that is of value to management, and to enable managers to appreciate the help that accountancy can give them.

The programme has been designed to cover the interests of accountants in business and in practice and of all ranks of management from chief executive to foreman. Sectional meetings will be staged on the management accounting needs of the small firm, and a series of meetings will underline the relevance of accounting to production management, personnel management, sales management and research. Copies of the programme are now obtainable from the British Institute of Management, 8 Hill Street, London W1.

Metal Finishing

Institute's Annual Conference

DETAILS are now available from the Institute of Metal Finishing, 32 Great Ormond Street, WC1, of the annual conference to be held at the Norbreck Hydro, Blackpool, from 17-21 April. The conference will comprise five technical sessions.

The first technical session will be held during the morning of the second day when four papers will be presented: 'Alkaline Electrobrightening & Anodising of Aluminium'; 'Some Studies of Phosphoric Acid Based on Chemical Brightening Solution for Aluminium'; 'Studies in Bright Anodising by the Ammonium Bifluoride—Nitric Acid Process'; and 'Bright Anodised Aluminium & its Employment in Automobile Manufacture'.

In the afternoon three papers forming the second technical session will be presented: 'Smoothing of Mild Steel by Barrel Treatment in Oxalic Acid—Hydrogen Peroxide Solution'; 'Tin-Zinc Alloy Deposition from Stannate-Complexone Solutions'; and 'A Preliminary Investigation of the Formation of Cracks in Hard Chromium Electrodeposits & the Evolution of Hydrogen During Deposition'.

On the third day the third technical session will comprise two papers: 'The Engineering Aspect of Electroplating Plant'; and 'Automatic Plant for Bright Zinc Plating'. In the evening there will be a Hothersall Memorial Lecture delivered by Dr. W. A. Wesley, manager of the research laboratory of the International Nickel Co., of New Jersey, US.

Six papers will be presented on the fourth day: 'Laboratory Evaluation of Paint Durability—Accelerated Weathering Tests'; 'Polytetrafluorethylene Dispersons for Metal Finishing'; 'The Painting of Magnesium Alloy Surfaces & the Principle of Surface Sealing'; 'Industrial Nickel Coating by Chemical Catalytic Reduction'; Practical Brush-Plating'; and 'Electroformed Spray Masks'.

The President of the Board of Trade has informed the House of Commons that the Government have concluded that a case has not been made out for the removal of the import of duty on basic slag.

World Zinc Statistics

LAST year world zinc production rose by 11 per cent to a record output of 2,643,000 long tons, reports the British Bureau of Non-Ferrous Metal Statistics. Only two countries, Australia and Belgium, failed to increase production during 1955. Of the total production of zinc, over one-third, 920,000 long tons, was produced in the US. The output of Soviet controlled territories reached 385,000 long tons.

Consumption of slab zinc also rose in 1955, increasing by 300,000 tons which was equivalent to an approximate production of 2,600,000 tons. In previous years consumption had been considerably lower than production. The increase last year, the British Bureau reports, was mainly as the result of recovery in the US where consumption rose by 180,000 tons to approximately 960,000 tons. Higher consumption of slab zinc in 1955 is reported for the UK, France and Germany, although the increases were not so great as in 1954.

Canadian Phosphorus Plant

ELECTRIC Reduction Co., of Canada, an Albright & Wilson subsidiary, is to build a $5,000,000 plant on a 35-acre site in Hamilton to process phosphorus and produce sulphuric acid and 'wet-process' phosphoric acid. This project, believed to be the first of its kind in North America, will boost to about $21,000,000 the company's announced expansion since the end of World War II.

When the plant goes into production early in 1957, it will be the first in North America to have two parallel processing lines for the manufacture of phosphoric acid. Existing plants in North America are said to follow either electro-thermal or 'wet-process' methods.

The Hamilton works will process some phosphoric acid to turn out chemical compounds for use in detergent, water conditioning, metal treatment, food processing, textile and other industrial and agricultural fields.

Cellulose production in Sweden last year was a record. It is anticipated that final figures will reveal an output of almost 3,000,000 tons. Previous best was in 1954 when 2,840,000 tons was produced. It is expected that about two-thirds of this year's output will be exported.

French Petrochemicals

New $30,000,000 Project

NAPHTACHIMIE, the French petrochemical concern, has completed negotiations with Scientific Design Co. Inc., New York, for the design and engineering of a major expansion programme planned for Naphtachimie's ethylene oxide plant in Lavera, France. The expanded plant will have a capacity nearly double its present 8,000 tons per year. The total investment in the entire Lavera petrochemical installation will exceed $30,000,000, thus representing the largest such project in continental Europe. Announcing this recently, Dr. Pierre Rubé, 'Directeur General Adjoint' of Naphtachimie, described the French petrochemicals industry as proceeding rapidly toward full recovery from the devastation of World War II.

Dr Rubé said that the excellent recent progress of the French chemical industry was particularly encouraging since its problems had been somewhat more serious than those of other industries shattered by the war. While French firms were closed, destroyed or appropriated, US plants evolved new techniques and cheaper raw materials at a rate far greater than ever before.

Recovery is attributed by Dr. Rubé to the general recovery of Europe and to the vital flow of technical know-how that has been passing in both directions between Europe and the US. Dr. Rubé cited Naphtachimie's new oxide plant as an example of this. The fundamental idea for the process in use there—direct oxidation of ethylene—was conceived in France over 20 years ago. First commercial realization however took place in the US. More recently Scientific Design developed its own improved version and was then engaged by Naphtachimie to bring the process back to France and install it in the new Lavera plant, which went on stream in 1953, thus becoming the first facility in Europe to manufacture ethylene oxide by direct oxidation. The expansion of the Lavera plant will be completed by the middle of 1957.

With the new facility, Naphtachimie will further strengthen its prominent position in the European ethylene oxide and glycol markets. The only other announced European producer of ethylene oxide by direct oxidation will be the Societe Chimique des Derives du Petrole (Petrochim) in Antwerp, Belgium.

Dr. Rubé saw in the ethylene oxide project, and its expansion, a typical case history of how recent growth has taken place in French petrochemicals. The markets for ethylene oxide and glycol compounds, both manufactured in the Lavera plant, have been growing at a rapid rate owing in part to the increase in the use of automobiles in France (about 30 per cent higher than two years ago). In addition, there has been good growth in the markets for glycol ethers and similar products employed in the paint and resin field—an increase brought about by the boost in new home construction and maintenance.

Dr. Rubé noted that exports of chemicals should also rise now that improved techniques have narrowed the gap between French and US prices for finished oxide and glycol products, despite the generally higher cost of raw materials in France.

Naphtachimie is a subsidiary of three leading French firms: Pechiney, Kuhlmann, and Societe Generale pour les Huiles de Petroles (an affiliate of British Petroleum Co.). Concurrently with this expansion in ethylene oxide, Naphtachimie is also enlarging its ethylene plant and some other facilities.

Dr. Ralph Landau, vice president of Scientific Design, participated with Dr. Rubé in the joint announcement of the Naphtachimie expansion. In substantiation of Dr. Rubé's remarks on the vitality of the European chemical industry and the importance of movement of know-how, Dr. Landau noted several recent examples of process export activity from the US, including a styrene monomer plant to be built in Marzingarbe, France, under American guidance.

Clodol Industries Ltd., chemical manufacturers, of 37 Lovaine Place, Newcastle-on-Tyne, are proposing to build a factory at Forth Banks, Newcastle-on-Tyne.

Perkin Centenary

Celebration Arrangements Announced

THE programme of events for the Perkin Centenary Celebration has just been announced. This celebrates the discovery by Perkin in 1856 of the synthetic dye Mauveine, and a series of lectures and receptions and a banquet have been arranged on 7 to 10 May.

Monday 7 May. (evening). *Reception*: representatives of the sponsoring bodies will receive overseas delegates to the Celebration at the Hall of the Worshipful Company of Tallow Chandlers in the City of London.

Tuesday 8 May. (afternoon). *First lecture*: 'The Life and Work of Perkin', by Professor John Read, F.R.S., University of St. Andrews. (evening). *Reception*: delegates and guests at Guildhall in the City of London.

Wednesday 9 May. (morning). *Second lecture*: 'The Development of the Dyestuffs Industry', by Mr. Clifford Paine, B.Sc., development director, Imperial Chemical Industries Ltd. (afternoon). *Third lecture*: 'The Tinctorial Arts Today', by Mr. J. G. Evans, M.Sc.Tech., technical director, Bradford Dyers' Association. (evening). *The Perkin Centenary Banquet* at the Dorchester Hotel, Park Lane, London W1. The president of the Perkin Centenary Celebration, Professor Sir Cyril N. Hinshelwood, F.R.S., will be in the chair.

Thursday 10 May. (morning). *Fourth lecture*: 'The Development of Organic Chemistry Since Perkin's Discovery', by Professor Sir Alexander R. Todd, F.R.S., of the University of Cambridge.

It was during the Easter vacation of 1856 that William Henry Perkin, working at his home in Shadwell, London, produced mauveine on a small scale. By late 1857 the new dye was being sold to textile dyers and printers as Aniline Purple. In this short period Perkin had not only devised a process for the commercial manufacture of his product, but had also initiated technical service by visiting users of his product, showing them how to apply it and helping them to overcome the technical problems which arose.

Common Shares Issue

AN ISSUE of 125,000 npv common shares of Petrochemsol Chemicals Ltd. is expected to be made soon by the Canadian firms, W. C. Pittfiled & Co. and Kippen & Co. at $4.50 per share. The proceeds amounting to $500,000 (less estimated expenses of $13,500) will be used as follows: about $200,000 to reduce bank indebtedness, $64,997 to retire the outstanding $80,000 principal amount of 5½ per cent sinking fund notes, the balance to working capital.

Petrochemsol Chemicals Ltd. was incorporated under the name of S.Nord Chemical Co. in 1952, changing its title last year. The company owns and operates a light oil refining plant at Petrolia, Ontario, and produces nitration grade benzole, toluol, xylol, solvent naphthas and related by-products.

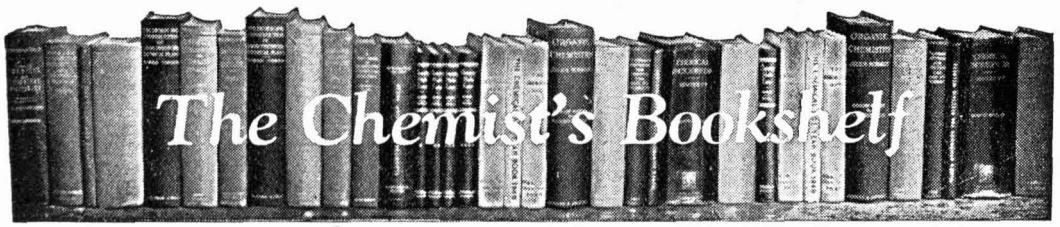
In the years ended 31 March 1954 and 1955, the net losses of the company were $54,273 and $111,685 respectively before provision for income tax. For the six months ended 30 September 1955 net loss amounted to $6,568, while for October and November the net profit is shown at $46,542.

Chemical Price Levels

THE Association of British Chemical Manufacturers has issued a statement on the Chancellor of the Exchequer's recent appeal to all sections of industry to exercise restraint in ways which would stop inflation.

The statement says that 'the chemical industry has for a long time exercised special restraint on the prices of its products, reducing where possible and resisting increases as long as it could.

'While fully recognizing this, Council feels that this is a time when special care and restraint are particularly required from all ranks in industry and it wishes to urge all members to avoid increases wherever the level of costs leaves a choice open in the determination of selling prices.'



SYNTHETIC ION-EXCHANGERS. By G. H. Osborn. Chapman & Hall, London. 1955. Pp. ix + 194. 30s.

This volume is divided into two almost equal parts. The first part contains seven chapters devoted to various aspects of ion-exchange resins, and the second part contains an extensive bibliography.

A volume of this size makes no pretence at being a comprehensive text-book, but the first chapter describes the simple chemistry of the resins and their applications together with a short mathematical discussion. A useful summary of the principal commercial resins is given followed by a chapter giving the principal analytical applications. Apart from the 'Classic' separation of ions and ion-exchange chromatography there are a number of quite novel uses including the separation of insoluble substances such as barium sulphate; redox and chelating resins; and ion-exclusion, a quite new principle which is based on the fact that an electrolyte tends to concentrate itself outside an ion-exchange bead, whilst a non-ionic material is evenly distributed. While valuable separations can be effected, and the resin is not used up, there are some disadvantages such as low capacity and a large volume of feed-liquid.

While much work must have been put into the bibliography, the method of subdividing it into two sections, applications in subject order, and theoretical in alphabetical order of authors does not make for easy reference, particularly as in most cases references are not included with the various chapters. Thus the reference to Potter & Moresbyon p. 38 on the estimation of iron and copper in boiler water is not traced under 'theoretical' but under 'water' in the application section, while the reviewer has not succeeded in tracing any reference to the work of Skogsied on chelating resins, although it may be lurking somewhere in the hundred pages of references. A few normal numbered references have been placed after chapter three, but nowhere else, while on page five a reference figure '1' is given, but is not quoted at the end of the chapter. Other references quoted by authors names are difficult to trace. The last page is numbered 419 instead of 194.

No doubt these errors will be corrected in subsequent editions; the author must be commended for his efforts in assembling a bibliography of this magnitude.—H.W.

ADVANCED ORGANIC CHEMISTRY. By E. E. Royals. Constable & Co. Ltd., London. 1955. Pp. 948. 68s.

Probably no science is better supplied with text-books at all levels than is organic chemistry. In this competitive atmosphere any newcomer to the field must needs incorporate a fresh approach if he is to tempt the jaded palate. In an attempt to achieve this Professor Royals has selected two basic themes as his foundation, 'Hydrocarbons' and 'The Carbonyl Group'. The first leads to discussion of alkanes, *cyclo*alkanes, alkenes, aromatics and alkynes; the chapter on the last is a welcome contrast to the meagre treatment of acetylenic compounds usually given in text-books. The second theme, of course, treats of aldehydes, ketones and carboxylic acids and derivatives, but from a viewpoint underlining the unifying organic function of the carbonyl group. Throughout the whole volume runs the clarifying thread of modern concepts of theoretical organic chemistry presented in a refreshingly common-sense manner.

Within the above limitations of subject, this book fulfils the above criterion of stimulation. The topics are discussed in an adult manner with a clarity and an attractive thoughtfulness of exposition which should have a strong appeal to the student already possessing a basic knowledge of the

fundamentals of organic chemistry. The price, however, is not so appealing—R. A. RAPHAEL.

CHEMICAL PROCESSING & EQUIPMENT. Prepared by the United States Atomic Energy Commission. McGraw-Hill, New York & London. 1955. Pp. 316. 45s.

This volume is a somewhat disappointing member of a series prepared to publicize some of the American disclosures at the 'International Conference on Peaceful Uses of Atomic Energy' which was held at Geneva in 1955. It is presumably the sole member of the series dealing with chemical technology and from its title we accordingly expect a lot.

The sub title of the brief first section (44 pp.) reveals its limitations, 'Chemical Processing of Reactor Fuel Elements of the Idaho Chemical Processing Plant'. This one recovery process for irradiated fuel elements is the extent of the process revelations. The second and much larger section (255 pp.) reviews the ingenious but more widely known techniques for handling highly irradiated samples in the laboratory. The information we may have hoped for about the purification of the crude ores, the production of uranium hexafluoride or other recovery processes for the irradiated fuel elements is not given. However, the outline account does afford an interesting illustration of a chemical process for quantities of intensely radioactive materials.

Economical operation of a nuclear reactor demands the essentially complete recovery of uranium and plutonium from the irradiated fuel elements. In this example the problem is to effect the recovery from a uranium-aluminium alloy fuel element. The process is in three stages involving in turn: dissolution of the spent fuel elements in nitric acid, adjustment of the composition of the solution and separation of the uranium from the aluminium and fission products by continuous liquid-liquid extraction, later the plutonium is recovered from the stream containing largely fission products. Methyl isobutyl ketone is used as a solvent for the uranyl nitrate, dissociation into ions being repressed by the addition of excess NO_3. Chemical flow sheets and an overall process equipment flow diagram are presented for the uranium recovery.

The plant is briefly described. The first priority is reliability in operation and this is assisted by process simplicity. Stainless steels are used but little is said of the tremendous advances in welding techniques which were required before such units could be designed for 'guaranteed reliability'. Such items as pumps are installed in duplicate so that if one fails the continuous process is not held up. Decontamination must be adequately effected before the repairs may be undertaken. To facilitate decontamination all vessels have built-in cleaning sprays. Precautions taken in the design of the buildings are given and health physics precautions at the plant are also summarized.

As noted above, the greater part of the volume is a catalogue of laboratory equipment and manipulative devices developed for the remote handling of intensely radioactive materials. A wide range of equipment (about 125 items) is described including: shielded experimental cells, viewing and optical systems, remote physical-measurement equipment, manipulators, machine tools, materials handling equipment, monitoring equipment, and so on. Line diagrams or photographs are provided; in most cases dimensions are not given but reference is made to the 'reference drawings' which are available from the Technical Information Service of the United States Atomic Energy Commission.

The book is an attractively prepared advertisement for a smaller portion of the American atomic energy project than its title would suggest.—J. S. M. BOTTERILL.

Australian Tannin Research

THE AUSTRALIAN leather industry is reported to be trying to find new sources of tannin, which costs the country about £A1,000,000 a year in imports. The laboratory of the Australian Leather Research Association at Lane Cover, New South Wales, is at present testing the bark of the Monterey pine, *Pinus Radiata*, which came to Australia from the US, for suitable tannin.

It has been established that the bark produces tannin, though not of a quality required for tanning leather. The laboratory is determining the age at which the tree has the best yield and experiments will be carried out to see whether chemical treatment can improve the tannin sufficiently for the requirements of the leather industry.

• HOME •

New Address

Huntington, Heberlein & Co. Ltd., chemical plant engineers, will move to new premises at Simon House, 28-29 Dover Street, London W1, on 27 February.

Modern Outlook

Mr. A. A. North, BSc., of the Chemical Research Laboratory, Teddington, Middlesex, recently addressed the second of four week-end meetings at the Devonport and Plymouth Technical College for the study of chromatography. Chemists from Bristol, Bridgewater, St. Austell and Yeovil enrolled for the course, and noting this, Dr. F. Royle, M.Sc., Ph.D., head of the chemistry department at the college, said that although the chemistry department was housed in Victorian buildings its outlook was abreast with modern scientific thought.

£1,250,000 Plant Order

An order, valued at about £1,250,000, for a sea-water evaporating and distilling plant, has been placed with J. & J. Weir Ltd., of Cathcart, Glasgow. The plant is to be erected at Nruba, Netherlands Antilles, for the provision of 8000 tons (1,792,000 gallons) of fresh water daily. When completed the plant will comprise four sextuple-effect horizontal evaporating units, each with its own interstage pre-heaters, distilling condenser, and pumps, and capable of a daily output of 2,000 tons of fresh water. Fifteeen firms from Britain, the US, Germany, Italy and France, tendered for the contract.

More Research Grants Awarded

In the *7th Annual Report* of the Regional Advisory Council for Higher Technological Education for London and the Home Counties it is reported that the location of chemical engineering courses has been settled with local education authorities in accordance with the advisory committee's recommendation that the two final years' study, for the present, be at Battersea Polytechnic and West Ham College of Technology. Regarding chemical engineering research, the Report announces that the DSIR has granted the committee's request for more grants, and will deal more favourably with chemical engineering applicants, having informed universities and colleges accordingly.

Blending Shed

Lankro Chemicals Ltd., of Salters Lane, Eccles, Lancs, are building a new blending shed at an estimated cost of £15,000.

Radiation Protection Course

A short course on the elements of radiological protection (personal safeguards against radiation) will be held in the Isotope School of the Atomic Energy Research Etablishment at Harwell, Berks, from 9 to 13 April. The course will consist of lectures and practical work and is primarily intended for industrial users of radioactive isotopes. Application forms and details of the course can be obtained from the Isotope School.

Allied Colloids' Extensions

Extensions costing about £35,000 and covering over 10,000 sq. ft. are being carried out at Allied Colloids (Manufacturing) Co. Ltd., of Bradford. Work is almost complete on extensions to double warehouse space, and on a new machine shop. Later a new administrative block and canteen will be built. Plant and machinery costing £15,000 to £20,000 has been ordered for the new buildings.

First Private Reactor

The first privately-owned atomic reactor in the UK will be built at Aldermaston, Berks, by Associated Electrical Industries this summer. The reactor, which will start work at the end of 1957, after being tested for six months, will be used for research purposes as a prototype for research reactors which the company hopes to sell in large numbers. It will be of the 'swimming pool' type and the company is offering these reactors for sale at £75,000 each.

Industrial Accidents & Diseases

Fatal accidents in the UK last December totalled 121, compared with 115 in November and 120 in December 1954. Of these, six were recorded among workers in the chemicals, oils, soaps, and the metal extracting and refining trades. Of 21 cases of epitheliomatous ulceration (skin cancer) reported among pith and tar and mineral oil workers, four deaths resulted, all from mineral oil. There were 26 cases of chrome ulceration recorded.

• OVERSEAS •

Canadian Oil Production

Canadian oil production could be doubled or tripled in the next 10 years if the present tempo of exploration was maintained, said Dr. T. A. Link, a well-known Canadian geologist, at Toronto recently.

NZ Casein Pool

All casein produced in New Zealand for export will, with the exception of one private contract, be acquired by the New Zealand Dairy Commission, pooled on a national basis, and marketed by the Commission exclusively. Casein will be graded by the Commission's dairy division.

New Resin Exported

The first overseas shipment of a new resin, Dapon, was made recently by Food Machinery & Chemical Corporation (Chemical Divisions), New York. The resin is a solid prepolymer of diallyl phthalate, and is made at FMC Ohio-Apex Division's new resin plant at Nitro, West Virginia, US.

Australian Nylon Plant

Work is starting on a £A4,000,000 factory project of British Nylon Spinners (Australia) Pty., at Bayswater near Melbourne. The factory is expected to provide most of Australia's nylon needs when it starts production in three years' time. Total investment in the factory will be £A3,000,000, and £A1,000,000 worth of equipment will be bought from Britain. Target output is 5,000,000 lb. a year. The company is a subsidiary of British Nylon Spinners of the UK.

ICI Polythene Plant For Sydney

ICI of Australia and NZ are to build a polythene plant on a 130-acre site at Botany, Sydney, at a cost of £A2,250,000. Mr. J. R. Glenn, the managing director of the company, announced that when production begins at the end of next year it is expected that the plant will fulfill all of Australia's polythene requirements. Australia imports about £1,000,000 of polythene annually, but import restrictions will cut this year's imports by a half. An ICI spokesman in London said that planned production of the new plant was for 3,000 tons of polythene a year, and that ICI in the UK would provide the Australian company with technicians.

US Aids Fertilizer Output

Ahmed Abbud, the Egyptian industrialist, has been granted a $6,000,000 loan by the US Export-Import Bank for the enlargement of his fertilizer plant at Suez. The extensions to the plant will raise output from 220,000 to 320,000 tons of fertilizer a year.

$350,000,000 Development Plan

A record sum of $350,000,000 will be spent by the Standard Oil Company of California this year in exploring for new oil supplies, developing existing oil lands, expanding refineries and improving its marketing system. This sum would bring its outlay to nearly $1,500,000,000 for the five-year period, 1952-56 inclusive.

Polythene Expansion

Plans for the construction of a polythene plant in Brazil have been announced by Union Carbide & Carbon Corp. This addition to Union Carbide's growing group of overseas polythene plants will be erected and operated by the wholly-owned subsidiary, Union Carbide do Brazil, SA, at Cubatao, near Santos, and adjacent to the refinery and ethylene plant of Petrobras, the Brazilian Government agency that controls all major refining operations.

Synthetic Rubber Dispute

In a testimony before the US Senate Banking Committee the president of the Goodrich-Gulf Chemicals said that the failure of the Government to ratify the sales of its last and largest synthetic rubber plant in West Virginia to his company would extend the present synthetic rubber shortage by as much as a year. It was the possibility that the Government was condoning a monopoly in synthetic rubber that led Mr. J. W. Fulbright, chairman of the Banking Committee, to introduce a Bill against the sale of the plant to Goodrich-Gulf. A majority of the Banking Committee voted in favour of the immediate sale for $11,000,000. Congress had until 11 February to disapprove the sale, after which date the deal was automatically closed.

PERSONAL

MR. SYDNEY SMITH, M. INST. GAS E., F. INST. F., chairman of the East Midlands Gas Board since February 1952, has been appointed chairman of the Scottish Gas Board in succession to SIR ANDREW CLOW, K.C.S.I., who is due to retire on 30 April.

MR. L. O. KEKWICK, chairman and managing director of Amalgamated Oxides (1939) Ltd., and a past-president of the Oil & Colour Chemists' Association, has been elected chairman of the Zinc Pigment Development Association in succession to MR. H. L. WHITWORTH.

MR. L. P. O'BRIEN is to relinquish his managing directorship of Laporte Industries Ltd. on 31 March, but will continue to act as chairman of the company. He will be succeeded by MR. P. D. O'BRIEN, the chairman of Laporte Chemicals Ltd., and Laporte Titanium Ltd. Another Laporte appointment is that of MR. JAMES JONES to be chairman of Laporte Acids Ltd.

MR. THOMAS TALBOT GORSUCH, B.Sc., A.R.I.C., of Hendon, a research chemist with County Laboratories Ltd., who is shortly to take up an appointment with the Atomic Energy Research Establishment at Harwell, was married at Hendon recently to Miss Fay Josephine Robinson, of Finchley.

The Minister of Agriculture, Fisheries & Food, with the agreement of the Minister of Health and the Secretary of State for Scotland, has approved the appointment of MR. COLIN S. DENCE as a member of the Food Standards Committee in place of MR. ROBERT WRIGHT, B.Sc., A.R.C.S. Mr. Dence is a past-president of the Food Manufacturers' Federation and managing director of Brand & Co. Ltd.

Hercules Powder Co. Ltd. announce additions to their board. MR. C. H. B. RUTTEMAN, who started Hercules Powder Co. Ltd. in 1944 and has been managing director since, has been appointed chairman of the board of the British company. MR. H. E. HARTZELL, who for the last five years has been a director of the British company, has been appointed managing director. Three new directors, MR. T. E. BREAKELL (secretary), MR. E. F. PARKER and MR. C. H. COLMAN, have been appointed.

MR. H. R. WALTON, B.Sc., sales manager of Fisher Governor Co. Ltd. has been appointed a director.

SIR HENRY TIZARD, G.C.B., A.F.C., F.R.S., a director of Glaxo Laboratories Ltd., and Solway Chemicals Ltd., and a member of the National Research Development Corporation, and MR. FRANK SCHON, chairman of Marchon Products Ltd., and Solway Chemicals Ltd., have been appointed to the board of Albright & Wilson Ltd.

MR. SAMUEL L. NEVINS, vice-president, Olin Mathieson Chemical Corporation, was awarded an honorary Doctor of Laws degree at the University of Arkansas on 28 January in recognition of his achievements in chemical research and as an industrialist. Mr. Nevins is responsible for the corporation's plant food division, with headquarters at Little Rock, Arkansas. The citation said that Mr. Nevins 'worked out the first process for recovering elementary sulphur from the sour gases of the oil wells of South Arkansas, a development which led to great industrial expansion', and that he 'pioneered in the development of high analysis pelletized fertilizer, a plant food development which means much to agricultural progress in this State.'

Obituary

The death has been reported of MR. D. W. G. MARSHALL, Firs Hill Court, Pool Bank, joint managing director of the Yorkshire Dyeware & Chemical Co. Ltd. He was 47.

We regret to announce the death of DR. HAROLD KING, C.B.E., M.Sc., D.Sc., F.R.S., at Wimborne, Dorset, early this week. Dr. King, who was 69, was educated at the University of Wales and was a chemist with Tar and Ammonia Products, Beckton, from 1911-12 and was then with Burroughs Wellcome from 1912-19. From 1919-50 he was head of the Chemistry Division of the National Institute for Medical Research. A Fellow of The Chemical Society, he was Hanbury Medallist in 1941 and Addingham Gold Medallist in 1952.

British Chemical Prices

(These prices are checked with the manufacturers, but it must be pointed out that in many cases there are variations according to quantity, quality, place of delivery, etc.)

LONDON.—Firm conditions prevail in the chemical markets and prices, with few exceptions, are unchanged at recent levels. A steady home demand continues for the general run of industrial chemicals, and contract delivery specifications have covered good quantities. Rather more activity has been noted in fertilizers. The volume of export trade remains good, with overseas enquiry covering a wide range of products. Among the coal-tar products there is a steady call for the light distillates and good interest in cresylic acid and creosote oil.

MANCHESTER.—A generally firm undertone continues on the Manchester market for heavy chemical products although relatively few changes of any consequence have occurred since last report. Steady contract deliveries are being made of the alkalis and other leading products and additional buying interests covering a wide range have been dealt with during the past week, enquiries coming in from home users as well as from shippers. A fairly steady movement of fertilizers has again been reported and a ready outlet for most of the light and heavy by-products is being found.

GLASGOW.—Although in certain sections of the industry there appear to be nominal demands, on the whole the Scottish heavy chemical market still continues to be rather slow. Little or no alteration in prices has to be reported. In regard to the export market, business remains fairly brisk with the usual volume of enquiries being received.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 10 tons, £83 ; 80% pure, 10 tons, £89 ; commercial glacial, 10 tons, £91 ; delivered buyers' premises in returnable barrels (technical acid barrels free) ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £123 per ton.

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

Aluminium Sulphate.—Ex works, £14 15s per ton d/d. MANCHESTER : £14 10s to £17 15s.

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

Ammonium Bicarbonate.—2-cwt. non-returnable drums, 1-cwt. non-returnable kegs ; 1-ton lots, £50 5s per ton.

Ammonium Chloride.—Per ton lot, in non-returnable packaging, £27 17s 6d.

Ammonium Nitrate.—D/d, £31 per ton (in 4-ton lots).

Ammonium Persulphate. — MANCHESTER : £6 2s 6d per cwt., in 1-cwt. lots, delivered. £112 10s per ton, in minimum 1-ton lots, delivered.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £101 and £97 10s per ton.

Antimony Sulphide.—Crimson, 4s 4d to 4s 9½d ; golden, 2s 7½d to 4s 0¾d ; all per lb., delivered UK in minimum 1-ton lots.

Arsenic.—Per ton, £45 to £50 ex store.

Barium Carbonate.—Precip., d/d ; 4-ton lots, £41 per ton ; 2-ton lots, £41 10s per ton, bag packing.

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

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £42 10s per ton d/d ; 2-ton lots, £43 per ton d/d.

Bleaching Powder.—£28 12 6d per ton in returnable casks, carriage paid station, in 4-ton lots.

Borax.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, anhydrous, £61 10s ; granular, £41 ; crystal, £43 10s ; powder, £44 10s ; extra fine powder, £45 10s ; BP, granular, £50 ; crystal, £52 10s ; powder, £53 10s ; extra fine powder, £54 10s.

Boric Acid.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, granular, £70 ; crystal, £78 ; powder, £75 10s ; extra fine powder, £77 10s ; BP granular, £83 ; crystal, £90 ; powder, £87 10s ; extra fine powder, £89 10s.

Calcium Chloride.—Per ton lots, in non-returnable packaging : solid, £15 ; flake, £16.

Chlorine, Liquid.— £37 10s per ton, in returnable 16-17-cwt. drums, delivered address in 3-drum lots.

Chromic Acid.—2s 0⅝d per lb., less 2½%, d/d UK, in 1-ton lots.

Chromium Sulphate, Basic.—Crystals, 7⅞d per lb. delivered (£73 10s per ton).

Citric Acid.—1-cwt. lots, £10 5s cwt.

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

Copper Carbonate.—3s per lb.

Copper Sulphate.—£120 15s per ton f.o.b., less 2% in 2-cwt. bags.

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

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

Formic Acid.—85%, £86 10s in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G., £12 9s 0d per cwt. Refined pale straw industrial, 5s per cwt. less than chemically pure.

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

Hydrofluoric Acid.—59/60%, about 1s 3d per lb.

Hydrogen Peroxide.—27.5% wt., £128 10s per ton. 35% wt., £158 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 17s 7d per lb., in 28-lb. lots.

Iodoform.—£1 6s 7d per lb., in 28-lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight, 14d per lb. ; dark tech., 44 per cent by weight, 9d per lb., ex-works ; chemical quality, 44 per cent by weight, 12¼d per lb., ex-works ; 1-ton lots, usual container terms.

Lead Acetate.—White : About £150 per ton.

Lead Nitrate.—About £135 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red, £147 ; orange lead, £159. Ground in oil : red, £164 10s ; orange, £170 10s.

Lead, White.—Basis prices : Dry English in 5-cwt. casks £151 10s per ton. Ground in oil : English, 1-cwt. lots 194s per cwt.

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

Litharge.—£149 per ton, in 5-ton lots.

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

Magnesium Carbonate.—Light, commercial, d/d, 2-ton lots, £84 10s per ton, under 2 tons, £92 per ton.

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

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

Magnesium Sulphate.—Crystals, £16 per ton.

Mercuric Chloride.—Technical Powder, £1 4s 6d per lb., in 5-cwt. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—£1 9s 3d per lb., for 5-cwt. lots.

Nickel Sulphate.—D/d, buyers UK £170 per ton. Nominal.

Nitric Acid.—80° Tw., £35 per ton.

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, about £130 per ton, carriage paid.

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £92 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s 3½d per lb.

Potash, Caustic.—Solid, £93 10s per ton for 1-ton lots ; Liquid, £36 5s.

Potassium Carbonate. — Calcined, 96/98%, about £74 10s per ton for 1-ton lots, ex-store.

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

Potassium Dichromate.—Crystals and granular, 1s 1d per lb., in 5-cwt. to 1-ton lots, d/d UK.

Potassium Iodide.—B.P., 14s 1d per lb. in 28-lb. lots ; 13s 7d in cwt. lots.

Potassium Nitrate.—In 4-ton lots, in non-returnable packaging, paid address, £63 10s per ton.

Potassium Permanganate.—BP, 1-cwt. lots, 1s 9d per lb. ; 3-cwt. lots, 1s 8½d per lb. ; 5-cwt. lots, 1s 8d per lb. ; 1-ton lots, 1s 7¾d per lb. ; 5-ton lots, 1s 7¼d per lb. ; Tech., 5-cwt. packed in 1-cwt. drums, £8 14s 6d per cwt. ; packed in 1 drum, £8 9s. 6d per cwt.

Salammoniac.—Per ton lot, in non-returnable packaging, £45 10s.

Salicylic Acid. — MANCHESTER : Technical 2s 7½d per lb. d/d.

Soda Ash.—58% ex-depot or d/d, London station, about £15 5s 6d per ton, 1-ton lots.

Soda, Caustic.—Solid 76/77% ; spot, £30 to £32 per ton d/d (4 ton lots).

Sodium Acetate.—Commercial crystals, £91 per ton d/d.

Sodium Bicarbonate.—Per ton lot, in non-returnable packaging, £15 10s.

Sodium Bisulphite. — Powder, 60/62%, £42 15s d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—Per ton lot, in non-returnable packaging, paid address, £59 5s.

Sodium Chlorate.—About £80 per ton in 1-cwt. drums, carriage paid station, in 4-ton lots.

Sodium Cyanide.—96/98%, £113 5s per ton lot in 1-cwt. drums.

Sodium Dichromate.—Crystals, cake and powder, 10¾d per lb. Net d/d UK, anhydrous, 1s 0½d per lb. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride.—Delivered, 1-ton lots and over, £5 per cwt. ; 1-cwt. lots, £5 10s per cwt.

Sodium Hyposulphite.—Pea crystals £35 15s a ton ; commercial, 1-ton lots, £32 10s per ton, carriage paid.

Sodium Iodide.—BP, 17s 1d per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £133 per ton.

Sodium Metasilicate.—£25 per ton, d/d UK in ton lots, loaned bags.

Sodium Nitrate.—Chilean refined granulated over 98% 6-ton lots, d/d station, £28 10s.

Sodium Nitrite.—£32 per ton (4-ton lots).

Sodium Percarbonate.—12½% available oxygen, £8 6s 9d per cwt. in 1-cwt. kegs.

Sodium Phosphate.—Per ton d/d for ton lots : Di-sodium, crystalline, £38 10s, anhydrous, £84 ; tri-sodium, crystalline, £39 10s, anhydrous, £82.

Sodium Silicate.—75-84° Tw. Lancashire and Cheshire, 4-ton lots, d/d station in loaned drums, £10 15s per ton ; Dorset, Somerset and Devon, £3 17s 6d per ton extra ; Scotland and S. Wales, £3 per ton extra. Elsewhere in England, excluding Cornwall, and Wales, £1 12s 6d per ton extra.

Sodium Sulphate (Desiccated Glauber's Salts).—d/d in bags ton, £18.

Sodium Sulphate (Glauber's Salt).—£9 5s to £10 5s per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER : £6 10s per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot, £33 2s 6d per ton, d/d, in drums in 1-ton lots ; broken, £34 2s 6d per ton, d/d, in drums in 1-ton lots.

Sodium Sulphite.—Anhydrous, £66 5s per ton ; commercial, £25 5s to £27 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £20 to £22, according to fineness.

Sulphuric Acid.—Net, naked at works, 168° Tw. according to quality, per ton, £10 7s 6d to £12 ; 140° Tw., arsenic free, per ton, £8 12s 6d ; 140° Tw., arsenious, per ton, £8 4s 6d.

Tartaric Acid.—Per cwt. : 10 cwt. or more £13 10s, one cwt. £13 15s.

Titanium Oxide.—Standard grade comm., with rutile structure, £172 per ton ; standard grade comm., £152 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d, white seal, £119 ; green seal, £117 ; red seal, 2-ton lots, £114 per ton.

Solvents & Plasticizers

Acetone.—Small lots : In 5-gal. cans : 5-gal., £125, 10-gal. and upward, £115, cans included. In 40/45 gal. returnable drums, spot : Less than 1 ton, £90 ; 1 to less than 5 tons, £87 ; 5 to less than 10 tons, £86 ; 10 tons and upward, £85. In tank wagons, spot : 1 to less than 5 tons (min. 400 gal.), £85 ; 5 to less than 10 tons (1,500 gal.), £84 ; 10 tons and upward (2,500 gal.), £83 ; contract rebate, £2. All per ton d/d.

Butyl Acetate BSS.—£159 per ton, in 10-ton lots.

***n*-Butyl alcohol, BSS.**—10 tons, in drums, £143 per ton d/d.

***sec*-Butyl Alcohol.**—5 gal. drums £159 ; 40 gal. drums : less than 1 ton £124 per ton ; 1 to 10 tons £123 per ton ; 10 tons and over £119 per ton ; 100 tons and over £120 per ton.

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

Diacetone Alcohol.—Small lots : 5 gal. drums, £177 per ton ; 10 gal. drums, £167 per ton. In 40/45 gal. drums ; less than 1 ton, £142 per ton ; 1 to 9 tons, £141 per ton ; 10 to 50 tons, £140 per ton ; 50 to 100 tons, £139 per ton ; 100 tons and over, £138 per ton.

Dibutyl Phthalate.—In drums, 10 tons, 2s per lb. d/d ; 45-gal. drums, 2s 1½d per lb. d/d.

Diethyl Phthalate.—In drums, 10 tons, 1s 11½d per lb. d/d ; 45 gal. drums, 2s 1d per lb. d/d.

Dimethyl Phthalate.—In drums, 10 tons, 1s 9d per lb. d/d ; 45 gal. drums, 1s 10½d per lb. d/d.

Dioctyl Phthalate.—In drums, 10 tons, 2s 8d per lb. d/d ; 45 gal. drums, 2s 9½d per lb. d/d.

Ether BSS.—In 1 ton lots, 1s 11d per lb. ; drums extra.

Ethyl Acetate.—10 tons lots, d/d, £128 per ton.

Ethyl Alcohol (PBS 66 o.p.).—Over 300,000 p. gal., 2s 9d ; 2,500-10,000 p. gal., 2s 11½d per p. gal., d/d in tankers. D/D in 40/45-gal. drums, 1d p.p.g. extra. Absolute alcohol (75.2 o.p.) 5d p.p.g. extra.

Methanol.—Pure synthetic, d/d, £43 15s per ton.

Methylated Spirit.—Industrial 66° o.p. : 500 gal. and over in tankers, 4s 10d per gal. d/d ; 100-499 gal. in drums, 5s 2½d per gal. d/d. Pyridinised 64 o.p. : 500 gal. and over in tankers, 5s 0d per gal. d/d ; 100-499 gal. in drums, 5s 4½d per gal. d/d.

Methyl Ethyl Ketone.—10-ton lots, £133 per ton d/d ; 100-ton lots, £131 per ton d/d.

Methyl *iso*Butyl Ketone.—10 tons and over £159 per ton.

***iso*Propyl Acetate.**—In drums, 10 tons, £123 per ton d/d ; 45 gal. drums, £129 per ton d/d.

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

Rubber Chemicals

Carbon Bisulphide.—£61 to £67 per ton, according to quality.

Carbon Black.—8d to 1s per lb., according to packing.

Carbon Tetrachloride.—Ton lots, £79 10s per ton.

India-Rubber Substitutes.—White, 1s 5¾d to 1s 9½d per lb. ; dark, 1s 4d to 1s 6¾d per lb. delivered free to customers' works.

Lithopone.—30%, about £55 per ton.

Mineral Black.—£7 10s to £10 per ton.

Sulphur Chloride.—British, about £50 per ton.

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

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

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals. delivered in bulk, 90's, 5s ; pure, 5s 4d.

Carbolic Acid.—Crystals, minimum price 1s 4d to 1s 7d per lb. delivered in bulk, ½d per lb. extra in 40/50 gal. returnable drums. Crude, 60's, 8s per gal. Crystals, 1s 4d to 1s 7d per lb., d/d crude, 8s naked, at works.

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

Cresylic Acid.—Pale 99/100%, 6s 4d per gal. ; 99.5/100%, 6s 6d per gal. D/d UK in bulk : Pale A.D.F. from 6s 5d per imperial gallon f.o.b. UK, 85 cents per US gallon, c.i.f. NY.

Naphtha.—Solvent, 90/160°, 5s per gal ; heavy, 90/190°, 3s 11d per gal. for bulk 1000-gal. lots, d/d. Drums extra ; higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in buyers' bags, £17 14s to £29 2s per ton nominal, according to m.p. ; hot pressed, £40 18s per ton in bulk ex-works ; refined crystals, £59 10s per ton d/d min. 4-ton lots.

Pitch.—Medium, soft, home trade, £9 per ton f.o.r. suppliers' works ; export trade about £10 10s per ton f.o.b. suppliers' port.

Pyridine.—90/160, 20/- to £1 2s 6d per gal.

Toluole.—Pure, 5s 9d ; 90's 5s 0d per gal. d/d. MANCHESTER : Pure, 5s 7d per gal. naked.

Xylole.—For 1000-gal. lots, 5s 10d to 6s per gal., according to grade, d/d London area in bulk.

Intermediates & Dyes (Prices Nominal)

***m*-Cresol** 98/100%.—4s 9d per lb. d/d.

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

***p*-Cresol** 34/35° C.—4s 9d per lb. d/d.

Dichloraniline.—4s 3½d per lb.

Dinitrobenzene.—88/99° C., 2s per lb.

Dinitrotoluene.— S.P. 15° C., 2s 0½d per lb. ; S.P. 26° C., 1s 4d per lb. ; S.P. 33° C., 1s 2d per lb. ; S.P. 66/68° C., 1s 10d per lb. Drums extra.

***p*-Nitraniline.**—4s 10d per lb.

Nitrobenzene.—Spot, 10d per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—2s 4d per lb.

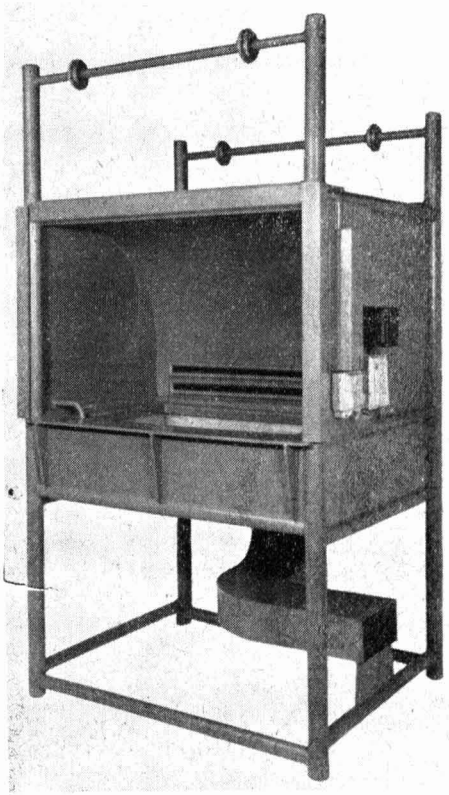
***o*-Toluidine.**—1s 10d per lb., in 8/10-cwt. drums, drums extra.

***p*-Toluidine.**—5s 9½d per lb., in casks.

Dimethylaniline.—3s 3d per lb., drums extra, carriage paid.

Publications & Announcements

A CABINET designed to prevent the toxic effects of hydrofluoric acid and the danger of explosion from handling perchloric acid has been produced by Turner & Brown Ltd., of Davenport Street, Bolton, Lancs. The main structure of the cabinet is in BX Cobex rigid vinyl tube reinforced with metal. The side and back panels are of rigid pvc sheet $\frac{1}{8}$-inch thick. A stainless steel tank (optional) can be incorporated to form the working level. The tank is insulated from the pvc with glass wool, and it is claimed that Bunsen burners and hotplates may be used with complete safety. A water feed irrigates the tank to a depth of $\frac{1}{8}$-inch. Fumes are drawn out through bottom extract ports to a pvc fan, and in the case of perchloric acid the ducts may be sprayed with water to eliminate build up and risk of explosion. A totally enclosed fluorescent light fitting and control gear are provided. The sliding sash is manufactured from transparent pvc adequately reinforced. This is raised and lowered by Terylene cords working on pvc pulleys and counter balanced by lead weights in a tubular pvc housing.



Turner & Brown's new fume cabinet

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PIONEERS of advanced designs in welded platework, Whessoe Ltd., of Darlington, have just issued their 62nd leaflet in the series devoted to weld inspection which can be obtained, free of charge, from the company. The leaflet illustrates and describes Whesso's latest metods of inspection of shop and site built tanks and vessels, non-destructive methods and semi-destructive methods, site and works inspection, inspection and development, and typical examinations.

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A NEW data sheet, 'Silicones in the Glass Industry', has been issued by ICI. The sheet describes the use of silicones as mould release agents in making glass bottles, etc., and as surface coatings for glassware to reduce breakage during transport, and handling.

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PART of the series of compilations of thermodynamic and transport properties of gases published by the US National Bureau of Standards, 'Tables of Thermal Properties of Gases' by Joseph Hilsenrath, C. W. Beckett, W. S. Benedict, Lila Fano, H. J. Hoge, J. F. Masi, R. L. Nuttall, Y. S. Touloukian and H. W. Woolley, is a 478-page book covering in tabular form air, argon, carbon dioxide, carbon monoxide, hydrogen, nitrogen, oxygen, and steam. Tables are given at close temperature intervals for the thermodynamic and transport properties of the gases covered, and the thermodynamic properties—compressibility factor, density, entropy, enthalpy, specific heat, specific-heat ratio and sound velocity—are tabulated for the real gases at pressures up to 100 atmospheres and to temperatures of 600°K for hydrogen, 1,500°K for carbon dioxide, 850°K for steam, and 3,000°K for the remainder. The ideal-gas thermodynamic functions are tabulated uniformly to 5,000°K. Available from the National Bureau of Standards, US

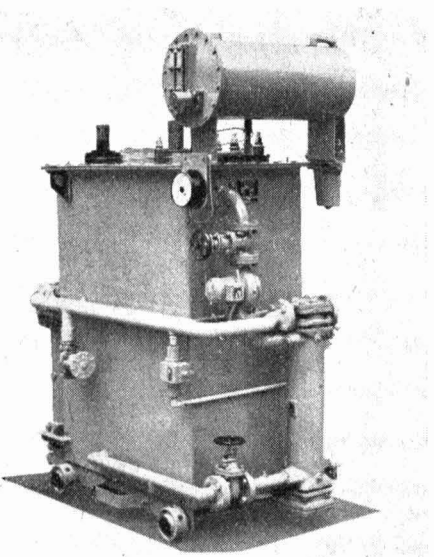
Department of Commerce, Washington 25, DC, the book is priced $3.75 Foreign remittance must be in US exchange and should include an additional one-third of the publication to cover postage.

* * *

NINE Westculite forced oil water-cooled rectifier sets manufactured by the Westinghouse Brake & Signal Co. Ltd. are now being erected at the Brightside Works of Wm. Jessop & Sons Ltd. in Sheffield, where they will be used to supply direct current for melting titanium in electric furnaces. Westculite selenium rectifier units are immersed in oil in the tank shown. Circulated by ThermoPak pumps, this oil removes from the rectifier units heat created during rectification. This heat is transferred in two heat exchangers to flowing water which removes it from the installation. The range of ThermoPak circulators made by Sigmund Pumps Ltd. has capacities of from 10 to 200 gpm at heads of up 22 ft. Branch sizes are from one inch to four inches. These circulators are glandless, supersilent pumps, said to be ideally suited for circulating systems of both heating and cooling media. The illustration shows one of the Westculite rectifier units with a DC output of 2,000 amps at 40 v. Two Sigmund ThermoPak circulators with a total capacity of 70 gpm are used for circulating the oil in which the rectifiers are immersed. In the illustration the pump is shown mounted between the top valve and the Serck oil-to-water heat exchanger. They have two-inch flanged branch connections, and the stator motor, which can be removed without dismantling any other part, is wound for 55 volt, three phase supply.

* * *

THE latest edition of 'Vacuum', a review of developments in vacuum research and engineering, published by Edwards High Vacuum Ltd., Crawley, Sussex, is now available. A useful feature of this publication is the classified abstracts section in which abstracts are given of literature relating to all branches of vacuum science and engineering. Articles in this issue include 'Cathodic Sputtering—An Analysis of the Physical Processes' by A Guentherschulze, 'The Properties of Some Reactively Sputtered Metal Oxide Films', by L. Holland and G. Siddall, and a training report on Thin Film Optics at the Imperial College of Science and Technology. In a letter to the editor, J. Hodkinson of the Physical Laboratory, Ferranti Ltd., describes a method for making polythene windows for vacuum systems which has proved very useful for constructing X-ray tube windows in cases where the window is required to be as near as possible to the source from which the X-rays are being emitted.



The Westculite rectifier unit

* * *

A NEW design of flow indicating device is now being made by Liquid Systems Ltd., Craig's Court House, 25 Whitehall, London SW1, in accordance with the company's contract with the Bowser organization and Rubery Owen & Co. Ltd. The Fig. 55A Bowser flow sight is made in bronze and is of the double window clear vision type. Equipped with a nozzle on the inlet side to cause the liquid to flow downward in a round stream without contacting the glasses, they are recommended for use on gravity lines where the flow is vertically downwards. It can also be used on pressure lines for observing clarity of liquid. A prominent feature is the method of retaining the glass. The retainer is threaded on the outside, permitting rapid and uniform circumferential tightening. There are no bolts to cause uneven pressure and glass breakage. Maximum pressure for the standard model is 125 psi. It is fitted with heavy plate glass and is threaded with female connections.

Chemical & Allied Stocks & Shares

THE continued menace of inflation, which has called for still further measures from the Government, and is likely to demand even tougher ones in the April Budget, has naturally had its impact on stock markets. British Funds fell heavily, as they always do when the bank rate rises, and other fixed-interest securities, including debentures and preference shares, also moved lower in price.

Mr. Macmillan's anti-inflation moves are very comprehensive, but the feeling in the City is that they may not work rapidly enough to check the expansion in our imports and if so, there would be no early improvement in our gold and dollar reserves. We have only four or five months in which to put these reserves into better shape, because in the second half of the year they usually show an adverse trend owing to payments to the US for tobacco, cotton and other imports.

Credit Squeeze

There is of course no doubt that the 5½ per cent bank rate, plus the credit squeeze by the banks, and the other measures, including the vetting of new issue applications to the CIC, will do a great deal to slow down spending by industry. It is recognised that this is inevitable if inflation is to be held in check; but the feeling is that reduction of spending by the Government should be on a much larger and more comprehensive scale.

The effects on industry are serious, taking more than a short view, because it means a check to the re-equipment and modernization of plant, which will become vital as we move closer to the automation and nuclear age. Many shares have fallen to their lowest levels for two years, and among the big falls in British Funds the most spectacular was in 3½ per cent War Loan, which changed hands down to £70, its lowest ever, though later there was a recovery in price to £72. At one time last year it was £88¼. Share values have also made a slight recovery from recent big falls, but they show substantial declines on balance for the month.

Imperial Chemical, for instance, have declined on the month from 46s. to 42s. and now yield fully 4¾ per cent on the basis of last year's 10 per cent dividend. Monsanto 5s. shares dropped from 28s. to 25s. 6d., and Fisons from 54s. 3d. to 51s. 6d. Moreover, despite the excellent impression created by the financial results, Hickson & Welch 10s. shares have receded on the month from 31s. to 27s. 6d. xd.

In other directions, Albright & Wilson 5s. shares were 18s. 6d., compared with 20s. 3d. a month ago, and Reichhold 5s. shares moved down from 20s. 6d., to 18s. 9d. with the general trend. Yorkshire Dyeware & Chemical 5s. shares, however, kept at 10s. 9d. Elsewhere, Laporte 5s. shares have declined from 16s. 9d. to 15s. 7½d. Hardman & Holden 5s. shares from 12s. 3d. to 11s. 6d, while Brotherton 10s. shares lost 1s. at 33s. 6d.

British Glues fell from 16s. 3d. to 14s. 9d. and F. W. Berk 5s. shares were 8s., compared with 8s. 9d. a month ago. Anchor Chemical 5s. shares were easier at 14s. 6d. despite the 17½ per cent dividend which was in accordance with expectations. There has been a considerable business in Borax Consolidated shares, and although the financial results were up to best estimates in the City, the shares have not been immune from the general trend in markets, and were 162s. 6d., compared with 167s. 6d a month ago Shares of companies connected with plastics also reflected the prevailing trend. British Xylonite, for example, were 38s., compared with 40s. 3d. a month ago, and British Industrial 2s. shares 5s. 1½d., compared with 5s. 9d. Glaxo 10s. shares have declined on the month from 33s. 9d. to 29s.6d. Compared with a month ago, Unilever have fallen from 68s. to 63s. 3d. and the 6s. 8d. units of The Distillers Co. from 23s. to 21s. 6d. Boots Drug 5s. shares were 13s. 6d. compared with 15s. 3d. a month ago.

Trade Union Dispute

A dispute between two rival trade unions as to who will install 420 metal window frames is expected to delay the completion of a seven storey block of offices which are being built for Brotherton & Co., chemical manufacturers, at Leeds. Completion, promised for September, will be delayed for about two months if the dispute is not settled.

Law & Company News

Commercial Intelligence

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

Mortgages & Charges

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

A. C. BEESON & SONS LTD. Grimsby, paint manufacturers.—17 January, mortgaged to Midland Bank Ltd. securing all moneys due or to become due to the Bank; charged on 121 Duncombe Street, Grimsby, with fixtures. *£1,602. 30 December, 1950.

REGENCY FINISHES (BRIGHTON) LTD., paint manufacturers.—16 January, £8,250 mortgaged to Eagle Star Insurance Co. Ltd., charged on certain land at South Coast Road, Peacehaven.

WILD-BARFIELD ELECTRIC FURNACES LTD. Watford.—17 January, £100,000 debenture stock secured by a Trust Deed dated 30 December, 1955; charged on premises known as Elecfurn Works, Watford By-Pass, Bushey, and specified adjacent property &c. *£50,000. 5 April, 1955.

Satisfactions

ALFRED NIGHTINGALE & SONS LTD. Bedford, fertilizer manufacturers &c.—Satisfaction 25 January, of mortgage registered 25 November, 1937.

PILKINGTON BROTHERS LTD. Liverpool, glass manufacturers.—Satisfaction 25 January, of debenture stock registered 13 November, 1947, to the extent of £2,000.

New Registrations

Burnett Dyes Ltd.

Private company (561,449). Capital £15,000 in £1 shares. To acquire the business of Burnett Dyes Ltd. (in voluntary liquidation), and to carry on the business of and to manufacture and deal, whether as merchants, factors, agents or otherwise in dyes, dyestuffs and dyewares, chemicals, etc. Subscribers (each with one share):—George H. Webster, 11 Hutton Road, Marshfields, Bradford 5, and Squire Lowry, 3 Bowman Road, Buttershaw, Bradford.

Karmor Ltd.

Private company (561,467). Capital £100 in £1 shares. To carry on the business of miners, refiners, distillers and manufacturers of and dealers in any ore, mineral substance or product and any chemical or other preparation or production; chemical manufacturers etc. Subscribers (each with one share): K. E. Wright and S. R. Ward, of 18 Austin Friars, London EC2.

Company News

Boots Pure Drug Co. Ltd.

At a meeting on 20 February of the board of Boots Pure Drug Co. Ltd., a resolution was passed that an interim dividend for the half-year ending 31 March 1956, of three per cent, less tax, be paid on that date to ordinary shareholders on the register at 8 March 1956.

Revertex

Revertex, manufacturers of rubber latex and synthetic rubber emulsions have recommended a final dividend of 15 per cent, making 25 per cent on the £412,500 capital as increased by a 50 per cent scrip issue. Similar payments were made for the previous year on the smaller capital. Taxed profit for the year to 30 September 1955, expanded from £190,077 to £234,007. Tax charged was £233,000.

Borax Consolidated Ltd.

The trading profit of Borax Consolidated for the year ending 30 September 1955 was £2,438,190 as against £1,712,834 for the previous year. An investment income of £315,984 was also made, making a total income for the year of £2,754,174. After making allowance for tax deductions, dividends and a transfer to general reserve of £500,000 the balance to be carried forward is £1,056,189, compared with £935,874 for the previous year. Dividends for the year were: interim five per cent, and proposed final 18 per cent making a total for the year of 23 per cent. The figure for the previous year was 18 per cent.

Next Week's Events

TUESDAY 28 FEBRUARY

Royal Institution

London: 21 Albermarle Street W1, 6 p.m. 'Colloids & Their Behaviour' by Sir Eric Rideal, M.B.E., M.A., D.Sc., F.R.S.

Institution of Chemical Engineers

Manchester: Reynolds Hall, College of Technology, 7 p.m. 'A Case Study of the Expansion of a Fine Chemical Plant' by B. L. Budd, B.Sc., A.I.Chem.E., A.C.G.I., and J. S. Brough, M.I. Chem.E.

WEDNESDAY 29 February

Manchester Metallurgical Society

Manchester Lecture Room, Central Library, 6.30 p.m. 'BISRA research on 'Electric Furnaces' & 'Ingots' by W. H. Glaisher, B.Sc., A.I.M.

Society for Analytical Chemistry

London: Burlington House, Piccadilly W1, 4.30 p.m. Bernard Dyer Memorial Lecture, 'The Evolution of Agricultural Research' by Sir William Slater, K.B.E., D.Sc., F.R.I.C.

SCI (Food Group)

London: Rooms of The Chemical Society, Burlington House, Piccadilly W1, 6.30 p.m. 'Some New Aspects of the Mechanism of Fat Oxidation & its Inhibition' by N. Uri, M.Sc., Ph. D.

THURSDAY 1 MARCH

SCI (Nottingham)

Nottingham: Gas Showrooms, 7.30 p.m. 'Safety in the Chemical Industry' by L. J. Burrage, Ph.D., D.Sc., A.M.I.Chem.E., F.R.I.C.

The Chemical Society

Bristol: Chemistry Department, The University, 5.15 p.m. 'Tropylium' by Professor M. J. S. Dewar, M.A., D.Phil.

Textile Institute

Cardiff: The University, 7.15 p.m. 'Modern Textile Finishing' by Professor C. S. Whewell, B.Sc., Ph.D., F.R.I.C., F.T.I., F.S.D.C.

FRIDAY 2 MARCH

SCI (Manchester)

Manchester: The University, 6.30 p.m. Levinstein Memorial Lecture, 'Applications of Carbohydrates in Industry & Medicine' by Professor M. Stacey, Ph.D., D.Sc., F.R.I.C., F.R.S.

SCI (Stirling)

Grangemouth: Refinery Recreation Club, 2.30 p.m. Joint meeting with RIC & Institute of Petroleum. 'Corrosion Control by Water Treatment' by R. S. Thornhill; 'Water Treatment for Recirculating Cooling Systems' by C. W. Drane, B.Sc.; and 'Boiler Water Conditioning at Ultra High Pressures' by C. D. Weir.

Society of Instrument Technology

Fawley: Copthorne House, Fawley, Hants, 7 p.m. 'Control Engineering & the Automatic Process Plant' by D. S. Townend.

The Chemical Society

Newcastle upon Tyne: King's College, 4 p.m. Meeting for the reading of original papers.

Southampton: Chemistry Department, The University, 5 p.m. 'Cationic Polymerization' by Professor A. G. Evans, M.Sc., Ph.D.

Cambridge: University Chemical Laboratory, Pembroke Street, 8.30 p.m. 'Some Recent Studies in the Fatty Acid Field' by Dr. B. C. L. Weedon, B.Sc., A.R.I.C.

Ramsay Fellowships

APPLICATIONS for two Ramsay Memorial Fellowships for advanced students of chemistry will be considered in June. One of the fellowships will be limited to candidates educated in Glasgow, who can apply to be considered for either fellowship. The value of each fellowship will be £600 per annum, to which may be added a grant for expenses of research not exceeding £100 per annum.

The fellowships will normally to tenable for two years.

Full particulars can be obtained from the joint honorary secretaries, Ramsay Memorial Fellowships Trust, University College London, Gower Street, London WC1. Completed application forms must be received not later than 20 April, 1956.

Will

MR. JAMES MACAULEY BENTLEY, of Brook Lea, Low Lane, Horsforth, near Leeds, senior partner of Thomas Bentley & Son, soap manufacturers, of Horsforth, left £49,220 (net £49,130, duty paid £15,337).

Shawinigan's New Plant

THREE engineers of Shawinigan Chemicals Ltd. have left Canada for Europe to study new types of cells for possible use in a projected caustic soda and chlorine plant at Shawinigan Falls. Construction is to begin this spring, and the plant is expected to be in operation by next year.

The engineers will return in about a month and their reports on European methods will be evaluated against those in the US. A decision will then be reached as to the type of cell for the new plant.

Capacity of the $5,000,000 plant has not yet been decided. It will be built on a new 50-acre plant site on the bank of the St. Maurice River in Shawinigan East. Shawinigan Chemicals and associated companies are large consumers of caustic soda and chlorine. It is understood that this is chiefly supplied by CIL at present. The output is also expected to be used in the development of new products. The plant will provide a base should the company go into production of other chemicals.

Instrument Conference

AN Instrumentation Appreciation Conference will be held by the Association of British Chemical Manufacturers at the Hotel Majestic, Harrogate, from 19 April to 22 April, 1956. The conference is intended primarily to acquaint higher management with the potentials and benefits of more extended instrumentation in the factory. It will not be of a highly technical nature. A display and demonstration of modern measurement and control equipment will be given by leading instrument makers to illustrate points made in the various conference lectures.

The conference is open to any user of instruments and the fee is £1 10s. Attendance will be limited to 400. Further details and application forms can be obtained from the intelligence officer, ABCM, Cecil Chambers, 86 Strand, London WC2.

The Norwegian Government has submitted a verbal offer to the Syrian Government for the construction of an oil refinery in Syria.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

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

ARMSTRONG SIDDELEY MOTORS have a vacancy for a **SENIOR CHEMIST** in their Chemical Laboratory. This is a new position of unusual responsibility, since the successful applicant would be expected to take charge of chemical work and be directly responsible to the Chief Chemist. A Degree in Chemistry is essential, although in certain circumstances an Honours Degree in general science would be acceptable. Applicants should be over 25 and have had previous experience in executive positions. The position carries commensurate salary and senior executive status. Applications will be treated in strictest confidence and should be sent to the TECHNICAL PERSONNEL MANAGER, ARMSTRONG SIDDELEY MOTORS, COVENTRY quoting Reference SC/Lab.

ASSISTANT GROUP MANAGER

A vacancy exists with the Industrial Group of the **UNITED KINGDOM ATOMIC ENERGY AUTHORITY, at CAPENHURST WORKS,** Nr. Chester.

DUTIES: To be responsible for the safe and efficient operation of a group of plants, designed to high vacuum standards and handling process gases. The work also includes the operation of a large refrigeration and disposal plant.

QUALIFICATIONS AND EXPERIENCE: Applicants should have an Honours degree in Chemistry, Chemical Engineering or Physics or have equivalent qualifications. They should have previous managerial experience in a Chemical Works, some of which should preferably have been associated with plants handling radioactive and toxic materials. A sound appreciation of cost control is essential.

SALARY: £1,130 rising by annual increments of approximately £40 to £1,435 p.a.

The successful candidate if under 55 will be required to join the Authority's contributory pension scheme, which includes Widows' and Dependants' benefits.

A house may be available within a reasonable time for the successful candidate, if married.

Suitably qualified persons are invited to send a **POSTCARD** quoting reference 1,304 for application form to the Works Secretary, U.K.A.E.A., I.G., Capenhurst Works, Nr. Chester.

Closing date 9th March, 1956.

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SEVERAL **LABORATORY** vacancies exist for young men of G.C.E. standard which offer a technical career in the Paperboard Industry on either Works Control or Research and Development.

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For these grades an Honours degree in Science is essential.

ASSISTANT EXPERIMENTAL OFFICER:	£330 (at age 18)-£718
EXPERIMENTAL OFFICER:	£808-£988
SENIOR EXPERIMENTAL OFFICER:	£1,155-£1,350.

For these grades G.C.E. Advanced level (or equivalent) in science subjects is essential.

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Housing may be available for married officers with families.

Send **POST CARD** for application form to Personnel Officer, Radiochemical Centre, Amersham, Bucks. (Ref. 504).

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PATENTS

THE Owners of Patent No. 591767, which concerns **"IMPROVEMENTS IN PREVENTION OF FOAMING OF HYDROCARBON OILS",** are desirous of arranging by way of Licence or otherwise, on reasonable terms, for the commercial development in Great Britain of this invention. For particulars address **ELKINGTON AND FIFE, 329, HIGH HOLBORN, LONDON, W.C.1.**

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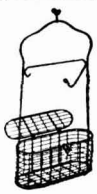

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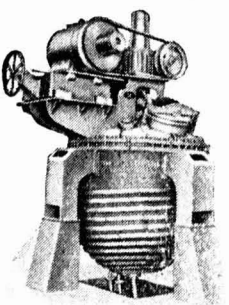

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