

Dr

THE Chemical Age

VOL. LXXIII

17 SEPTEMBER 1955

No. 1888.

Such difficulties arise

"Many difficulties occur in the pursuits of the dairy farmer which render his occupation precarious. Such difficulties arise entirely from an ignorance of the scientific relations of the practice in which he is engaged."



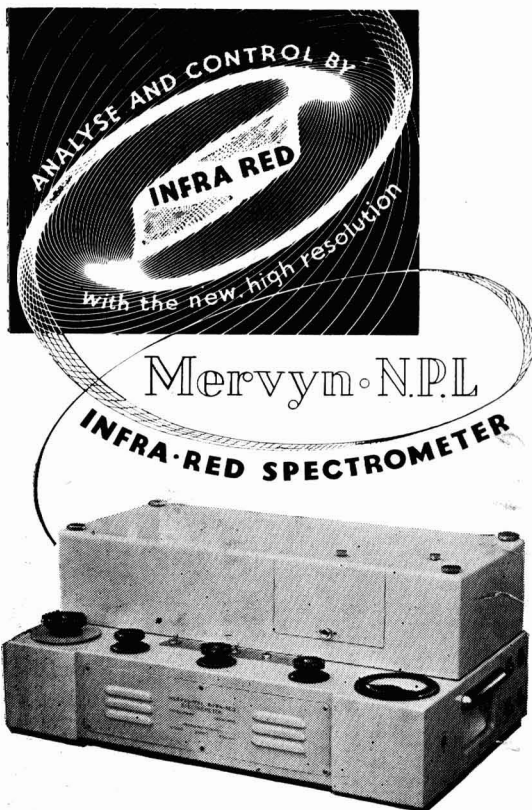
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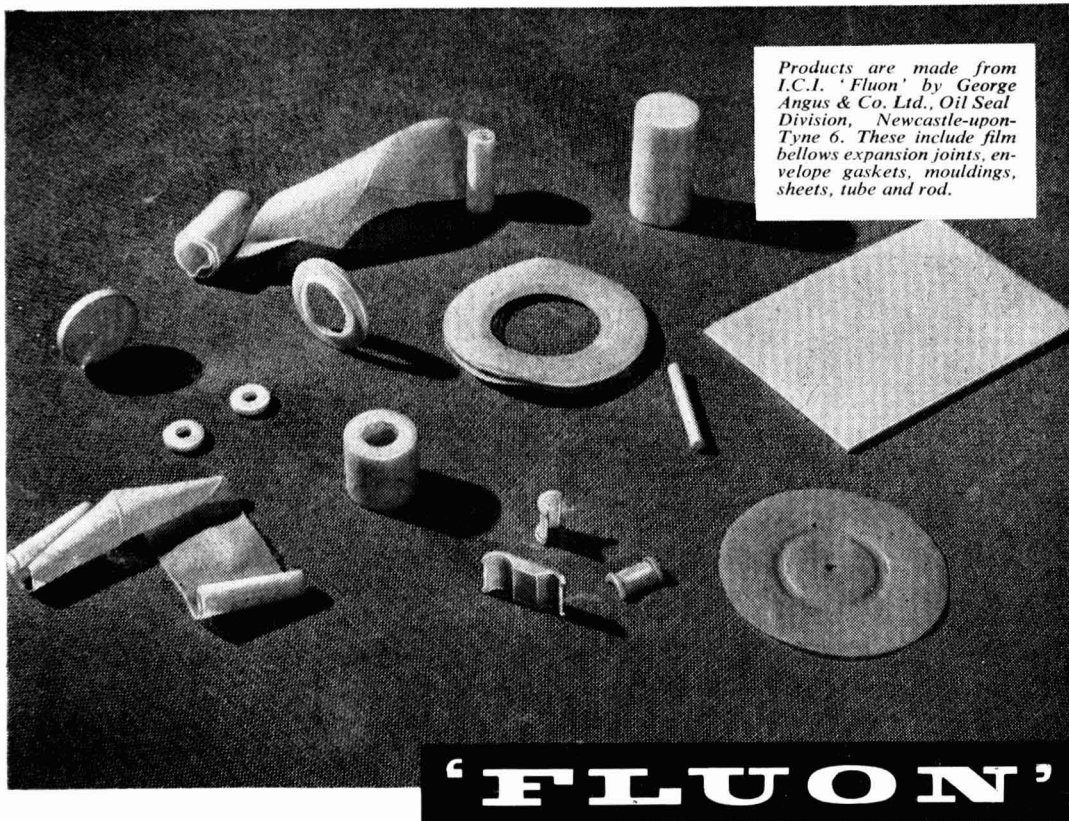
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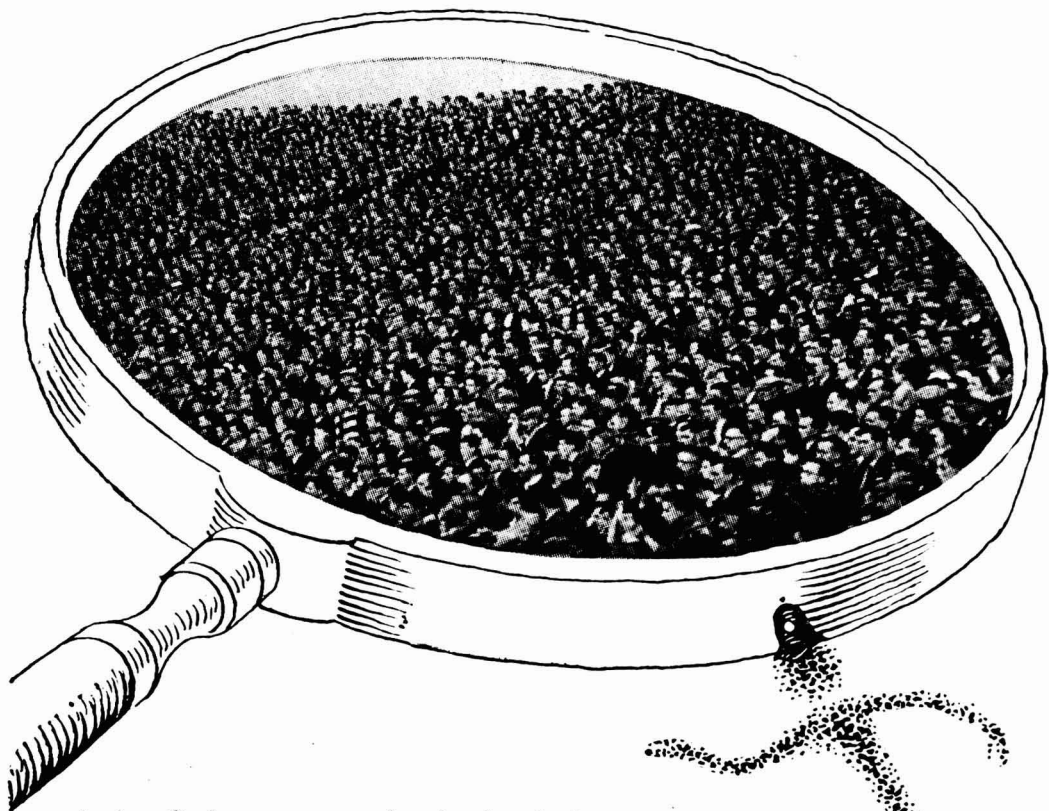
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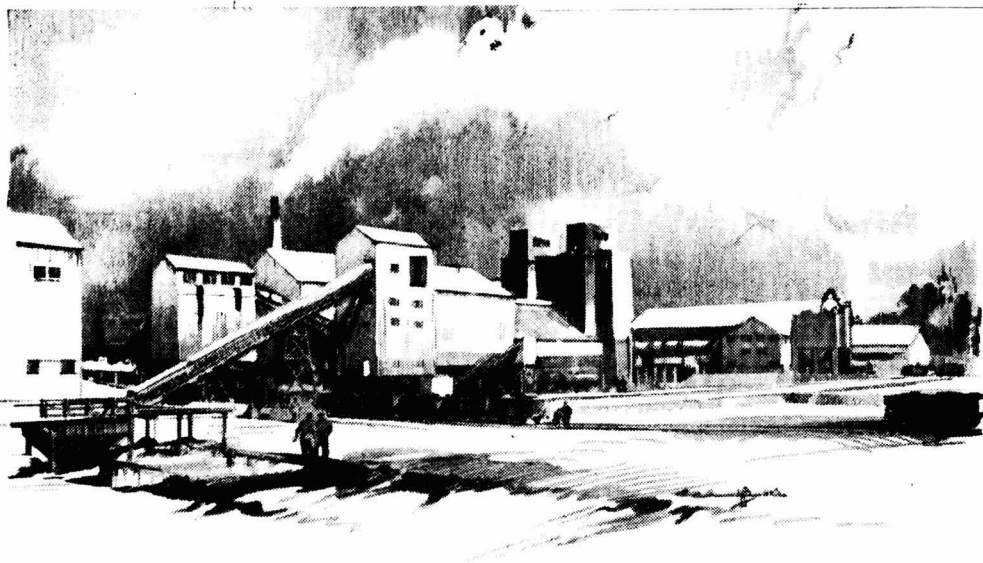
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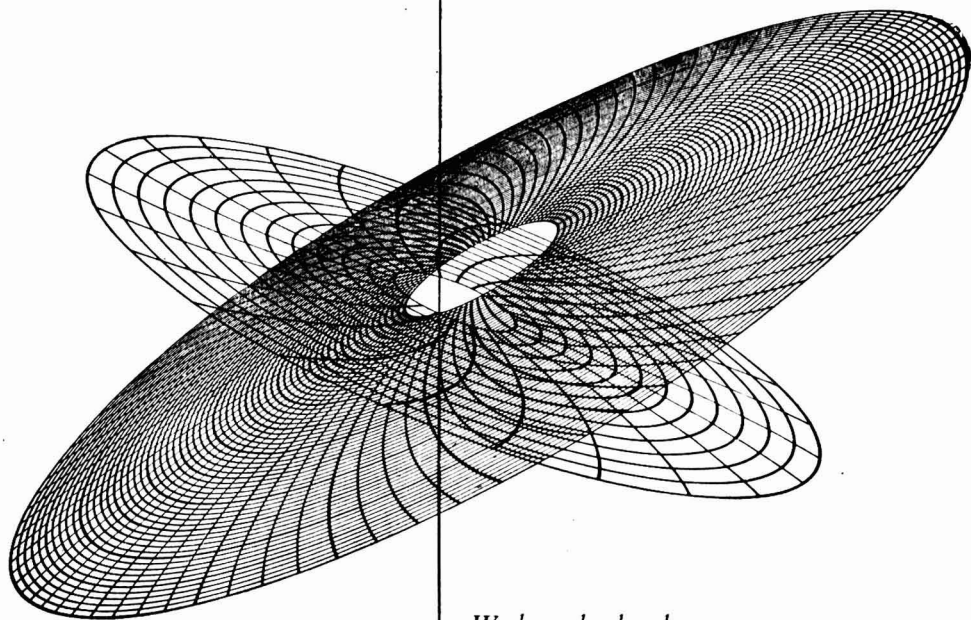
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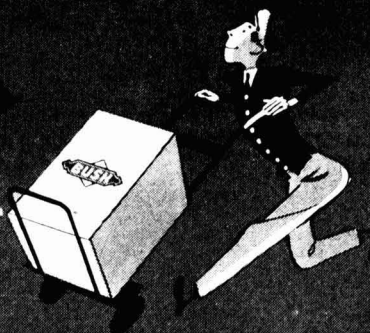


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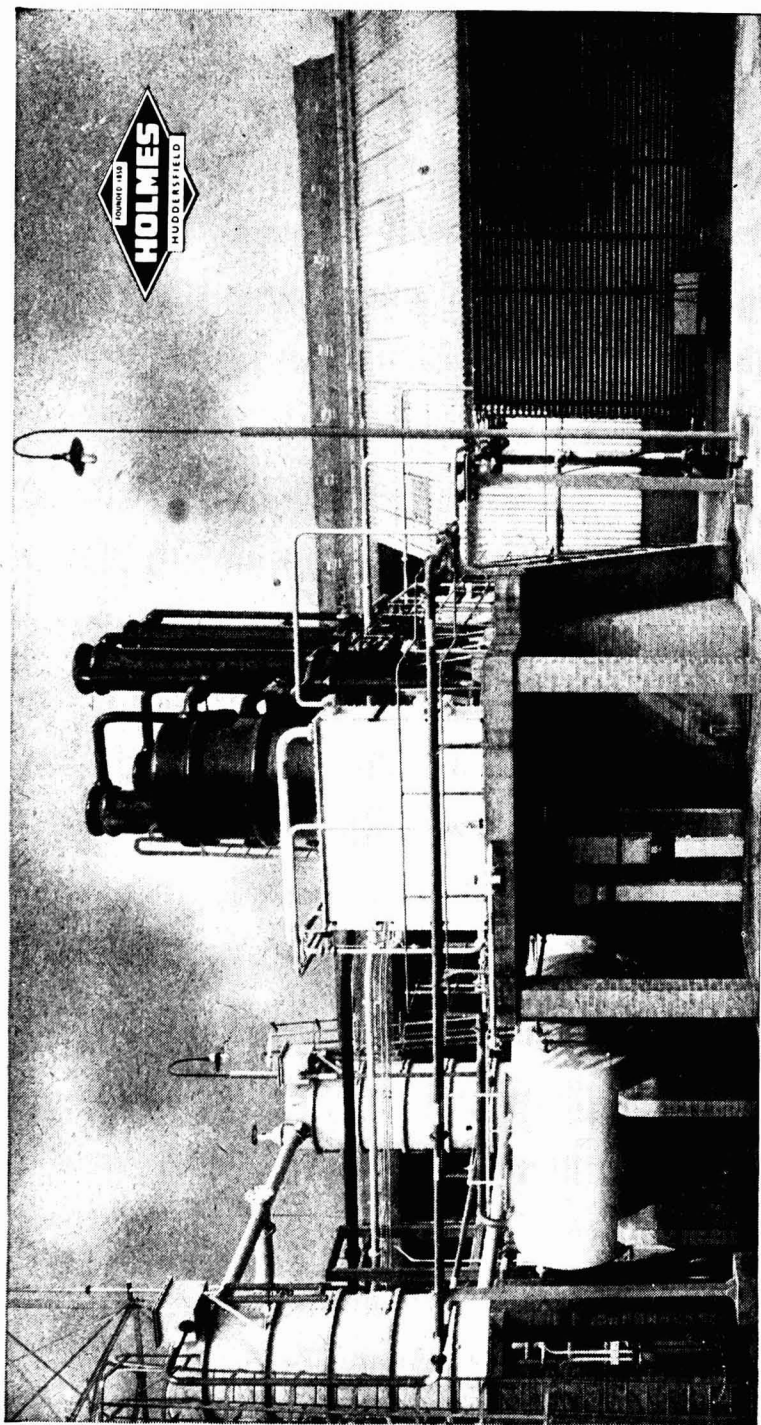


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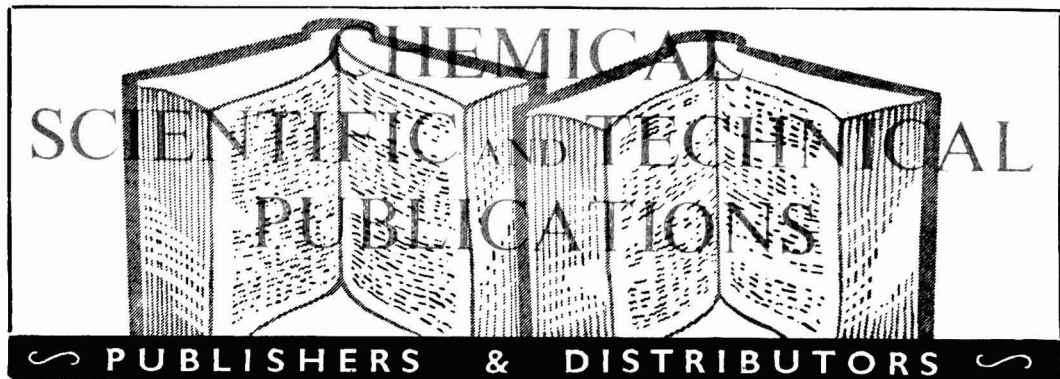
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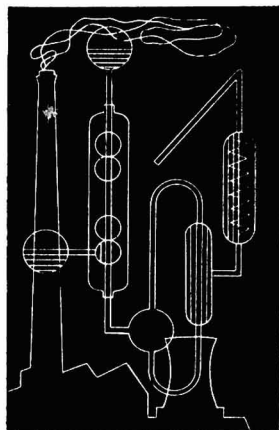
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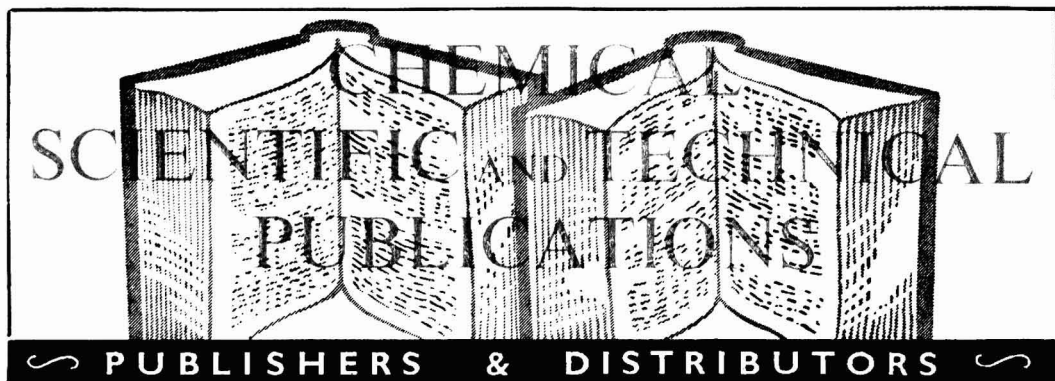
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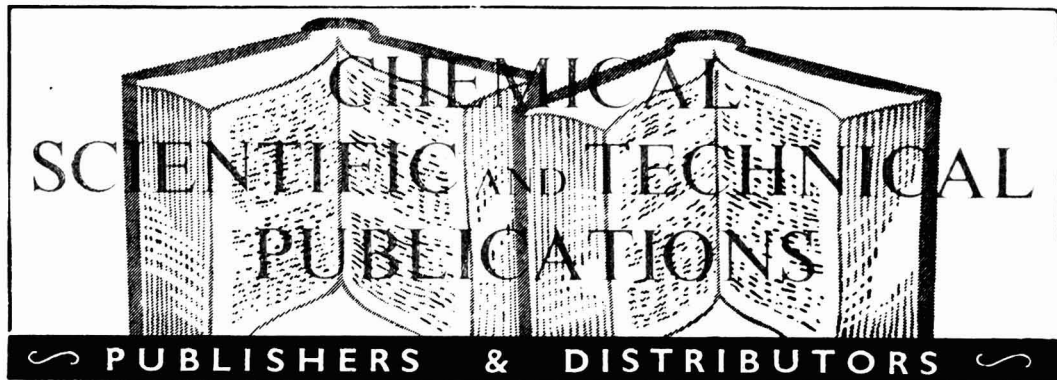
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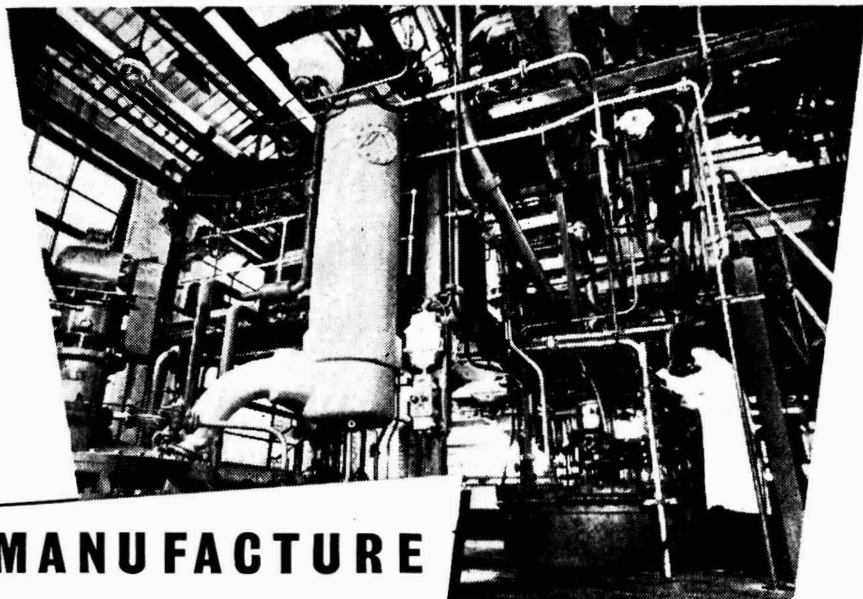
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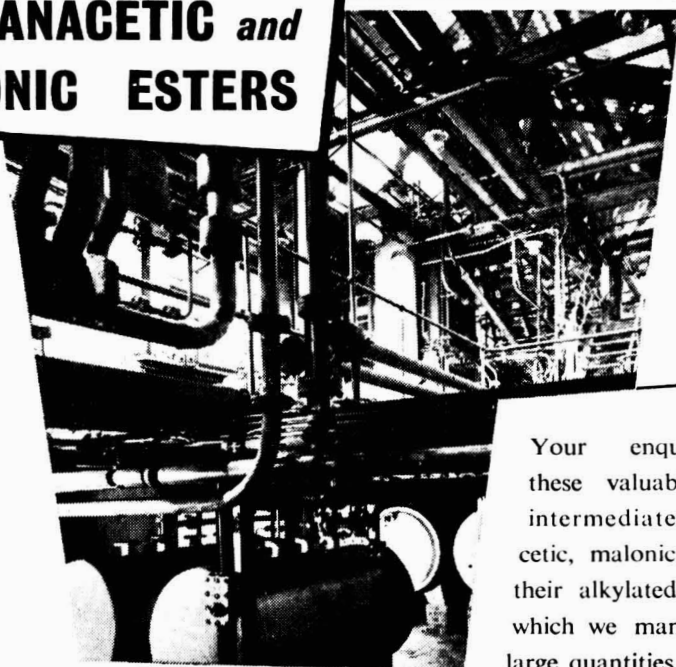
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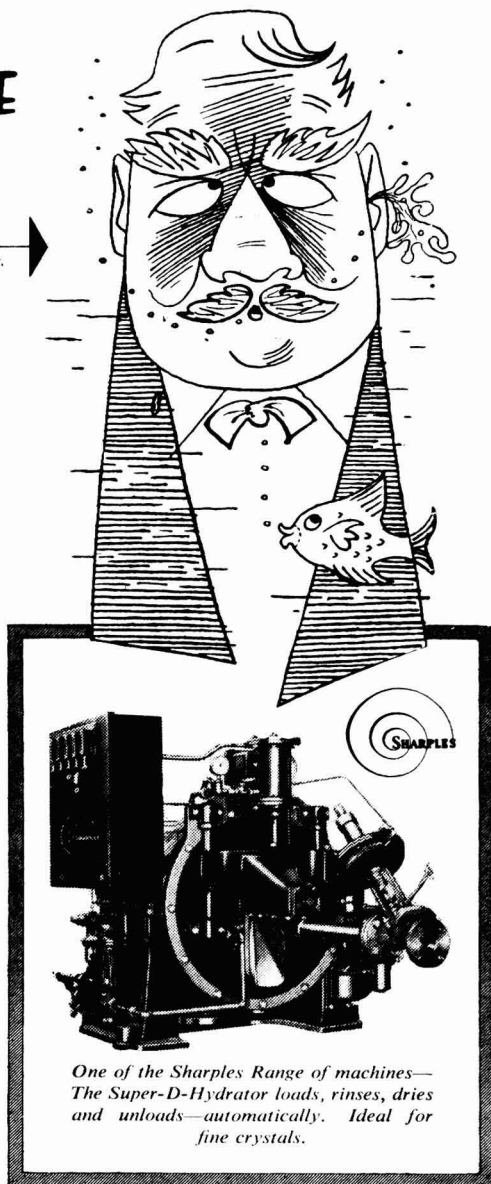
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One Thing & Another

AT this time of the year there is a seasonal dearth of news from the scientific world. During late August and early September holiday resorts at home and abroad must be crowded with scientists and technologists. 1955 is proving to be different only in one respect—the shortage of news is more noticeable than ever. Recently a well-known footballer's book about the professional game was published. It included one chapter entitled, if we remember correctly, 'What the Average Director Knows about Football,' and the chapter consisted of a few entirely blank pages. We must confess to being strongly tempted to adopt the same device for these two pages this week, 'What a Leader-writer Can Write About in September'. Mr. Butler could no doubt nudge us somewhat pointedly and say there is plenty to write about, but we dealt with this heavy theme of accountancy four weeks ago. Nor in any case do we assume that our readers fall into that section of the community which must be constantly made aware of national dangers that are scarcely describable as obscure. The economic situation does not seem to have improved, and 'ides of September' must throw much the same shadows as the 'ides of August.' If they are longer shadows, that is typical enough of autumn both economically and photographically.

Two events of September, one retrospective and the other prospective, came to our rescue—not perhaps as straws grasped when drowning, for in circumstances of aridity a risk of drowning can be faced almost with welcome. It may be more suitably metaphoric to regard these two events as mirages in a leader-writer's desert. September has

already brought the birth-centenary of the inventor of the cinema, William Friese-Greene of Bristol; and later September is to bring the start of commercial TV in Britain. Here at any rate two of the most potent impacts of science or technology upon leisure and the human mind are accidentally brought together.

The story of Friese-Greene and the cinema is better known today than it was during this tragic pioneer's lifetime. The popular fallacies that Edison or the Lumière brothers invented the first cinema camera and moving pictures have been exploded. Friese-Greene's provisional patent is dated June, 1889; the date for the Lumière brothers first contribution is 1895 and Edison's first 'cinema-patent,' the kinoscope, was dated 1891, the same year in which Friese-Greene was declared bankrupt and committed to prison. In 1910 Friese-Greene established priority as the inventor of the cinema in an American court; and the actual exhibition of films taken by him in Brighton in the 1880s was probably more decisive than the date-history of patent registrations. By then Friese-Greene had already patented a colour cinema-camera and a stereoscopic projector! In 1921 a shabby, grey-haired stranger made an emotional appeal at a meeting called to discuss the post-war plight of British films, and at once fell back in his chair to die from cerebral hæmorrhage. Friese-Greene had finished his contributions to the cinema. There was the sum of 1s. 6d. in his pocket.

We can assume that things today are better ordered for the technical pioneer. Inventors can be assisted by the State, large industrial companies are more alive to the long-term potentialities of entirely new ideas. If the rôle and pros-

pects of the individualist have been reduced, the pace and chance of development have been enormously increased by 'team work'. Technology in any field has gone beyond the stage of 'lone hand' hopefulness. Heartbreak there may still be when the vision of the absorbed individualist is unmatched by that of the organised 'group,' but the rigours of extreme economic hardship are not additionally imposed. So many technical miracles have been turned into everyday utilitarian performance that 'impossibilities' are not lightly and unthinkingly dismissed.

The social impact of the cinema and sound radio is now old enough to be assessed—that of TV is perhaps still too young. It seems true to say that the cinema soon became the principal art-form of the masses, and as such it has been dominated by a mass-producing industry whose standard output cannot frequently aim at qualities ranging beyond the common-factor requirements of the more numerous sections of the public. In this country sound radio—and to this present date, TV—have not been enslaved to box-office statistics, and what can openly be called entertainment has been steadily mixed with forms of adult education. There is little doubt that the artistic and intellectual qualities of films, especially of British films, have advanced in the past 10 years; this may well be attributed to the raising of public standards by radio. The officialised, middle-class 'stuffiness' of radio programmes can all too easily be criticised, but there has been little alternative for listeners and none for viewers. The best work of the BBC has had profound effects if its duller efforts have been without effect at all. The so-called documentary film, including the specialised form known as the scientific film, has been restored to public life by TV, and it is perhaps strange that the contemporary cinema, at any rate as represented by the average programme, has mainly ignored this revival.

There have been many fears that commercial TV will have a debasing impact upon public taste and opinion. Such fears are based upon a somewhat wild conception of advertisement-sponsored entertainment. If the much-described

crudity of the US pattern in commercial TV is true (and some descriptions must surely be exaggerated), the reaction of the British public to similar methods cannot be anything but unfavourable and to such an extent that the advertising value of the medium would largely be destroyed. The need for reasonably spaced intervals during which advertising matter will be put over is creating an entirely new demand for short films, films that must be made specially for commercial TV unless existent documentary 'shorts' are used. This can well bring about something of a revolution in the art-form of the film, which has for many years been chained to the 90-120 minutes' length of the standard cinema main-feature or second-feature product. Nor need it be regarded as a backwards step for the single BBC TV programme to enter an era of viewing competition, even though at the start that competition will affect only certain areas in the country. Competition rarely reduces values. A fourth counterpoint to fear about commercial TV is sheerly economic. TV productions are inevitably costly, and it is difficult to see how alternative programmes could have been developed here without appreciably raising the costs of TV licences. The introduction of income from advertising—the same economic device that enables a daily paper costing 6d. or 8d. per copy to produce to be sold for 1½d. or 2d.—solves this problem.

Certainly it remains to be seen whether the pessimists about commercial TV or the optimists are right, but neither preformed judgment nor hasty judgment in the first few weeks would seem appropriate. There could be some distortion of scientific aims and work; a sponsored programme of genuinely scientific material might be followed by pseudo-scientific advertising claims in the hope that an atmosphere of continuity would bring a sense of authenticity. The best defence against this possibility is to be found in the common sense of both scientists and public. Scientists should not allow themselves to be subtly exploited in this way, and the public need not be supposed to be as readily gullible in any case.

Notes & Comments

Raw Material Facts

TOO many people, including those who speak or write with some authority, invest the word 'productivity' with powers of economic magic. If productivity rises, wages can rise; if productivity rises, crises can be swept away. Although it is obvious that any kind of economy—personal, corporate, or national—is healthier when productivity is high than when it is low, this is far from the whole of the story. Labour is only one resource. Raw materials make another. British productivity and West European productivity have risen strikingly enough in the past two or three years, yet resultant prosperity is increasingly overshadowed with fears of crisis. The strains placed upon many essential raw material supplies can explain much of the present economic *malaise*. In few countries can coal output keep pace with demand; much the same is true of steel. Other major metals largely tell the same story. Copper has soared in price in a few months; zinc has risen sharply since last year; aluminium is scarce. Rubber also costs twice as much as it did 12 months ago. The popular formula of more and more productivity intensifies these pressures upon raw material supplies and can raise market prices even higher, so that any country which must buy raw materials heavily from other countries will inevitably find more and more discomfort in the 'terms of trade'.

Fundamental Disparity

IT is an old scientific principle that the order of accuracy in any measurement cannot be greater than the order for accuracy for the least accurate operation in that measurement. In the long run much the same principle applies to productivity—if rising productivity in the car or refrigerator industries is not matched by similar progress in the coal industry, there is little ultimate gain. It is far simpler to raise output-per-man in fabricating manufactures

than in the basic extractive industries that produce raw materials. It takes far more time and generally more capital as well to bring about a 10 per cent increase in metallic ore output than some similar increase in the output of articles made from the metal. Every surge of productivity in countries like Britain or Germany, whose main activities are the production of finished goods, accentuates this fundamental disparity, and creeping inflation suddenly begins to move at a much more alarming pace.

Tablet Testing

MOST of the chemical subjects discussed at the recent British Pharmaceutical Conference at Aberdeen had a specialised complexity that must severely limit wider appreciation. A generation or two ago the pharmaceutical 'chemist' was apt to be regarded with a certain inferiority by other chemists—his was a science overblended with art and tradition and therefore one of lesser scientific status. The sweeping advancement of chemotherapy has swept away this idea; whether it had any validity or whether it was merely a fallacy no longer matters. One of the few subjects that can be selected for its simplicity of theme is that of tablet testing. Here the problems encountered by pharmaceutical chemists are somewhat similar in type to those that industrial chemists often have to consider. The compressed tablet is not only a convenient 'dose,' it is a mechanical product.

Trial by Ordeal

IT was said that the most reliable method of testing tablets for physical strength was to send them round the world and see what they looked like on their return. Quicker methods of imitating this trial by ordeal seem to require improvement. Mechanical agitation in the laboratory, an obvious enough procedure, has been handicapped

by the cushioning effect of the powder that is first formed. That is to say, the powder created by early damage protects the remaining tablet shapes from further damage. A new testing device involves two glass tubes as vessels for agitation—they are connected by a mesh-screen and any powder formed in the tube containing the tablets falls into the second tube. It was suggested that this new method should form the basis of an official test. Chemical products other than those of medical purpose are put up in tablet forms, and this sensible refinement in mechanical strength testing should have a number of applications outside the realm of drugs.

Uniformity Vital

ANOTHER tablet problem is that of uniformity of weight. The official test for pharmaceutical tablets requires the individual weighing of a sample of 20 tablets to establish conformity to prescribed deviation tolerances. A testing procedure that is based upon modern statistical science would certainly be less cumbersome and no less

reliable. Such a procedure was put forward at the Conference. After determining the average weight of 20 tablets, a batch should be rejected if 2 tablets in the first 5 weighed were deviating by more than the tolerated amount, and a batch should be accepted if none of the first 11 weighed showed an unpermitted deviation. An even more effective application of statistical method could be based upon measuring 'half-deviations'; if sample-weighings of individual tablets took only half the permitted tolerance as a criterion for acceptance or rejection, it was claimed that a decision could be safely reached on a maximum operation of only six weighings. It must be doubted whether this proposal will be speedily accepted in any system of official testing; the principles of statistical science are far from widely understood, and 'committees' are therefore much more difficult to convince than individuals. Most official sampling procedures are more cumbersome than they need be because the reliability of the statistical approach is established by mathematical methods somewhat beyond the school-taught standard.



Two tankers now used regularly for road despatch of bulk quantities of Distec fatty acids. They are stainless steel of the single-compartment type and have pumps and heating coils fitted. Each carries 12-tons of fatty acids. The Distec range is made in Hess Products' Fractional Distillation Unit at Littleborough, nr. Rochdale. In the near future they will also be making the Armour range of nitrogen derivatives of their fatty acids which will be offered for sale by Armour & Company Ltd., of London

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IT HAS been reported that five million gallons of resin emulsion paints were made in Britain last year, of which 96 per cent was based on polyvinyl acetate.

The chief advantages of polyvinyl acetate (PVA) over other resins in the formulation of emulsion paints are its very high pigment binding capacity and the high scratch and abrasion resistance of the flexible polymer films. The high moisture permeability is another important feature, which is particularly valuable when emulsion paints are applied to fresh walls, fairly green plaster, or green concrete.

In the production of PVA resins, vinyl acetate is first prepared by passing acetylene through glacial acetic acid containing a catalyst such as mercuric sulphate, phosphate or acetate. The temperature is held at approximately the boiling point of vinyl acetate (74°C), so that the compound distils over as soon as it is formed. Excess acetylene is re-circulated. Should the reaction temperature rise appreciably above 70°C, the main reaction product tends to be ethylidene diacetate, which is formed by the combination of vinyl acetate and acetic acid. A small amount of a copper or iron salt or a salt compound may be added to the vinyl acetate to prevent polymerisation during storage.

Polymerisation

Polymerisation is effected by maintaining the highly purified monomer, mixed with a solvent, at its boiling point for several hours. The solvent and any unpolymerised vinyl acetate can then be removed by distillation, the polyvinyl acetate being extruded and shredded. The degree of polymerisation is governed by a number of factors such as temperature, the nature and quantity of the solvent, the catalyst, and the concentration in which the catalyst is present. In general, a material of low molecular weight is obtained when polymerisation is carried out at a high temperature. When vinyl acetate is polymerised in solution, lower molecular weight products are formed as the concentration of vinyl acetate in the solution increases.

Until recently, Britain was entirely de-

pendent on importation for supplies of the monomer, but this difficulty was overcome during the current year, when a plant established by the British Oxygen Company came into operation. This plant has made it possible to extend the applications of polymer emulsions into other fields and is leading to the development of new uses, some of which are only now beginning to be realised. In general, PVA is suitable for any applications for which rubber latices could be considered, but it has the additional advantage that because of its chemical nature it is non-ageing.

Adhesives

Outside the paint industry the major outlet for PVA polymer emulsions appears to be in the manufacture of adhesives. Because of their quick setting properties these materials are rapidly displacing animal and vegetable glues as adhesives for wood, Cellophane, envelopes, packaging paper, and for general purposes. They are extremely versatile and will serve where no other glue, natural or synthetic, will meet the technical requirements.

In Germany and other European countries PVA is already being used widely in furniture manufacture, following successful experiments by German firms. Though approximately three times as expensive as animal glue or urea formaldehyde, it offers advantages which allow it to be economically employed for every joint required in the furniture industry with the exception of veneers, for which it has proved too expensive.

One of the most important gains is that no preparation is required, the adhesive being used exactly as supplied by the manufacturer. Apart from the time saved, this results in the more economical use of material, since there are no faulty batches and any adhesive which has not been used can be put back in the container.

In the stationery trade, a thin coating of PVA is replacing the heavier coating of vegetable gum traditionally used in the production of remoistenable envelopes.

PVA polymer emulsions are also being successfully used as bonding agents for

cloth, felt, straw, cork, leather, mica, stone and porcelain. They are compatible with natural and synthetic resins including rubber, shellac and ester gums.

Flexible films can be obtained from plasticised PVA emulsions on drying at room temperature. Applications are therefore being found for these materials as wet adhesives, paper coatings, impregnants and textile finishes, where a continuous film is required.

With as little as five per cent plasticiser (on the solids) PVA will give a continuous film, but the amount and nature of the plasticiser are governed by the amount of work in hand and the degree of pigmentation required. Small amounts of organic solvents also assist in film formation.

Two Types of Plasticiser

The plasticisers used with PVA may be divided into two types. The first group comprises quick-coating plasticisers which fuse with the latex, so that on drying a continuous film is formed. In the second group are slow-acting plasticisers which remain as separate globules in the emulsion but fuse with the PVA after the formation of the film. When plasticisers of the latter type are used, flexibility goes on increasing for some time after the film has been formed by drying the latex.

PVA can be thermoset with reactive chemicals, such as melamine and dimethylol urea, to increase the resistance of the polymer to water and steam, and also to impart stiffness. The dried or cured films resulting from this treatment are oil and grease resistant. They are thus very suitable for use as coatings for food packaging materials and adhesives.

A moisture-proof coating composition described in BP 576134 comprises an aqueous solution of PVA produced by emulsion polymerisation of vinyl acetate in the presence of at least one organic hydrophilic colloid and a wax having a melting point between 47 and 140°F, so that when a film is laid down and subjected to a hot air blast, a surface bloom is provided and protects the PVA. A paraffin wax is usually preferred. The wax is present in the form of discrete substantially uncrystallised particles, the amount being equivalent to 12-14 per cent of the total charge. The proportion of PVA ranges from 30 to 70 per cent. The compositions so formed may be

used to make waterproof materials such as cardboard, leather, fabrics and paper.

PVA polymer emulsions are also used as heat sealing adhesives for cellulose, protein and some inorganic pigment products.

In the textile industry the first applications for PVA emulsions were as sizing and stiffening agents for textiles in place of the conventional starches and gums. These uses are steadily gaining ground. PVA resins are employed by the finisher, sometimes alone and sometimes in conjunction with starches, softeners or plasticisers. Special vinyl acetate copolymers have recently been developed for spot-resistant loom finishes.

Plastic starches based on polymer emulsions have been marketed for laundry and household use. It is claimed that materials starched by this method have better wearing properties and garments require less frequent starching.

Non-woven fabrics constitute one of the largest potential outlets for polymer emulsions in the textile industry. PVA and other emulsions are finding applications as binders for the fibres, which may be arranged in parallel or random orientation. Among the end products made by this technique are batting for saturation with polyester resins, disposable towels, sanitary items, packaging materials, and milk filters.

Non-slip Floorings

Growing interest is also being taken in PVA emulsions for floor finishes and in concrete work. During the last few years, jointless *in situ* floor finishes based on PVA have been used on a large scale in Germany and several types have now become available in Britain. In general, these finishes are comfortable to walk on, non-slip and fairly quiet. The number of operations involved in laying a PVA floor finish is large, but this disadvantage is counter-balanced by the very small amount of material used and the ease with which it can be spread.

The use of special PVA emulsions in mortar and concrete mixes imparts improved flexibility and adhesion to a wide variety of surfaces. Adhesion to old cements is so improved that thin skim coatings can be applied successfully for the renovation of industrial flooring. Concrete produced by the incorporation of PVA emulsions into Portland cement mortars has increased im-

compact and tensile strength and is both dust-free and abrasion resistant.

The characteristics mainly responsible for the growing importance of PVA resins in the adhesives, finishing, laminating, binder and special coating fields may be summarised as follows:—

1. PVA emulsions are extremely simple to use and require no added ingredients.
2. Compatibility with dextrin, starch and other natural glues. These may be used as extenders, or conversely, PVA emulsions can be used to upgrade natural glues.
3. Excellent wet tack and fast setting, giving high rates of production.
4. Heat is not necessary to effect a bond.
5. High bond strengths under dry conditions.
6. Bond strengths under wet or damp conditions are better than with natural glues.
7. Good moisture resistance.
8. Immunity from mildew or fungus attack even under conditions of high temperature and humidity.
9. Flexibility and resilience are outstanding.

This combination of desirable characteristics may be varied by modifications in composition and preparation to suit the

requirements of particular applications. An indication of the wide range of PVA emulsions now being manufactured in the United Kingdom is afforded by the table appearing below which is published by courtesy of British Resin Products Ltd.

Epok V.700 and V.701 have maximum mechanical and freeze/thaw stability and are therefore particularly valuable for emulsion paints designed for export. The films adhere well to all types of surfaces. These emulsions may also be used as woodworking adhesives, textile sizes, coating of all descriptions, and as modifiers for Portland cement. Epok V.770 and the plasticised version V.777 are emulsions of very fine particle size, which give films of exceptional clarity. This property renders them particularly suitable for clear finishing coats. Epok V.730 and V.732 are designed to combine the attributes of both the Epok V.700 and the V.770 class of emulsions. Epok V.750 is an internally plasticised PVA emulsion. Since the plasticiser is chemically bound to the PVA molecule, there is no possibility of plasticiser loss or migration. Thus Epok V.750 is eminently suitable for all film-forming applications where non-volatility of plasticiser and non-migration are essential requirements.

Epok emulsion Type and plasti- ciser content (parts per 100 of polymer)	V.700 Unplasticised	V.701 *DBP20	V.770 Unplasticised	V.775 DBP10	V.777 DBP20	V.730 Unplasticised	V.732 DBP20	V.750 Copolymer Internally plasticised.
Corresponding unplasticised emulsions	—	V.700	—	V.770	V.770	—	V.730	—
Total solids (per cent)	49-52	53-55	50-52	52.5	52-55	49-42	53-55.5	50
pH	6.5-7.5	6.5-7.5	6.5-7.5	6.5-7.5	6.5-7.5	6.5-7.5	6.5-7.5	6.5-7.5
SG of emulsion	1.092	1.072	1.086	1.080	1.070	1.098	1.086	1.065
Particle size (microns)	approx. 1	approx. 1	0.1-0.3	0.1-0.3	0.1-0.3	approx. 1	approx. 1	approx. 1

* DBP=dibutyl phthalate.

1,5 Pentanediol Available

SUPPLIES of 1,5 pentanediol, another in the series of acrolein derivatives, is now available in the US in tank car, tank truck, and drum car load quantities from Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp.

This new diol undergoes reactions typical of glycols—oxidation, dehydration, esterification, and acetalisation, and forms esters and polyesters that are important intermediates in the manufacture of polyester resins,

urethane foams and elastomers, fibrous glass-reinforcing resins, magnet and wire enamels, and other resinous materials.

Various esters of 1,5 pentanediol have been suggested as plasticisers for vinyl polymers and such textile fibres as cotton, rayon, and wool. It should be of interest to manufacturers of brake and hydraulic fluid compositions, emulsion breakers, lubricating oil additives, cosmetic preparations, insect repellent formulations, resin solvents, anti-freeze solutions, and chemical intermediates.

Gas-from-Oil Agreement

First Large Plant Planned

AN AGREEMENT has been signed between the British Petroleum Co. Ltd. and the South Eastern Gas Board for the production of town gas from oil in a plant to be erected by the Board at the Company's Kent Oil Refinery, Isle of Grain.

The British Petroleum Company are granting a long lease of a site which will be sufficient for the construction of oil gasification plant up to a daily capacity of 80,000,000 cu. ft. If the plant is developed to this extent it will be equal in output to the largest gas works in the area.

In the first stage gas will be produced on the scale of 15,000,000-20,000,000 cu. ft. a day, with a saving of about 300,000 tons of coal a year. The quantity of oil to be used in the first stage is estimated to be 60,000-70,000 tons a year.

Orders will be placed by the Board as soon as possible for four oil gasification units and these should be completed in two to two-and-a-half years. Experiments have shown that the Segas plants developed by the Board can convert into gas a wide range of oil products. The agreement, which is for a period of 20 years, is intended to lead to a close working relationship with the refinery in order to use whatever oil products are available to the best advantage of both parties.

Mains will be laid from the Isle of Grain to Strood in Kent to feed the gas into a trunk main system through which gas will be distributed South of the Thames from Sittingbourne in the east as far as Guildford in the west.

The new plant will be the first in the country to use oil products on a large scale as the only materials for gas production.

Paint Technology Courses

STARTING Monday, 26 September, the Department of Chemistry and Food Technology of the Borough Polytechnic, Borough Road, London S.E.1, will run a series of courses in paint and varnish technology.

One, a course for the intermediate certificate of the City & Guilds of London Institute in pigments, paints and varnishes is designed for those already employed in the paint and allied industries and is a part-time

course of three years' duration of nine hours a week. It covers organic and inorganic chemistry, physics, paint application and colour matching, technology of pigments, manufacture, etc.

A part-time course of two years duration of nine hours a week is for the final certificate of the City & Guilds of London Institute, covering physical and colloid chemistry, convertible coatings, lacquers, analysis, works practice, pigments, dyestuffs and lakes.

Other courses are for combined ordinary national certificate and intermediate City & Guilds course, combined higher national certificate and intermediate City & Guilds course, combined higher national certificate in chemistry for final City & Guilds course, and courses for science graduates and for those holding A.R.I.C. or N.H.C. in chemistry, as well as special and advanced courses.

Facilities are available both for laboratory and pilot plant research and students may undertake investigations for higher degrees. Registration is on 19 to 22 September.

New Monsanto Plant

MONSANTO Chemicals Ltd. announce that it has authorised expenditure of more than £500,000 for the construction of a new plant to manufacture phthalic anhydride at its Newport, Mon, factory. The new plant is expected to be in operation towards the latter end of 1957.

Representing a very substantial addition to Monsanto's present output of phthalic anhydride, which has been manufactured at its Ruabon factory since 1936, the new plant will bring the company's total production of this essential chemical raw material up to some 15,000 tons yearly.

The decision to provide the additional capacity is the result of the steadily increasing demand from the British paint, plastics and related industries, which export a high proportion of their products. Direct export of part of the additional phthalic anhydride production is also envisaged.

Phthalic anhydride is used in the manufacture of polyester resins; of alkyd resins used in many types of surface coatings and industrial finishes; in the manufacture of phthalic esters used as solvents, plasticisers and insect repellents; in the production of numerous pharmaceuticals and dyestuff intermediates.

Research in Israel

Reports of Learned Societies Published

AMID the political turmoil of the Near East, it is pleasant to record the steady scientific development and research which is a feature of modern Israel, and which has done so much to transform lands that were barren for two millenia into valuable agricultural territory. Equally the Negeb is now being used as a source of valuable minerals.

The *Bulletin of the Research Council of Israel** covers a wide range of subjects. Pure chemistry is not forgotten, but as may be expected, agriculture and its branches such as botany and entomology, are responsible for the largest section of the included papers. Sections on physics, geology and geography are also included, a large folding map of the structural contours of Israel being issued with the September 1954 number. Most of the research described in the *Bulletin* has taken place at the laboratories of the Hebrew University of Jerusalem, the Research Institutes at Rehovoth, and the Institute of Technology at Haifa. Several papers however were submitted from abroad including several medical ones from the United States, a paper entitled 'New and Interesting Bees' from Cyprus, and 'New Israel Aphids' which was submitted from the Netherlands.

Two Symposia

Reports of various learned societies such as the Israel Chemical Society, the Microbiological Society can be found, and also two symposia organised by the Israel Physical Society on the Solid State, and on Cosmic Rays. The introductory lecture at the latter was given by Professor P. M. S. Blackett.

English is used almost entirely as the language of publication, although there is a Letter to The Editor in French, which is also accepted as a language of publication.

The issue of June 1954 is in honour of the 70th birthday of Professor Andor Fodor, who migrated to Palestine at the invitation of Dr. Weizmann in 1923 to establish an Institute for Chemical Research and Teaching at the newly-founded Hebrew University of Jerusalem.

In 1947-48, in spite of the conditions stipulated in the Armistice Treaty, the University had to abandon its home on Mount Scopus.

At the time of Professor Fodor's retirement in 1953, however, the primitive conditions necessary after the war of liberation were somewhat ameliorated. The principal researches of Professor Fodor have been on the nature of enzymes and on protein structure. A list of his publications is included.

The June issue also includes summaries of papers read at the 15th Annual Meeting of the Israel Chemical Association. A considerable amount of work has been done on elucidating the mechanism of reactions by the use of isotopes, including the mechanism of the hydrolysis of inorganic oxyacids using O^{18} as tracer, and the reaction between deuterium and amines has been investigated. There has also been much work on the kinetics of a large number of organic reactions, including those of ethyl fluoroacetate, which exhibits a reactive methylene group. Lithium bromide, which is readily soluble in organic solvents, can be used to remove carbobenzoxy groups, a useful reaction in biochemistry.

The December issue reports some research on the stability of soils treated with a soil conditioner of the vinyl acetate-maleic acid type. Results indicate that bonds between soil particles and polymer molecules are not of an ion exchange character.

Each issue of the *Bulletin* is clearly divided into subject headings, and it must be difficult to find a corresponding journal elsewhere in the world. The papers read at the meeting of the Biological Society are worthy of note. They include a summary of work aiming at the conquest of poliomyelitis, although no details of these papers are given.

**Bulletin of the Research Council of Israel*. Published by the Israel Scientific Press, POB 801, Jerusalem. Issued quarterly. Vol. IV., June 1954-March 1955. 430 pp. Annual subscription £4 (about 30s.).

Orlon Plant

The Du Pont Co. of Canada is to build a plant at Maitland, Ontario, for the production of Orlon acrylic fibre, used in clothing fabrics.

Geneva Conference Papers

UNO will Publish Complete Record

THE Secretary-General of the United Nations, Dag Hammarskjöld, has announced the forthcoming publication by the United Nations of the proceedings of the International Conference on the Peaceful Uses of Atomic Energy, held in Geneva in August. It will be published in 16 volumes of approximately 500 pages each, and will constitute the complete record of the Conference, and comprise all papers, whether presented orally or in written form, together with a record of the discussions.

The papers will be published in several languages; the English edition will be available in the beginning of 1956, others at a date to be determined.

Publication, in full, of the Geneva papers is considered unique in that it will be the only publication which will make available, in their entirety, the more than 1,000 scientific papers submitted at the conference by over 30 countries and international agencies.

Any of the individual scientific papers, in mimeographed form, may be purchased from the United Nations bookshop. The following are the tentative titles of the 16 volumes:

- Volume 1—The World's Requirements for Energy; The Role of Nuclear Power.
- 2—Physics; Research Reactors.
- 3—Power Reactors.
- 4—Cross-Sections Important to Reactor Design.
- 5—Physics of Reactor Design.
- 6—Geology of Uranium & Thorium.
- 7—Nuclear Chemistry & the Effects of Irradiation.
- 8—Production Technology of the Materials Used for Nuclear Energy.
- 9—Reactor Technology & Chemical Processing.
- 10—Radioactive Isotopes & Nuclear Radiations in Medicine.
- 11—Biological Effects of Radiation.
- 12—Radioactive Isotopes & Ionising Radiations in Agriculture, Physiology, and Biochemistry.
- 13—Legal, Administrative, Health & Safety Aspects of Large Scale Use of Nuclear Energy.
- 14—General Aspects of the Use of Radioactive Isotopes; Dosimetry.
- 15—Applications of Radioactive Isotopes & Fission Products in Research & Industry.
- 16—Record of the Conference.

A special pre-publication price of \$110 (USA), £39, & 450.00 Swiss francs for the full series of 16 volumes has been established. This will be protected for all advance orders received up to 31 December, 1955. Orders for the full series, or for individual volumes (final prices to be announced) may be placed with the United Nations sales agents or the United Nations Headquarters Bookshop.

Key Industry Duty

THE TREASURY have made an Order under Section 10(5) of the Finance Act, 1926, exempting the following articles from Key Industry Duty, for the period beginning 12 September, 1955, and ending 18 February, 1956:—

5-*N*¹-Acetylsulphanilamido-3:4-dimethylisooxazole (a substituted sulphonamide).

Ethyl linoleate (an ethyl ester).

Piperazine.

This Order is the Safeguarding of Industries (Exemption) (No. 7) Order, 1955, and is published as Statutory Instruments 1955 No. 1380. Copies of the Order may be obtained (price 2d. net, by post 3½d.) from HM Stationery Office.

Investing in Turkey

TURKEY'S chemical industry is attracting foreign capital. Recent reports reveal that three companies, Swiss, German, and American, are to link with Turkish concerns.

A. Wander & Co., of Switzerland, have announced they are going to establish a pharmaceutical plant in Istanbul in conjunction with Yilbak TAO, of Turkey.

An American company, the Newport Mining Corp. is to form the Turkish-American Mineral Prospecting Co. in association with a Turkish group as yet not named. The American company proposes to invest \$300,000 in the venture.

The West German firm, Friedrich Beck Pinsel Fabrik are planning to build a factory for the manufacture of paints.

Gas Purification & Chemical Co.

At an extraordinary general meeting a resolution increasing the authorised share capital of the company from £100,000 to £500,000 was approved. A wholly-owned subsidiary, Gas Purification Ltd., has been formed by the company.

Polyesters for Rope

Advantages Over Manilla

MYLAR, a polyester film produced by E.I. du Pont de Nemours & Co. Inc., is now being slit into filaments, spun into a yarn and used for making rope by a number of American companies.

The rope has the advantage that it is water repellent, impervious to acids, oils and greases, has a high dielectric strength, and remains flexible over a wide range of temperatures.

Tests were made recently on samples of Mylar rope and manila rope, both of $\frac{5}{8}$ in. diameter. Both were tested, on a friction-endurance testing machine under a constant load of 750 lb., and one specimen was tested under a constant load of 1,500 lb. The machine was operated at 20 cycles per minute, the rope passing twice over a sheave during each cycle. The results of the test are shown in the table.

Samples	TEST RESULTS		Remarks
	Constant Load	Friction Endurance (Cycles)	
$\frac{5}{8}$ in. Manila ..	750 lb.	13,455	Failed
$\frac{5}{8}$ in. 'Mylar' ..	750 lb.	270,000	Intact
$\frac{5}{8}$ in. 'Mylar' ..	1,500 lb.	17,954	Failed

Tests on the $\frac{5}{8}$ in. rope of Mylar were discontinued after 270,000 cycles with the rope still intact. A further test, doubling the load factor to 1,500 lb., revealed that the $\frac{5}{8}$ in. diameter rope made of Mylar completed 17,964 cycles, or 4,519 cycles more than manila with twice the load factor.

The rope is also very resistant to elongation; a specimen measuring $\frac{7}{8}$ in. in diameter which was subjected to 1,000 lb. load was stretched only 2.25 per cent. The material is, however, fairly expensive—about \$3 a lb.

A water ski tow line of Dacron (Terylene) and Mylar polyester is now being produced by one company in the US. It is sold in standard lengths of 75 ft., is $\frac{1}{4}$ in. in diameter and has four strands. Each strand consists of $\frac{5}{64}$ in. extruded monofilament Dacron core to ensure good buoyancy. Over this core is laid sufficient Mylar to obtain high tensile strength, excellent stretch control, and high resistance to abrasion.

The die cast loop—the end that is attached to the boat—is covered with a clear vinyl tube for added protection against abrasion. The 12 in. wooden handle is grooved for

the continuous line that forms a symmetrical 'Y', and is permanently attached with a polythene die cast connector. The breaking strength of this combination line is 615 lb.—stronger than the best of natural fibre ropes of the same diameter.

US Explosives Decrease

EXPLOSIVES used for industrial purposes in the US last year declined by nine per cent. Total consumption for the year was 719,723,169 lb., compared with 790,810,690 lb. in 1953, a record year. The only type of explosive for which there was increased demand was black blasting powder, in granular form, which increased by 24 per cent over 1953. The all-round drop in demand for explosives was attributed to the reduction in coal production.

Last year the greater portion of explosives consumed in the US was in coal mining which used 29 per cent of the total. The metal mining industry, too, used less than in 1953. Practically all large metal producing States used less explosives. Twenty per cent of the explosives sold in the US in 1954 was used by the metal mining industry, quarries and non-metal mines using 24 per cent. These figures have been released following a mineral industry survey.

Permalin in Copenhagen

PERMALIN of Gloucester will exhibit nearly 200 items of equipment and components used in the electrical, chemical and general engineering industries on their stand at the British Trades Fair in Copenhagen from 29 September to 16 October. They cover the three grades of Permalin densified wood laminates, the new Permafibre glass reinforced plastics and Dialam SRBP tubes and EHT bushings. One section of the stand will feature the products manufactured by Permalin subsidiary companies, Hordern-Richmond and Hydulignum-Jabroc (Tools) Ltd.

A special feature on show will be the 25 ft. photographic mural, designed by Philip Kemp Ltd., which shows at a glance the many different applications of the displayed materials in industry. In the chemical section there will be a display of filter press plate and frames, laboratory bench top section, liquid agitator, effluent filter gate, liquid taps, and fume extraction hoods and fans.

Carbon Black Fillers

New Development in Silicone Rubber

FOR THE first time, silicone rubber is being cured successfully using carbon black fillers instead of the conventional silica-type fillers. This new development in silicone rubber technology was announced on 31 August by the silicones department of Linde Air Products Company, a division of Union Carbide and Carbon Corporation. This advancement has been made possible through the use of Linde W-96 Silicone, a new type of gum stock featuring controlled reactivity.

Previously, as far as is known, it has been impossible to secure satisfactory reinforcement with carbon black fillers in silicone rubber under production conditions. However, Linde reports that many of the blacks tested have given reinforcement equal to that obtained with silica fillers. Comparison of typical post-cured properties of a carbon black-filled rubber show this similarity in reinforcement:

Property	Carbon Black Rubber	Silica Rubber
Hardness (shore A)	54	54
Tensile Strength (psi.)	750	750
Elongation (%)	270	250
Compression Set*	47	13
Brittle Point (°F)	-90	-93
* Method B, % of original deflection, after 22 hours at 350° F.		

Linde points out that carbon black-filled silicone rubber is essentially an altogether new product, and should perhaps be judged by different standards from conventional silicone rubbers.

The special properties of silicone rubber are well known to the rubber industry, and have been used to advantage for several years, but Linde expects many new applications will be opened up by this new development. As an example, Connecticut Hard Rubber Company has moulded conductive silicone rubber that will be usable at temperatures above and below the limits of organic rubbers. It is believed that a material of this type will prove useful for applications such as aeroplane de-icers, where the properties of an organic or silicone rubber alone have not been able to meet the requirements. Linde expects rapid development along these lines, since many of the techniques used in compounding organic rubbers should be applicable to the new silicone rubber.

Physical properties and other data for several carbon black-filled W-96 compounds are available to those desiring to explore further the wide potentialities of this new development.

Digest of Statistics

Chemicals Employ More Workers

FIGURES just published by the Central Statistical Office show that the chemical industry's latest index of industrial production based on the 1948 average of 100 is 180. Although slightly below the figures for the early part of this year, it is higher for the industry than any recorded in the index which covers a period starting in 1946. The latest figure for all industries, which is for the month of June, is 136.

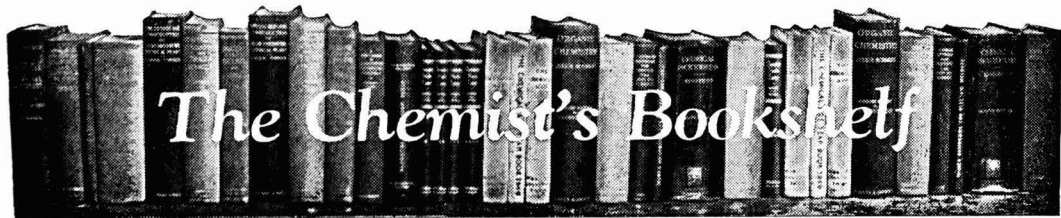
The number of people employed in the industry which includes coke ovens, dyes, explosives and fireworks during June totalled 287,000, of whom 65,700 were women. The pharmaceuticals, perfumery and soap section figure is 113,000; paint and varnish section 41,300; and mineral oil refining, greases and glue, 71,700. In the chemical industry section including coke ovens, dyes and explosives, the number of employees was 10,000 more than were employed in this section in the corresponding month in the previous year, and 30,000 more than in June 1948.

Production figures show a decline in phosphatic fertilisers which are given only up to May. At 25,600 tons, production was 6,000 tons lower than in the preceding month, and is the lowest since August, 1954. Consumption during May totalled 26,700 tons, 9,000 tons fewer than in April.

Production of nitrogenous fertilisers for June totalled 23,580 tons of which 2,580 tons were exported. The figures are about constant, for production has shown little change since April, 1953. Although it has risen to 27,000 tons three times during this period.

Sulphuric acid production in June was 170,600 tons, consumption 169,000 tons. Consumption of materials for processing sulphuric acid was sulphur 19,400 tons; pyrites 38,600 tons; spent oxide 21,600 tons; and anhydrite 33,800 tons.

The report, covering all industries, is contained in the *Monthly Digest of Statistics* published by HMSO, price 4s. 6d.



TECHNIQUE OF ORGANIC CHEMISTRY. Edited by A. Weissberger. Second Edition. New York, Interscience Publishers Inc. London, Interscience Publishers Ltd.; Vol. I, Part III, **PHYSICAL METHODS IN ORGANIC CHEMISTRY.** 1954. Pp. xi + 434. Figs. 121. \$8.50. VII. **ORGANIC SOLVENTS: PHYSICAL PROPERTIES AND METHODS OF PURIFICATION.** A. Weissberger, E. S. Proskauer, J. A. Riddick and E. E. Toops. 1955. Pp. vii + 552. \$8.50.

These two volumes complete the run of the series from Volume I (in three parts) up to Volume VIII, and are an invaluable contribution to the reference literature of chemistry.

The first of the present volumes, which supplements the existing two volumes of the second edition of Vol. I, contains new sections on electron microscopy, microspectroscopy, the determination of streaming birefringence, dielectric measurements, radio-frequency and neutron diffraction. In addition, there are chapters which form substantial additions to the existing sections on the viscosity of dilute polymer solutions, X-ray diffraction methods for the determination of crystal structure, electron diffraction by the sector-microphotometer, and radioactive measurement by scintillation counters. The section on magnetic susceptibility appearing in an earlier volume has been re-treated here also.

Because of the size of the work and the considerable amount of material in Parts I and II not yet obsolete, this method of presenting the new material has been chosen rather than the production of a third edition, and those who already possess the other volumes will undoubtedly welcome this thoughtful decision.

Most chemists will have had occasion at one time or another to consult Weissberger and Proskauer's 'Organic Solvents', and Vol. VII is a completely revised edition of this work which takes its place very appropriately in the series. The book con-

tinues to present its information as before. First there is a classification of the solvents, of which 254 are included. This is followed by a discussion of the physical properties of solvents which are of importance, 28 of which are chosen for listing. Tables are then given of the selected properties, with extensive literature references. Almost one-third of the book is devoted to a comprehensive rather than critical discussion of criteria of purity and detailed accounts of the purification of the individual solvents.

It would be superfluous to recommend these books, which are uniform with the rest of the series, to those who already possess the earlier members.—**CECIL L. WILSON.**

PRINCIPLES OF EMULSION TECHNOLOGY. By Paul Becher. Reinhold Publishing Corporation, New York; Chapman & Hall Ltd., London. 1955. Pp. 149. 24s.

This is the fifth volume in the series of Reinhold Pilot Books—others have dealt with such diverse subjects as titanium and its alloys, adhesive bonding of metals and patent law in the research laboratory. This new series is intended to represent a new concept in the publication of technical books, and its volumes are intended to cover all fields of science and technology and to serve as comprehensive sources of information for research workers in all fields. The volumes are small in size for convenience in handling, comparatively short in length but complete in coverage, and, it should be emphasised, written in a language designed for the non-expert in the subject.

This particular volume on emulsion technology has been written by a member of the staff of the Colgate-Palmolive Co. for those readers who have studied chemistry and require rather more knowledge about emulsions than is usually given in courses on physical chemistry. The author has attempted to present the general principles of emulsion technology in terms of practical examples.

The book contains some eight chapters in

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all, dealing with dispersions and emulsions, surface activity, the theory of emulsions, the chemistry of emulsifying agents, emulsification equipment, the testing of emulsion properties, emulsion formulation and demulsification. All these subjects are treated in a general way and no heavy demands are made upon the previous knowledge of the reader. Individual references are excluded but a short list of general reference books on emulsions and related subjects is included at the end of the volume.

There are many people engaged in scientific and technical activities who lack either the time or the extensive background knowledge required to derive much benefit from the advanced and detailed treatises available on various technological subjects. To these people this series of volumes of pocket size would seem to offer considerable assistance in obtaining a broad outline of a particular subject. The present volume should be especially useful to the many workers concerned with the production and use of emulsions.—G.S.E.

ANALYTICAL CHEMISTRY: THE WORKING TOOLS. Edited by C. R. N. Strouts, J. H. Gilfillan and H. N. Wilson. Oxford University Press (Geoffrey Cumberlege), London. 1955. Vol. I. Pp. xxiv + 494; Vol. II, Pp. xii + 571. £5 5s.

This is a comprehensive and detailed survey of the operations and methods that find most use in the analytical laboratories of Imperial Chemical Industries Ltd., together with their background, mathematical, physical and chemical. There must be few aspects of analytical chemistry that have not been thoroughly examined in one or other of the laboratories concerned, so that, as one might expect, the compilation takes one through all branches from the classical gravimetric and titrimetric procedures to more recent instrumental methods such as infrared absorption spectrophotometry and X-ray diffraction.

It should first of all be emphasised that the methods described are preferred methods, and that the book is not intended as a comprehensive treatise on analytical chemistry. As a consequence, there are omissions, not because the methods omitted are bad

methods, but presumably simply because in the laboratories concerned other methods are utilised. Two extreme examples will illustrate this point. In the section on filtration, although a detailed account is given of the use of the ordinary filter funnel and filter paper, filtration by means of sintered-glass crucibles receives only passing mention (where one might have expected a more lengthy section on the use and care of these pieces of apparatus) and porous porcelain crucibles receive no mention at all. At the other end of the scale, there is no section dealing with radiometric methods of analysis.

The second point to bear in mind in assessing the content of these volumes is that the sub-title is 'The Working Tools'. The work therefore does not concern itself with methods for the determination of specific substances, but rather with general procedures and general principles in the use of apparatus and instruments.

If these self-imposed limitations are remembered, then it can fairly be claimed that the editors and the individual authors chosen by them have done an excellent job.

Rightly, Volume I begins with a short chapter on accuracy which summarises admirably some principles which analysts (and, indeed, other chemists) should but do not always remember. There follows a chapter on general manipulations (the use and care of apparatus made of different materials, and such operations as precipitation, filtration, drying). Chapter 3 discusses sampling—a topic usually very scantily treated—both in general terms and with reference to specific types of materials. There are then chapters on weighing, on titrimetry, on the determination of various other physical properties such as temperature, density and melting point, and on distillation.

Chapter 10 gives notes on the purity of reagents and the preparation of reagent and indicator solutions. Chapter 11 deals with the measurement of pH. The standard I.C.I. method of standardising titrimetric solutions starting from silver as the primary standard is described in Chapter 12. The remainder of Volume I is devoted to organic ultimate analysis, both macro and micro, with some other micro operations, and to gas analysis.

Volume II is largely concerned with instrumental analysis: potentiometric and conductometric titrations, polarography, electrodeposition, colorimetric analysis and

absorptiometry, spectrophotometry in the ultra-violet and infra-red, emission spectrography, X-ray spectrography and X-ray diffraction. Chromatographic analysis is included in this volume also, which concludes with a useful account of statistical methods as applied to analysis.

It will be seen from this outline of the contents that the range covered is imposing, and since the size of the volumes is generous (the work might have been spoiled by enforcing a more niggardly allocation of space) a most valuable collection of analytical information is the result. One cannot read far in this work without having recalled half-forgotten fragments, both of the science and of the art of analysis, which may never have been seen in print before, and have often only been perpetuated in the contact of good teachers with willing and observant learners. If only for stating these things in plain terms the book is to be welcomed.

This is undoubtedly a work which cannot do other than increase the stature of analytical chemistry. Much of the information included is, in the most assimilable form, what is, in fact, sound general chemistry. Much of the information, in other words, can be just as valuable to chemists concerned with branches other than analysis. In fact, the work is a forcible emphasis of the old truth that analytical chemistry can provide one of the best possible trainings for general chemical operations.

These volumes, then, should naturally, in the first place, find a home in any analytical laboratory. But they should equally be available to, and prescribed reading for all students of chemistry, whether intending analysts or not (the rather high price will unfortunately preclude all but intending specialists from buying them although by present standards the price is not inordinate). And they would not be out of place, as a general reference work, in any chemical laboratory, whatever its professed activities. —CECIL L. WILSON.

GESCHICHTE DER CHEMIE. Part II. Von der Entdeckung des Sauerstoffs bis zur Gegenwart. By G. Lockemann. Walter de Gruyter, Berlin. 1955. Pp. 151, 16 illustrations. DM.4.80.

This little book forms part of the 'Sammlung Göschen', a collection of inexpensive paper-covered booklets on a great variety of

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subjects which has been familiar to German students and laymen for over 60 years. The volume under review traces the development of chemistry from the discovery of oxygen to the present day. It contains a surprising number of facts. Indeed, it can be likened to a 'Baedeker' guide book—comprehensive, accurate, concise, but digestible only in small doses. The author does little to stimulate interest in the facts which he dispenses, and the book is therefore quite unsuitable as an introductory text. However its excellent indexes and its modest price and size commend it as a useful pocket reference book.—J.C.P.S.

PROPERTIES OF ALGINATES. By R. H. McDowell. Alginate Industries Ltd., London. 1955. Pp. 47.

The growth of the 'chemicals from seaweed' industry has been very rapid and alginates are finding technical and commercial applications in many aspects of life to-day. This booklet has been published as a guide to fresh prospective users of these versatile compounds and contains a mass of valuable information. The treatment is theoretical in nature, giving an account of the structure and physical properties rather than a resumé of commercial formulations. Standard analytical methods are given for the purity and principal properties of alginates. The book should be used in conjunction with the AIL data sheets which provide more detailed information of the application of alginates to the welding, food, pharmaceutical and paint industries.—J. R. MAJER.

PROGRESS IN THE CHEMISTRY OF THE FATS & OTHER LIPIDS. Edited by R. T. Holman, W. O. Lundberge & T. Malkin. Vol 3. Pergamon Press, New York and London. 1955. Pp. 475. 70s.

In this volume, a wide variety of subjects is dealt with, and particular emphasis has been placed on the biochemical significance of the lipids. Thus, parenteral administration of fats, the biochemistry of fat-soluble vitamins, formation of animal fats, the triglyceride composition of natural fats, some aspects of the intestinal absorption of fats, and metabolism of the steroid hormones, are each discussed by an appropriate authority.

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Recent developments in techniques for the separation of the lipids are reviewed in two articles, one on the use of low temperature crystallisation, and the other on low pressure distillation. Other articles consider the chemistry of synthetic detergents and of oxygenated fatty acids, and the physical chemistry of solutions of soap-like substances. This volume maintains the high standard of its predecessors. The articles are both readable and comprehensive and numerous references and tables, admirably set out, give much useful information. The book is invaluable for those interested in this field of chemistry.—A. S. JONES.

HANDBUCH DER MIKROCHEMISCHEN METHODEN. Edited by F. Hecht and M. K. Zacherl. Vol. I, Part 1: PRAPARATIVE MIKROMETHODEN IN DER ORGANISCHEN CHEMIE: H. Lieb and W. Schöniger. MIKROSKOPISCHE METHODEN. L. Kofler and A. Kofler, Vienna. Springer-Verlag. 1954. Pp. vi + 236, Figs. 275. £4 1s. (to subscribers to the complete work £3 4s. 6d.).

This is the first section of an ambitious project, a comprehensive survey of microchemical methods, which is to appear over the next few years in six (formal) volumes (but comprising at least eight actual volumes). The names both of the editors of the series and of the authors of these two contributions are too well known in microchemical circles to require any comment, other than that the reader is thereby assured of a completely authoritative treatment.

In the present volume there are collected together not only the experience of the authors, but a comprehensive survey over the whole field of two branches of microchemical methods which will be of particular interest to organic chemists; although much that is presented in both branches can be of considerable value to the inorganic chemist also.

Professor Lieb and Dr. Schöniger are already known as valuable contributors to the literature of synthetic organic microchemistry, and the methods which they describe here should be read with attention by all organic chemists, not already familiar

with their writings, who have to handle small amounts of material either for purification or for further preparative work. In the 88 pages of this section they describe methods of filtration, drying, extraction, dialysis, recrystallisation, distillation, sublimation and adsorption, in addition to general manipulation. Comprehensive literature references are given, and the section is liberally illustrated.

The name of Kofler is firmly associated with microscopic methods, and in particular with the determination of melting point and the investigation of phase relations on small amounts of material with the help of the microscope. The information thus obtained is of use in the identification, and, on occasion, in the quantitative investigation of crystalline material. These aspects of microscopy are discussed from both theoretical and practical aspects. M. Brandstätter contributes a short chapter on orientated overgrowth in organic crystals. The book closes with a useful 25-page introduction to the investigation of the optical properties of crystalline material using the polarising microscope.

Both sections of this volume are excellently presented, and the quality both of content and of production augurs well for the success of the whole series.—CECIL L. WILSON.

FOOD TECHNOLOGY, PROCESSING & LABORATORY CONTROL. Advisory editor, F. Aylward. George Newnes Ltd., London. 1955. Pp. 303. 21s.

This book is the latest in the 'Chemical & Chemical & Engineering Series' of George Newnes and is, to our way of thinking, an improvement over the other horses from the same stable. It is, however, 'light reading' and bears all the earmarks of having been 'forced' in the sense that one speaks of early rhubarb or the first tomatoes in the springtime. When fruit or vegetables are grown under natural conditions and are allowed to mature without undue prompting on the part of the grower they have more flavour than those grown in steam-heated glass-houses. In the same way a book which is planned in cold-blood by a publisher and written (no doubt after many proddings) by a number of authors inspired more by a sense of duty or loyalty than any overwhelming desire to put their

thoughts into print, the book lacks something.

Although 19 well-known food chemists and technologists have contributed to 'Food Technology, Processing & Laboratory Control' and while each has handled his own particular assignment efficiently, the book as a whole is disappointing. It is, we regret to say, dull and listless and one cannot help thinking that one author who honestly believed that there was need for such a book as this could have done a much better job. Although several of the contributors are recognised as experts in their fields there is very little fresh information. Most of the references given are very ordinary and, in certain cases, very ancient. Furthermore, the number of references given is entirely inadequate.

The book is divided into two sections. Part 1 deals with processing methods and the chapters (with the authors) are: 'Sugar Refining' (H. C. S. de Whalley), 'Sugar Confectionery' (D. W. James), 'Chocolate Manufacture' (A. Norton), 'Jam Manufacture' (J. H. Campbell), 'Edible Fats-Shortening' (D. Le Roi), 'Margarine' (G. H. Clarke), 'Flour Milling' (A. J. Amos), 'Breadmaking' (F. E. Thomas), 'Biscuit Manufacture and Cake Making' (H. N. Mills), 'Canning—Fruits and Vegetables' (W. E. Rhodes and C. M. Muir), 'Refrigeration' (T. N. Morris), 'Dehydration' (E. G. B. Gooding and E. J. Rolfe).

Part 2 is concerned with laboratory control and here the chapters are: 'Sugar Refining' (H. C. S. de Whalley), 'Jams' (J. H. Campbell), 'Edible Fats' (A. A. McKerrigan), 'Wheat Testing' and 'Flour Testing' (A. J. Amos), 'Bakery Materials' (W. P. Ford and F. E. Thomas), 'Milk' (J. G. Davis) and 'Meat Products' (C. D. Essex and J. H. Shelton).

'Food Technology' will no doubt interest many chemists and chemical engineers engaged in food processing; to the younger man it should prove useful. It is well laid-out and printed and the illustrations, on the whole, are good. In these days of high printing and binding costs the price of 21s. is not unreasonable. But when one knows and highly respects the advisory editor and several of the authors and when one has read similar books of this nature one cannot help but feel disappointed.—J.C.

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THE SCIENCE OF CHEMISTRY. Second Edition. By George W. Watt and Lewis F. Hatch. McGraw-Hill Book Company Inc., New York & London. 1954. Pp. vii + 546. 44s.

An attempt is made in this book to present the science of chemistry in a form suitable for assimilation by the non-specialist student. In their preface the authors emphasise that the needs of students who specialise in non-technical subjects but who are required to devote a minimum amount of study to one or more of the physical or biological sciences constitute a separate and distinct instructional problem.

It is for the student who has chemistry thrust upon him in this way that this book is written. Whether it succeeds in its aims is a difficult matter to decide, as success and failure depend largely on the individual's idea of the purpose of education.

For the reader who merely wants a general acquaintance with chemistry, and is not concerned with theoretical concepts and ideas this book can be recommended. It is up to date, well set out, has good illustrations and is written in an interesting and intelligent style. It is perhaps one of the best of its class that we have come across.

From the point of view of the serious student, however, there are several disadvantages. The range is too wide and the treatment too superficial for any British examination. As an example, very little time is devoted to the basic principles of organic chemistry before the reader finds himself struggling with complicated structural formulae for dyes and pharmaceuticals. A little more time spent on fundamentals and less on more advanced topics would have increased its value in this country.

These remarks are intended not so much as a condemnation of the book, but rather as a warning of its limits as far as the British student is concerned. They perhaps serve to demonstrate the differences in the British and American concepts of education. Which is the better is a subject which it would be quite out of place to discuss here and we can best finish by saying that this book is useful and informative, but do not expect too much of it. It is an addition to, rather than a substitute for, the normal range of textbooks.—J.P.S.J.

SAC Meetings

To Present Eight Papers

AT an ordinary meeting of The Society for Analytical Chemistry at 7 p.m. on Wednesday, 5 October, in the Meeting Room of the Chemical Society, Burlington House, Piccadilly, London, W.1, the following papers will be presented and discussed:—

The Colorimetric Determination of Phosphorus in Steel and Copper-Base Alloys, by W. T. Elwell, F.R.I.C., and H. N. Wilson, F.R.I.C.; The Determination of Small Amounts of Carbon in Steel by Low-pressure Analysis, by R. M. Cook and G. E. Speight, A.Met., B.Sc., F.R.I.C.; and The Determination of Small Amounts of Sulphate by Reduction by Hydrogen Sulphide, and Titration with Mercuric or Cadmium Salts Using Dithizone as Indicator, by E. E. Archer.

Scottish Section

The Scottish section of the society will hold a meeting at 7.15 p.m. on Friday, 30 September, in Room 24, the Royal Technical College, George Street, Glasgow, when the subject will be The Determination of Traces of Lead. There will be an introductory talk by Noel L. Allport, F.R.I.C., honorary secretary of the Society for Analytical Chemistry, to be followed by papers on:—

Lead in Biological Materials, by S. L. Tompsett, B.Sc., Ph.D., D.Sc., F.R.I.C., and The Determination of Lead by Square-wave Polarography, by D. J. Ferrett, M.A., D.Phil.

A joint meeting of the microchemistry group of the society and the Mid-Southern Counties section of the Royal Institute of Chemistry will be held at 5 p.m. on Friday, 7 October, in the Large Chemistry Lecture Theatre, The University, Southampton. The papers to be presented and discussed are:—

Trace Elements in Archaeology, by C. F. M. Fryd, Methods for Determining the Trace Element Status of Plants, by E. J. Hewitt, and The Estimation of Trace Elements in Plant Material and Soils by means of *Aspergillus Niger*, by D. J. D. Nicholas.

During the afternoon visits have been arranged to either the works and research laboratories of Leicester Lovell & Co., North Baddesley, or Ocean Terminal, Southampton.

US Capital for Canadian Plant

FINANCE totalling \$21,000,000 has been arranged for constructing a chemical fertiliser plant near Medicine Hat, Alberta, to be completed by October next year. The plant is being built for a recently incorporated Alberta company, North-west Nitro-Chemicals Ltd., financed by Canadian and US capital.

The Royal Bank of Canada has agreed to purchase up to \$12,000,000 of the company's first mortgage 4½ per cent serial bonds and a large US and Canadian investment group, headed by Eastman, Dillon & Co., offered publicly an \$8,500,000 (US funds) issue of the company's 10-year 5½ per cent subordinate income debentures.

The offering was in units, consisting of \$50 principal amount of debentures and five shares of common stock, at a price of \$50 per unit (US) plus accrued interest on the debentures. In addition, Eastman, Dillon & Co. underwrote 300,000 common shares at \$1.50 a share. Prior to this financing \$1,000,000 was placed in the treasury through the purchase of five per cent preferred shares by Commercial Solvents Corp. and New British Dominion Oil Co., Calgary.

Northwest Nitro-Chemicals, according to the prospectus covering the offering, will have capacity to produce in a year 35,000 tons of ammonium nitrate and 107,000 tons ammonium phosphate, with units to produce nitric acid and sulphuric acid.

BP's Middle East Interests

PRODUCTION of crude oil during July in the Middle East where British Petroleum Co. Ltd. has interests were:—

At Kuwait, where BP has 50 per cent interest, 4,824,665 tons, which brought the total for the first seven months of the year to 31,948,222 tons.

In the Iraqi fields of the Iraq Petroleum Co. group in which BP is a partner, 2,631,605 tons, bringing the total so far for the year to 18,464,346 tons.

At Qatar the production by the Qatar Petroleum Co., a member of the IPC group, reached 459,595 tons, bringing the total production figures for the first seven months to 3,053,915 tons.

In South Iran where BP has a 40 per cent interest in operations production was 1,429,000 tons.

• HOME •

Radio-isotopes

An international conference on the production and utilisation of electromagnetically enriched radio-isotopes was held at AERE Harwell from 13 to 16 September. Among those present were representatives from Australia, Belgium, Canada, Denmark, Egypt, France, Germany, Holland, Sweden, the US and Yugoslavia, together with about 40 British scientists. A total of 26 papers were presented.

Induction Soldering

Philips Electrical has announced that it will undertake a limited amount of induction soldering and brazing at its industrial applications centre, Brixton, London S.W.9. Enquiries should be made to Philips at its Industrial Products Division, Century House, Shaftesbury Avenue, London W.C.2.

Manchester Office

Arising from the merger of Hordern-Richmond Ltd. and Permalit Ltd., offices for the two companies have been opened in Manchester at 3rd floor, B. block, 89 Oxford Street, Manchester 1.

Prospecting for Lead and Zinc

A programme of drilling and prospecting for lead and zinc deposits at Swinhope, Northumberland, is being carried out by The New Consolidated Gold Fields Ltd., 49 Moorgate, London E.C.2, who have acquired an option on a mining lease for this purpose.

Plans Approved

Darlington Chemical and Insulating Co. Ltd. have had plans approved for the erection of new office buildings and a garage in West Auckland Road, Darlington.

Babcock & Wilcox Get Contract

Babcock & Wilcox have got the contract to supply and install the boiler plant for the £1,500,000 power station to be built by the Hong Kong Electric Co.

Ultra-Violet Ray Exhibition

Hanovia Lamps of Slough, Bucks, are to hold an exhibition in the Display Hall of the Midland Electricity Board, Chester Street, Aston, Birmingham 6, from 3-14 October. Exhibits will show the complete range of applications of ultra-violet rays in industry.

New Offices for R. W. Greef

R. W. Greef & Co. Ltd. announce that in view of the continued expansion of their business they are removing to larger premises and from 26 September their address will be Garrard House, 31/45 Gresham Street, London E.C.2. The new telephone number will be MONarch 1066 (12 lines); the cable address, Greef London; and the telex number, 2-2590. Inland telegrams should be addressed: Greef Cent. London.

Coke Oven Replacement

On Tuesday, 6 September, John Lysaght Ltd., of Scunthorpe, opened a new battery of coke ovens at their Normanby Park works. The battery replaces half an old one of 47 ovens and is designed to produce 2,000 tons of blast furnace coke a week. The remaining half of the old battery is also to be replaced.

New Telephone Number

Styrene Co-Polymers Ltd. have changed their telephone number at their head office and laboratories. The new number is: Sale (Manchester) 8256 (5 lines).

British Oxygen Company's Awards

The British Oxygen Co. Ltd. has awarded three fellowships for post-graduate research. They have been made to Mr. R. Clarkson, a Bachelor of Science at the Department of Chemistry, Manchester University, for research at Oxford; Mr. R. A. H. Pool, a Bachelor of Arts at New College, Oxford, for research in the Inorganic Chemistry Laboratory, Oxford; and Mr. D. I. Wilkinson, a Bachelor of Science at the Department of Organic Chemistry, Queen's University of Belfast, for research in the same department.

Closing Laboratories

The Research Council of the British Whiting Federation announce that the laboratories at Bedford will be closed on or about 20 September and that all work will by then have been transferred to the new laboratories at The Hall, Welwyn, Hertfordshire, telephone Welwyn 462/3. Mr. D. C. Soul, B.Sc., A.R.C.S., F.R.I.C., who has been appointed Director of Whiting Research, will be in charge.

. OVERSEAS .

US Sulphur

In its latest report of the US sulphur industry the Bureau of Mines deals with the month of June. Production in that period totalled 425,050 long tons of native sulphur and 32,500 tons of recovered sulphur (of a purity of 97 per cent or greater).

Commissioner's Toronto Address

The new address of the United Kingdom Trade Commissioner's office in Toronto, Canada, is: 119 Adelaide Street West (telegraphic address: Toroncom Toronto; telephone: Empire 2-1223).

Hydrofining Units

Work will start by the end of this year on the building of hydrofining units at British Petroleum's Kent and Hamburg refineries. The hydrofiners will produce desulphurised gas oil; 400,000 tons at Kent, and 260,000 at Hamburg.

Turkish Cement Production

Two cement factories are to be built in Turkey, one in Adana and the other in Bartin. Each will produce 450 tons of cement daily, and will cost £T6,767,000 and £T5,630,000 respectively. Later the Turkish Government will draw up plans to build five more. At present there are seven factories producing a total of 1,200,000 tons of cement annually.

Joint Financed Refinery

A refinery, to be financed jointly by the Royal Dutch Shell and the Canadian Eagle Oil Co., is to be built near Havana, Cuba. It will have a designed intake of 1,250,000 tons of oil a year. Crude oil supplies, expected to become available for the new plant by November, 1956, will come from Venezuela.

US Chemical Sales

Sales of chemicals in the US for the first six months of this year were a record at \$11,500,000,000, 18 per cent higher than for the corresponding period last year. Preliminary figures from the Manufacturing Chemists' Association show that wages and employment are also up with the industry employing 810,000 people during the first half of the year. Earnings have increased by 25 per cent.

\$12,000,000 Chlorine-Caustic Soda Plant

A \$12,000,000 chlorine-caustic soda plant is to be built in Vancouver by Hooker Chemicals Ltd. Dredging of a deep-sea dock at the 75-acre site has just been started.

May Exhibit in Paris

Mr. Robert Campbell Smith, commercial secretary to the Canadian embassy in Paris, said on his return to Vancouver recently that the Federal Government is investigating on behalf of Canadian chemical industries, the possibilities of Canada entering the International Chemicals and Plastics Exhibition in Paris in November next year.

Duty Free

The Australian Department of Trade and Customs have announced that centrimide and preparations of centrimide, and lauryl sulphate in powder form (BP standard) will be admitted free of duty until further notice.

East German Chemicals for Chile

Chemicals are among a wide range of products East Germany will export to Chile under a trade pact recently signed in Berlin.

Nitrate Ban Lifted

The Chilean Government has lifted the ban on nitrate deals with Iron Curtain countries. The Nitrate Sale Corp. of Chile have been told by the Mining Ministry that they can now negotiate with Communist China and North Korea for the sale of nitrate.

Argentine-Standard Oil Agreement Attacked

The granting of oil drilling and pumping rights by the Argentine Government to the Standard Oil Co. of California has been attacked by opposition groups in the Argentine as a surrender of national sovereignty.

For Supervising Uranium Prospecting

The British Atomic Energy Commission is to open an office in Salisbury, Rhodesia, by the end of this year. It will supervise uranium prospecting and help other uranium prospectors throughout the Federation. This was announced in Salisbury recently. Southern Rhodesia's Director of Geological Survey, Mr. J. C. Ferguson, said that the Atomic Energy Commission was anxious to see that Southern Rhodesia's uranium prospects were thoroughly investigated.

PERSONAL

DR. SHAUN M. COX, technical and scientific director of James A. Jobling & Co. Ltd., of Sunderland, makers of Pyrex glass, has created a new products development department, under the managership of MR. P. L. KIRBY, which will be responsible for the experimental progress of certain new technical products. The research department, under MR. STIRLING, will in future incorporate the chemistry department and deal solely with research. The consultancy aspects of the scientific side of the company will be conducted by a group of experts: MR. J. MATHER, MR. G. RUTHERFORD and MR. F. WESTWICK.

MR. VERNON YOUNG, F.C.I.S., has been appointed chairman of International Combustion Ltd. MR. WALTER GRAINGER, M.Inst.F., and MR. JOHN MAYER, B.Sc., A.M.I.Mech.E., who were recently appointed joint-managing directors of International Combustion (Holdings) Ltd., have also been appointed as joint-managing directors of International Combustion Ltd. The new appointments are effective from 31 August, 1955.

MR. R. H. COLLCUTT has been appointed head of the operational research section of the British Iron & Steel Research Association in succession to MR. R. T. EDDISON.

MR. W. L. M. O'CONNOR has been elected chairman of Calor Gas Holding Co. in place of the late MR. BARRINGTON C. GAIN.

MR. ERIC A. BEVAN, managing director of Styrene Co-Polymers Ltd. has left by air to visit South Africa. He will contact the company's customers in Johannesburg, Durban, Port Elizabeth and Cape Town, and also deliver a lecture to each section of the Oil & Colour Chemists' Association in Johannesburg, Durban and Cape Town.

MR. DAVID T. MARVEL, a vice-president of Olin Mathieson Chemical Corp., has been appointed vice-president in charge of sales of the metals division. At the same time, Mr. Marvel announced that operations of the metals division will be expanded with the establishment of separate sales organisations for brass and aluminium roll

bond. In line with this move, MR. E. W. SHERMAN, formerly sales manager of the metals division, has been appointed sales manager for all brass products, and MR. H. F. DEVENS, formerly assistant to the general manager, has been named sales manager for roll bond products.

MR. P. R. R. COAD will resign from the board of T. F. Firth & Sons on 31 October to devote all his time to H. J. Enthoven & Sons, the company in which he was recently appointed a director.

MR. R. B. HAGART has succeeded the late MR. P. M. ANDERSON as a director of African Explosives & Chemical Industries.

SIR PERCY H. MILLS, the first president of the Institute of Industrial Supervisors, who played a prominent part in the Institute's foundation in 1948, will be going to the US in September to receive the Edward O. Seits Memorial Award for International Management, presented by the National Association of Foremen of America. Sir Percy was selected by the National Association of Foremen Board of Directors 'for his furthering of the N.A.F. high ideals for management in foreign industry'.

Obituary

MR. ALBERT ROBERT RIVET, who died on 6 September aged 76 spent his lifetime in the paint trade. He joined the firm of T. & W. Farmiloe Ltd. in 1894 when the original partners in the business were still active. In the first World War Mr. Rivet joined the Ministry of Munitions where he worked under DR. ADDISON, later VISCOUNT ADDISON, and SIR LEONARD LLEWELLYN. For his war services Mr. Rivet was awarded the M.B.E. Soon after the war Mr. Rivet became general commercial manager of T & W. Farmiloe Ltd. and in 1952 he joined the board. He was one of the founders of the United Kingdom Lead Manufacturers' Association, now known as the Sheet Lead & Pipe Manufacturers' Federation. He subsequently became chairman of these two bodies, and only gave up the chairmanship of the Federation in 1951.

Publications & Announcements

ELECTRODES for welding Edgar Allen stainless steels are described in the September edition of Edgar Allen News, published by the company at Imperial Steel Works, Sheffield 9. Murex Welding Processes Ltd. are shortly to issue a revised edition of their pamphlet M.19 on Welding Stainless Steels. One feature of this is a comprehensive table giving the types of Murex electrode for the various proprietary stainless steels. In the new edition, Edgar Allen & Co. Ltd. have amended their recommendations for the range of Imperial and Maxilvry stainless steels. An extract is given from the tables and copies of the complete pamphlet can be obtained from Murex Welding Processes Ltd., Waltham Cross, Herts.

* * *

BECAUSE they have added a number of items to their range of interchangeable laboratory apparatus, Quickfit & Quartz have added two descriptive supplements to the Q & Q catalogue. In addition, the company announces a reduction in the prices of their spherical joints for high-vacuum work. Supplement No. 1 gives descriptions of 20 items not included in the main catalogue. These include large-scale apparatus, using B34 joints throughout, and details of four evaporators—the climbing film, circulatory cyclone, rotary film and jacketed evaporation dish types. Supplement No. 2 describes the semi-micro portable laboratory apparatus used for organic preparation, and contains a detailed breakdown of each assembly into individual components.

* * *

SEVERAL new entries have been made in the catalogue of chemicals supplied by British Drug Houses, Poole, Dorset. 5:5 dimethyl hydantoin is referred to in US patent 2,532,278 as of use in the preparation of hydantoin-formaldehyde resins. USP 2,541,101 refers to its employment in the preparation of textile softeners and lubricants, and a 2.5 per cent aqueous solution is said to be effective as a final rinse in preventing ageing stains in multi-colour photographic emulsions (USP 2,579,436). Diphenyl phthalate has also been added to the range. It is issued as almost colourless crystals, mp 73-4°C. Its main use is in the plastics industry. USP 2,603,543 and 2,613,156 describe its use in

thermoplastic adhesives, while USP 2,616,418 covers its application in a thermoplastic cast material. It is also stated to be a useful plasticiser in PVC compositions (USP 2,502,371). A third addition to the range is 2-methyl-3-butyn-2-ol, an acetylenic alcohol. There are many references in the literature to the reactions of this compound, and it would appear to be a useful intermediate in the preparation of a variety of unsaturated aldehydes and ketones. Other additions are methyl phthalyl methyl glycolate (technical), which is described as a plasticiser of wide potential use, and orotic acid (uracil-4-carboxylic acid), which is said to be the biological precursor of nucleic acid pyrimidines, and a growth factor in various animals and bacteria. It is issued as the monohydrate, molecular weight 174.11.

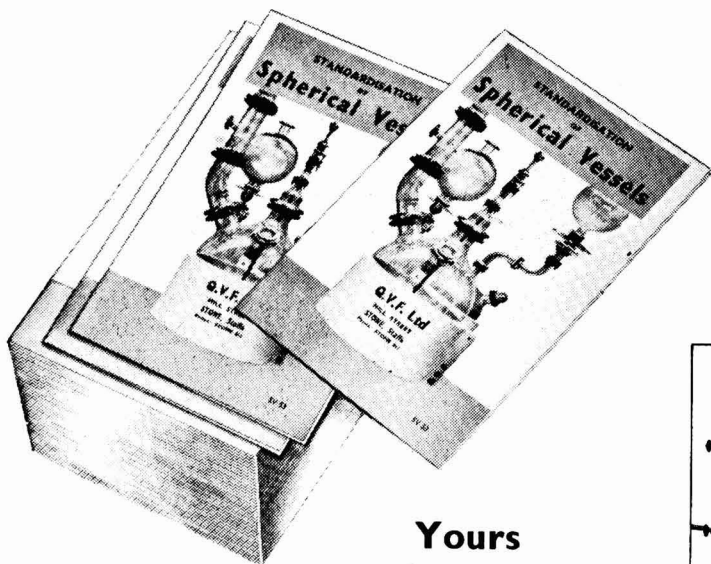
* * *

'DUE to the rise in the cost of coal, practically everything we buy is going to cost us more. It will probably follow that SIMA members will increase their prices.' These remarks are contained in the president's news letter in the August edition of the SIMA Bulletin. The president goes on to emphasise the necessity of ensuring that all possible ways of becoming more efficient are explored before prices are advanced. We must make sure that we are as efficient as we think we are. The question, 'Can the atom solve our fuel problem?' is discussed in an article by W. R. Hawthorne, Professor of Applied Thermodynamics at Cambridge. The attractions of nuclear power are probably greater in Britain than anywhere else in the world, the US included, he says. In spite of these attractions there are enough uncertainties and difficulties to prevent undue optimism. One difficulty is the time lag. One must accept patiently the delays inherent in such a technology. After 1960 the efforts of interested industrial companies may add enough momentum to enable the programme to be appreciably expanded. Professor Hawthorne concludes by saying that perhaps the most important conclusion we can draw is that, whatever form of energy we have to depend on, our greatest need is to increase the supply of scientists and technologists.

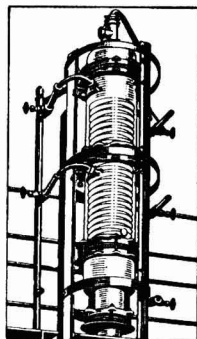
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Import Regulations Eased Sir John Cass Courses

France Lifts Quantitative Restrictions

ON 2 September the French *Journal Officiel* announced that certain goods can now be imported into France free of quantitative restrictions when originating in, and being exported from member countries of the Organisation for European Economic Co-operation or their dependent overseas territories. Import applications in respect of the newly liberalised goods which were deposited in accordance with previous notices and which were not returned to the applicants before 5 September are considered void. Among items liberalised are:—

Sulphur, natural calcium phosphates (tricalcic phosphates), aluminium oxide and hydroxide, chlorides of ammonium (other than for agricultural use), carbides, aromatic hydrocarbons, acyclic mono alcohols and their halogenated, sulphonated and nitrated derivatives, acyclic polyhydric alcohols and their halogenated, sulphonated and nitrated derivatives, cyclanic, cyclenic and cycloterpenic alcohols and their derivatives, and including the ketones of this order, isobutyl acetate, acyclic polyacids and their salts and esters, adipic acid, cresotinic acids, imines and imides, nitrogenous chemical fertilisers, and phosphated chemical fertilisers in bulk or packages of a gross weight of more than 25 kg.

New Tax Rates

Amendments to the list of goods subject to the special temporary compensation tax when imported into France and Algeria have also been made. Some chemicals and the rate of tax (per cent of value) they are subject to are as follows:—

Ammonium chlorides and nitrates other than for agricultural purposes (10), acyclic polyhydric alcohols and their halogenated, sulphonated and nitrated derivatives (15), acetic acid, its salts and esters (15), acyclic polyacids, their derivatives and their salts and esters (10), cresotinic acids and their salts and esters (15), acyclic monoamines (10), cyclic amino-alcohols, amides and their salts (10), nitrogenous chemical fertilisers (10), applied and artificial abrasives (15), plastic materials with a cellulose ester base (10). The full list of items are published in the September issue of the *Board of Trade Journal*.

DETAILS of courses to be run by the department of chemistry during the first and second term session 1955/56 have been published by the Sir John Cass College, Jewry Street, Aldgate, London E.C.3.

Statistical Methods in Scientific & Industrial Research by A. J. Feuill, B.Sc., Ph.D., A.R.I.C., opens the new session and comprises 20 lectures. Starting on 26 September, the fee is £2. Spectrochemical Analysis by A. S. Nickelson, B.Sc., F.R.I.C., begins on 28 September. A course of 10 lectures on Absorption Spectroscopy will be held in the second term. Fee £1. Absorption Spectroscopy is also the title of a series of first term lectures to be given by A. R. Philpotts, M.A., which begin on 30 September; fee £1.

Starting on 22 November J. L. Wood, M.A., Ph.D., will give the first of four lectures entitled 'An Introductory Survey of Non-Equilibrium Processes', and on 4 October, A. G. Maddock, M.A., Ph.D., A.R.C.S., D.I.C., of the radiochemical laboratory, Cambridge, will begin a course of eight lectures on Radiochemistry & Radioactivity.

APV Training Course

REPRESENTATIVES and trainee representatives from 14 countries are attending a sales training course at APV's Crawley, Sussex, factory. It began on 5 September and will run to 15 November, and comprises lectures and inspection tours of APV installations. The course was organised at the suggestion of Mr. John Bryant, APV's Australian agent and managing director of the Australian associated company, who is in England for six months.

Pharmacists' Congress

More than 1,000 delegates representing 44 countries will attend the congress of the Federation Internationale Pharmaceutique to be held in London from 18 to 23 September. The delegates, a record number for the congress, will be welcomed by Mr. Iain Macleod, the Minister of Health, on behalf of the Government, and Mr. Harry Steinman, president of the Pharmaceutical Society of Great Britain in the Friends' House, Euston Road, London, on Monday morning, 19 September, when Sir Hugh Linstead, MP, will preside.

Goblins in the cleaning tank?



The addition of small amounts of Sequestrol (ethylene diamine tetra-acetic acid Geigy) to both acid and alkaline cleaners for metals, whether simple immersion or electrolytic in type, often much improves their action by solubilising the more intractable surface films of oxide, carbonate etc. Cleaners formulated from concentrated Sequestrol solutions are valuable for specialised applications, for example, alkaline electrolytic de-rusting, cleaning of brazed assemblies, removal of welding flux, etc. Particulars on request.

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may be the answer

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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.)

ARTS & CRAFTS (DONCASTER) LTD., dealers in plastics.—9 August, charge to Westminster Bank Ltd. securing all moneys due or to become due to the bank; charged on warehouse & office property at High Road and Low Road, Balby, Doncaster, & fixtures. *Nil. 12 January.

PLASTIC FINISHES LTD., London E.C.—12 August, mortgage to Lloyds Bank Ltd. collateral to a charge registered 16 December, 1950, securing £5,500 (not ex.); charged on property at Krooner Park, Camberley. *£1,849. 19 July, 1954.

ROBERT BOAG & SON (formerly UTILITY FERTILIZERS LTD.), Stanford-le-Hope.—12 August, £1,000 charge, to A. V. Iles, Thorpe Bay; charged on Stanford Works, Stanford-le-Hope. *Nil. 3 December, 1954.

Satisfactions

PEACOCK & BUCHAN LTD., Southampton, manufacturers of anti-fouling compositions, etc.—Satisfaction, 17 August, £2,300 balance of amount outstanding 1 July, 1908, and £1,000 registered 10 August, 1950.

STOCAL ENAMELS LTD., Burton-on-Trent.—Satisfaction, 15 August, of charge registered 21 May, 1941.

Change of Name

A. G. TURNEY ENGINEERING COMPANY LTD., Tyne Street, Felling Shore, C. Durham, changed to Felling Zinc Oxide Company Ltd., on 3 June, 1955.

Increase of Capital

FEROXIDE LTD., makers of red oxide of iron, chemists, druggists, etc., Crown Street, Warrington, Lancs, increased by £20,000, in £1 ordinary shares, beyond the registered capital of £4,000.

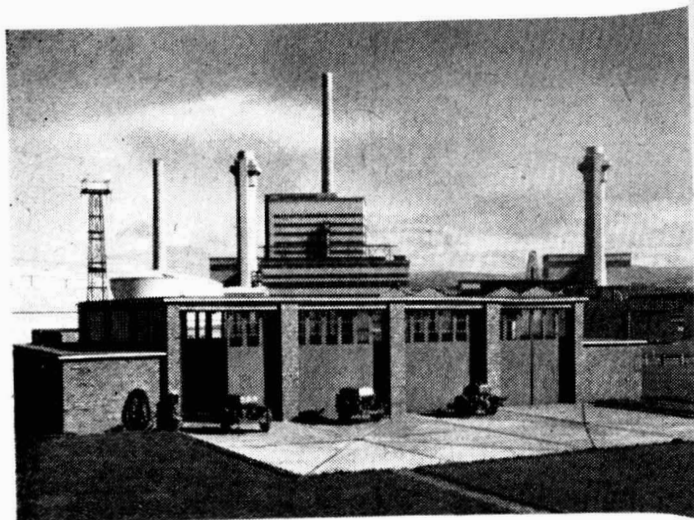
Company News

Albright & Wilson Ltd.

The provisional accounts of the Albright & Wilson group of companies for the half-year to 30 June, 1955, show a combined trading profit after all charges other than depreciation and taxation of £1,577,000 compared with £1,462,000 in the same period in 1954. The net profit attributable to stockholders of Albright & Wilson Ltd. amounts to £426,000 (1954—£430,000) arrived at after charging depreciation £669,000 (1954—£475,000), taxation of £520,000 (1954—£530,000) and after adding back the net loss attributable to minorities of £38,000 (1954 profit £27,000). The markets for the main products of the group have continued their upward trend, but although the trading profit is above that for the comparable period of last year higher depreciation charges resulting from the operation of new plant have more than offset the increase. The group profit has also been adversely affected by a loss incurred as a result of technical difficulties, now overcome, at the plant of a partly-owned subsidiary. In addition, the UK company has experienced mounting costs especially as regards freight, fuel and raw materials for which, in an endeavour to maintain steady prices, it did not recoup itself in the period under review. These cost increases are still accumulating and have made imperative the selling price increases recently announced. For the second half of the year the market outlook is good and further expansion of turnover is expected. The Board has today declared an interim dividend on the ordinary stock of 5 per cent in respect of 1955. This compares with the equivalent interim for 1954 of 4½ per cent, being 7 per cent on the capital before the scrip issue authorised by the resolutions passed at the extraordinary general meeting in June.

Wasag-Chemie AG

Last year the turnover of the Wasag-Chemie AG group of manufacturers of explosives, plastics, chemicals and fertilisers, etc., rose by 16.7 per cent to DM.111,600,000. Exports increased, too, being 12.5 per cent of the total, compared



Britain's Atomic Factories



The whole of the pipework in the highly and medium radio-active areas on the primary separation plant and vessels in the highly active section of Britain's Atomic Factories were fabricated in stainless steel and installed by Ashmore, Benson, Pease & Company. Using many welding sets, in conjunction with Argon arc sets, Ashmore's installed over ten miles of pipework with 40,000 butt-welded pipe joints and completed five miles of plate and sheet welding. Twenty-five X-ray sets were employed and extensive use made of radio-active isotopes. Approximately 60,000 radiographs were filed.



THE POWER-GAS CORPORATION LIMITED
AND
ASHMORE, BENSON, PEASE & COMPANY

STOCKTON-ON-TEES AND LONDON

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with 10 per cent the previous year. Net profits totalled DM.801,935, making, with DM.228,718 brought forward, a total of DM.1,030,653 for distribution. A dividend of 8 per cent is declared on the DM.10,000,000 share capital and, after DM.30,000 for supervisory board fees, DM.200,653 is carried forward. The year marked the last stages of the company's post-war rebuilding scheme. Production ranges were extended and important orders were received. The manufacture of plastic tubes was begun, and research into plastics developed.

Murex Ltd.

In his statement to shareholders, Sir Arthur Smout, LL.D., chairman of Murex Ltd., said that the company had in operation a pilot plant for the extraction and fabrication of zirconium metal, which apart from its possibilities as an important atomic metal, is of interest to chemical engineers generally. The company has devoted a considerable amount of time to atomic energy research. During the next few months the company will close its copper refinery and are unlikely to compete in this field again. Expenditure on buildings, plant and equipment during the year was £256,000 and a three-year programme has been determined which will involve expenditure on fixed assets substantially in excess of the normal depreciation provision that will arise in those years, and a further £200,000 out of the profits of the year under review has been added to the reserve for the replacement of fixed assets now standing at £875,000. The annual general meeting will be held in London on 28 September.

Market Reports

LONDON.—Active conditions have been reported from most sections of the industrial chemicals market with contract delivery specifications covering good quantities. More buying interest has been shown in fertilisers and the soda products and potash chemicals continue on a firm basis. The non-ferrous metal compounds are firm and as reported in last week's issue of THE CHEMICAL AGE, borax and boric acid prices are being raised by 20s. per ton and 30s. per ton respectively as from 1 October. A steady demand has been in evidence for creosote oil, carbolic acid and refined tar and elsewhere in the

coal tar products market an active interest has been maintained.

MANCHESTER.—A fairly steady demand for chemicals from the textile and allied industries has been experienced on the Manchester market during the past week and good contract deliveries of a wide range of products are going forward to other leading outlets. Fresh inquiry from home users has been on a fair scale and some additional business has been placed for shipment. The price position generally is on a firm basis. Some descriptions of fertilisers are fairly active, but in most lines trading conditions are quiet to moderate. The light and heavy tar products, with a few exceptions, are meeting with a steady demand.

GLASGOW.—There is little of importance to report during the past week from the Scottish market. The position generally has been rather quieter, and orders received have been mostly against nominal requirements. Prices have been steady with the exception of those related to metal derivatives, which are showing an upward tendency. The export market still continues satisfactory.

Next Week's Events

MONDAY 19 SEPTEMBER

British Ceramic Society

Stoke-on-Trent: North Staffordshire Technical College. Annual general meeting of Pottery Section, 6.30 p.m.; annual general meeting of Society, 7 p.m.; president's inaugural address by T. G. W. Boxall, B.Sc., A.C.G.I., A.M.I.C.E., F.I.Ceram., 7.45 p.m.

TUESDAY 20 SEPTEMBER

Oil & Colour Chemists' Association

London: Royal Society of Tropical Medicine & Hygiene, Mansion House, W.1. Chairman's evening, 7 p.m.

WEDNESDAY 21 SEPTEMBER

Incorporated Plant Engineers

Bristol: Grand Hotel. Discussion on 'Coal and Oil', 7.15 p.m.

THURSDAY 22 SEPTEMBER

Institute of Metal Finishing

London: Rembrandt Hotel, South Kensington. Joint meeting of organic and industrial finishing groups. 'Technical Service Problems', by F. C. Faulkner.



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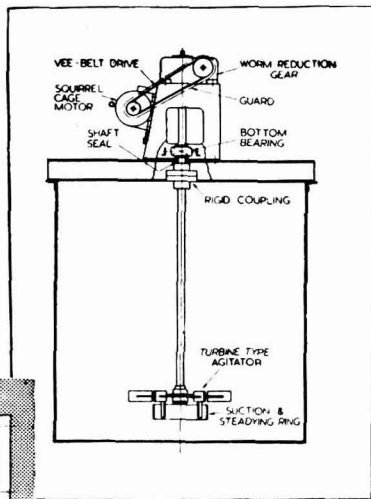
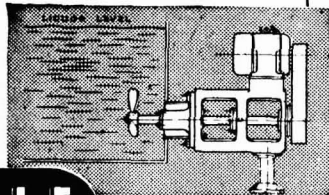
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Side entry type for large vessels where complete agitation is essential but where degree of agitation is "Medium." (Incorporates our self-closing device on the gland allowing re-packing when necessary with tank full.)



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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.

CHEMICAL ENGINEERS

CHEMICAL ENGINEERS required by progressive Rayon Yarn Producers for research and development work. Applicants should be A.M.I. Chem. E., or have university degree in Chemical Engineering. Good salaries, prospects and pension scheme. Applications, which will be treated in confidence, should state age, qualifications, details of experience and be addressed to Personnel Manager, British Enka Ltd., Aintree, Liverpool. 9.

CHEMISTS

CHEMISTS required by progressive Rayon Yarn Producers for research and investigation of process problems. Minimum qualification A.R.I.C. Applicants should have experience of chemical process work and preferably also of textile technology.

Good salaries, prospects and pension scheme. Applications, which will be treated in confidence, should state age, qualifications, details of experience and present salary and be addressed to Personnel Manager, British Enka Ltd., Aintree, Liverpool. 9.

LABORATORY ASSISTANT REQUIRED for expanding Chemical and Development Laboratory in Alperton. The laboratory forms part of a newly established Development Organisation operating for an international group of companies. The applicant must have some ability in laboratory arts and glassblowing. Experience of control of junior staff and analysis desirable. Hours, 9 a.m. till 5.30 p.m., 5-day week. Commencing salary from £500 per annum, depending on experience and qualifications. **BOX No. C.A. 3428, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

SCIENTIFIC OFFICER required by the **ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, BERKS**, for basic research in inorganic and metallurgical chemistry. Minimum qualification is First or Second Class Honours degree in Chemistry preferably with some research experience of physical chemistry. Some knowledge of the following is desirable:

- (a) High vacuum techniques as applied to gases and metals.
- (b) Distillation practice and theory and
- (c) Radio chemistry.

SALARY

£505—£905 p.a. (male). Starting salary assessed accordingly to age, qualifications and experience. Contributory Superannuation scheme. Successful married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates; until housed a lodging allowance may be payable. Requests for application forms by **POST CARD** to the **SENIOR RECRUITMENT OFFICER** at the above address. Quote reference A511/38.

INDUSTRIAL CHEMIST required by leading container closure manufacturers in Midlands. Progressive position requiring knowledge metal printing, varnishing, stoving, and metallurgy, associated with food packaging industry. Maximum age 35 years.—Written applications, with details of experience previous appointments, etc., to **P. A. METAL CLOSURES LTD., BROMFORD LANE, WEST BROMWICH, STAFFS.**

CONTROL CHEMIST. A GRADUATE CHEMIST (age 25-30) is required by the undermentioned Company for its factory in Heywood, Lancs. The successful applicant will be responsible for the analytical control of a range of household products. The duties will also involve close liaison with production personnel from the points of view of both current production and the production development of new products. Initial salary, £750-£850 per annum. Pension and Superannuation Scheme. Applicants should write to the **PERSONNEL MANAGER, NICHOLAS PRODUCTS LABORATORIES, LIMITED, 71-76A, BUCKINGHAM AVENUE, SLOUGH, BUCKS.**

McKECHNIE BROTHERS, LTD.,
require an experienced
METALLURGICAL CHEMIST
for their Widnes Works.
A.R.I.C. standard essential.
Age 30-40.

Write, giving full details of experience and qualifications,
to:

McKECHNIE BROTHERS, LTD.,
P.O. BOX 4,
WIDNES, LANCs.

RESEARCH CHEMISTS

CHEMISTS required by progressive Rayon Yarn Producers for research and development work. Applicants should be Honours Graduates and preference will be given to those having industrial experience. Good salaries, prospects and pension scheme. Applications, which will be treated in confidence, should state age, qualifications, details of experience, present salary and be addressed to **PERSONNEL MANAGER (R), BRITISH ENKA, LTD., AINTREE, LIVERPOOL, 9.**

SENIOR EXPERIMENTAL OFFICER required by the **ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, BERKS**, to undertake Chemical Engineering calculations and design work, and the preparation of flowsheets, for novel atomic energy processes. Applicants should have as minimum qualification, H.N.C. in Chemistry or Chemical Engineering, or equivalent, and some experience of this type of work, not necessarily in the atomic energy field. A Degree in Chemical Engineering would be an additional advantage. Candidates below the age of 35 are not normally considered for appointment.

SALARY, £1,090 to £1,285 per annum (male). Contributory Superannuation Scheme. Successful married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates.

Requests for application forms by **POSTCARD** to the Senior Recruitment Officer at the above address. Quote reference A.19/38.

McKECHNIE BROTHERS, LTD.,
require a qualified and experienced
MAINTENANCE ENGINEER
for their Widnes Works. Age 30-40.

Write, giving full details of experience and qualifications,
to:

McKECHNIE BROTHERS, LTD.,
P.O. BOX 4,
WIDNES, LANCs.

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wanted to take charge of existing Research and
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Interesting work of wide scope.

Reply, stating experience and salary required, to:

McKECHNIE BROTHERS, LTD.,
P.O. BOX 4,
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THE BATA SHOE COMPANY OF INDIA, LIMITED,
require the services of an experienced
CHEMIST

to take charge of a Rubber and Chemical Laboratory
serving a very large rubber factory.

Experience of Rubber Technology is essential. A know-
ledge of Shoe Polish, Cleaners and Leather Finishes is
desirable.

This senior post carries liberal local and overseas leave
facilities, provident fund membership, housing and a
good salary with prospects.

Apply in own handwriting to **PERSONNEL MANAGER,**
15, OLD BOND STREET, LONDON, W.1.

SENIOR SCIENTIFIC OFFICERS, SCIENTIFIC OFFICERS

THE Civil Service Commissioners invite applications
for pensionable appointments. Applications may be
accepted up to 31 December, 1955, but early application
is advised as an earlier closing date may be announced.
Interview Boards will sit at frequent intervals. The
Scientific posts cover a wide range of scientific research
and development in most of the major fields of funda-
mental and applied science. In biological subjects the
number of vacancies is small; individual vacancies exist
for candidates who have special knowledge of, or who
are interested in palaeobotany, and recent and
pleistocene mammals.

Candidates must have obtained a University Degree
with first or second-class honours in an appropriate
scientific subject (including Engineering), or in Mathe-
matics, or an equivalent qualification; or possess high
professional attainments. Candidates for Senior Scientific
Officer posts must in addition have had at least three
years' post-graduate or other approved experience.

Candidates taking their degrees in 1955 may apply
before the result of their degree examination is known.

AGE LIMITS. - Senior Scientific Officers, between 26
and 31, but specially suitable candidates under 26 may
be admitted; for Scientific Officers, between 21 and 28
during 1955 (up to 31 for permanent members of the
Experimental Officer class). Salary (London): Senior
Scientific Officers, (men) £1,070-£1,245; (women)
£933-£1,137. Scientific Officers: (men) £513-£925;
(women) £513-£835. Women's scales subject to improve-
ment under equal pay scheme. Somewhat lower rates in
the provinces.

Further particulars from **CIVIL SERVICE COM-
MISSION, SCIENTIFIC BRANCH, 30, OLD BURLINGTON
STREET, LONDON, W.1,** quoting No. S.53/55 for Senior
Scientific Officers and S.52/55 for Scientific Officers.
7679/a/100/9/55/J.S.

PRINCIPAL SCIENTIFIC OFFICER/SENIOR SCIENTIFIC OFFICER required by the **ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, Berks,** to lead a team concerned with chemical process development and plant design studies. The post offers experience of novel problems in the atomic energy field. Applicants should hold a first or second class Honours degree in Chemistry, with additional experience in chemical engineering and applied chemistry problems, or in chemical engineering with additional research and development experience, or equivalent qualifications.
SALARY:

Principal Scientific Officer -
£1,205 p.a.—£1,615 p.a. (male)
Senior Scientific Officer—
£1,040 p.a.—£1,205 p.a. (male).

Contributory Superannuation scheme. Successful married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates.

Requests for application forms by **POST CARD** to the **SENIOR RECRUITMENT OFFICER** at the above address. Quote reference A573/38.

SENIOR CHEMICAL ENGINEER OR CHEMIST for developing and marketing Petroleum Plant, required by The Power-Gas Corporation, Ltd., Stockton-on-Tees. Age about 30 years. The appointment will be confirmed on a permanent basis if satisfactory after a trial period of twelve months. It is anticipated that the post will involve periodic journeys abroad and in making the appointment emphasis will be placed on ability to grasp new ideas and techniques, together with initiative and common sense.

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CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE: 3265 EAST.**

POWDER MIXER BY BARRON—trough 30 in. by 18 in. by 18 in., driven through Vee-belts to 2 h.p. motor.

STEEL TROUGH MIXER—48 in. by 24 in. by 30 in. deep. Fast and loose pulley drive.

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TWO BRAND NEW STERILISING VESSELS—7 ft. long by 3 ft. diameter.

One **S. J. WERNER MIXER** with pan approx. 2 ft. by 2 ft. of the tilting type.

Two steam jacketed **CAST-IRON FILTER PRESSES**—each with 38 s.j. plates and 39 frames, cake size 2 ft. 4 in. square.

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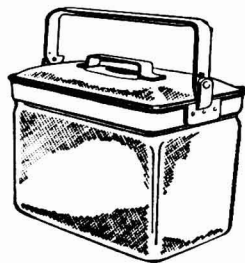
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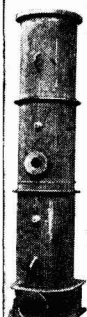
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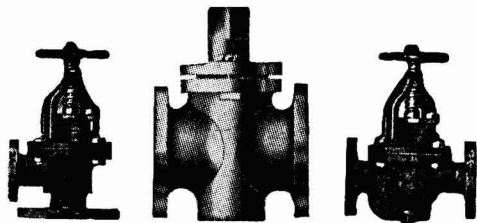
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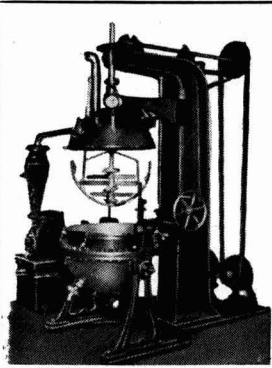
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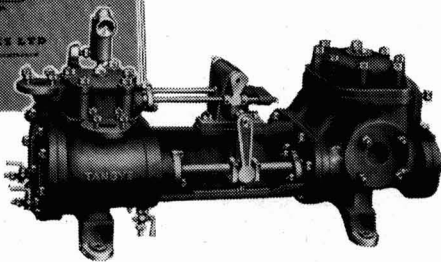
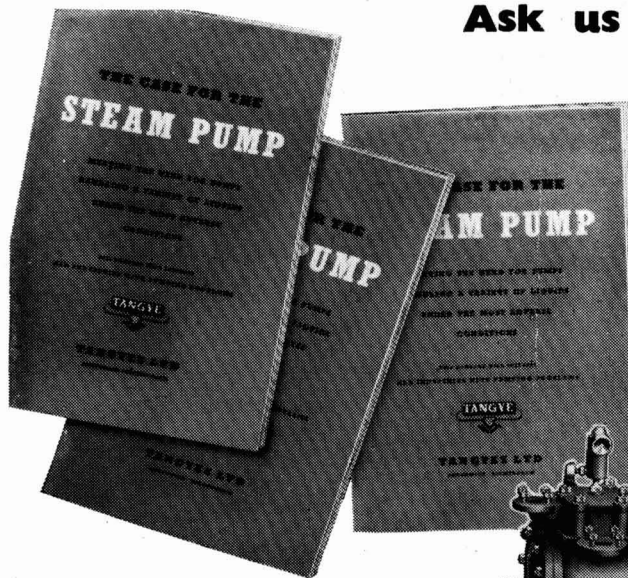
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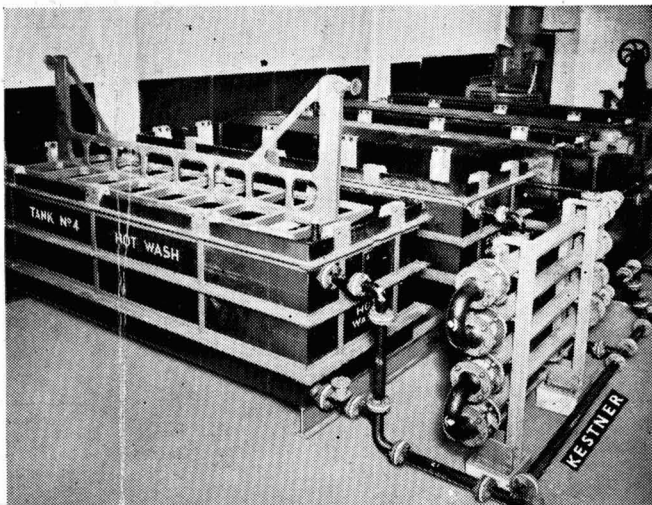
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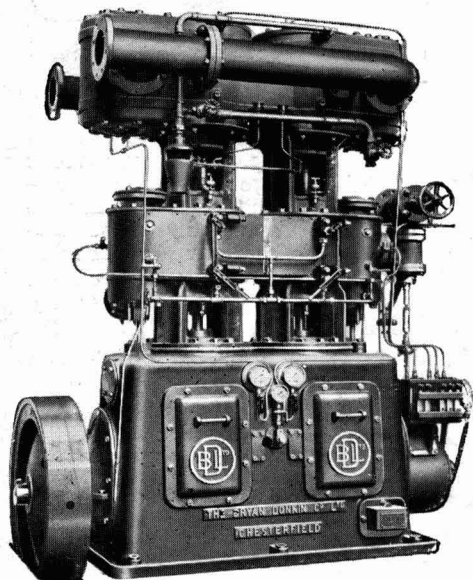
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